

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

## The State of Food and Agriculture 1958

#### CORRIGENDUM

On page 3, line 5 read: 1948/49 - 1952/53 instead of: 1952-53.

## THE STATE OF FOOD AND AGRICULTURE 1958

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS Rome, 1958

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### **FOREWORD**

This year's annual report on the state of food and agriculture gives special attention to a comparison of the situation in the economically more developed and less developed parts of the world.

In 1957/58 there was, for the first time, a check in the steady postwar expansion in the world agricultural output. While the immediate cause was unfavorable weather in a number of important producing areas, it is shown that longer-term economic factors were also in large measure responsible. Growing agricultural surpluses, mainly in the more developed countries of the world, have led increasingly to policy measures to restrain further expansion, and for some years these have led to a considerable slowing down of the tempo of agricultural development. By contrast, the rate of agricultural expansion in the less developed countries has generally been well maintained, apart from the vagaries of weather, particularly for the major part of their output which is destined for their own consumption. Production for export has to some extent been affected by the agricultural surpluses in the more industrialized parts of the world. Moreover, real earnings from agricultural exports have been reduced by the downward drift of their prices on world markets, side by side with a continuing rise in prices of manufactured goods.

The paradoxical situation has arisen that in the more developed countries, where supplies are already abundant or overabundant, technical progress has made possible a further rapid expansion of output if markets for larger supplies could be found. On the other hand, in the less developed countries, where demand is increasing rapidly with the fast growth of population and rising standards of living, agricultural expansion is more difficult because of more primitive techniques, lack of investment capital and often unsuitable systems of land tenure and other institutions. The report suggests that these disparities have often been increased by the agricultural price policies of the two groups of countries.

The implications of this situation for future agricultural development policies and for international trade in agricultural products are discussed in Chapter II of the report, the general survey. This chapter contains also the usual review of recent production developments in all parts of the world, of trends in agricultural trade and prices, and of the outlook for the main agricultural commodities.

Chapter III of the report consists of a special regional study of food and agricultural developments in Africa South of the Sahara. The growing international interest in this region has already been reflected in decisions to establish a United Nations Regional Economic Commission for Africa and also a Regional Office of FAO. It is time, therefore, for FAO to begin to devote as much attention to studies of Africa as to those of the other economically less developed regions. The preliminary review included in the present report ranges over the whole field of postwar food and agricultural developments in this vast and diverse region and therefore gives only the briefest introductory sketch of many important problems. This course was chosen, however, in preference to a more detailed study of some specific question, as it was felt that a broad general review would provide a background of basic data against

which future analyses of particular problems could be seen in better perspective. It is also hoped that it may give rise to suggestions as to which problems should be given priority for special study in the future.

The second special chapter, Chapter IV, reviews the rapid postwar growth of the world's forest products industries and their impact on the world's forests. As countries become economically more developed their requirements of sawnwood, plywood and fibreboard, and especially of wood pulp and paper, increase immensely, and these industries are expanding and also becoming more and more widely dispersed throughout the world. The world's forests are adequate to meet these expanding demands, thanks to more efficient and rational utilization of wood and to forest improvements, though in many areas extensive reafforestation is necessary both for the production of timber and for protective purposes. Moreover, the growing attention given to forest conservation and forest influences is lessening the danger of that reckless exploitation which in the past has gravely depleted the forest and soil resources of so many countries of the world.

The special studies of developments in Africa and of the impact of the growth of forest industries on the world's forests take on a fuller significance if read against the background provided by the review of the world situation in Chapter II. Taken together, the three parts of the report cover a wide field and put into perspective problems which, though primarily agricultural, have much wider implications, in particular on present efforts to raise standards of human well-being, especially in the economically less developed countries of the world.

B.R.Sen
Director-General

## Chapter I - SUMMARY

#### Chapter II. World Review and Outlook

Agricultural Production. The year 1957/58 saw the first check in the steady expansion of world agricultural production since the war, and the preliminary FAO index of world agricultural production (average 1952-53 = 100) fell back to 119 against 120 in the previous year. World per caput agricultural production declined from 109 in 1956/57 to 107 in 1957/58. The output of the world's fisheries and forests was also slightly lower in 1957/58 than the year before.

Agricultural production continued to increase in the Near East and more slowly in Europe, the U.S.S.R. and Latin America. But in the Far East there was no increase over the record level of 1956/57, while in Africa, Oceania, and especially North America agricultural production in 1957/58 was appreciably lower than the year before.

In each case the weather was an immediate cause of the setback. The monsoon rains came too late for a full rice crop in many countries of Southeast Asia. There was a partial failure of the cereal crop in North Africa and a severe drought in Australia after a run of good seasons. In North America a poor grain crop in the Canadian Prairie Provinces coincided with a downturn in the pig and cattle cycles in the United States and also with cutbacks in cotton and tobacco production under the Soil Bank program.

General Background. There are, however, a number of underlying factors which in recent years have slowed down the whole tempo of agricultural expansion in the economically more developed countries of the world and, to some extent, in the less developed countries as well. They are briefly considered below, before summarizing other main features of the current food and agricultural situation.

In the economically more advanced countries agricultural policies are increasingly dominated by the problem of agricultural surpluses. National incomes and consumption levels per caput are already fairly high and the demand for agricultural products rises only slowly, especially in the food-importing countries of Western Europe where population shows relatively little increase. Moreover, much of any increase in demand at the retail level is absorbed by more elaborate processing and distribution services, and a relatively small part is transferred back to the farm. Although recent striking improvements in agricultural methods would make it relatively easy to step up production, any such expansion must be restrained in view of mounting surpluses. The slow growth of demand naturally affects not only farmers in the industrialized countries themselves, but also farmers elsewhere who are dependent on exports to these countries.

The situation is very different in the less developed countries. On the one hand, even small rises in income lead to relatively sharp rises in the demand for food, which are superimposed upon the increase due to the rapid growth of population. On the other hand, in many countries primitive methods of agriculture, together with lack of capital and obsolete systems of land tenure and other institutional difficulties, make it hard to expand production in line with the rapid growth of demand.

These disparities appear to have been intensified by the price policies of the two groups of countries, arising from differences between their social and economic structure. In many of the more developed countries relatively high farm prices have tended to stimulate production and to restrain consumption, while in many of the less developed countries relatively low ceilings on consumer prices appear often to have had the reverse effect.

These considerations, discussed more fully in the section on agricultural policies, appear largely to explain some important recent trends in the world food and agricultural situation. For example, in the more developed regions of the world the average annual increase in output in the past four years was only one third of that in the four preceding years, while in the less developed regions progress has been fairly well maintained. Again, net exports of foodstuffs from the less to the more developed regions had, by 1956/57, fallen to about one third of their prewar level. Food exports from the more developed regions, notably North America and Oceania, on the other hand, have risen sharply and now not only provide a larger share of the European food supply, but are moving in rapidly increasing quantities to the less developed countries themselves.

Volume of International Trade. The rise in the volume of world trade in agricultural products which began in 1955, after several years of stability at about the prewar level, continued in the calendar year 1957. But the increase of 3 percent over 1956 was a good deal less than in the two preceding years when it averaged 8 percent. As before, the increased volume of trade was largely, though by no means entirely, due to surplus disposal operations in the United States and to a much lesser extent in Western Europe, the largest single item being the large increase in United States shipments of cotton under special terms. On the import side, some 60 percent of the increased volume of trade was accounted for by larger imports into Western Europe, mainly of raw materials and beverages, and some 30 percent by larger food imports into the Far East, partly for reserve stocks and partly for current consumption, in spite of the record rice crop harvested in late 1956. Although there was some weakening of demand, the volume of world trade in forest products in 1957 was maintained at the previous year's level.

Following the record harvest of 1956 there was a sharp rise in grain exports from the U.S.S.R. in 1957, mainly to Eastern Europe; trade between the Communist group of countries is not included in the FAO indices of the volume of agricultural trade. There was also a marked rise in Soviet exports of forest products, including exports to countries outside Europe.

Special Measures to Expand Agricultural Exports. A review of surplus disposal operations in recent

years indicates that some 30-40 percent of United States agricultural exports are currently shipped under special programs, while payments under other government subsidies amount to some 6 - 8 percent of the total value of United States agricultural exports outside the special programs. Directly or indirectly subsidized exports of agricultural products from Western Europe are also increasing, but because of the complexities of the various systems no estimate can be made of their extent. Other countries also use various methods of expanding agricultural exports, including special credits and multiple exchange rates; again, no estimate of their total extent is possible, but they appear to be on a smaller scale than those in the United States and Western Europe.

Changes in Stock Levels. In spite of measures to restrain production and vigorous campaigns of surplus disposal, aggregate world stocks of agricultural products at mid-1958 showed little change from a year earlier. They are now estimated to be equivalent to about 10 percent of world agricultural production. About three quarters are located in North America.

Wheat stocks fell by some 5 million tons (10 percent) during 1957/58, mainly because of smaller crops in North America, but are likely to rise sharply in 1958/59. Stocks of coarse grains in North America rose by nearly a quarter to the record level of over 60 million tons and are likely to rise further in 1958/59. Stocks of cotton in the United States, however, have been reduced by some 40 percent from peak levels in mid-1956. There was a renewed rise in world stocks of butter in 1957/58 and a further rise in stocks of coffee, after a temporary decline in 1956/57.

Price Trends in International Markets. The slow decline in the general level of agricultural prices on world markets was reversed temporarily in the first half of 1957, but was resumed later in the year and in early 1958. Nevertheless, the FAO index of average export unit values of agricultural products for the year 1957 as a whole (average 1952-53 = 100) at 95 was three points higher than in the year before. The halt was in a sense illusory, however, since prices of manufactured goods on world markets continued to rise. The average purchasing power of agricultural exports for manufactured goods therefore fell for the third year in succession. In comparison with the base period 1952-53, the average purchasing power of agricultural products has fallen by about 10 percent, of which about one half represents lower agricultural prices and the other half the increase in average export unit values of manufactures.

The average figures naturally conceal considerable differences between commodities. Thus, prices of, for example, cereals and butter tended to fall continuously, while cocoa prices recovered, though prices of both coffee and cocoa remain much lower than in the boom year 1954. Prices of forest products were maintained in 1957 but began to fall in early 1958. Details for individual commodities are given in Annex Table 12.

Earnings from Agricultural Exports. Preliminary estimates suggest that the increase in the volume of world agricultural exports slightly more than compensated for their fall in purchasing power, so that total earnings from agricultural exports (in real terms) were fractionally higher in 1957 than in 1956. The difference was slight, however, and for some regions, including Latin America and the Far East, real earnings from agricultural exports were appreciably lower than in 1956. Moreover, the main rise in export values occurred in North America and thus essentially reflected the increase in exports under special terms. There was also a substantial rise in both the volume and value of agricultural exports from the Near Eastern region.

General Economic Conditions and the Demand for Agricultural Products. The recession in the United States and the slowing down of economic expansion in Western Europe led to some weakening of the demand for agricultural and forest products on international markets. On the other hand, the demand for domestically produced foodstuffs, and in general for agricultural raw materials, has been generally well maintained in both industrial and less developed countries.

The immediate outlook for 1958/59 in the more industrialized countries seems at best to be no more than a maintenance of the level of economic activity of early 1958, and there are as yet no tangible signs of an economic recovery, though an upturn in 1959 is widely expected. In the circumstances no strengthening of the import demand for agricultural and forest products seems likely in the immediate future, but recent experience, together with the measures being adopted in some countries for

maintaining consumer purchasing power and for the revival of economic activity, suggest that the over-all domestic demand for foodstuffs is likely to be maintained.

Farm Prices and Incomes. In most countries, especially in the more developed regions, farm prices were reasonably stable and in some cases showed a small increase in 1957/58, largely because of the influence of price support measures or of temporary shortages of supplies. In many countries, however, as in international markets, the prices of the goods farmers buy increased more rapidly than those of farm products, so that their purchasing power declined. Both in international and domestic markets, farmers have thus been unfavorably affected by continuing price increases in the economy as a whole.

Up-to-date information on trends of farm incomes is available for rather few countries, and only for economically more developed countries. Farmers appear to have suffered some fall in incomes in nearly all exporting countries, including the United States, though some improvement occurred in early 1958. In most importing or self-sufficient countries, on the other hand, measures to support farm incomes appear to have been reasonably successful, and in a few instances, e.g., the United Kingdom and Western Germany, there was some increase in absolute terms, though not in comparison with incomes in other sectors of the economy.

Comparisons of average returns to farmers per ton of some of the main farm products (Annex Table 13) bring out the wide variation from country to country under present support systems. They give some indication of the difficulties which arise in reducing tariffs and other obstacles to international trade in agricultural products.

Consumer Prices. The upward trend of retail prices continued in 1957, though there were indications that the rise may have been somewhat slower than in 1956. However, of 89 countries for which indices of retail prices are available, the index rose to a greater or lesser extent in 69, and only in 20 was there stability or some decline. In most countries food prices kept fairly closely in line with the movement of the general cost of living. Increases in retail food prices reflected partly higher farm prices and partly the continuing rise in distribution costs, while in some countries there was also reduction or abolition of consumer subsidies or the removal of price controls.

Agricultural Policies. In the economically more advanced countries there were relatively few major policy changes during 1957/58, though increasing attention is being given to a more fundamental approach to the problem of agricultural surpluses and towards channeling production towards the commodities where some further increase in demand seems likely. In Western Europe the problems arising from the establishment of the Common Market and the negotiations for a wider Free Trade Area have received much attention.

In many of the less developed countries, badly needed measures for agricultural expansion and general economic development have been hampered by shortages of investment funds, largely because of declining export earnings. Nevertheless, vigorous efforts are being made to keep pace with growing requirements, and in a number of cases greater priorities have been given to agricultural projects and the share of agriculture in available investment funds increased. Several countries are establishing or considering the establishment of reserve stocks as an insurance against future shortages and as a contribution to greater farm price stability.

A number of changes have been announced during the year in the agricultural policies of the Communist group of countries, especially the U.S.S.R., as part of the drive to catch up with the unsatisfied demand for consumer goods stemming from the long period of priority for heavy industry. In many instances, prices to farmers have been raised and methods for the collection and sale of agricultural products simplified. In the U.S.S.R. the machine tractor stations are being disbanded and their equipment sold to collective farms, which will have greater autonomy, both financially and in planning their production.

Commodity Situation and Outlook. Short summaries of the current situation and short-term outlook for each of the major agricultural products are set out in the final section of Chapter II. These are already highly condensed and do not lend themselves to further summary.

#### Chapter III. Food and Agricultural Developments in Africa South of the Sahara

Almost all countries of Africa South of the Sahara are largely agricultural and depend primarily on agricultural exports for foreign earuings. Some three quarters of the population are engaged in agriculture, a higher proportion than in any other major region. Population growth has accelerated since the war, but is slower than in other developed regions, and its density is still generally low. With only 5 percent of the world's population, the region is estimated to contain more than 15 percent of the total agricultural area. Agricultural production, however, is only about 4 percent of the world total, though in trade the region looms larger and accounts for the major portion of world exports of oil palm produce, groundnuts, cacao and sisal.

The main food and agricultural problems of the region are summarized in the concluding part of the chapter and roughly fall under three principal headings: low productivity, the poor quality of diets, and the vulnerability of export revenues to fluctuations in world prices.

Production, Trade, and Prices. Agricultural production has increased remarkably rapidly since the war, but is still low in relation to population and to available land and is largely subsistence in character.

The volume of exports has grown even faster than production and most of the main products, except for cocoa and oil palm produce, have shown a very sharp expansion. Export values have fluctuated considerably, with serious effects as the exports of many territories consist almost entirely of one or two products. Incomes received by producers, however, have to some extent been protected by the price stabilization schemes in many territories. The much smaller volume of agricultural imports has also increased rapidly.

Fish production is almost four times the prewar level, most of the increase coming from Angola, the Union of South Africa, and South West Africa. Most of the large forested area is inaccessible, while commercial exploitation is limited by its mixed character, but the small production and exports of forest products are increasing.

Food Consumption and Nutrition. Food production appears to have more than kept pace with the postwar growth of population, and dietary surveys indicate that in general the intake of calories more or less corresponds to calculated needs. In some areas, however, there is still a severe shortage in the period immediately preceding the harvest, while deficiencies of protein, especially animal protein, and of

certain vitamins and minerals are widespread, as the starchy staple crops predominate very heavily. Food habits and the idea that cattle are primarily a store of wealth also militate against dietary improvement in many areas. Among the rapidly growing urban populations increases in income are of overriding importance in better nutrition. The qualitative deficiencies of diets, above all the lack of protein, cause much morbidity and mortality, contributing especially to the high rate of mortality in children between one and four years and reducing the productivity of the adult population.

Technical Progress. Although the population is sparse by world standards, in many areas it is already too great for the maintenance of fertility under shifting cultivation, and the development of satisfactory systems of permanently settled agriculture is imperative. A large part of the forest cover has already been destroyed, with serious effects on soil and water resources. The present low economic value of the forests is part cause of their destruction.

In spite of the rapid postwar expansion of research services, much remains to be learned about the maintenance and increase of fertility in tropical and subtropical soils. Crop improvements and plant protection have so far been concentrated largely on export crops and more research is needed on local food crops, especially those which could improve dietary quality. Although many animal diseases can now be controlled, the tsetse fly still excludes the more productive breeds of cattle from about half of the region. The development of suitable systems of mixed farming for the African cultivator is making slow progress. The practical application of improved techniques also lags far behind the results of research and the gap will grow wider unless extension services are expanded.

The Changing Institutional Framework. Mainly under the influence of the development of cash crops, tribal systems of land tenure are evolving in many areas toward the individualization of land ownership, with government aid and safeguards. The supply of agricultural credit seems inadequate and there is probably much scope for the experimental introduction of supervised credit and for a further development of co-operative credit. Agricultural co-operatives, mainly of the marketing and credit types, have made good progress in many

parts of the region. A large number of public or semipublic organizations have also been established, especially since the war, for the marketing of specified export crops. Guaranteed producer prices are now widespread, quality has been improved by the introduction of grading systems and better methods of processing, while marketing has also been assisted by considerable improvements in transport facilities. Concern with export marketing has, however, sometimes led to a comparative neglect of local food products.

Agricultural Development Plans. Since the war, agriculture, forestry, and fisheries have benefited from a marked expansion in public development expenditure, both directly and also as a result of improvements in basic services. Apart from the large part played by metropolitan financial assistance, the high proportion of total funds devoted to basic services, particularly transport, and to social projects is noteworthy. Recently an increased proportion has been allocated to the directly productive sector, including agriculture. There are signs of the emergence of a shortage of development capital. In the earlier postwar years, the lack of equipment and technicians were generally the chief limiting factors.

#### Chapter IV. The Growth of the Forest Industries and their Impact on the World's Forests

Man's relationship to the forest has changed through the centuries, but under this influence the forest area has almost continuously diminished. The most serious encroachments occurred long before the advent of modern torest industries, through clearance of forested land for agriculture and the reckless exploitation of the forests for fuel and wood for construction. Yet the major forest industries, particularly sawmilling (since the advent of the steam engine a century ago) and the pulp and paper industry, have made serious incursions in the forest at various times and in particular areas.

Sawmilling, the oldest of the major forest industries, remains the most important, followed, both in seniority and importance, by the pulp and paper industry, the plywood industry and board products manufacture. Generally speaking, the younger the industry the more rapid its current growth rate, which is leading to a change in the pattern of raw

material requirements from the forest, since the several industries differ in their ability to make use of particular dimensions and species of timber. In recent years there has also been rapid progress in broadening the raw material basis of these industries. The changing pattern of total timber needs carries important implications both for the economic operation of the forest industries and, through a more rational utilisation of the forest crop, for forestry.

In recent decades the pressure on forest resources, and the need of heavily capitalized forest industries to assure their raw material requirements over a longer period, have helped to promote forest conservation and sound forest practice. This favorable trend has been facilitated by advances in forest science and by rising forest consciousness, including a more widespread understanding of the multiple role of the forest. A major problem is how to bring about improved forestry practices on the part of the many millions of small forest owners on whom the forest industries must largely depend for their future timber supplies.

So long as a recognition of the community interest in the forest, based on an informed public opinion, was lacking, the professional for ester was naturally conservative, striving to safeguard the needs of posterity against insistent current demands on the forest. With the rival interests in the forest, and notably the forest industries, increasingly disposed to take a long-term view, the professional forester is able to pay more attention to ensuring that the needs of users, whether in the shape of timber crop, amenities, or other non-crop values, are met.

Economic growth will bring a continued rise in the demand for forest products, but there need be no doubt of the forests' ability to meet this demand. Apart from the huge areas of forest still untapped and the new forest resources which must be created in certain areas, there is today, even in the countries most advanced in forestry, a considerable gap between the actual and potential yield of the forest. How far this gap can be diminished depends as much on economic factors as on technical possibilities.

## Chapter II - WORLD REVIEW AND OUTLOOK

## TRENDS IN AGRICULTURAL PRODUCTION

The year 1957/58 saw a check in the steady postwar rise in world agricultural production. According to preliminary estimates, total production continued to grow rapidly in the Near East, where the weather was very favorable, and more slowly in Europe, the U.S.S.R., and Latin America. In the Far East, however, there was a slight decline in the high level of output reached in 1956/57, while in Africa, Oceania, and North America production in 1957/58 was appreciably lower than the year before (Table II-1). In each case the decline was due mainly to the weather, though in North America other factors played an important part. There was a partial crop failure in North Africa, while Australia suffered badly from drought after several favorable seasons. In North America, a poor grain crop in the Canadian Prairies Provinces coincided with a downturn in the hog and cattle cycles in the United States and a consequent fall in meat production, and with reductions in the output of cotton and tobacco. The situation in each region is reviewed more fully in later paragraphs.

But while the weather was the immediate cause of the decline in world production in 1957/58 there had been for some years a slowing down in the rate of expansion, especially in the regions of the world with higher levels of income and more advanced agricultures. It is apparent from Table II-1 that in the latter regions there has been little increase in output since 1953/54. The position is examined further in Table II-2, where the average annual increase in production in the four years from 1952/53-1953/54 to 1956/57-1957/58 are compared with the corresponding rise in the four

TABLE II-1. INDEX NUMBERS OF AGRICULTURAL PRODUCTION

Region	Prewar average	1953/54	1954/55	1955/56	1956/57	1957/58 (prelim.)
AND THE RESIDENCE OF THE PARTY			Average 1948/49	- 1952/53 == 10	90	
Western Europe	73	115 107 108	115 104 108	116 109 116	116 114 114	117 109 111
Three above regions	82	110	108	112	114	112
Latin America	97 83	108 110 119 113	112 113 119 119	116 116 122 119	120 119 127 123	122 119 131 120
Four above regions	88	111	114	117	121	121
All above regions World <sup>1</sup>		111 110	111 111	115 115	118 120	117 119

<sup>&</sup>lt;sup>1</sup>Including estimates for the U.S.S.R., Eastern Europe, and Mainland China.

preceding years. The comparisons are made between the average production in two successive seasons in order to minimize the influence of weather.

The growth of production in the agriculturally more advanced regions is seen to have been less than one third as fast in the last four years than in the four preceding years, the sharp fall in the rate of growth in Western Europe from the high level of the earlier period being particularly striking. The slower tempo in these regions must be attributed primarily to the inhibiting effects of agricultural surpluses. In general, weather has not been less favorable, and technically there appears to have been no reason why the more rapid expansion of the earlier years should not have continued.

In the economically less developed regions the rate of expansion has been more sustained. There has been a decline of some 20 percent in the average rate of progress in the four regions taken together, though Latin America is an exception to the generally slower trend, but this is of an altogether different order of magnitude from the sharp change in the case of the first group. As indicated elsewhere, the rapid growth of domestic demand in the less developed regions is the main factor which has made possible this continuing rapid expansion. Some countries, however, have had to curtail their agricultural development programs for lack of investment funds, e.g., as a result of

the general fall in real prices on export markets. In other cases such factors as the inadequacies of local systems of marketing, unrealistic price policies, unsuitable methods of land tenure, or shortage of farm credit have tended to hamper agricultural progress.

Table II-2 shows also the average rate of growth of the population of each region during the period under review. In the first four-year period to 1952/53-1953/54 the growth of agricultural production exceeded the growth of population in each region of the world except Oceania, where, however, the increase in population was particularly fast. In the most recent four-year period production has also lagged behind population in North America, as well as in the three "higher-income" regions taken together. But production has continued to grow faster than population in each of the economically less developed regions, and in the world as a whole.

The combined influence of the growth of population and of agricultural production are shown in Figure II-1, which shows the postwar trend of per caput agricultural production in the more and in the less economically developed regions, respectively. Two striking facts emerge from this chart, and from the similar figures of total and per caput food production in Table II-3. The first is that in the less developed regions taken as a whole per caput production, both of food and of all agricultural

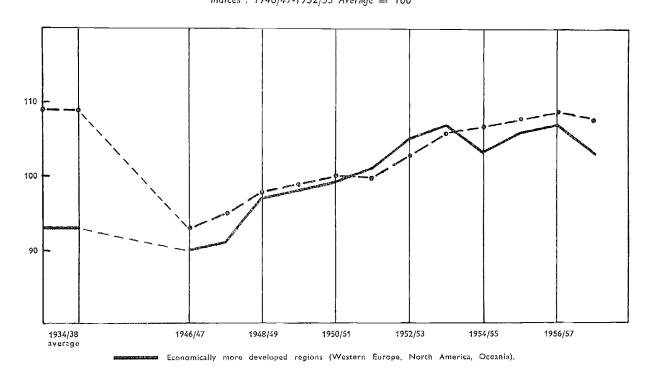
Table II-2. Average Annual Growth of Agricultural Production and of Population in the Four-Year Period to 1956/57-1957/58 Compared With the Preceding Four Years

		e annual altural production	Average annual increase in population			
Region	1948/49-49/50 to 1952/53-53/54	1952/53-53/54 to 1956/57-57/58	1948/49-49/50 to 1952/53-53/54	1952/53-53/54 to 1956/57-57/58		
	Percent					
Western Europe	4.8 2.1 1.8	1.3 0.8 1.1	$\begin{array}{c} 0.7 \\ 1.8 \\ 2.9 \end{array}$	$egin{array}{c} 0.8 \ 1.9 \ 2.4 \ \end{array}$		
Average three above regions	3.2	1.0	1.1	1.2		
Latin America	2.9 2.7 5.9 4.3	3.1 2.4 3.0 2.3	2.4 1.5 2.2 1.9	$2.4 \\ 1.5 \\ 2.1 \\ 1.8$		
Average four above regions	3.3	2.6	1.8	1.7		
$\mathrm{World^1}$	3.1	2.4	1.5	1.5		

<sup>&</sup>lt;sup>1</sup>Excluding estimates for Eastern Europe, the U.S.S.R., and Mainland China.

FIGURE II-1. Per Caput Agricultural Production in Economically More and Less Developed Regions

Indices: 1948/49-1952/53 Average == 100



Economically less developed regions (Latin America, Far East, Near East, Africa)

products, was no greater in 1956/57 and 1957/58than before the war: gains in Africa and the Near East have been offset by losses in per caput output in the Far East and Latin America. The second is that virtually the whole increase in world per caput production results from the increased output of North America and Western Europe, for the contributions of the Near East and Africa are still small in relation to total world agricultural production. The predominant share of North America and Western Europe in the increase in world per caput output would probably remain true if Eastern Europe, the U.S.S.R., and Mainland China were included in the estimates, but available data for these countries are too incomplete for reliable per caput estimates.

The above considerations do not mean that there has been no improvement since the prewar period in the available food supply in the less developed regions of the world, relative to their populations. They do mean, however, that any improvement has been limited. It has in fact largely resulted not from in creased per caput production, but from changes in the pattern of world trade in foodstuffs,

in particular the increased food imports, and smaller food exports of the less developed regions of the world, compared with the prewar period. These changes are discussed later in the section on the volume of world trade in agricultural products.

The fact that even today both per caput agricultural and food production in the less developed regions appear to be little, if at all, greater than before the war once more underlines the continuing importance of maintaining and increasing efforts towards a balanced and economic development of their agricultures. The setback in these regions during the war was greater than in the more developed regions as a whole (where losses in Europe and Oceania were offset by striking gains in North America), while the more rapid growth of population in the less developed regions necessitates a relatively faster growth of production if their generally meager levels of consumption are to be raised.

To end this review of production trends, attention may be drawn to two charts, which illustrate some main developments in world agricultural production since 1934-38. The first

TABLE II-3. INDEX NUMBERS OF VOLUME OF TOTAL AND PER CAPUT FOOD PRODUCTION

		Total	food prod	luction		Per caput food production				
REGION	Average 1934-38	Average 1948/49 and 1949/50	Average 1952/53 and 1953/54	1956/57	1957/58 (prelim.)	Average 1934-38	Average 1948/49 and 1949/50	Average 1952/53 and 1953/54	1956/57	1957/58 (prelim.)
				. Average	1948/49 -	1952/53	= 100			
Western Europe North America	93 71 90	91 98 101	111 108 106	116 115 107	$\begin{array}{ c c c }\hline 117 \\ 112 \\ 103 \\ \end{array}$	$\begin{array}{ c c } & 102 \\ & 85 \\ & 108 \end{array}$	92 100 106	108 103 100	111 103 93	111 99 87
Three above regions	82	95	109	115	114	93	97	106	107	105
Latin America	79 96 84 80	95 99 91 94	107 109 115 110	122 119 128 121	121 118 132 118	106 116 102 97	98 101 94 97	100 104 108 105	106 109 112 109	103 106 113 104
Four above regions	88	96	109	121	121	108	100	105	109	106
All above regions World <sup>1</sup>	84	96 96	109 108	118 119	117 119	101 105	98 95	105 104	107 108	105 106

<sup>&</sup>lt;sup>1</sup>Including estimates for Eastern Europe, U.S.S.R., and Mainland China.

(Figure II-2) shows the growth of world production and its distribution between the main regions or groups of regions. It shows clearly the rise in production in North America dur-

ing the war, the rapid recovery in Western Europe and Oceania from the damage or neglect of the war years, and the flattening off of production in these three regions since 1952/53

FIGURE II-2. Growth of World Agricultural Production and Share of Different Regions

World Agricultural Production, 1948/49-1952/53 Average == 100

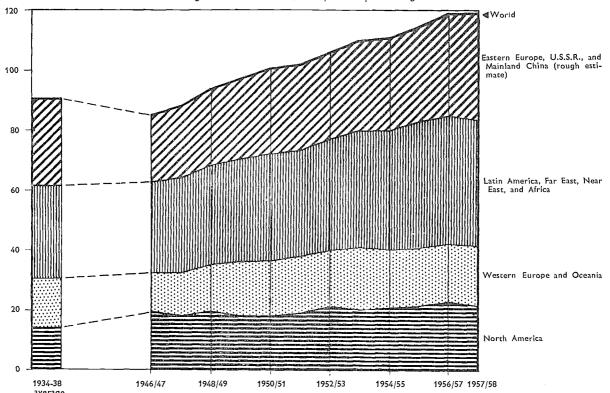
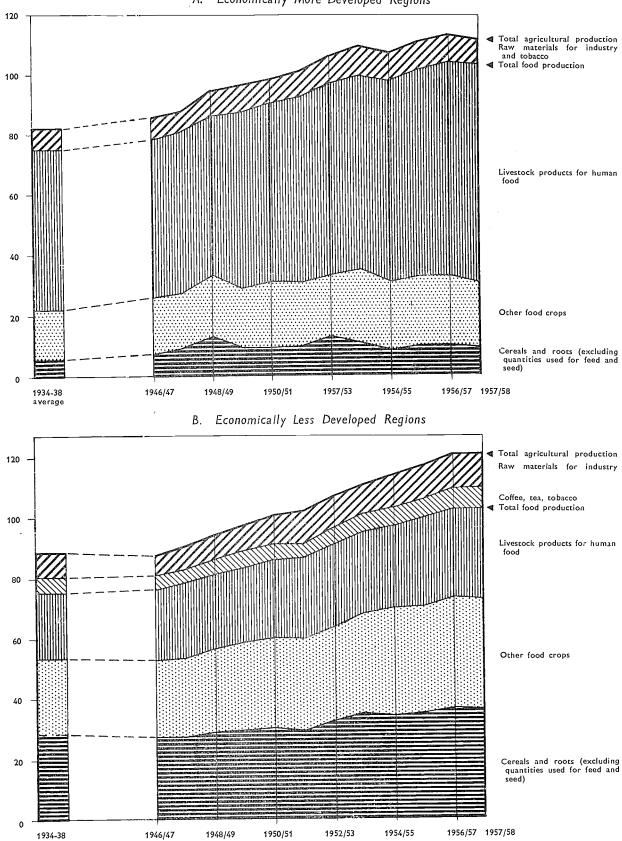


FIGURE II-3. Growth of Agricultural Production and Share of Main Commodity Groups

Average Total Agricultural Output 1948/49-1952/53 = 100
A. Economically More Developed Regions



average

under the influence of mounting surpluses. It shows all the continuing growth of production in both the less developed regions of the world, and in the Communist groups of countries, where the demand for agricultural products is still rapidly expanding, and the problems of agricultural surpluses have not yet arisen to any significant extent, at least so far as their domestic markets are concerned. At present the economically more developed regions, the less developed regions, and the Communist groups of countries, respectively, are each responsible for roughly one third of the total volume of world agricultural production.

The second chart (Figure II-3) shows the changing composition of production in the more and the less developed regions, respectively, by broad groups of commodities. The increase since the prewar period in the net output of basic foods (cereals and roots) in the more developed regions does not, of course, reflect any increase in the consumption of these foods, but rather their lessened dependence on imports from other regions, the increase in their exports and in some cases also in the level of stocks. Since 1948/49, however, it is evident that the main expansion in the more developed regions has been in livestock products, which in any case account for by far the largest part of their output, though latterly even this has tended to flatten out.

The much smaller share of livestock products in the total output of the less developed regions is evident from Figure II-3(b). In these regions the net output of cereals and roots for human food appears to have increased rather slowly since 1954, though these commodities account for about one third of the total output. The main expansion in recent years appears to have been in "other crops," including, e.g., sugar, oilseeds and fibers, both for domestic use and export. To some extent livestock production has also expanded as the demand for livestock products increases with rising incomes. The data for these regions are of course subject to a wider margin of error than those for the economically more advanced countries.

## Growth of Production in Individual Countries

While indices for regions and groups of regions are useful to obtain an overall view of developments or to reveal broad trends, they inevitably conceal very large differences be-

tween individual countries. Even in regions where on the average production has grown rapidly some countries lag behind, e.g., for technical reasons, for lack of investment funds or of markets, or because of war or civil disturbances. Other countries have been able to surpass considerably the average rate of progress. As an indication of the magnitude of the variations from country to country, the percentage growth of production in selected countries in each region (generally those for which the basic data are most complete) is set out in Table II-4. It may be added that the wide differences between countries revealed in this table do not impair the validity of the analyses in the earlier paragraphs, which are based on the aggregate production in each region or group of regions, and not on averages for individual countries.

#### Fisheries Products

The steady postwar expansion of the world catch of fish and shellfish, which reached a record level of about 29 million tons in 1956, also appears to have been checked in 1957, but final figures when available are likely to be about the same as in 1956. There were less abundant supplies of fish in some fisheries, notably the Norwegian winter herring fisheries, and economic factors, including rising costs, lower prices for some fishery products, and stiffer competition from fish-exporting countries, also contributed. The decreases were, however, offset by an increase in the Japanese catch.

#### Forest Products

In 1956 there were already indications that the rapid postwar growth in the demand for forest products was slowing down, and with it their production. This tendency became still more pronounced in 1957, though in some regions it developed only in the latter part of the year. At the same time new earlier planned capacity, particularly for pulp and paper production, was put into operation. This further increased the imbalance between current demand and potential supplies. A substantial over-capacity in world forest industries thus emerged in 1957. The decline of some 30 million cubic meters in the estimated world production of roundwood in 1957 compared with 1956, though only about 2 percent of the total output, was the largest in any year since the

Table II-4. Percentage Increase in Agricultural Production in Selected Countries  $1948/49 \cdot 1952/53$  to  $1955/56 \cdot 1956/57$ 

(based on FAO indices of agricultural production)

Under 10 rereent	11-20 percent		Over 20 percent
Western Europe (Regional average 16	percent)		
	Denmark	(35%) (40%) (37%) (13%) (23%) (34%)	Germany, Western 21%       (18%)         Yugoslavia       22%       (11%)         Italy       24%       (37%)         Belgium-Luxem-       bourg       29%       (55%)         Austria       32%       (16%)         Greece       39%       (40%)
North America (Regional average 12	,		
United States 11% (48%)	Canada 14%	(65%)	
Oceania (Regional average 15 percent)			
	New Zealand 11%   Australia 15%	(31%) (28%)	
Latin America (Regional average 18	percent)		
Cuba	Brazil 16%   Argentina 18%	(36%) (38%) (48%) (21%) (59%)	Mexico 41% (105%)
Far East (Regional average 17 perce	(nt)		
Malaya.       1% (42%)         Burma.       2% (16%)         South Korea.       3% (6%)         Pakistan.       4% (13%)         Thailand.       6% (85%)	Ceylon 11%   India 17%   Taiwan 18%	(58%) (21%) (30%)	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Near East (Regional average 24 perc	ent)		
	Egypt 19%   Turkey 21%	(34%) (70%)	
Africa (Regional average 21 percent)			
	Madagascar 14%	(20%) (30%) (44%)	Algeria 20% (15%) Union of S. Africa 25% (64%)

Note: Figures in parentheses show increases from 1934-38 to 1955/56-1956/57. <sup>1</sup>Former French Zone.

war, and reflected the general weakening in demand for new raw material supplies by forest industries.

The main impact was felt in North America where the recession led to a reduced output of nearly all forest products in 1957, except newsprint, compared with the previous year, the decline ranging from some 3 percent for woodpulp to about 10 percent for plywood and sawn softwood and nearly 20 percent for sawn

hardwood. Production was more sustained in Europe, and although the output of sawn softwood fell by some 5 percent, the production of other commodities, including wood pulp, plywood, and sawn hardwood increased slightly. Preliminary estimates indicate that the output of most forest products also increased slightly in the U.S.S.R., the Far East, and Africa, but declined slightly in Latin America and Oceania (see Annex Tables).

## Agricultural Production in 1957/58 and Short-Term Prospects

In the sections which follow brief comments are given on agricultural production in 1957/58 in each region of the world, and on prospects for 1958/59 so far as the limited information at present available permits. Short notes are also included on the production of forest products and fisheries. Statistics of the production of the main agricultural, forestry, and fisheries products in each region will be found in the Annex Tables.

North America. As mentioned earlier, the main factors contributing to the reduced level of production in 1957/58 were the poor cereal harvests in the Prairie Provinces, where drought during the growing season was followed by persistent rains at the time of harvest; a reduced production of cotton and tobacco in the United States, largely as a result of the Soil Bank operations, and a decline of some 4 percent in meat production (excluding poultry meat) in 1957, compared with 1956. Almost half the decline in the United States meat output occurred in the last quarter of the year, and resulted from a simultaneous downturn in the hog cycle and the cattle cycle. The main effect was on the production of pork, but a record feed supply in 1957/58 and a favorable hog/feed price ratio in the latter part of 1957 are reflected in expanded farrowing plans for the spring pig crop in 1958. After several years of rising cattle numbers a decline set in during 1956/57 and at the beginning of 1958 there were some 3 million (3 percent) less than at the beginning of 1956. The effect of the Soil Bank and other measures to bring current production more closely into line with effective demand are reviewed in the section on agricultural policies.

The most recent forecast available (mid-June) puts the wheat crop in 1958 in the United States at some 34.5 million metric tons or about 8.5 million more than in 1957, owing to an increase of 19 percent in the area under winter wheat and favorable weather during the winter. The prospective area under wheat in Canada in 1958 is about 2 percent less than last year, the smallest since the wartime reduction program in 1943, but with favorable weather a normal crop may be expected. A further increase in stocks of wheat in North America during 1958/59 is, therefore, likely.

For coarse grains, increased areas under both oats and barley are in prospect in Canada, but

in the United States an increase in the expected area under maize is considerably exceeded by a decline in the prospective area under barley, oats, and sorghums. Record plantings of soybeans are expected, and some increase in the area under rice, but the tobacco acreage will again be slightly lower. In the United States red meat production may decline somewhat in 1958, but poultry meat production will continue to expand, and total output may be slightly above 1957. In Canada, red meat production is likely to increase. In both countries, milk production is likely to expand somewhat and again to exceed commercial demand.

Western Europe. Harvests in 1957 were good in most countries of Western Europe, with the main exception of fruit and wine. Total grain production in northwestern Europe was only slightly above the preceding year, but the share of wheat was much larger than in 1956, when the crop was reduced by spring frost. Only in the three northern countries (Finland, Norway, and Sweden), where persistent heavy rains damaged the crop, was production much less than in 1956. The shift from oats to barley continued in most countries. In Southern Europe, grain production was considerably higher. except in Italy. Yugoslavia had a record crop, the maize crop being the highest since 1938, when the area was larger. As a result of previous high production and low prices in many countries, the potato area was smaller than in the preceding year, and production was further reduced by lower yields. Sugar beets showed high yields in many countries, notably Western Germany where production was 20 percent above the 1951-55 average and 16 percent above the 1956 level, in spite of a somewhat smaller crop area. In Italy, however, the crop area and output were greatly reduced following the 1956 surplus.

Although prices remained low, pig meat production continued to increase in many countries because of the earlier expansion in pig numbers. Denmark and the Netherlands, the two main exporting countries, have reduced the number of breeding sows in anticipation of marketing difficulties, but production remained high in the first part of 1958. Milk production also continued to rise in nearly all countries, and in some the quantities sold off farms rose even more quickly, sometimes because of delivery subsidies. As liquid milk consumption has generally remained stationary or tend-

ed to decline, increased quantities of milk were available for butter and cheese production. In the United Kingdom production of butter and cheese reached a record level in 1957, while in Western Germany butter production in November, December, and January 1957/58 was 14, 23, and 29 percent greater than in the same months of the previous year.

Eastern Europe. Harvests in 1957 were also good in most countries of Eastern Europe. The cereal crop was the heaviest since the war, exceeding the low crop of 1956 by 8.1 million tons (about 20 percent). Good weather and the increased incentives offered to farmers, both contributed to this result. Only in Czechoslovakia (for the second year in succession) and Eastern Germany were the grain crops less than good, and both countries have become heavily dependent on grain imports.

Sugar beet yields were particularly high in 1957, ranging from one quarter (Bulgaria, Hungary, Poland) to one half (Albania, Czechoslovakia, and Romania) more than in 1956. Eastern Germany was the only exception, with yields little better than the average of the previous five years. The potato crop was rather lower than in 1956 in Czechoslovakia and Poland, but elsewhere appears to have been good.

Milk output rose, notably in Poland and Bulgaria (some 10 percent) and Eastern Germany (about 7 percent). Marketings of meat, including pork, were also higher, despite somewhat limited supplies of feed grains from the 1956 harvest. Except in Hungary, where recovery from the setback in late 1956 is not yet complete, pig numbers are rising quickly in Eastern Europe. Egg production is also on the increase. The heavy crops of coarse grains and fodder should provide the basis of a further expansion of livestock production in 1958. In Romania, however, where the number of animals was greatly reduced in 1956/57, the rebuilding of herds will take some time.

U.S.S.R. Cereal production in 1957 was some 20 percent lower than the record harvest of 1956, wheat production falling by about 14 percent and maize production by no less than 40 percent. Drought in the newly opened-up regions of Kazakhstan and Siberia, as well as in the Urals and the Volga region, was the principal factor. Good crops were harvested in the traditional cereal areas of the Ukraine and the Kuban. The fall in deliveries to the

State, amounting to 37 million tons against 54 millions in 1956, was considerably greater than the fall in production.

There was a sharp rise in the output of sugar beet, mainly in the Ukraine, where the weather was favorable and the crop area had been greatly extended. The crop of 39 million tons was 20 percent more than in 1956 and 50 percent above the 1952-56 average. There was little change in cotton production. It was recently announced that in coming years the textile industry of the U.S.S.R. will be essentially developed through the production of synthetic fibers.

The large supply of feed grains from the record 1956 harvest, and the emphasis now being placed on livestock production, were reflected in an 8 percent increase in the output of eggs and 12 percent of milk in 1957 compared with 1956. Meat production is not yet known, but State procurement is said to have increased by 12 percent. The whole increase consisted of pork, and slaughterings of young cattle were reduced to provide heavier animals for the coming year.

Oceania. Australia had a bad year because of droughts in the early part of the season, though rain early in 1958 prevented a drastic reduction in output. This was the first break in the run of good seasons since the war. Cereals, milk, and wool were the products which suffered most. Output of cereals fell by about one third, and of wool and milk by about 7 percent. Production of sugar, tobacco, fruit, and eggs was at or above the previous season's level. Slaughterings in the first part of the season rose because of the drought, but were sharply reduced later leaving estimated meat production about the same as the year before. Preliminary estimates for New Zealand, where conditions were favorable, indicate that the output of milk increased by 7 1/2 percent and of wool by 1 percent; meat production may also be slightly higher.

Latin America. Total agricultural production rose only fractionally and food production fell slightly, which in view of the rapid growth of population in the region meant a substantial fall in per capit production. Cereal production fell by some 5 percent, a rise of 6 percent in maize being outweighed by a heavy fall in the output of wheat. Most other food crops showed little change. Non-food crops did better, coffee production rising by nearly 20 percent,

with smaller increases for cotton and tobacco. Livestock production as a whole was rather stable. There was a small decline in the output of beef and mutton and a small increase in that of pork, milk, eggs, and wool.

In Argentina, area and output of wheat, barley, rye, and oats was reduced though there were good crops of maize and oilseeds. Cattle numbers fell from 47 to 44 millions because of a higher rate of slanghtering in 1956 and some tendency to plow pasture for the production of flax, sunflower, and other crops, for which prices are now more attractive, but wool output increased by 5 percent. In Uruguay too, there has been some shrinkage in pasture and cattle numbers. The wool clip, however, at 90,000 tons, was 5 percent higher than the year before. Brazil had a good year, with an increase of nearly 30 percent in coffee production, and smaller gains for casao, sugar, and wheat. Crop production in Chile showed little change, while production in Peru fell somewhat because of drought and pests, notably for cotton and sugar. After some years of drought in the highlands, prospects for 1958/59 are more favorable. Drought also reduced crops of maize, beans, barley, and cotton in Colombia, but hardly affected the output of coffee. Production in Venezuela continued to rise. In spite of political unrest in Cuba, tobacco production rose by 12 percent and rice by 20 percent giving the largest crop for many years. The sngar crop is also good, but the government is attempting to restrict production. Mexico had a good season in 1957/58, although overall ontput was rather lower than the exceptional crops of the previous year. Irrigated crops like wheat and cotton showed remarkable increases (17 and 12 percent, respectively) and sugar reached a record output of over 1 million tons, but this did not fully offset the effects of drought on non-irrigated crops such as maize and dry beans, and also to some extent on fruits and vegetables.

Far East. Agricultural production as a whole was maintained in 1957/58 at the high level of the previous year. There was a significant reduction in the production of rice and to a lesser extent of barley, maize, millets and sorghums, offset by an increase in wheat and other food crops, and in industrial crops. Provisional estimates put the fall both in rice production and in cereal production as a whole at some 3 to 4 million tons (about 3 percent).

The countries worst hit were India, Burma, Thailand, Ceylon, and Cambodia. A poor crop in India, coinciding with an increased demand, made it necessary to restrict movements of grains, resume procurement and increase imports. In Pakistan, food shortages were reported in some areas. Japan, however, harvested the second largest rice erop on record.

There has been a considerable increase in sugar production in the region, and the gradual expansion of pulse and oilseed production continued. Root crops were higher than last year, though below the record level of 1955. Tea production reached a postwar record in 1957/58 owing to a favorable year in Ceylon and smaller increases in other producing countries except Pakistan, where drought damaged part of the crop.

In Mainland China it is stated that the targets of the first five-year plan from 1952 to 1957 have been substantially reached. On the agricultural side, grain production over the period is said to have risen from 154.5 to 185 million tons (some 20 percent), and cotton production from 1,305,000 to 1,640,000 tons (about 25 percent). A steady increase of other crops was also reported, while the area under irrigation rose by 60 percent to 37.3 million hectares. Proposals for the second five-year plan are discussed in the section on agricultural policies.

Near East. The continued expansion of production in 1957/58 was based essentially on grains, pulses, and fibers; other crops and livestock production showed either little change or a decline. Grain, the main crop of the region, reached the record output of 37 million tons, 11 percent more than in 1956. Over 14 million tons were harvested in Turkey, surpassing the 1953 record, and in Iraq and Syria production was some 30 percent higher than in 1956, itself a very good year. Smaller increases were recorded in Egypt and Israel, while in Iran and Jordan crops, though above average, were somewhat smaller than in 1956.

The regional production of cotton at 860,000 tons was some 5 percent higher than the year before thanks to increases of nearly 20 percent in both Egypt and Syria, partly offset, however, by a smaller crop in Turkey and a decline of nearly 40 percent in the Sudan. Except for citrus in Egypt and grapes in Syria, 1957/58

was a bad year for fruit. The production of 220,000 tons of dates in Iraq was 20 percent less than in 1956 and 50 percent less than in 1955, while the crop in Iran at 105,000 tons was nearly 25 percent smaller than last year.

Prospects for 1958/59 production of major crops are unfavorable in many countries, especially in the "Fertile Crescent." Wheat and particularly barley crops are reportedly reduced by almost one third because of a dry winter in Iraq, Jordan, and Syria and also in Cyprus, Israel, and Libya. Range pasture is also affeeted and export bans on cereals and livestock have been imposed in Syria and Iraq. The lack of winter rain may also reduce underground water and hence the acreage and output of summer crops, especially vegetables. In addition, most countries were heavily infested by locusts, including Turkey. A lower rice acreage is reported in Egypt and a small cotton crop in the Sudan.

Africa. Agricultural production in Africa appears to have declined in 1957/58 from the high level reached in the previous season. Although the growth of production has recently tended to slow down in the large part of the region that lies south of the Sahara, there was a further small increase in production in this area in 1957/58. But this was much more than offset by substantial reductions in North Africa. The severe drought in Morocco in the previous winter resulted in falls of 40 percent in wheat and as much as 70 percent in barley production from the 1956/57 levels. Algeria was also affected by drought, barley production declining by 40 percent. These poor cereal harvests coincided with small olive crops, while in Tunisia, where cereal production increased, the olive oil output was halved and was the chief factor in the overall decline in agricultural production. There was, on the other hand, a further substantial rise in the North African production of citrus fruit.

South of the Sahara, caeao production, affected by bad weather in Ghana, Nigeria, and the Ivory Coast, fell nearly 25 percent from the record of the previous season and there were smaller reductions in oil palm products. Rice production again rose sharply, with a record harvest in Madagascar, while the production of groundnuts reached new record levels in both French West Africa and Nigeria. In the Union of South Africa maize output fell slightly, but the steady expansion of most other commodities continued.

## THE VOLUME OF INTERNATIONAL TRADE IN AGRICULTURAL PRODUCTS

The rise in the volume of world trade in agricultural products which began in 1955 after several years of stability at about the prewar level, continued in 1957 but at a slower rate than in either of the two preceding years. Moreover, the index of world agricultural imports rose more than the corresponding index of exports, reflecting the arrival in early 1957 of goods shipped in the latter part of 1956. Most main groups of agricultural products shared in the increase in 1957, but the largest rise occurred in the raw materials group, mainly because of surplus disposal operations for cotton. Overall trade in forest products, not included in the general index for agricultural products, showed no change from 1956 and remained somewhat below the peak level of 1955. As throughout the postwar period, the volume of trade in agricultural products increased a good deal more slowly than the volume of world trade as a whole (Table II-5).

Exports of agricultural products from Latin America declined, and there was no change in the general level of African exports, but with these exceptions all regions of the world exported more agricultural products than in 1956 (Table II-6). As in the two previous years, however, by far the largest part of the increase in world trade in 1957 resulted from larger North American exports, due mainly to surplus disposal operations. Exports of food and feedingstuffs from North America were in fact rather smaller than in 1956. The Western European demand for cereals receded from the high level of 1956, when European crops were below average; France, which in 1956/57 became exceptionally a wheat-importing country, is likely to export over 2 million tons in 1957/58. There was also some fall in North American exports of livestock products, though these were partly offset by larger exports of oils and fats. But the rise in cotton exports, already mentioned, more than outweighed the smaller shipments of foodstuffs from North America. The heavy fall in Latin American exports occurred in coffee and textile fibers, and included wool and especially cotton; larger exports of sugar, oils and fats, fruit, and meat, however, led to somewhat increased shipments of food as a whole, despite some decline in cereals.

On the import side, some 60 percent of the increase in world trade was accounted for by

Table II-5. Indices of the Volume of World Trade in Agricultural Products <sup>1</sup> by Main Commodity Groups

COMMODITY	1934-38 average	1948-52 average	1953	1954	1955	1956	1957 (prelim.)
			Indice	es: 1952-53	= 100		
Total world trade (agricultural and non-agricultural) <sup>2</sup>	70	86	103	108	118	128	134
Agricultural products	98	95	102	101	107	116	119
Foods and feedingstuffs	100	93	102	102	109	120	123
Beverages and tobacco	86.5	95	104	99	107	114	114
Agricultural raw materials	105	97.5	102	101	103	110	115
Forest products <sup>3</sup>	92	91	102	117	131	128	128
Cereals	101	93	97	92	96	118	114
Sugar	79	89	108	101	108	109	115
Oilseeds and vegetable oils	165	98	103	123	130	141	147
Fruit, fresh and dried	89	83	106	108	114	106	119
Livestock products	96	94	104	106	115	123	125

<sup>&</sup>lt;sup>1</sup>Average of indices of world imports and world exports (excluding intra-trade within Communist group of countries. — <sup>2</sup>Index of world exports adjusted to 1952 53 base; comparable League of Nations estimates included for 1934-38.— <sup>3</sup>Not included in general agricultural index.

larger imports into Western Europe of beverages and raw materials; imports of foodstuffs were slightly smaller than in 1956. Another 30 percent represented increased imports into the Far East of all main groups of products, but especially cereals (which reached an all-time record in spite of the good rice crops harvested in late 1956), livestock products, and cotton. All other regions, however, with the exception of North America, increased their agricultural imports.

Developments in 1957 thus reflected the two dominant factors influencing present shifts in the pattern of world trade in agricultural products: the surplus situation in the more industrialized countries, and the decline in net exports from the less developed regions as their own requirements absorb more and more of their own production. These underlying trends are easily seen in the lower part of Table II-6, showing the net trade position of each region.

The situation in the less developed regions has been considered in earlier issues of The State of Food and Agriculture and only a brief resumé need be given to bring out the magnitude of postwar developments. Under the pressure of rapidly growing requirements, outrunning the growth of production, gross food exports of the less developed regions of the world have declined, and in addition considerable imports

of foodstuffs into Asia and Latin America have developed from North America and Australia. These consist primarily, but by no means exclusively, of cereals. Both the Far East and the Near East, formerly substantial net exporters, have had large net imports of foodstuffs in nearly every year since the war. Net food exports from Latin America have generally ranged from 20 to 40 percent below the prewar average. Africa has been an exception, and in recent years net food exports from that region have been some 20 to 30 percent higher than before the war. Nevertheless, net exports of food and feedingstuffs from the less developed regions of the world as a whole to the industrialized countries had shrunk by 1956 and 1957 to little more than one third of their prewar volume.

Net exports of non-food products, including both beverages (e.g., coffee) and fibers and other raw materials, have been maintained and in some cases expanded. Their production has increased, and domestic consumption of these commodities has not yet begun to expand at the rate that the requirements of the less developed regions for foodstuffs has expanded. Non-food products thus account for an increasingly important share of the total agricultural exports and foreign exchange earnings of the less developed regions. As a result, net agri-

Table II-6. Regional Indices of the Volume of Gross and Net trade in Agricultural Products

Region	1934-38 average	1948-52 average	1953	1954	1955	1956	1957 (prelim.)
Gross Exports (All agricultural products)			Indice	s: 1951-53	= 100		• • • • • • • • • • • • • • • • • • • •
Western Europe. North America Oceania Latin America Far East (excl. China) Near East	106 61 79 104 156 81 77	81 101 97 100 97 86 91	103 93 103 109 100 115 102	114 90 94 103 102 106 114	125 91 105 109 111 102 122	124 125 111 116 109 100 129	127 135 116 109 112 109 129
Gross Imports (All agricultural products)							
Western Europe. North America Oceania Latin America Far East (excl. China). Near East	114 81 67 58 103 52 64	95 100 99 91 83 99 86	104 99 104 102 99 99	106 86 122 104 99 95 107	112 93 128 101 100 111 118	121 96 118 97 119 122 129	124 95 128 105 126 132 132
Net Exports (All agricultural products)							
North America	(1) 80 114 514 108 81	(1) 97 102 190 79 92	(1) 102 111 107 130 102	$\begin{pmatrix} 1 \\ 91 \\ 103 \\ 119 \\ 116 \\ 116 \end{pmatrix}$	$\begin{pmatrix} 1 \\ 103 \\ 111 \\ 179 \\ 95 \\ 123 \end{pmatrix}$	375 111 120 55 79 128	558 115 110 17 88 128
Net Imports (All agricultural products)							-
Western Europe	116 392	99 83	105 200	103 38	108 125	119 (°)	124 (°)
Net Exports (Food and feedingstuffs)							
North America	(1) 87 183 158 117 95	95 94 120 (1) (1) 95	88 107 118 (1) (1) 107	69 94 129 (1) 117 139	91 106 132 (1) (1) (2)	148 117 140 (1) (1) (1) 132	140 110 148 (1) (1) (1) 116
Net Imports (Food and feedingstuffs)							
Western Europe	$ \begin{array}{c c} 128 \\ 15 \\ {2 \choose 2} \\ {2 \choose 2} \end{array} $	106 ( <sup>2</sup> ) 57 100	102 ( <sup>2</sup> ) 99 50	96 ( <sup>2</sup> ) 82 ( <sup>2</sup> )	104 ( <sup>2</sup> ) 53 133	129 ( <sup>2</sup> ) 98 150	123 ( <sup>2</sup> ) 112 217

<sup>&</sup>lt;sup>1</sup>Net importer. — <sup>2</sup>Net exporter.

cultural exports of all kinds from these regions have fallen by only 10 to 20 percent from the prewar volume, compared with the fall of some 60 percent for foodstuffs alone.

Among the agriculturally more advanced regions, Oceania has substantially expanded its net exports in the same period, a large share of the increase going to Asian countries rather than to the traditional importers in Western Europe. But the major expansion of exports

has, of course, come in North America, at first in response to wartime and postwar shortages, and later under the pressure of its domestic surpluses. Recent developments in surplus disposal are discussed more fully below. In the event, the North American region, which before the war was a small net importer of foodstuffs and a large net importer of agricultural products as a whole, has been a consistent net exporter of foodstuffs, and in 1956 and 1957 became also

a net exporter of agricultural products as a whole (in terms of volume weighted at 1952-53 prices).

In 1956 and 1957 Western Europe thus became for the first time the sole net-importing region for agricultural products, though for foodstuffs alone the Far East and the Near East are also net importers. Nevertheless, for the products which Western Europe itself pro-

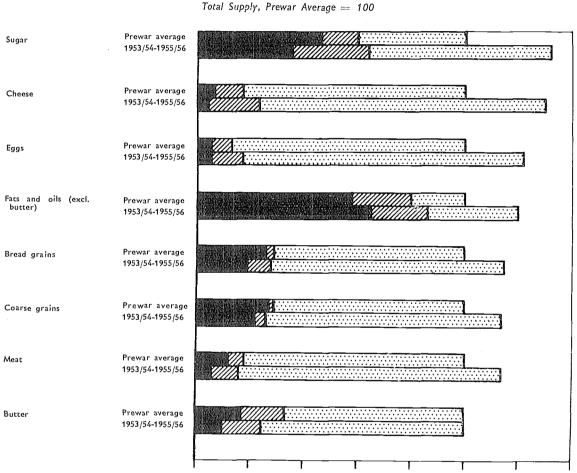
duces the pressure of its own expanding production, stimulated by technical improvements and by price and income supports, increases steadily against a more slowly rising ceiling of requirements.

Long-term developments in the Western European market for agricultural products are shown in Figure II-4 which compares average annual supplies in 1934-38 and 1953/54 to

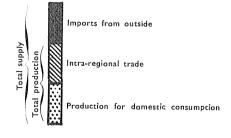
120

140

FIGURE II-4. Total Supplies of Selected Commodities in Western European Countries, Showing Proportion Covered by Domestic Production, by Intra-European Trade, and by Imports from Outside the Region, 1934-38 Average and 1953/54-1955/56 Average



SOURCE : OEEC, Statistical Summary of Agricultural Production and Food Consumption in OEEC Countries. Paris, December 1957.



1955/56. For some commodities, notably sngar, cheese, and eggs, there has been a substantial increase in total consumption. But in nearly every case the increased requirements have been met by a larger production within the country itself, or within the Western European region. Thus domestic production, and to a lesser extent intra-European trade, have generally increased. For none of the commodities included in the chart has there been any expansion in the volume of imports from outside the region, with the one exception of oils and fats.

The growing pressure of surplus supplies in Western Europe is most evident in the case of livestock products. Thus among the main features of the intra-European market in livestock products in 1957/58 were the growing dependence of the European exporting countries on the West German market for eggs, poultry meat, cheese, and butter; the increasing imports of meat, butter, and cheese into Italy, where the demand for such foods is rising; and the disappearance of the British market as an important outlet for eggs. Moreover, prices for eggs, bacon, and butter on the British market fell considerably, in the case of butter due to increased competition from marginal exporting countries in Europe. 1 Exports of butter from Sweden, Finland, Ireland, France, Austria, and Norway, which in 1955 and 1956 amounted to about 8,000 and 38,000 tons, respectively, increased to about 95,000 tons in 1957, and largely offset a  $2\frac{1}{2}$  percent decline in butter exports from Denmark, causing at the same time a 17 percent decline in the value of the Danish butter export. The total volume of European butter exports exceeded that of the previous year by more than 30 percent. Imports into Western Germany (32 percent), Italy (43 percent)<sup>2</sup> Switzerland (11 percent) and the United Kingdom (2 percent) increased.

The overall situation of the less developed regions of the world as a whole vis-à-vis the more advanced countries, so far as trade in agricultural products is concerned, is summed up in Table II-7. On the one hand this shows the rapid fall in net exports of food from the less developed regions, the irregular growth of net exports of beverages and tobacco, and the somewhat fluctuating course of trade in agricultural raw materials. The indices of net imports into the more developed regions naturally bring out the obverse of these developments (see also Figure II-5).

There are at present no indications of any substantial change in these trends. It seems likely that the pressure of supplies on the markets of the more industrial countries will increase, especially since the initial impact of surplus disposal operations may be diminishing. The growing demand for foodstuffs in the less developed regions may continue to provide some expansion of outlets for surplus production in the more advanced regions, though the ab-

Table II-7. Indices of Net Trade Between Less Developed Regions as a Whole and More Industrialized Regions as a Whole

Соммориту	1934-38 average	1948-52 average	1953	1954	1955	1956	1957 (prelim.)
N. E. J. J. Too Dandened Pegional			Indice	s: 1952-53	= 100		
Net Exports of Less Developed Regions   All agricultural products	131	104	110	108	117	115	107
	440	157	132	192	194	169	155
	87	95	104	95	104	114	112
	91	97	110	99	111	99	84
Net Imports of More Developed Regions <sup>2</sup> All agricultural products  Food and feedingstuffs  Beverages and tobacco  Raw materials	138	100	109	105	110	103	99
	434	140	125	148	127	106	106
	88	96	102	98	106	111	114
	89	88	113	96	110	88	74

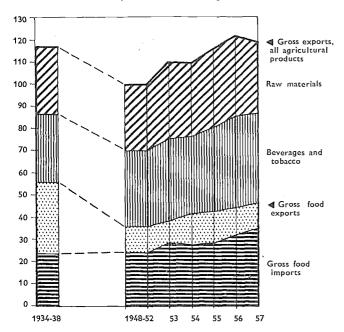
<sup>&</sup>lt;sup>1</sup>Latin America, Far East, Near East, and Africa. — <sup>2</sup>Western Europe, North America, and Oceania.

<sup>&</sup>lt;sup>1</sup>In 1957, Finland, Ireland, and Sweden exported 49,000 tons of butter to the United Kingdom, as compared with 11,000 tons in 1956 and 1,000 tons in 1955.

<sup>&</sup>lt;sup>2</sup>In March 1958 Italy, however, stopped all imports of butter to permit domestic markets to recover.

FIGURE II-5(a). Volume of Gross Exports of Agricultural Products from Less Developed Regions and Volume of Gross Imports of Foodstuffs

Total Exports 1948-52 Average = 100

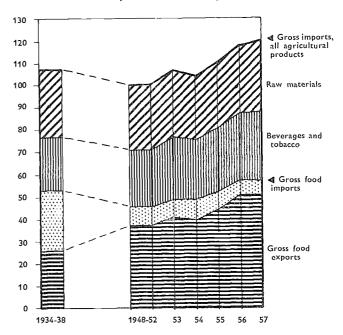


sorptive capacity of these new markets is heavily circumscribed by their lack of foreign exchange. To the extent that this difficulty can be overcome, however, the rather widespread policy of establishing national reserve stocks should, for some years, provide an additional source of demand, superimposed upon that already provided by rising populations and incomes.

#### Forest Products

In 1957 the volume of world trade in forest products as a whole was maintained at the 1956 level. Regional developments, however, showed considerable changes from 1956. In North America, exports of roundwood declined by about 10 percent (in 1956 they had risen by close to 7 percent); exports of sawnwood continued the decline already apparent in 1956. Trade in newsprint also showed a small decrease in 1957 whereas exports of wood pulp slightly increased, largely because of larger shipments from North America to Europe and other overseas markets. In Europe, exports of roundwood were about maintained, while trade in sawn softwood showed a small rise. Exports of plywood also picked up somewhat after the heavy decline that had occurred in 1956. As FIGURE II-5(b). Volume of Gross Imports of Agricultural Products into More Developed Regions and Volume of Gross Exports of Foodstuffs

Total Imports 1948-52 Average = 100



to pulp and paper, exports of wood pulp and newsprint fell slightly, while exports of other paper and board rose by over 8 percent. Exports of most forest products by the Soviet Union to Europe as well as to other regions, notably the Near East and Latin America, also increased.

In 1957 the volume of world trade in forest products is likely to show some decline from the levels recorded in 1957. Import requirements of roundwood and sawnwood in North America and Europe are clearly smaller than a year earlier. The demand for wood pulp and pulp products will, in 1958, probably be more affected than in 1957 by the North American recession and the slowing down in Europe's economic expansion. The steady postwar expansion of paper and board consumption might therefore come to a halt, at least temporarily. Further details are given later in the section on the Commodity Outlook.

## Agricultural Trade of Eastern Europe and the U.S.S.R.

The indices of the volume of agricultural trade discussed above take into account imports received from the Communist group of countries by the rest of the world, and also exports to the Communist countries from the rest of the world. They do not cover trade between the Communist countries themselves. Considerably more information is now becoming available of the international trade of these countries, notably for the calendar year 1956, or the crop year 1956/57, though comparable data for previous years and for 1957 are generally lacking. Some recent developments are given below in considerably greater detail than for other countries as the information is still not easily found.

In 1956/57 the U.S.S.R. exported some 6.8 million tons of cereals, including 3.9 million tons of wheat. Of these quantities some 4.7 million tons of cereals (69 percent) and 3.1 million tons of wheat (nearly 80 percent) were shipped to Eastern Europe. This compares with exports of only 1 million tons of wheat in 1955/56, and an average of some 600,000 tons in 1934-38, and for the first time approaches the average of over 4 million tons in the five years before the First World War. The increase reflects both the good cereal harvest in 1956 in the Soviet Union and the poor harvest in that year in Eastern Europe. Total imports of cereals into Eastern European countries in 1956/57 amounted to 5.3 million tons, an increase of rather more than one million tons over the previous year. Against this there were exports of 0.7 million tons in 1956/57, compared with 0.6 million tons the year before.

Prospects for 1957/58 are different because of the good crops harvested in Eastern Europe (except Czechoslovakia) and the less satisfactory harvest of the Soviet Union. Nevertheless, stocks accumulated in 1956 made possible exports against contract from the Soviet Union of some 3.4 million tons of cereals by the beginning of 1958, including 2.9 million tons of wheat.

Imports of rice into Eastern European countries have considerably increased in recent years. In 1956 the Soviet Union imported some 640,000 tons, of which some 54,000 tons were re-exported to Eastern Germany and 32,000 tons to Poland.

In spite of the recent expansion of sugar production, the U.S.S.R. has been a net importer in each of the last three years. Imports in 1957 amounted to 519,000 tons (excluding any quantities obtained from Poland and Czechoslovakia), against 244,000 tons in 1956. Exports and re-exports in 1957 are believed to have approached 200,000 tons, including ship-

ments to Finland, Iran, Afghanistan, and China. The main imports came from Cuba, which supplied 344,000 tons in 1957 and 214,000 tons in 1956. Data on sugar exports from Eastern Europe are incomplete; exports from Czechoslovakia in 1957, at 100,000 tons (excluding sugar exported to the U.S.S.R.) were slightly larger than the year before. Exports from Poland at 98,000 tons increased from 61,000 tons in 1956, but remained below the 1953-55 average of 440,000 tons. Hungarian exports of sugar declined sharply in 1957 to 10,000 tons in 1957 against 40,000 tons in 1956.

For oilseeds the latest available data relate to 1956, when the U.S.S.R. imported some 180,000 tons of groundnuts, 548,000 tons of soybeans, 96,000 tons of vegetable oils, and 17,000 tons of technical oils, mainly from China and Eastern Europe. Eastern Germany was the main Eastern European importer of butter in recent years (39,000 tons in 1956/57, as well as 10,000 tons of cheese). Eastern Germany also imported 187,000 tons of eggs in the same year, mainly from Bulgaria and Poland, against 200,000 tons in the preceding year. The U.S.S.R. is also increasing its imports of Bulgarian eggs which in 1956 reached some 103 million eggs.

The U.S.S.R. imported some 183,000 head of cattle in 1956/57, mainly from Hungary, as well as 85,000 tons of meat, with exports and re-exports of 24,000 tons. Considerable quantities of meat were also imported by Eastern Germany (107,000 tons) and Czechoslovakia (39,000 tons). Data for imports in earlier years are incomplete. On the export side, however, Polish exports of pig meat in 1956/57 at 66,000 tons were some 15 percent higher than the year before, while exports from Hungary at 18,000 tons were about 20 percent less. The U.S.S.R. also imported some 126,000 tons of fish in 1956; Eastern Germany imported some 137,000 tons against 151,000 tons the year before.

Finally, trade in fruits has developed appreciably in recent years. Bulgaria, the largest exporter, disposed of some 86,000 tons of all varieties in 1956; Hungary in 1955 exported some 40,000 tons of apples. The principal importers in 1956 were Eastern Germany (74,000 tons), and the U.S.S.R. (52,000 tons of apples, 20,000 of peaches, 27,000 of grapes, 40,000 of tangerines, 24,000 of oranges, and 22,000 of lemons).

The recent expansion of food imports, including some semiluxury types, into the U.S.S.R. and Eastern European countries appears to

reflect the growing demand for consumer goods and the efforts of the authorities to raise living standards. It is largely a new development; imports of fruit into the U.S.S.R. before the war, for example, were almost negligible, shipments of citrus fruit averaging some 15,000 tons annually in 1934-38. How far such food imports are likely to expand it is difficult to judge, though it may be presumed that, as for most products, the Communist group of countries will attempt to meet their own requirements for products for which their climates are suitable.

The same trend is also evident for non-food products. Thus in 1956 the U.S.S.R. imported 3,300 tons of coffee (600 tons in 1934-38), 16,000 tons of tea (18,000 tons in 1934-38), and 16,000 tons of eocoa (8,000 tons in 1934-38). Figures for intermediate years are generally lacking. Appreciable quantities of these commodities were also imported in 1956 by Eastern Germany, Poland, and Hungary.

A considerable trade in textile fibers has now developed in the area; in 1956, the U.S.S.R. exported some 310,000 tons of cotton against imports of 51,000 tons, while in 1957 the exports were 319,000 tons and the imports 109,000 tons. Egypt is the principal supplier to the U.S.S.R., providing 38,000 tons in 1956 and 82,000 tons in 1957. In the last two years Eastern European countries have bought more than 80 percent of Soviet cotton exports; their total imports of cotton were as follows:

Table II-8. Imports of Cotton into Eastern European Countries

		1956	1957		
Country	Tota1	From U.S.S.R.	Tota1	From U.S. S.R.	
		$\dots Thousan$	d tons .	, ,	
Albania					
Bulgaria	12	5		11	
Czechoslovakia	84	44	78	49	
Germany, Eastern	91	82		76	
Hungary	40	<sup>1</sup> (27)	38	31	
Poland	86	63	121	69	
Romania	43	30		29	

¹In 1955.

In the case of wool, the U.S.S.R. imported 48,000 tons in 1956, including 24,000 tons from China and Mongolia, and 10,000 tons from "Southeast Asia and the Middle East." This compares with average imports of 28,000 tons in 1934-38. In addition, some 2,400 tons of silk were imported from China and Northern Korea.

Imports of rubber into the U.S.S.R. and Eastern Europe were high in 1956, totaling some 220,000 tons, but declined sharply to about half that quantity in 1957. In 1958, imports are again rising and for the whole year may As there is a reach some 180,000 tons. re-export trade within the group there can be no exact estimate of supplies to each country. For example, the U.S.S.R. imported 141,000 tons in 1956, including 105,000 tons from Malaya and 19,000 from Indonesia, but some of these quantities will have been re-exported. Gross imports into Poland were 28,000 tons in 1956 and 31,000 in 1957, while the corresponding figures for Czechoslovakia were 33,000 and 38,000 tons, respectively.

In 1957 Soviet exports of forest products, including shipments to countries ontside Europe, showed a general rise, and the volume of sawnwood and plywood exports reached new postwar heights. In early 1958 world import demand for most forest products, particularly those forming the bulk of Soviet exports to Western Europe, fell off sharply. The U.S.S.R. however, seems so far to have maintained its volume of exports at the 1957 level, and present indications are that exports for the whole year may show a further rise rather than a fall. Several factors appear to contribute to this result. The rapid growth of demand for consumer goods in the U.S.S.R. has led to rising import needs, at least temporarily. The determination of the Soviet shippers to sell all quantities earmarked for export in 1958 led to a rather flexible Soviet price policy, and sucessive reductions were made in export prices in the spring of 1958. At the same time several leading industrial countries in Western Europe are looking urgently for larger markets in the East and particularly in the Soviet Union, as other outlets tend to contract. The efforts of the U.S.S.R. to maintain exports of forest products, which account for over one third of Soviet exports to Western Europe, have thus met with a favorable response.

## SPECIAL MEASURES TO EXPAND AGRICULTURAL EXPORTS

There are essentially three ways of dealing with real or potential agricultural surpluses: by reducing production of commodities in excess supply; by increasing consumption on the home market; and by special measures to increase the volume of exports. Examples of the first two are discussed in later sections dealing with agricultural policies and with individual commodities. The following paragraphs briefly review recent developments under the third, and on the whole the most widespread, method, sometimes known as "surplus disposal."

The largest and most widely known surplus disposal operations are of course those of the United States, notably under Public Law 480 and the Mutual Security Act. Many European countries have also resorted to direct or indirect export subsidies to expand exports of, e.g., grain, fruits, and livestock products, often principally as a means of maintaining domestic price levels. Operations in these two areas are considered in turn below. But there are other examples. Thus, in a number of bilateral trade agreements, notably with the countries of the Communist bloc, subsidies are indirectly included in the barter terms or in special credit arrangements. In many countries, especially in Latin America, special exchange rates are granted to encourage exports. Other countries give special tax concessions on agricultural and other exports. There is also the question of trade with countries with centrally planned economies where prices do not necessarily reflect relative cost relationships; it is not clear whether or how far this trade involves subsidies, as for example in recent heavy reduction in export prices of wood from the U.S.S.R.

It should be stressed, however, that surplus disposal operations and direct subsidies on agricultural exports are very much less common in less developed than in more developed countries. Apart from the fact that surpluses occur primarily in the more developed countries, for reasons discussed elsewhere, this could hardly be otherwise since the less developed countries seldom dispose of the financial resources for any extensive program of export subsidies.

#### **United States Operations**

It is difficult to build up a comprehensive picture of United States surplus disposal operations because of the number of programs involved, and the fact that operations under each are reported in varying degrees of detail, e.g., tonnages and countries of destination are not always reported, and often reported for different periods and in different financial terms, e.g., at export values, or in terms of cost to the Commodity Credit Corporation (CCC) or other agencies concerned. Officially the term "surplus disposal" is limited to exports under the provisions of special legislation, in particular the Agricultural Trade Development and Assistance Act of 1954 (P.L. 480) and under Section 402 of the Mutual Security Act.

#### Public Law 480

Financial resources available under P. L. 480 were extended by an amendment to the law in 1957 which:

- (i) increased Title I anthorizations (foreign currency sales) from 3,000 to 4,000 million dollars;
- (ii) increased Title II anthorizations (famine relief) from 500 to 900 million dollars.

The same amendment extended the period of operation of Titles I and II from June 1957 to June 1958, provided that up to 25 percent of the foreign currency received under Title I agreements should be made available for loans to private firms (largely United States firms and affiliates) to assist in the development and expansion of business in the foreign country concerned, and permitted barter transactions with Eastern European countries. It also permitted donations to the latter countries under section 416 of the earlier Agricultural Act of 1949. There are no special financial provisions for operations under Title III of P.L. 480, so far as barter transactions are concerned, and any losses appear as losses on CCC transactions.

At the time of writing a further extension of P.L. 480 to June 1960 is before Congress, recommending anthorization of 1,500 million dollars under Title I and about 400 million dollars under Title II in each of the two years of this further extension.

Cumulative authorizations and shipments under P.L. 480 from its inception in July 1954 to the end of 1957 were as follows:

Authorization	is	Shipment	ts
Million	U.S.	. dollars	

	annon 0.5.	aowars
Title $I^1$		2492.8
Title II <sup>1</sup> 2	390.7	277.9
Title III		
(a) domestic and foreign		
$donations^1$	1 216.0	1 216.0
(b) barter transactions <sup>3</sup>	873.1	$^{4}896.6$
TOTAL <sup>5</sup>	5 823.0	44 883.3

<sup>1</sup>At CCC cost: the equivalent in export market values of Title I authorizations and shipments are \$2,308.8 and \$1,650 million respectively. — <sup>2</sup> Title I includes \$247 million and Title II \$47 million for freight. — <sup>3</sup> At export market value. — <sup>4</sup> Includes shipments under earlier authorizations. — <sup>5</sup> The totals indicate only general orders of magnitude as the Title III (b) transactions are costed on a different basis from the other items.

### Mutual Security Act

During the same period July 1954 to December 1957 procurement authorizations under the Mutual Security Act totaled 1,367 million dollars. In the three fiscal years July 1954 to June 1957, for which more complete data are available, procurement authorizations amounted to 1,047 million dollars and actual expenditures to 916 million dollars. Of the total expenditures, 328 million dollars (36 percent) were for cotton, 316 million (34 percent) for wheat, 78 million (9 percent) for coarse grains, 64 mil-

TABLE II-9. UNITED STATES AGRICULTURAL EXPORTS UNDER SPECIAL PROGRAMS YEARS ENDING 30 JUNE 1955, 1956, AND 1957 1

	1							Total		Of which	
TYPE OF FINANCING AND YEAR	Wheat and flour	Coarse grains <sup>2</sup>	Rice (milled)	Cotton	Tobacco leaf	Fats and oils³	Dairy prod- ucts	includ- ing all other	under P.L. 480	under M.S.A.	under Export- Import Bank
Management of the control of the con				Million	U.S. doll	ars at ex	port mar	ket values	3		
Foreign currency sales and grants				ALL PROPERTY OF THE PROPERTY O				di aliante de la constante de			
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	226 310 288	43 64 105	4 45 132	222 202 323	15 55 35	81 134 171	130 205 176	737 1 056 1 532 1 137	*205 697 1153 903	*532 352 379 234	
Barter agreements											
1954/55	98 118 139	23 167 121	$egin{pmatrix}  imes \  imes \ 2 \end{bmatrix}$	× 5 127		3 5 2	$\frac{\times}{\times}$	125 299 401 86	125 299 401 86		
Dollar loans and credits											
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{10}{1}$			59 61 64				69 61 69			69 61 69
Total under special programs									İ		
1954/55	334 428 655	66 231 - 226	4 45 134	281 268 514	15 55 36	84 139 173	130 205 176	931 1 416 2 002 1 300	*330 996 1 554 989	*532 352 379	69 61 69
Percent of total U.S. exports under special programs <sup>4</sup>											
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	67 72 68	27 58 63	6 52 72	41 72 46	15 10	17 24 27	61 69 73	30 41 42 32	*11 28 33	*17 10 8	$\begin{array}{c c} 2\\2\\1\\\cdots\end{array}$

Sources: U.S. Department of Agriculture, The Demand and Price Situation, November 1956 and 1957; Foreign Agricultural Trade Digest, June 1958; U.S. Department of Commerce, Foreign Grants and Credits, June 1957.

Note: P.L. 480 shipments at export market values; × denotes less than 0.5 million dollars; \* estimated.

'Data on special programs is based on reported shipments under Public Law 480, expenditures under the Mutual Security Act, and disbursements under Export-Import Bank and CCC credits. Because of differences in reporting periods, exports under the special programs are not stricly comparable with official export statistics. Data for total agricultural exports include estimated value of donations under Section 416 of the Agricultural Act of 1949 (Sec. 302, Title III, P.L. 480) which are not identified by manne in the official trade reports. — "Corn and meal, bard, and coatmeal, and grain sorghums. — "Lard, tallow, soybeans, cottonsced, flaxseed, groundnuts and oils expressed therefrom. — "Excludes CCC export sales and sales under the International Wheat Agreement, unless exported under the special programs.

lion (7 percent) for oils and fats, and 54 million (6 percent) for dairy products.

What the above operations under P.L. 480 and the Mutual Security Act mean in relation to total United States agricultural exports is brought out in Table II-9, in which all figures have been recalculated at export market values. This table, which includes also credits for purchases of cotton by the Export-Import Bank, covers the four fiscal years 1954/55 to 1957/58, the figures for the last year being United States forecasts.

Thus in 1954/55 shipments under these special programs accounted for 30 percent of all United States agricultural exports; in the two subsequent years this proportion rose to 41 percent and 42 percent respectively, but in 1957/58 it is expected to fall back to about 32 percent. In 1956/57, the last year for which complete information is to be had, some 60 to 70 percent of all shipments of wheat, coarse grains, rice, and dairy products, nearly half the export of cotton, and more than one quarter of the exports of oils and fats were made under special programs. Rather over half the total value of the special program exports in the same year was accounted for by exports of cereals of all kinds, about one quarter was cotton, while dairy products, fats and oils made up most of the balance.

Although shipments under the special programs covered in Table II-9 represent by far the largest part of United States Government assistance to agricultural exports, it should not be supposed that the balance of the exports is entirely on a commercial basis. Two other main forms of subsidy may be mentioned.3 United States exports under the International Wheat Agreement are subsidized at the rate of approximately 70 cents per bushel: in effect, therefore, virtually all United States wheat exports are subsidized in one way or another. Secondly, the Commodity Credit Corporation sell commodities for export to private exporters at less than the domestic price; its losses on such transactions are thus in effect a type of export subsidy. The magnitude of expenditures under these two headings is set out in Table II-10; the total amounts in the years 1955/56 and 1956/57 amounted to some 4-5 percent of the total value of United States agricultural exports in those years, and of some 6-8 percent of the total value of exports outside the special programs. No details are available of the destination of shipments under these headings.

TABLE II-10. UNITED STATES GOVERNMENT SUB-SIDIES ON AGRICULTURAL EXPORTS OUTSIDE THE Special Programs

Subsidies	1954/ 55	1955/ 56	1956/ 57	1957/
	л.	[ fillion U	J.S. doll	ars
Payments on exports under International Wheat Agreement	91	75	67	<sup>1</sup> 45.5
Losses on CCC sales to private exporters <sup>3</sup> .	50	70	159	287
of which: Butter, etc. Meat and	()	()	(12)	, ,
poultry . Cotton, etc. Wheat and	(—) (—)	()	(a) (14)	(-) (14)
flour	(50)	(70)	(133)	(73)
Total payments or losses	141	145	226	

<sup>(</sup>a) Less than 500,000 dollars.

Rather complete details are published of the destination by volume and value of shipments under P.L. 480, especially under Titles I and II (see Annex Table 10) but similar information under other programs appears to be less readily available. A reasonably clear picture of the general distribution of shipments under the special programs may be obtained, however, from Table II-11, though the total figures in the final column should be taken as indicative only, since periods covered and the method of costing in the first three columns are not identical. It is evident, however, that the largest shipments have been to Europe and the Far East, followed in turn by the Near East and Latin America.

Under Title I of P.L. 480 the largest shipments of wheat have been to India (7-8 million tons), Yngoslavia (2.1 million tons), Brazil (0.96 million tons), Turkey (0.92 million tons) Japan (0.84 million tons). Italy has been the largest importer of cotton under this Title (90,000 tons), followed by Japan (69,000) Indonesia (43,000)

<sup>&</sup>lt;sup>3</sup>In addition, one third of United States customs revenues are set aside for export promotion under an Act of 1936, but in recent years the amounts spent for agricultural exports under this heading are insignificant.

<sup>&</sup>lt;sup>1</sup>To February 1958. — <sup>2</sup>Estimated on basis of first 10 months' operations. — <sup>3</sup>Representing the difference between the CCC investment and the sales price and thus including an element of storage and other costs.

and Pakistan. All figures relate to total shipments to the end of 1957. Comprehensive data have been published for all commodities.

Table II-11. Destination of Agricultural Shipments from the United States Under Special Programs

Region	P.L. 480 Titles I and II (July 1954 to Decem- ber 1957) <sup>1</sup>	III (July 1954 to	Mutual Secu- rity Act (July 1954 to June 1957) <sup>3</sup>	. Total of preceding columns
		. Millio	n U.S.	dollars
Western Europe .	1 044	4617	510	2 171 (47%)
Eastern Europe .	15			15
Latin America .	299	25	25	349 (8%)
Far East	1 080	118	319	1 517 (33%)
Near East	323	25	62	410 (9%)
Africa	10	1		11
Destination not known		112		112 (2%)
TOTAL	2 771	898	916	4 585 (100%)

Sources: U.S. Department of Agriculture, Commodity Credit Corporation, Report of Title I Operations (P.L. 480) No. 57 and of Title II Operations (P.L. 480) No. 37; International Cooperation Administration, Operations Report (Data as of 30 June 1957).

<sup>1</sup>Shipments: estimated cost to CCC. — <sup>2</sup>Shipments: at export market values. — <sup>3</sup>Expenditures. — <sup>4</sup>Includes about \$45 million shipped to Australia, Canada, and the Union of South Africa.

#### **Exports from European Countries**

Since domestic prices of agricultural products in most European countries, as in the United States, are generally higher than prices on world markets, export trade involves, of necessity, recourse to export subsidies. The problem has become more acute as the rapid development of agricultural technology, combined with price supports or direct subsidies to producers, gives rise to exportable surpluses even in countries where agricultural policy does not aim at developing or maintaining exports.

An expert group at the Organization for European Economic Co-operation (OEEC) is at present engaged in a study of the problem of aids to exports. The group has not been able to obtain figures for the *volume* of subsidized exports and considers that "an exhaustive study of the statistics would not yield valid

eonclusions as to the real incidence of the measures applied, except in certain limited cases." According to the same experts, it seems equally impossible to estimate the value of subsidized trade in agricultural products in Europe. The value of the aids to export is dependent on the difference at a given time between prices in the home market and the price in international trade. Whether aid is intermittent or regular also depends on the size of the exportable surpluses for the year in question and the time required for their disposal.

The different forms that this export aid takes in the various countries ranges from direct grants to exporters of bonuses or subsidies by governments, financing of all or part of losses incurred on exports, etc., to a simple reduction of railway tariffs for export goods. Although some countries, e.g., Finland, resort mainly to direct State subsidies, while non-governmental bodies play a leading part in other countries such as Austria, Ireland, Sweden, and Switzerland, individual cases are rarely clear-cut. Owing to the complexity and the intermingling of the various forms of aid to exports, it is hard to decide to what extent, or even at what period, subsidies come from the producers' organization alone, from direct government assistance, or from indirect aid based on compensation and equalization systems.

A list of the chief products, which benefit from aids to exports in the different exporting European countries, is given below:

Wheat — in France, Italy, and Sweden;

Meat — in Austria, Belgium, Finland, France, Italy, Norway, Netherlands (pig meat), United Kingdom, Sweden, Western Germany;

Butter — in Anstria, Finland, France, Ireland, Netherlands, Norway, Sweden, Switzerland;

Cheese — in the same countries as for butter, adding Italy and Belgium;

Fruit — in France, Greece, Italy, Spain, Switzerland.

This list includes, in fact, all exporting countries except Denmark; even this country can, however, in extreme cases be considered to apply aid to exports.<sup>4</sup> The Danish bounty on

<sup>&</sup>lt;sup>4</sup>Newly proposed measures to foster exports of Danish agricultural products are discussed elsewhere in this chapter.

dollar exports of cheese is in effect an export subsidy, as producers of some types of cheese receive a benefit comparable with the more clear subsidies paid in other countries to butter exporters.

The two main products where the high level of production gave rise to marketing difficulties in 1957 were butter and pig meat. These difficulties are likely to persist. The following examples for butter may be quoted. Finland exported 25,200 metric tons of butter in 1957. 23 percent more than in 1956 with a government subsidy amounting to 7,200 million markkaa (22.5 million U.S. dollars). Total subsidies for butter, cheese, eggs, milk powder, and pork reached the level of 12,500 million markkaa (40 million dollars) in 1957. Exportable surpluses are expected to continue to rise in 1958 and the devaluation of the currency will probably be of small relief as international prices are falling. Sweden exported 23,800 metric tons of butter in 1957, 16 percent more than in 1956 at prices much below the level of domestic wholesale prices. Norway exported 7,100 metric tons of butter, 17 percent more than in 1956, at prices which were 7 percent lower than in 1956. In Austria the bulk of the surplus milk production has gone into butter, export of which the government has subsidized without effectively moving the surplus. In January-November 1957, 8,000 metric tons of butter were exported (28 percent of the market production). Export prices during the first nine months were 22.39 schillings per kilogram compared with a domestic wholesale price of 31.42 schillings. During the first 11 months in 1957, butter exports from Ireland totaled 13,000 metric tons, almost 18 times the amount exported during all of 1956. Over 90 percent of Irish butter exports in 1957 went to the United Kingdom under heavy subsidy. Trade statistics indicate that 5,200 metric tons of butter were exported during the third quarter of 1957 at an average f.o.b. price equivalent to 38.5 cents per pound. During this period the wholesale price of creamery butter in Dublin was equivalent to 54.8 cents per pound. Similar examples could be given of the subsidized export of pig meat.

Other instances could also be quoted. Exports of agricultural produce from *Italy*, for example, increased by some 20 percent in 1957 in comparison with 1956, but this rise was due almost entirely to the exceptionally large exports of soft wheat, flour, and sugar below

cost prices. In the first half of 1957, soft wheat was exported at 4,600 lire per quintal as compared with an average domestic price of about 7,000 lire. Government support price for wheat, however, is to be reduced after the 1958/59 season. In 1956/57 more than 17,000 metric tons, of surplus sugar were exported at prices considerably below the domestic level.

The list of cases could be extended and completed by, e.g., a systematic comparison of export unit values and domestic wholesale prices. The examples quoted, however, are enough to indicate that the directly or indirectly subsidized export of agricultural products in Western Europe is very widespread, though the scale of such operations is, of course, substantially smaller than in the United States.

## CHANGES IN STOCK LEVELS IN 1957/58

There was no fundamental change in the stock situation in 1957/58. Stocks of some commodities, notably wheat and cotton, were substantially reduced in some cases, probably only temporarily. Stocks of other commodities, notably coarse grains, substantially increased. Despite surplus disposal operations and measures designed to curtail surplus production, the high level of stocks continues to overhang the market (Table II-12).

At the end of 1957/58 stocks of wheat in the four main exporting countries are likely to be about 10 percent lower than a year earlier as a result of smaller crops in these countries and surplus disposal operations. Even now, however, wheat stocks are high and they are likely to go up again in 1958/59 since present prospects are for heavy wheat crops in North America, while export outlets, even at concessional terms, are likely to contract. Stocks of coarse grains in North America are expected to be at the record level of some 63 million tons at the end of 1957/58, nearly one quarter higher than a year earlier, mainly because of the record crop in the United States. As production in both the United States and Canada is likely to increase in 1958, yet a further addition to stocks in 1958/ 59 seems probable. Stocks of rice remained at their recent fairly low level in 1957/58.

The major reduction of United States stocks of cotton achieved in 1956/57 as a result of production controls and the largest volume of exports for 25 years continued in 1957/58, despite an appreciably lower level of exports. Stocks at the end of 1957/58 are likely to be some 1.3

TABLE II-12. ESTIMATED STOCKS OF MAJOR COMMODITIES, 1952-58

					Stock	S		
Commodity	Month	1952	1953	1954	1955	1956	1957	1958 (forecast
		1		Mil	lion metri	c tons		
Wheat		1						
United States	1 July	7.0	16.5	25.4	28.2	28.1	24.7	23.8
Canada	I Aug. I Dec.	5.9	$\begin{array}{c} 10.4 \\ 2.0 \end{array}$	16.8	14.6	15.8	19.9	17.7
Argentina	I Dec.	$\begin{vmatrix} 0.1 \\ 0.5 \end{vmatrix}$	1.8	$\begin{array}{c c} 1.6 \\ 2.6 \end{array}$	$\frac{2.4}{2.6}$	$\begin{array}{c} 1.5 \\ 2.4 \end{array}$	$\begin{bmatrix} 2.2 \\ 1.2 \end{bmatrix}$	$\begin{vmatrix} 1.2 \\ 0.5 \end{vmatrix}$
Total 4 major exporters.	1 1500.	13.5	$\frac{1.0}{29.9}$	$\frac{2.0}{46.4}$	47.8	47.8	48.0	43.2
France	l Aug.	1.2	0.8	1.0	1.4	0.9	0.8	0.7
Italy	I Aug.			2.1	1.4	2.0	2.1	Ĭ.6
Rice (milled equivalent)  Asian exporters \(^1\)	31 Dec.	0.7	1.4	1.3	0.5	0.5	0.0	0.1
United States	31 July	$\begin{bmatrix} 0.7 \\ 0.1 \end{bmatrix}$	1.4	0.4	$\begin{array}{c c} 0.5 \\ 1.4 \end{array}$	$\begin{bmatrix} 0.5 \\ 1.0 \end{bmatrix}$	0.3	0.1
Mediterranean exporters	30 Sept.	0.1	*******	0.2	0.3	0.2	0.0	0.1
Total  .  .  .  .  .  .  .  .  .	Jo Sopti	0.8	1.4	1.9	2.2	1.7	1.0	0.8
Coarse Grains <sup>2</sup>			1.1	1.0		1.1	1.0	0.0
United States	1 July 3	18.5	24.7	29.4	37.3	43.2	44.8	57.5
Canada	l Aug.	3.6	5. I	5.6	3.7	4.6	6.9	6.0
Total 2 major exporters.		$\frac{22.1}{}$	29.8	35.0	$\frac{3.1}{41.0}$	47.8	$\frac{51.7}{51.7}$	63.5
Butter				99.0	TI.U			09
United States	Dec.	0.01	0.03	0.17	0.07	0.01	0.04	
European countries <sup>4</sup>	Dec.			0.04	0.03	0.08	0.09	
Oceania	Dec.			0.06	0.06	0.05	0.06	
Total				0.27	0.16,	0.14	0.19	
Cheese United States	Dec.	0.10	0.11	0.09	0.09	0.28	0.28	
$egin{array}{lll} Dried & Skim & Milk \ & & & & & & & & & & & & & & & & & & $	Dec.	0.02	0.06	0.04	0.04	0.04	0.04	
United States	1 July	0.41	0.37	0.28	0.16	0.10	0.22	0.06
Argentina	I Dec.	0.30	0.23	0.08	0.10	0.10		0.00
Total 2 countries		0.71	0.60	0.36	$\frac{0.19}{0.19}$	0.10		
Liquid Edible Vegetable Oils .					0.10			
United States	1 Oct.	0.24	0.58	0.56	0.33	0.28	0.28	0.36
Cuba	31 Dec.	2.2	1.5	1.9	1.6	0.6	0.7	
World total	31 Aug.	10.7	$\frac{10.2}{}$	$\frac{12.0}{12.0}$	11.5	10.5	$\frac{-0.7}{9.8}$	
Coffee Brazil	30 June	0.18	0.20	0.20	0.20	0.63	$\frac{-3.6}{0.44}$	0.00
of which Government	90 90110	0.16	0.20	0.20	0.20	(0.22)	(0.22)	(0.88)
United States	30 June	0.22	0.21	0.21	0.08	0.17	0.16	0.15
Total of above		0.40		0.41	0.28	0.80	0.60	1.03
Tobacco (farm weight) United States	I Oct. 7	1.56	1.66	1.69	1.83	1.89	2.00	1.90
Cotton (lint)								
United States		0.60	1.22	2.11	2.43	3.14	2.45	1.86
Other producers		1.58	1.52	1.29	1.40	0.63	1.06	1.17
Importers	27 7 1	0.72	0.70	0.68	0.59	0.98	0.95	0.84
World total <sup>8</sup>	31 July	2.90	3.44	4.08	4.42	$\frac{4.75}{}$	4.46	3.87
World total	31 Dec.	0.73	0.72	0.74	0.76	0.74	0.76	
North America <sup>10</sup>	31 Dec.	0.89	0.80	0.77	0.69	0.92	0.99	
European importers <sup>11</sup>	31 Dec.	5.74	6.19	5.56	6.12	5.27	5.65	
European exporters <sup>12</sup>	31 Dec.	4.31	3.63	4.05	4.50	4.06	$\frac{3.05}{3.79}$	
North America	31 Dec.	14.25	16.05	14.60	14.84	16.96	16.70	
Sawn Hardwood	01.75							• • •
European importers <sup>13</sup>	31 Dec.	1.29	1.15	1.06	1.22	1.21	1.20	
European exporters <sup>14</sup> North America	31 Dec. 31 Dec.	0.31	0.28	0.27	0.32	0.47	0.45	
TYOTOH ZIHEHEE	91 Dec.	7.90	7.90	9.54	7.86	8.74	8.66	

Note: Quantities shown include normal carry-over stocks.

\*Excluding Mainland China. — \*Rye, barley, oats, maize, sorghum. — \*Maize and sorghum: 1 October. — \*United Kingdom, Western Germany, Ireland, Netherlands, Sweden. — \*Including seed in oil equivalent. — \*Carry-over of oils and soybeans: 1 October; cottonseed: 1 August. — \*Flue-cured types: 1 July. — \*Excluding U.S.S.R., Eastern Europe, and China and including in stocks estimated of cotton afloat. — \*Stocks include estimates of rubber afloat but exclude strategie stock piles; these are probably in the region of 1.5 million tons. — \*United States and Canadian mills and United States consumers. — \*Belgium-Luxembourg, Denmark, Western Germany, Netherlands, Switzerland, and United Kingdom. — \*Austria, Norway, Sweden, and Yugoslavia. — \*Belgium-Luxembourg, Western Germany, United Kingdom. — \*Austria and Yugoslavia.

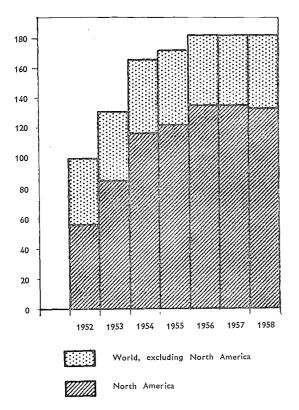
million tons (40 percent) smaller than the peak level two years ago. Elsewhere in the world cotton stocks in producing countries have tended to rise, and in importing countries to fall, but in 1957/58 the total is likely to show little net change.

The two most striking recent increases in stock levels, apart from coarse grains, are in butter and coffee. World butter stocks at the end of 1957 were over 35 percent higher than a year earlier, and may rise further in 1958 unless attempts to stimulate consumption and reduce production achieve substantial success. Stocks of other dairy products do not give rise to such serious problems.

In the case of coffee, world stocks were held at no more than a necessary working level until 1955, but began to rise in 1956 and after a temporary decline in 1957 are expected to rise still higher in 1958 as production now exceeds the effective demand at current price levels.

FIGURE II-6. Growth of Certain Key Stocks of Agricultural Products in the World and in North America 1952-58

World Stocks 1952 = 100



NOTE: Index based on stocks shown in Table II-12 only, and excluding

The movement of the aggregate volume of all agricultural stocks included in Table II-12 (in terms of price-weighted indices) is shown in Figure II-6. The estimated level of stocks in all regions at or about mid-1958 is not significantly different from a year earlier, but those in North America (about three quarters of the total) seem likely to be fractionally lower, though by not more than 1 to 2 percent. Similarly, there has been a slight decline from 1957 in the level of stocks held by the United States Commodity Credit Corporation (Annex Table 11). Total stocks included in the table and chart are equivalent to rather over 10 percent of annual world agricultural production, excluding production in Eastern Europe, the U.S.S.R., and Mainland China. Stocks held in North America are equivalent to rather more than one third of the annual agricultural output of that region.

# PRICE TRENDS IN INTERNATIONAL MARKETS AND EARNINGS FROM AGRICULTURAL EXPORTS

In spite of the continuing fall in prices of some commodities, e.g., cereals and butter, the slow general decline in the level of agricultural prices as a whole on world markets was halted in the last quarter of 1956 and the first half of 1957, largely as a reflection of the Suez crisis. The decline was resumed later in 1957 and continued in early 1958. Nevertheless, preliminary FAO indices of average export unit values and average import unit values (prices) of agricultural products as a whole were slightly higher for the calendar year 1957 than for 1956.

Indices of average export unit values are set out in Table II-13 for agricultural products as a whole and for certain groups of agricultural products, while the usual data on average unit import values (in U.S. dollars per metric ton), together with indices of import unit values, are to be found in Annex Table 12. Price movements (average unit values) for selected commodities are shown in Figure II-7.

The halt in the downward drift of agricultural prices, however, was in a sense illusory, since the purchasing power on international markets of agricultural products continued to fall because of the continuing rise in average unit values of manufactured goods. Thus, from the last quarter of 1956 to the last quarter of 1957 the UN index of average export unit values of manufactured goods (adjusted to the base

Table II-13. Indices of Average Export Unit Values (Prices) in World Markets

YEAR OR QUARTER	All agricul- tural products (1)	Food and feeding- stuffs (2)	Bever- ages and tobacco	Agricul- tural raw materials	Cereals	Edible oil and oilseeds	Meat (7)	Dairy products	Forest products	Manu- factured goods	Terms of trade
T.	(1/					·				(10)	1 1 10
										• • • • • • • • • • • • • • • • • • •	
1947	87 97	$\frac{105}{114}$	73 76	71 88	108 126	106 110	82 93	97	83 93	97	90
1949	90	102	70	88	101	106	98	113	93 81	101 95	96 94
1950	95	92	89	103	86	95	83	84	72	84	112
1951	118	103	100	157	93	122	94	93	114	101	117
$1952. \dots \dots$	102	101	99	107	100	98	102	100	107	102	101
1953	98	99 91	$\frac{101}{126}$	93 93	100	102	98	100	93	98	100
$1954. \dots	94	87	107	95	85 80	97 87	103 107	97 98	93 94	96 98	104 96
1956	92	87	101	91	77	91	104	99	95	101	91
1957 (prel.)	95	91	100	96	76	92	104	90	94	105	90
Quarterly Indices											
1954 I	99	95	115	92	90	105	100	97		97	102
<u>II</u>	104	94	135	95	87	102	99	93		97	107
${f III}$	$\frac{102}{97}$	92	138	90	82	97	103	96		96	106
J. V	97	88	123	93	81	89	111	102		96	101
1955 <u>I.</u>	99	90	117	99	82	89	109	98		96	103
$egin{array}{cccccccccccccccccccccccccccccccccccc$	$96 \\ 92$	88	109	97	82	86	103	93		97	98
$\operatorname{IV}$	92	87 86	$\frac{100}{102}$	92 92	80 77	87 87	105 111	96 103		98 99	94 93
								103	• • • •	99	93
1956 I	92	87	99	93	76	89	107	105		100	92
	91 91	88 87	$\frac{96}{102}$	92 88	77 76	$\frac{92}{92}$	$\frac{105}{102}$	94 98		101	90
IV	93	89	102	93	78	92	102	98		$\begin{array}{c} 101 \\ 102 \end{array}$	90 92
1957 I	96 96	91 91	$\frac{102}{100}$	$\frac{100}{100}$	77 76	93 94	106	88		104	93
III	95	$\frac{91}{92}$	99	95	76 76	94	$\frac{100}{107}$	86 93	• • •	$\frac{105}{105}$	91 90
IV	93	91	101	91	76	89	102	92		103	88

 $<sup>^1</sup>$  Import unit values; not included in general index for all agricultural products. —  $^2$  UN index of average export unit values adjusted to 1952-53 base.

1952-53 = 100) rose from 102 in the last quarter of 1956 to 106 in the last quarter of 1957, while average export unit values of agricultural products between these two quarters was virtually unchanged. In effect, therefore, their purchasing power for manufactured goods fell by 4 points, from 92 to 88 (1952-53 = 100).

In comparison with the base period (average of the two years 1952 and 1953) the average purchasing power in 1957 of agricultural exports as a whole for manufactured goods appears to have fallen by about 10 percent (Table II-13). About half this decline is due to lower agricultural prices and about half to the rise in prices of manufactured goods. The fall was heaviest for food and feedingstuffs, where prices fell by 9 percent and purchasing power by 14 percent. For agricultural raw materials as a whole the corresponding figures were 4 percent and 9 percent. For

the commodity group beverages and tobacco average export unit values in terms of U.S. dollars in 1956 and 1957 were almost exactly at the 1952-53 level, though much lower than the boom year of 1954 and the decline in purchasing power in comparison with the base period thus resulted entirely from the rise in non-agricultural prices (Figure II-8). It may be added that in spite of the almost continuous fall in the purchasing power of agricultural products as a whole in the last four years this is still substantially higher than during the depression of the nineteen-thirties. In comparison with the index figures of 90 for 1957 (1952-53 = 100) the average for the five years 1934-38 was exceptionally low at 64.

The averages for groups of commodities naturally conceal larger and often divergent movements for individual products. The following list, for example, sets out the average unit

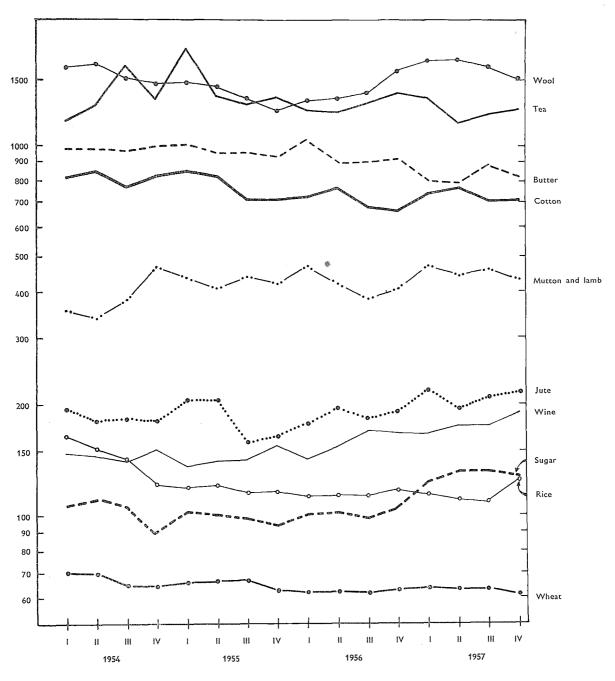
import value of some key agricultural products in 1957 as a percentage of the average 1952-53; in each case the real purchasing power for manufactured goods would be some 5 percent lower than the figures shown. It should be recalled, however, that in many instances, e.g., wool, prices in the last quarter of 1957,

and still more in early 1958, were lower than the average for 1957 as a whole (see Annex Table 12). It should also be borne in mind that in some instances, e.g., rice, the change reflects an unusually high price level in the base period, or vice versa as in the case of tea.

FIGURE II-7(a). Average Prices of Selected Agricultural Products in World Trade

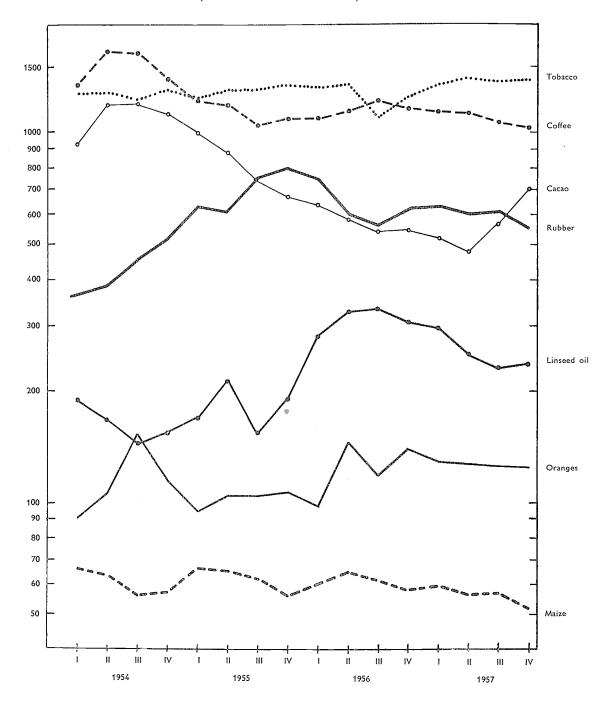
Quarterly Data, 1954-57

Export Unit Values in U.S. Dollars per Metric Ton



## FIGURE II-7(b). Average Prices of Selected Agricultural Products in World Trade Quarterly Data, 1954-57

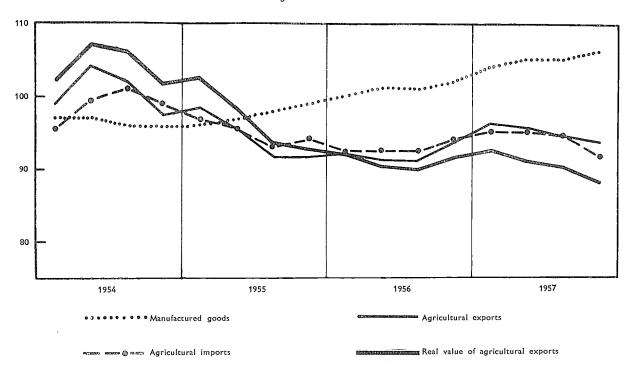
Export Unit Values in U.S. Dollars per Metric Ton



Average Unit Values of Certain Agricultural Products in 1957 as a Percentage of 1952-53 Average

FIGURE II-8. Average Unit Values of Agricultural Products in World Trade in Relation to Average Export Values of Manufactured Goods - Quarterly Data, 1954-57

Average 1952-53 = 100



#### Forest Products

International prices of forest products have remained remarkably stable since the Korean boom, and in general this stability continued during the greater part of 1957. Prices of roundwood, wood pulp and pulp products, however, began to fall in the late summer of 1957. In Europe, where international trade in roundwood is largest, prices of pulp wood and pitprops fell by some 10 percent between the autumn of 1957 and the spring of 1958, but appeared to have been stabilized at the lower level in the summer of 1958. A similar fall occurred in prices of mechanical wood pulp and the unbleached grades of chemical wood pulp. In the case of sawnwood, prices began to decline as early as mid-1956 in the United States, where by the spring of 1958 the fall had amounted to some 12-17 percent, but in Europe there was little change in prices, except that resulting from falling freight rates, until the spring of 1958. Following the weaker demand in early 1958, export prices from the U.S.S.R. were reduced by some 4-5 percent and Finnish shippers followed suit in late April. The market thus became more uncertain, and further price cuts occurred in mid-May when Soviet shippers reduced their prices by a further 4-7 percent. Other exporters then had to adapt their prices accordingly, including Swedish shippers who had previously maintained their prices. No immediate recovery seems likely in view of the continuing weakness of demand.

## Earnings from Agricultural Exports

Earnings of foreign currency from agricultural exports naturally depend on the volume of exports as well as the price level, or rather the price level in relation to the prices of the goods which are imported in exchange, and a number of exporting countries in recent years have endeavored to compensate for less favorable prices by larger exports. The volume of exports has also been increased by surplus disposal operations and in other ways. How far in any particular case a larger volume of exports results in larger earnings naturally depends on, e.g., the strength of the demand for the commodity in question, and the competition met from other exporters or from domestic production in importing countries. The over-all position is examined below.

Table II-14. Volume and Real Value of Agricultural Exports by Main Commodity Groups 1952-57

COMMODITY	1952	1953	1954	1955	1956	1957 (prel.)	
All agricultural products							
Volume		102 102	102 106	108 104	118 107	120 108	
Food and feedingstuffs				]			
Volume		102 103	104 98	112 99	123 107	125 108	
Beverages and tobacco							
Volume		104 108	98 127	107 115	116 116	113 108	
Raw materials							
Volume		101 97	101 99	103 102	112 102	116 109	

<sup>&</sup>lt;sup>1</sup>Total export earnings (f.o.b.) of all agricultural exporters, deflated by UN index of average unit export values of manufactured goods. — <sup>2</sup>Excluding exports from Eastern Europe, the U.S.S.R., and Mainland China.

Because of the gradual decline during the past four years of average export unit values of agricultural products, and still more in their purchasing power, the recent sharp rise in the volume of agricultural exports has not, of course, been accompanied by a corresponding increase in earnings by agricultural exporters. Thus, for agricultural products as a whole the increase of 20 percent in the volume of exports in 1957 over 1952-53 resulted in an increase of only 8 percent in earnings (in real terms). For food and feedingstuffs, where the fall in prices was sharper, an increase of 25 percent in the volume of exports also produced a rise of only about 8 percent in real earnings. For the two commodity groups beverages and tobacco and raw materials, the fall in prices in comparison with 1952-53 has been smaller, and the disparity between the growth of exports and the growth of earnings correspondingly reduced. But for the beverages group, and especially for coffee and cocoa, export earnings are, of course, far below the peak year 1954.

Comparisons of the growth of the volume of exports with the growth in real export earnings are made in Table II-15 and Figure II-9 for each region of the world, as well as for the less and the more economically developed regions combined and for the world as a whole. It is seen that there is in nearly every case

a consistent general pattern: a widening of the gap in recent years between the indices of export volume and real export earnings due to the lagging behind of the latter index. The disparity is particularly marked for Latin America and Africa, where the fall in prices of coffee and cocoa from the high levels of 1954 had a profound effect. An exception is the Near East, where rising prices of Turkish tobacco and Egyptian cotton have offset lower prices for cereal exports. It may be added that since the indices cover mainly unprocessed foodstuffs they are somewhat less complete for the more developed regions than for the less developed regions, since the former are exporting increasing quantities of, e.g., processed fruit and vegetables, which are not included. In particular, both the volume and value indices of exports from North America, which also exclude exports under the "relief and charity programs," would be somewhat higher if the coverage had been comprehensive.

The figures in Table II-15, as all other tables of the total and unit values of international trade, include sales for foreign currency and other surplus disposal shipments at the dollar equivalents of the values shown in the trade statistics of the exporting and importing countries. It is of interest that if the shipments under special programs set out in Table II-9

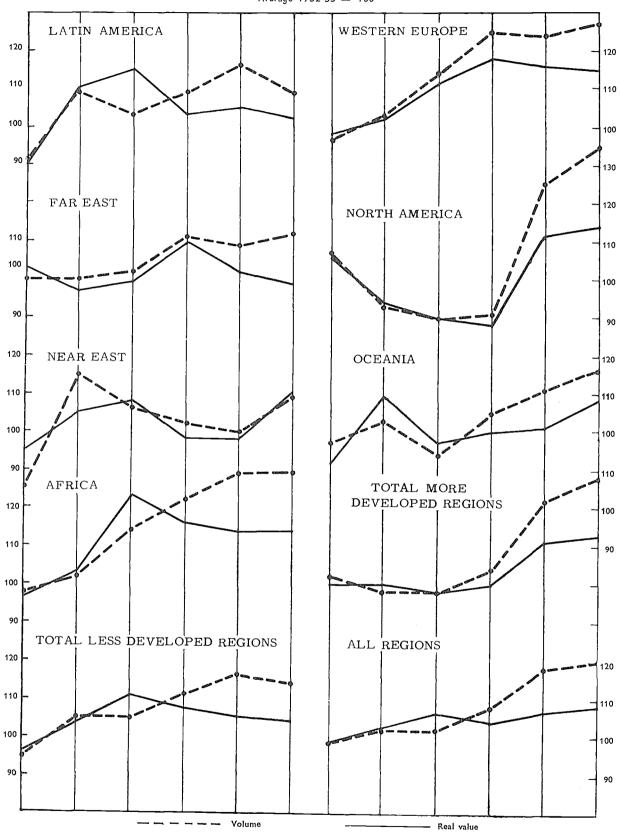
TABLE II-15. VOLUME AND REAL VALUE OF AGRICULTURAL EXPORTS

REGION		1952	1953	1954	1955	1956	1957			
All Regions (excl. Soviet bloc)										
Volume	•	98 98	102 102	102 106	108 104	118 107	120 108			
More Developed Regions	!									
Volume		102 100	98 100	98 98	104 100	122 111	128 113			
Less Developed Regions										
Volume		95 96	105 104	105 111	111 107	116 105	114 104			
Western Europe					,					
Volume	: :	97 98	103 102	114 111	125 118	124 116	127 115			
North America										
Volume	· ·	107 106	93 94	90 90	91 88	125 112	135 114			
Oceania										
Volume		97 92	103 109	94 97	105 100	111 101	116 108			
Latin America										
Volume		91 90	109 110	103 115	109 103	116 105	109 102			
Far East										
Volume		100 103	100 97	$\frac{102}{99}$	111 110	109 102	112 99			
Near East										
Volume		85 95	115 105	106 108	102 98	100 98	109 110			
Africa										
Volume		98 97	102 103	114 123	$\begin{array}{c} 122 \\ 116 \end{array}$	$\frac{129}{114}$	$\frac{129}{114}$			

above were excluded, the indices of the real value of world agricultural exports in 1955, 1956, and 1957 would be reduced to 97, 98, and 99, respectively, while those from the more developed regions would fall to 82, 86, and 92 in the same years. It thus appears that the more rapid growth of agricultural exports from the more developed countries in recent years, and indeed the expansion of agricultural ex-

ports as a whole, has been largely the result of surplus disposal operations, though it cannot of course be assumed that none of these shipments would have been made if facilities for exports under special terms and other measures to stimulate exports had not been available. The relation of special program exports to total United States agricultural exports was shown in Table II-9 itself.

FIGURE II-9. Volume and Real Value of Agricultural Exports by Regions  $Average \ 1952-53 = 100$ 



## GENERAL ECONOMIC CONDITIONS AND THE DEMAND FOR AGRICUL-TURAL PRODUCTS

In mid-1958 the world economic situation and outlook is dominated by the recession in the United States and uncertainties as to future developments in that country. Economic progress has also slowed down in most other industrial countries and in some a decline has set in, though in no case as sharply as in the United States. Slackening business activity in the industrial countries has inevitably affected the less developed ones and, indeed, all countries substantially dependent on agricultural or other primary exports. The weaker demand for their export products has accelerated the falling trend of prices for most basic commodities and reduced their earnings. ready vulnerable through long-standing balanceof-payment difficulties, these countries have had to scale down their development plans and often to reimpose or strengthen restrictions on imports. These measures are beginning to react back on the industrialized countries, where the slowdown in economic activity originated, and to increase their difficulties. While the Communist group of countries is not greatly affected by changes in the level of business activity in the rest of the world, they have other difficulties, notably in the agricultural sector, as is discussed elsewhere in this report.

The recession in North America originated from a reduction in private business investment, a trend also apparent in other industrialized countries. Until early 1958 most of these countries were following anti-inflationary policies which necessitated restraints on both private and public investment. At the same time, less favorable business prospects and expectations of lower prices led to a reduction of inventories. The smaller demand for both investment goods and stocks was reflected in reduced industrial production. In the United States it had already fallen, by May 1958, by more than in either of two preceding recessions in 1948-49 and 1953-54. Even in countries where industrial production has not yet declined and where unemployment remains at a low level, working hours have generally been shortened. Labor earnings have thus been reduced and accustomed annual pay increases often foregone. The lower level or slower growth of consumers' incomes has so far had little or no influence on purchases of food in the industrialized countries and has mainly affected purchases of consumers' durables and private house building.

Anti-inflationary policies are now being rather generally modified. In the first half of 1958 a number of countries, including the United States, the United Kingdom, Western Germany, the Netherlands, Belgium, Italy, and Deumark, made credit easier and cheaper as a means of stimulating private investment and, in some countries, consumer purchases as well. The extension of provisions for unemployment relief in the United States will also tend to maintain consumers' purchasing power. More potent measures, such as tax reductions or extensive public works, are also being put into operation in some countries.

The fall in prices on export markets of agricultural products (discussed elsewhere) has contributed to the improved terms of trade of the importing countries, but the worsening balance-of-payment position of exporting countries is evident in sharp falls in the free market exchange rates of the currencies of many agricultural exporting countries. In the twelve months ending February 1958 the Uruguayan peso went down by 25 percent, the Brazilian cruzeiro by 33 percent, the Colombian peso by 12 percent, and even the normally stable Peruvian sol by 6 percent. In the Far East the deterioration in the terms of trade is the most disturbing feature in addition to reduced export volumes. Burma, Ceylon, the Federation of Malaya, Pakistan, and the Philippines all lost substantial amounts of their foreign exchange reserves due to price falls of agricultural commodities, a situation which was aggravated in Indonesia by political unrest. The worsening of the terms of trade forced India to a reduction of planned capital expenditure under the second Five-Year Plan, and even current industrial production had to be reduced as industrial materials, too, became subject to import restrictions imposed for balance-of-payment reasons.

In Oceania, Australia's earnings from sales of wool in the first nine months of the 1957/58 season were down by more than 20 percent compared with the previous season, and total export earnings in 1957/58 are expected to be reduced by 15 to 18 percent, leaving just enough to cover the estimated import bill. New Zealand expects its export earnings in 1958 to be lower than in 1957 by over 15 percent, necessitating substantial import restrictions.

Contrary to the fall in demand and prices on export markets, the demand for domestically produced foodstuffs, and in general for agricultural raw materials, has been well maintained in both industrial and less developed countries. Support measures have contributed to the general stability of domestic prices. Moreover, past experience suggests that in hard times consumers economize first on durable goods and only later, and as a last resort, change to a simpler or smaller diet. The repercussions of the slackening of economic activity on agriculture have thus been largely concentrated so far on some sectors of the export trade. The area affected may, of course, enlarge considerably if the recovery of the world economy does not come fairly soon.

### Short-Term Outlook

So far as North America is concerned there are as yet (June 1958) no signs of a pending turn of the economic tide, and none of the principal economic indicators point to an early recovery. The only counteracting forces yet visible are the efforts of governments to reverse the downward trend and these are likely to be strengthened if monetary and fiscal measures prove insufficient. Increased government expenditures, e.g., for public works, increased financial aid for private housing, and measures to encourage private investment have already been provided for in the United States. Similar measures are likely to be adopted in Canada.

In Western Europe some governments, including Norway, the Netherlands, and the United Kingdom, have started programs of public works or have reduced taxes to prevent the slowing down of business activity from hardening into a recession. But there are growing fears that this may happen if the North American recession is long continued. Shrinking foreign orders presage a further fall in exports, and the emergence of surplus supplies of, for example, coal and steel has already affected prices. If, as is likely, this reacts in turn on prices of other products, their present advantageous terms of trade would become less favorable and balance-of-payment difficulties may again emerge.

While government measures may well prevent any further worsening of the situation, a real recovery must await a revival of inventory accumulations and business expansion. Further reductions in inventories in North Amer-

ica are perhaps unlikely, but the rebuilding of stocks will depend on a revival of business confidence. Private investment, however, may decline even further. Studies of business plans in the United States indicate a decline of about 17 percent in 1958 from the previous year's level and a further decline of about 8 percent in 1959. In Canada the fall in investment in 1958 is of the order of 10 percent. In Western Europe, too, expenditures on industrial plants and equipment are tending to fall. The outlook for 1958/59 in the industrial countries thus seems, at the best, to be the maintenance of the level of economic activity of early 1958.

The demand for domestically produced agricultural products in these countries should remain fairly strong, as consumers' incomes are not likely to be reduced to an extent that would materially affect expenditures on food and clothing. For agricultural exporting countries, however, the prospect of a delayed recovery may further reduce foreign demand and export earnings and aggravate their precarious balance-of-payment position. They may not, in 1958/59, be able to restore imports and investment expenditures to their former levels. This, in turn, would be likely to slow down the expansion of demand for agricultural products on their domestic markets.

It is generally expected, however, that the anti-recession measures of the industrialized countries will stop the downward trend and that some time in 1959, at the latest, a renewed expansion is probable. Given the underlying growth factors of a rapidly increasing world population and the universal drive toward increased industrialization and higher living standards, recovery is generally considered unlikely to be long delayed, and when it comes it may well be rapid.

#### PRICES AND THE FARMER

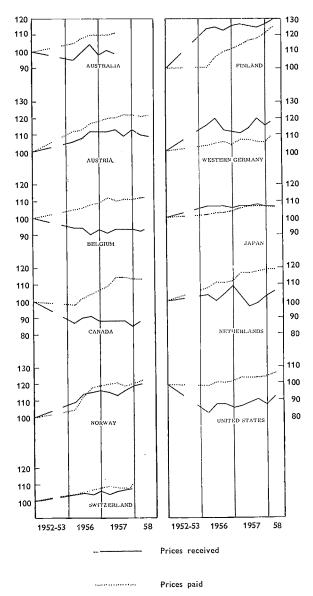
Data on relations between prices paid and received by farmers are available for rather few countries, among which no underdeveloped countries are included. In some of these countries there was a fairly strong movement against farmers in 1957 and early 1958, either because prices received fell or prices paid rose, or a combination of both. This was the case in, for example, Australia, Belgium, Canada and Finland. In some other countries, including the United States, Germany and Japan, the relation between prices received and paid

remained fairly constant. In mone of the countries for which there is information was there any definite improvement in the ratio (Figure II-10).

Canadian farmers experienced a price squeeze partly on prices paid and partly on prices received. In the early months of 1957, prices paid continued to rise as they had done throughout 1956. In the second part of the year, however, prices paid by farmers became fairly stable, but prices received started to fall, though they turned upwards again in early 1958. Taking the year as a whole, the relationship

FIGURE iI-10. Index of Prices Received and Prices Paid by Farmers

1952-53 = 100



of prices paid to prices received was between 5 and 10 percent less favorable to Canadian farmers in 1957 than in 1956, and this trend continued into 1958.

By contrast, this relationship in the *United* States was only very slightly less favorable to farmers in 1957 than in 1956 and in the first quarter of 1958 there were signs of improvement, though this may be temporary. Prices paid by farmers were remarkably stable, there being no change in the index from March to October 1957. Prices received trended upwards until August and then, after some months of weakness, rose again early in 1958. By March, the relationship was about as favorable again as it had been in 1954 and 1955. It is not clear how long farmers will continue to benefit from the recent movement of prices received in their favor. Some factors, such as the effect ot frost on the Florida citrus crop, are clearly very temporary, but others, such as the relative shortage of livestock products, may last longer.

In Europe the most important factor in price relationships for farmers appears to have been the rise in prices paid. This may seem surprising in view of current surplus difficulties, but is largely explained by support measures which stabilize the prices farmers receive, while the prices they pay have been largely left to find their own level. Thus the squeeze on farmers, where it occurred, was mostly from prices paid, which in many countries continued their steady upward movement, while prices received remained fairly stable. Austria, Finland, the Netherlands, and Norway, all experienced price movements which left farmers worse placed in the first quarter of 1958 than in the first quarter of 1956, though in some cases, e.g., the Netherlands and Norway, there were some signs of recovery during 1957, mainly because the rise in prices paid slowed down. In Germany movements in prices were rather indefinite, but the rise in milk prices late in 1957 restored some of the ground lost by farm prices.

Outside North America and Europe, there is information for only two countries, Japan and Australia. The data for Australia show a fair degree of stability in the relationship of prices paid and prices received during 1956 and the first six months of 1957, but indices are not yet available for late 1957 when the fall in wool and wheat prices occurred. Farm prices in Japan continued to manifest the stability which has been a feature of that country in recent years, though, as a result of a slight

increase in prices paid, the relationship was a little less favorable to farmers in 1957 than in 1956, and this continued into the early part of 1958.

One notable feature about farm expenditure is that, in spite of the rise in unit costs, farmers have continued to use more by quantity of the goods and services needed to carry on production, with the exception of agricultural labor. Further information is given in a later section on farm requisites.

## Price Levels in Different Countries

As noted above, the greater stability of farm prices in recent years than before the war largely reflects the general adoption of price supports for a wide range of products. But price supports developed independently in each country, usually in agricultural economies already distorted by prewar tariffs and postwar inflation. It was probably inevitable therefore that support prices in different countries should have been established at widely different levels, if converted to a common currency. The wide range of prices for the same product from country to country does not necessarily reflect differences in purchasing power. In large measure the prices are the outcome of fixed official exchange rates, which in many countries differ appreciably from those which would be established on a free currency exchange. Nevertheiess, since these are the exchange rates applicable to most international transactions, the wide range of prices in dollar equivalents (or other common currency) frequently necessitates tariffs, quotas, or other means of regulating market supplies or prices, especially where the level of prices to the domestic producer is officially guaranteed.

Because of these repercussions on international trade, considerable interest attaches to the comparisons of average returns to farmers in different countries for some main agricultural products in Figures II-11 and II-12, and in Annex Table 13. In all cases these have been converted to U.S. dollars per metric ton at official exchange rates.

It should be noted that the figures used in the tables and charts are not strictly prices, although referred to as such below. They represent as nearly as possible the average return per ton to farmers for all grades marketed, and include not only the actual price received but also any additional receipts from subsidies, bonuses or other agricultural support payments. However, for these reasons they are probably more adequate indicators of the real situation, both as regards international trade and a country's internal price structure, than price quotations for one particular grade.

The wide range of prices shown by tabulations is striking, even if some of the extremes are omitted. For example, in the case of wheat only 13 of the 21 countries for which data are available had average returns within  $\pm$  15 percent of the median price in 1956/57, while in 4 countries average returns differed by over 30 percent. Yet wheat is one of the commodities for which the price range is smallest. For milk, only 7 out of 18 countries had average returns within 15 percent of the median price. For potatoes, where the range is rather wide, in only 8 countries out of 18 were average returns within 15 percent of the median price, while for 8 the difference was greater than 30 percent.

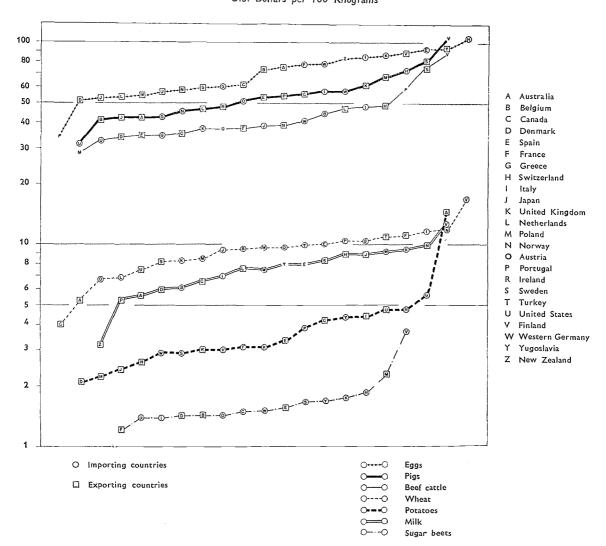
Figure II-12 shows average returns to farmers for wheat in 1955/56 and 1956/57 in relation to average import unit values e.i.f. In the latter year, in only 2 countries (both exporters) out of 21 were average returns to farmers lower than the average world import unit value, while in 11 countries they exceeded it by over 50 percent. This group included two substantial exporting countries, while in one other large exporting country average returns to farmers exceeded average world import unit values (c.i.f.) by nearly 20 percent. For most commodities, however, most exporting countries fell toward the lower part of the price range, though, as noted above, there were striking exceptions.

Although some countries appear to have generally high or generally low prices, there is no great measure of consistency. For example, returns to farmers in the United States were among the lowest for beef cattle and pigs, but were near the upper end of the scale for milk and potatoes. Prices for wheat and milk were particularly low in Australia, but above average for eggs and particularly high for potatoes. In the United Kingdom, prices of wheat appear to have been relatively low and of milk, eggs, and pigs relatively high.

It is notable that the price relationship between commodities varied a good deal from country to country. For instance, in France the price of eggs was about 9 times that of wheat in 1954/55; thereafter the price of eggs

FIGURE II-11. Average Returns to Farmers for Selected Commodities in Various Countries, 1956/57

U.S. Dollars per 100 Kilograms

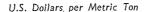


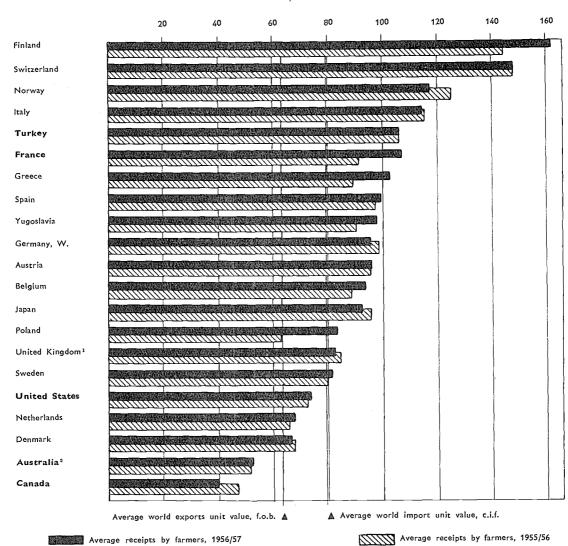
fell and the price of wheat rose, so that by 1956/57 eggs were only 7 times more costly than wheat. In the United Kingdom, on the other hand, although the price of eggs was also 9 times higher than wheat in 1954/55, the wheat price then fell and the egg price rose, to become 10 times higher than wheat.

Many examples of similar discrepancies in price movements within countries could easily be found. The explanation for them lies in the position of the individual country as an importer or exporter, its agricultural structure and the specific aims of the price support policies, in particular whether the policy aims at support for certain individual key commodities or for all commodities in general. For instance, in Italy great emphasis is laid on wheat prices,

which were maintained at a high level despite growing domestic supplies and, eventually, the need to dispose of subsidized exports. The same appears to be true of France, where wheat prices stayed high while prices of other cereals fell. In this connection there appear to be some significant similarities between price developments in the two major European food-importing countries, the United Kingdom and Western Germany. A major difference is that in the latter country milk prices have been rising steadily, while in the United Kingdom there has been a downward trend since 1954/55. This may, however, merely reflect a movement toward a more realistic price relationship for milk in both countries; in the United Kingdom the milk price was not only high by comparison

FIGURE II-12. Wheat (All Grades): Average Receipts by Farmers in Selected Countries, 1955/56 and 1956/57, and Average World Unit Values of Exports and Imports, 1956/57





NOTE: Net exporting countries are in bold type \*Including receipts from deficiency payments. — \*Data for 1954/55 and 1955/56.

with the world level but also high domestically, e.g., in 1953/54 the United Kingdom milk price was nearly 115 percent of that of wheat, whereas in Germany it was only just over 60 percent. In 1956/57 the relationship in the two countries was about 110 percent and 80 percent, respectively. On the other hand, in both countries beef cattle prices have been rising, while wheat prices have shown a declining tendency. This would be in line with the general development of the world agricultural situation. The figures available, however, do not cover a long enough period to show up significant long-term trends.

## FARM INCOMES

Taking the more developed countries of the world together—the only ones for which there is adequate information about farm incomes—the decline in income in the last year has not been so drastic as might have been expected from the difficulties in finding markets for a growing volume of production. But there is a notable contrast between the countries where production is mainly for domestic consumption and those where a sizeable proportion goes for export. In nearly all the exporting countries,

including the United States, farm incomes tended to decline in spite of the extensive income support measures built up over the last few years. In most importing or self-sufficient countries, however, it appears that on the whole government measures to support farm incomes were reasonably successful - in Germany and the United Kingdom there was even some rise — at least as far as absolute level is concerned, though not by comparison with incomes in other sectors of the economy. It is, of course, easier for a nonexporting country to maintain the level of farm income. But action taken by one country tends to encroach upon the room for maneuver of other countries, and it is an open question how much longer income supports in general can continue to hold, since there are not many unexplored possibilities left for further support measures.

It is difficult to isolate any predominant cause for the movements in farm incomes, and the effect of a change in prices on the prosperity of individual farmers varies a good deal according to the structure of agriculture in a particular country. Experience in recent years has been that total farm expenditure has risen faster in percentage terms than total farm receipts. Where expenditure is low in relation to receipts, however, the total increase of expenditure is often less than the total increase of receipts, and there has been some increase of net income. But where farm expenditure is high in relation to receipts, rises in costs more easily offset expansion of gross income, and bring about stability or even reduction of net income at current prices, as has happened in the United Kingdom in past years. This is another aspect of the difficulty, stressed in other parts of this report, of maintaining incomes without increasing output.

Two other factors complicate the situation, namely changes in the number of farmers sharing the global net income, and changes in the amount of non-farm income earned by farmers. For example, in the United States both factors combined to mitigate the effect of the long decline in global net farm income experienced from 1951 to 1956.

Turning to the *United States*, gross agricultural incomes in constant (1947-49) dollars remained unchanged from 1956 to 1957 at 24,500 million dollars, or 15 percent above the average for 1947-49. For the last two or three years changes have been small in comparison

with the strong secular rise in evidence in earlier years. Farmers' realized net income in 1957 was 11,500 million dollars, down a little over 500 million dollars or 4 percent from 1956. Even with marketings a little lower in 1957 (30,000 million dollars) than in 1956 (30,400 million dollars), realized gross farm income remained unchanged at 34,400 million owing to a substantial increase in government payments to farmers. Farm production expenses, however, tended to edge upward (from 22,300 to 22,900 million dollars) causing the above-mentioned decline in net income.

The income situation in 1958 depends on the relative strength of several factors. Prices received by farmers rose rapidly in the early part of 1958, but the average level in 1958 may be much the same as in 1957. The volume of production and sales is likely to rise. On the other hand, expenses are continuing to rise, but this may be offset by government payments which are expected to be still larger in 1958 than in 1957. The chances are that income will be much the same or perhaps a little higher in 1958 than in 1957.

In Canada, agricultural income did not rise and was an important exception to the general advance in national income in 1957. Total farm cash income in the year is estimated at 2,535 million dollars, about 5 percent less than in 1956. Prices of goods purchased by farmers, however, were again higher in 1957 and final estimates will probably show that farmers' net income was less than in 1956. Agricultural labor income also showed a decline in the last months of 1957 as compared with the same period of 1956. On present indications, the main cause of the decline in incomes was a fall in the volume of wheat production and in wheat prices, especially in the Prairie Provinces. However, up to now, receipts have been calculated only on the basis of preliminary average prices, which may be revised later.

The particular income situation of individual European countries has depended on the national pattern of agricultural production, the degree of dependence on foreign markets, and the harvest of the year. Some details for individual countries are given below.

In Western Germany the volume of farm sales in 1957/58 was about 15 percent above 1956/57. Receipts, including subsidies, rose considerably more. In spite of greater expenses the cash balance (cash receipts minus current expenditure) was estimated to be 14 percent

above the preceding year. Freliminary estimates for the United Kingdom show that in 1957/58 the previous falling trend of farm incomes was reversed, net income rising by just under 10 percent above 1956/57 in spite of a rise of 11 million pounds sterling in expenses, which, however, was the smallest for many years. The most striking feature about the movement in farmers' net incomes in recent years is the rise in support costs, which were 206 million pounds in 1955/56, 240 million pounds in 1956/57, and 290 million pounds in 1957/58. This rise has occasioned concern to the government and has led to a revision of support price levels.

In Denmark, however, where farmers' income depends largely on the development of export markets, farmers' income has shrunk. The value of total production in the agricultural sector fell from about 7,200 million kroner to about 6,900 million, although the volume of production rose by nearly 10 percent. The sales value of animal products declined by 2 percent in 1957 as compared with 1956, while the volume increased by 7 percent. There was, however, a partially compensating fall in expenses, and the net agricultural return (i.e., including wages) fell only from 5.4 million kroner to 5.2 million.

Farmers had a fairly favorable year in France as regards income. Production was at a fairly high level, except for wine; prices of many products tended to rise; and farm stocks of some foodstuffs carried over from previous years were reduced. Net income again rose, by 11 percent if receipts from liquidation of stocks are taken into account, or by 2.5 percent if these are omitted. The net product of agriculture and forestry in Italy together rose from 2,480,000 million lire in 1956 to 2,515,000 million lire in 1957. From the point of view of the agricultural industry only, there was a slight increase in the volume of output, relative stability of prices, but a continuation of the previous rising trend in expenses. This increase represents growing industrialization of agriculture, plus higher wage expenditure in spite of a further decline in the number of agricultural wage earners.

Both Australia and New Zealand have suffered from the attempts of other countries to maintain farm incomes. In Australia, a fall of about 8 percent in the volume of production was superimposed on adverse movements in export prices, and net farm incomes fell by more than 25 percent to the lowest level since

1948/49. In New Zealand, there was no such fall in the volume of production; nevertheless, preliminary estimates show that the income of the agricultural industry has fallen by some 10 percent, though the effect on farmers was somewhat mitigated by the distribution of stabilization funds. The approaching exhaustion of the dairy fund, however, poses a difficult problem.

Preliminary figures for Southern Rhodesia show that the net income of European farmers was about 9 percent lower in the year ending September 1957 than in the previous year, which was a particularly favorable year. The volume and value of output showed very little change, while total operating expenses continued their persistent rise, an increase shared by all the major items, such as wages, fertilizers, machinery expenses, and feed

In countries in the Soviet bloc, farm incomes on the whole seem to have risen. A change in government policy resulted in increased monetary incentives being offered to agricultural producers and compulsory delivery quotas were decreased during the past year. Consequently, there was a general increase in the value of agricultural output reinforced by the effect of good weather on the volume of production.

In *Poland*, the income of the agricultural population is reported to have risen by some 30 percent from its 1956 level of 32.6 million zlotys, against a planned increase of about 22 percent. Similarly, gross receipts of farmers in *Hungary* in 1957 were 14 percent above those of 1956, receipts from sales to the State being 27 percent higher and from sales on the free market 10 percent higher. Increased farm incomes are also reported from Eastern Germany, Romania, and Bulgaria.

## CONSUMER PRICES

The upward trend of retail food prices continued in 1957, although there were some indications that the efforts of governments to contain such increases may have been rather more successful than in 1956. Indices of the movements of retail food prices in 1957 are available for 89 countries. In 69, the index rose to a greater or lesser extent, and in only 20 was there stability or some decline. No more than six countries showed no rise in retail food prices in either 1956 or 1957. Where prices fell in 1957 the decline was usually of

Table II-16. Movement of Retail Food Price Indices in 1957 in Comparison with 1956 in More and in Less Developed Countries

	Total	Of which	Of which	Rise in 1957 compared with rise in 1956			
Ітєм	number of countries	no rise in 1956	also a rise in 1956	Slower than 1956	About the same	Faster than 1956	
			Number of	f countries			
All countries							
Rise in 1957	69	7	62	20	17	25	
No rise in 1957	20	6	14		190000		
Less developed countries							
Rise in 1957	50	7	43	14	17	12	
No rise in 1957	15	6	9		William Annual		
More developed countries							
Rise in 1957	19	Brisher room	19	6		13	
No rise in 1957	5		5				

only 1 or 2 percent, though there were more pronounced falls in Viet-Nam (8 percent), Denmark (5 percent), Ghana (4 percent) and the Belgian Congo (3 percent). In only seven countries in 1957, however (against 21 in 1956), was there a renewal of the rising trend of food prices after stability or a decline in the previous year.

Of the 62 countries where retail prices rose in both years, the rate of increase was slower in 1957 than in 1956 in 20 cases (including India, Taiwan, Southern Korea, Bolivia, Brazil, Paraguay, Cyprus, Iceland, and Sweden) and faster in 25 countries (notably in Argentina where the index rose by 34 percent against 14 percent in 1956, Colombia, Uruguay, Pakistan, Malaya, Egypt, French West Africa, and Spain). There was also a somewhat faster rise in retail food prices than in 1956 in Canada, the United States, Ireland, Luxembourg, and the Netherlands (Table II-16).

Food prices, on the whole, kept quite closely in line with the movement of the general cost of living. In 29 of the 84 countries for which comparable data are available, the cost of food rose more, and in 37 countries less, than retail prices generally, but in most instances the deviation was small, exceeding 2 percent in only 12 countries. The faster increase in food prices was pronounced in Argentina and Chile (9 percent divergence), Burma and Colombia (5 percent), Pakistan and Uruguay (4 percent).

Countries where food prices lagged substantially behind the general cost of living were: Brazil and Denmark (7 percent), Ghana and Nicaragua (4 percent), New Zealand and Norway (3 percent).

From the analysis in Table II-16 there appears to have been no striking differences in retail food price trends in the more and the less developed countries in that rather more than three quarters of the countries in each group showed a rise in prices during 1957.

In both groups of countries supply and demand factors were important. For example, the unfavorable effect of weather on supplies of fruit and vegetables, and the smaller output of beef and pork in the United States contributed to the continuing rise of retail food prices in North America, which amounted to 3 percent in the United States and 4 percent in Canada. In Japan, the smaller wheat and barley crops appear to have contributed to a rise of 4 percent in the retail food price index following two years of decline. Reduced supplies from smaller crops also affected price levels in, e.g., Malaya, Pakistan, and Colombia.

In Australia, New Zealand, and Denmark, where domestic prices are closely linked to export prices, the effects of the acute surplus situation developing in the dairy sector during the past year were clearly visible. In all three countries a continued upward trend of the cost of food during the last six years was reversed, and in Denmark retail food prices dropped

by as much as 5 percent. It is now, however, rather rare to encounter such a reaction to a surplus situation. In recent months a number of Western European governments, faced with an oversupply of milk and milk products, and trying to steer a course between the conflicting objectives of supporting farm prices and incomes, and avoiding still higher consumer prices likely to reduce consumption, have chosen different solutions.

Reductions in consumer prices for butter and cheese in the Netherlands and for butter in Sweden (where it applies only during the period of peak production) were decided on in the spring of 1958 in order to stimulate consumption and to reduce the risk of surpluses. In Sweden the cost is largely to be carried by producers, while in the Netherlands, where consumption has in consequence increased sharply, the lower prices involve a State subsidy. In Switzerland, too, increasing subsidies cushion the impact on producers of lower consumer. prices, and additional funds may have to be voted for this purpose. In Germany, on the other hand, higher prices, partly subsidized, have led to larger milk deliveries by farmers and some increase in distribution costs has been allowed. Consumer subsidies, however, are to be abolished under a policy of "true prices" adopted in late 1957, and the consumer will thus have to carry the whole price increase.

Similar "true price" policies were also adopted in France in the autumn of 1957 and, to a limited extent, in Norway in March 1958. In France and Germany this policy involved the removal of a bread subsidy. In Norway food prices had been maintained fairly stable during 1957 as a result of higher subsidy payments, but in 1958 subsidies are to be reduced from 800 million kroner to about 500 million kroner. In all three countries the result is a more or less pronounced rise in the cost of food, and any subsequent downward adjustments of food prices as a result of declining demand would be difficult because of farm price and income guarantees.

In contrast to higher-income countries larger supplies from domestic output or imports still appear to be readily reflected in consumer prices in other parts of the world. For example, larger wheat crops in Portugal, Syria, Turkey, and Yugoslavia helped to slow down the rise in food prices in 1957. Similarly, larger supplies from both domestic output and imports,

including those under the surplus disposal program, led to a reversal of the upward price trend in El Salvador, Guatemala, and Venezuela, and to a continuation of the downward trend in food prices in Ecuador, Honduras, Nicaragua, and Panama. In Brazil, the rise in food prices declined to 12 percent in 1957 from 23 percent in 1956, and compared with an increase of 19 percent in the general cost of living. This appears largely the result of considerable imports of wheat and dairy products under the surplus disposal program, though the decline in foreign exchange earnings and the slowing down of general economic development is likely to have reduced demand.

Factors influencing food demand, in particular the magnitude of development spending and the wage policy, and all measures directly affecting food prices, such as the discontinuation of consumer subsidies or the control of retail prices, play an important part in the course of food prices. For example, the sharp rise in food prices in 1957 in Argentina and Uruguay of 34 and 17 percent, respectively, was largely the result of relaxations in food price controls, discontinuations or reductions in consumer subsidies and simultaneous wage adjustments, increasing the pressure of demand at a time when supplies were restricted to some extent by efforts to expand exports.

Another important factor influencing retail food prices, particularly in the more developed countries, is the continuing rise in distribution margins, mainly as a result of higher costs and more elaborate processing and distribution services. For example, in the United States, the only country where detailed estimates of distribution costs are regularly published, there was a rise from 1956 to 1957 of 35 dollars in the cost of the so-called "farm food market basket." Only 10 dollars, however, represented the increased farm value of food, resulting largely from the temporary shortages of fruit, vegetables, and meat, while 25 dollars represented the increase in the farm/retail spread. It would be valuable if similar statistics were compiled regularly in other countries. In Sweden retail food stores announced in early 1958 that they would reduce by 5 percent the retail prices of over 2,000 food items because of continuous improvement in the efficiency of the wholesale and retail trade. But this appears to be an isolated case.

On the whole, there has been little regularity in food price developments in underdeveloped countries in recent years. Their level depends to a great extent on unpredictable factors, such as the size of the crop and, in deficit countries, on foreign exchange earnings, as well as on the adequacy and timing of anti-inflationary policies and measures. But the increasing reliance in underdeveloped countries on food imports under the special arrangements of the surplus disposal programs as a means of counteracting emergency situations, as well as to build up buffer stocks, and perhaps also more adequate and consistently applied food price policies, constitute stabilizing factors of steadily increasing importance.

In the more developed countries there are strong underlying factors tending toward higher food prices, especially the growing comprehensiveness and complexity of farm price and income supports, and the steadily mounting cost of food distribution. While productivity in agriculture and in the distributive trades has increased rapidly, these advances do not appear to have been passed on to the consumer to any substantial extent. The forces tending to drive prices up are still strong and it would seem premature to assume that a period of greater stability of consumer prices in the more developed countries is yet in sight.

## FOOD AND AGRICULTURAL PROB-LEMS AND POLICIES IN 1957/58

The problems of food and agriculture and the policies adopted to meet them in the more industrialized countries and in the economically less developed countries of the world, respectively, continued to diverge in 1957/58. In the economically more advanced countries the difficulties were increasingly those of surplus. In the less developed countries, on the other hand, food shortages persisted and in some instances became more acute despite efforts to expand production. Some countries had to increase their food imports and in some there was a sharp rise in food prices. The reasons for this dichotomy are increasingly recognized, but it may be useful to review them briefly before discussing the main food and agricultural problems and policy developments in each region of the world.

In the more industrialized countries, where incomes and consumption levels are already fairly high, further increases in income lead to relatively small increases in the demand for food and other agricultural products. More-

over, much of the increase in demand which does occur is absorbed by more elaborate processing or distribution services, and only a relatively small part is transferred back as increased effective demand at the farm level. The relatively high cost of food to consumers as a result of widening marketing costs and price supports may be presumed to limit the volume of consumption and in some cases appears to have led to an actual decline. On the other hand, the improved agricultural methods now widely adopted in these countries, aided by the greater financial stability of agriculture as a result of price supports, have led to a marked increase in production, and one which could be readily stepped up further if markets were available. Starting in North America, problems of agricultural surplus are spreading to more and more of the economically developed countries.

The slow growth of demand in the industrialized countries and the technical possibilities of readily expanding their domestic production of certain commodities naturally affect not only the farmers in the countries themselves, but also those in other countries, at all stages of economic development, who are dependent on agricultural exports to the industrialized countries. The effect is all the more marked because of the slow growth of population in some of the traditional food-importing countries. For some commodities indeed the market for imports in these countries is tending to shrink. This applies mainly to commodities where production in the importing countries themselves is rising more rapidly than demand (e.g., pig meat and milk products), where high consumer prices tend to limit demand (e.g., milk and meat), where the market is encroached on by substitutes (e.g., rayon and cotton; margarine and butter), or where consumption levels tend to decline above a certain income level (e.g., bread grains and potatoes). However, even for commodities which do not have to meet competition from domestic production (either agricultural or synthetic) in the industrialized countries (e.g., coffee), the relatively slow growth of demand means that anything more than a limited increase in exportable supplies may lead to a sharp fall in prices in world markets, or an accumulation of surplus

By far the greater part of the agricultural production in the less developed countries, however, is not for export but for consumption within the country, and here the situation is generally very different. At the low income and consumption levels in these countries even small improvements in national incomes resulting from their intensified development programs lead to sharp rises in the per caput demand for agricultural products. These are superimposed upon the rising demand due to their increasingly rapid population growths, as death rates decline with no decline in birth rates. But the often primitive methods of agriculture, the lack of funds to finance more rapid agricultural expansion coupled with recent falls in export prices, the sometimes archaic systems of land tenure, and the inadequate marketing facilities in many of these countries, all make it difficult to step up the flow of supplies to match this two-fold growth of demand. In many cases the consumption level of the farmers themselves is so low that they tend to consume more of their own produce once their immediate need for cash is met, rather than sell it on the market. Moreover, experience has taught the farmer that even in rapidly expanding markets a temporary or local excess of supplies can lead to a heavy fall in prices if there is no effective system of price support or no adequate public storage facilities. All these factors combine to impede an orderly expansion in the supplies marketed to match the rapid growth of demand, and the result is frequent local or national food shortages with rising or sharply fluctuating prices.

Typical of the growing realization in many less developed countries of the importance of a faster expansion of agricultural production, and especially the importance of the supplies reaching urban markets to match the rapid growth of demand, was the statement of the Indian Minister of Industry, Shri Manubhai Shah to the ECAFE Conference at Knala Lumpur in March 1958:

"The one cardinal lesson which we in the region will have to remember is that agricultural production cannot be relegated to the second place. Agriculture will have to be vitalized and a greater sense of urgency imparted to the need to maximize agricultural output."

The above paragraphs attempt to crystalize the essential differences between the situations in the more and in the less economically developed groups of countries, but there are, of course, all gradations between countries where income levels are highest and those where incomes are very low.

While the basic difficulties probably arise from the fact that agricultural production can be expanded most rapidly in the countries where the growth of demand is slowest, and vice versa, they have been increased by the social problems and policies of the two groups of countries. In the industrialized countries farm incomes have tended to fall behind those in other occupations. To correct this, governments have sometimes maintained or even increased support prices after demand was satisfied, or have used other methods of enhancing farm incomes which have tended to stimulate further production. Sometimes these policies have been continued from the period of wartime and postwar shortage and have become so much a part of the agricultural scene that they are difficult to change.

In less developed countries, on the other hand, the more general tendency has been to control farm prices at a rather low level in order to protect urban consumers and as a measure against inflation. Nor, as a rule, are there adequate funds available to raise farm incomes substantially by subsidies or other means which do not affect price levels. In some cases where prices in less developed countries have been raised to stimulate production the results have been disappointing, perhaps because the increase has failed to reach the cultivator owing to the system of land tenure or of deficiencies of the marketing system. But there are other cases where higher incentive prices have resulted in a marked production response, sometimes indeed to an embarrassing degree.

In practice, however, the agricultural price and income policies of the two groups of countries often appear to have increased the inherent difficulties of the situation. High prices in the countries where supplies were overabundant have tended to stimulate production and restrain consumption. Conversely, low prices in countries where supplies were inadequate have tended to discourage production and stimulate consumption. Yet, given the economic and social conditions in the two groups of countries, it is not easy to see how these further difficulties could have been avoided, at least within a national framework.

The obvious and most attractive solution to the paradox of excess supplies in the betterfed countries side by side with inadequate supplies in the poorer countries, even in relation to their low level of effective demand, is, of course, to export food from the one to the other. This has, in fact, been done on a substantial scale, notably by the United States, where, as is well known, a number of methods of overcoming the difficulties of payment have been devised. In this way the worst effects of shortages, arising both from crop failures and from expanded demand, have often been avoided. Recent developments on this side are discussed more fully in the section on international trade.

But, however valuable against emergencies, it is debatable whether this can be considered more than a partial solution of the problem. Commercial food imports on an adequate scale would overstrain the currency resources of most of the less developed countries to an extent that would badly hamper their general economic development. Shipments under special terms, whatever the safeguards, inevitably cause anxieties and difficulties to other exporters, who as a rule are not strong enough economically to match the special terms offered elsewhere, and who fear that as a result of such sales their own export outlets will fail to grow or even contract. More fundamental still, from the point of view of the less developed countries, is the possible impact of such imports on their own agricultural development unless their domestic markets are reasonably well organized.

If, as is sometimes the case, farm prices of cereals and other basic commodities are allowed to fall to unprofitable levels immediately after the harvest or in years of heavy crops, farmers have little incentive to increase their production for the market to meet the growing urban demand, especially if prices are kept down when any shortage occurs by imports under special terms. There is then a danger that a bare minimum will be produced for the market, that much of the country's agriculture will remain at a primitive subsistence stage, and that the whole economic development will be unbalanced.

If, however, some measure of domestic price stability is maintained, e.g., by market operations by public authorities to support prices during the post-harvest glut and to carry over surpluses from good harvests against future shortages, the transition from a subsistence to a market agriculture will be eased, and conditions will be more favorable for an expanding production for the market to meet the

growing demand. In such circumstances a more balanced development of agriculture and industry might be expected, and increased imports when domestic supplies were inadequate would be unlikely to discourage production for the market.

The main developments in agricultural policies in 1957/58 are reviewed below against this broadly sketched general background. In the economically more advanced countries of North America and Western Europe there have been relatively few major policy changes during the year, but increasingly serious consideration is being given to a more fundamental approach to the problem of agricultural surpluses. In Western Europe the problems and reorganizations arising in agriculture as a result of the establishment of the Common Market and the negotiations for a wider free trade area have also been a major topic of interest, and one likely to become increasingly important. Preliminary discussions on similar integration schemes were also held in Latin America, and are proposed on a somewhat informal basis and with more limited objectives in the Far East.

On the whole, the more dramatic changes during the year have occurred in the Communist group of countries, notably in the U.S.S.R., where increased efforts involving sharp changes in policy are being made to catch up with the increased demand for food and other agricultural products stemming from the long period of priority to heavy industries.

In many underdeveloped countries of Latin America, Southeast Asia, the Near East, and Africa, badly needed measures for agricultural expansion and for general development have been hampered by shortages of public investment funds and foreign currency, both largely stemming from the decline in real prices and earnings from primary exports. Nevertheless, vigorous efforts are being made to maintain the tempo of agricultural development, and in not a few countries an increased share of the investment funds available are being devoted to agriculture.

## North America

In view of the importance of the agricultural situation in North America to producers in other parts of the world, recent developments in this region are reviewed rather fully below, even though actual changes in policies in the past year have been limited, apart from a major

extension and revision of the Canadian price support system.

In the United States, agricultural policies in recent years have had two main objectives: on the one hand, to avoid a continuing excess of production over current consumption, while reducing accumulated surpluses by intensified disposal operations and, on the other, to prevent any further decline in farm incomes. It was already evident in 1956/57 that these aims were being achieved only to a limited extent, more especially on the production side where acreage restrictions and the Soil Bank proved ineffective in restraining output.

Altogether 27.8 million acres (11.25 million hectares) - 21.3 million (8.62 million hectares) in the Acreage and 6.5 million (2.63 million hectares) in the Conservation Reserve - were taken out of production of the six basic crops under these programs in 1957. The total acreage of all crops harvested, at 319 million acres (129 million hectares),5 however, was half a million acres (202,000 hectares) more than the year before because of increased plantings of other crops, mainly coarse grains other than maize. Moreover, the acreage reductions occurred mainly in drought areas and on poor soils, while the remaining crops were cultivated more intensively. As a result, the total of all crops harvested in 1957 was 6 percent above the 1947-49 average and equaled the record crops of 1948 and 1956. A comparison of the acreages and tonnages harvested of each of the basic crops in 1956 and 1957 is given below.

United States: Acreages and Tonnages of Six Basic Crops Harvested in 1957 in Comparison with 1956

						Cre	op area	$\begin{array}{c} Produc-\\ tion \end{array}$
							. $Percent$	change
Wheat .						****	12.3	- 5.7
Maize						•	3.9	- 1.5
Cotton .						_	13.2	- 17.6
Tobacco.							17.8	-22.9
Rice							14.6	-12.8
Groundnu	ts				_		12.3	6.3

While fairly substantial reductions were made in the output of tobacco, cotton, and rice, the fall in production of maize and wheat, the two commodities for which surplus stocks are largest, is seen to have been modest. The cost of the whole program for the year amounted to over 700 millions dollar; some 614 million dollars for acreage agreements and 108 million for conservation reserve contracts. The latter are estimated to cost another 60 million dollars before their expiry. In 1958, in spite of increased participation in the Soil Bank program, necessitating the appropriation of additional funds, 6 total crop production is expected to be still higher than in 1957 and to reach a new record level.

The lack of success of agricultural production policies was recognized in the President's Farm Message in early 1958: "... key problems remain unsolved. Rising production costs continue to limit farm income ... acreage controls have failed to bring agricultural production into line ... and unrealistic price support laws ... result ... in loss of markets."

In these circumstances the Administration submitted in January 1958 a new farm program to Congress proposing a number of major changes in farm legislation, including:

- 1. The Conservation Reserve Program of the Soil Bank should be strengthened, and the Acreage Reserve Program terminated after the 1958 crop.
- 2. Authority should be given to the Secretary of Agriculture to increase acreage allotments for cotton, wheat, rice, groundnuts, and tobacco by up to 50 percent above the levels determined by existing formulas.
- 3. Acreage allotment for maize should be eliminated.
- 4. The automatic increase of price supports as soon as surpluses are reduced provided for in existing legislation—the so-called Escalator Clause—should be abolished.
- 5. The range of mandatory price supports, now between 75 and 90 percent of parity, should be widened to a range of from 60 to 90 percent. (It may be recalled that the flexible price support, as against the previous rigid 90 percent support, was first fully implemented with the 1956 crop.)
- 6. Price support for cotton should be based on the average quality of the crop instead of the low grade as prescribed in the present law.

 $<sup>^5{\</sup>rm This}$  area, however, is about 123 million acres less than the 1946-55 average.

<sup>&</sup>lt;sup>6</sup>Funds available for the 1957/58 crop have been raised by Congress to 750 million dollars.

The evident intention of these proposals was to make possible further reductions in the level of support prices (points 4, 5, and 6), to place less reliance on acreage restrictions which can be circumvented to a considerable extent by more intensive cultivation (points 2 and 3), and to limit the rather ineffective expenditures on reducing the acreage under the six basic crops (point 1). They thus tend toward the gradual re-establishment of a free domestic market for agricultural products, where supply and demand would largely regulate prices and output. This approach implicitly assumes that those who could not farm profitably under such conditions would be absorbed in other sectors of the economy. These proposals are clearly controversial and their ultimate fate is uncertain at the time of writing.

Congress, itself unable to agree on an immediately acceptable farm policy, adopted a stop-gap bill freezing support prices for the current crop year at their 1957 level, i.e., temporarily withdrawing the discretionary powers from the Secretary of Agriculture to set support levels as low as 75 percent of parity, a discretion already exercised in the case of maize and milk. The President, however, vetoed the bill. It may be, therefore, that no major change in policy will emerge for the time being.

The United States Congress too is looking for new ways to cope with a situation which obviously needs to be remedied. A Subcommittee of the Joint Economic Comittee of both houses of Congress invited 60 experts from universities, government and farm organizations to submit proposals on a "Policy for Commercial Agriculture." Following these studies the Subcommittee concluded that four main lines of attack on the complex farm problem were necessary: (1) expanding outlets for farm products as a result of increased industrial uses, new crops, greater exports and increased domestic demand through better marketing; (2) measures to assist the normal flow of farm people into other occupations (developing local non-farm projects, education, industrial training); (3) assisting farm families in making adjustments (credit, better co-ordination of agencies now serving agriculture); (4) income programs for commercial agriculture (production control through the restriction of quantities sold with negotiability of quotas, two-price systems for wheat and cotton, subsidized domestic food consumption, direct income support payments to farmers, etc). No steps have been taken so far to translate these suggestions into legislation, but they suggest that the thinking of Congress differs considerably from that of the Administration.

While there appears to be some trend in the United States, or at least in the thinking of the Administration, toward greater reliance on the mechanism of the free market in agriculture, the recent tendency in Canada appears to be toward a larger measure of support. The new Conservative government established in March 1958 a permanent price support scheme for basic products enacted in the "Agricultural Stabilization Act." This superseded the "Agricultural Price Support Act" of 1946, under which only ad hoc support had been provided for, the coverage and level of price support being left largely to the discretion of the Administration. The new Act guarantees for a number of important agricultural products (cattle, pigs, sheep, butter, cheese, eggs, wool and also for wheat, oats, and barley grown outside the Prairie Provinces) a minimum price not less than 80 percent of the average price in the last ten years. The original proposal of the government was for a guaranteed minimum based on average prices during the previous three years, which would have given less stability to farmers but greater flexibility to the system.

There is no formula for fixing the actual level of the guaranteed price in any year, though it is stipulated that "the Governor in Council shall be guided by the estimated average cost of production of the commodity and by such other factors as the Governor in Council considers to be relevant." If support levels were maintained at a stable percentage of the moving average prices a continued downward trend of market prices would entail a continued decline in support levels, and vice versa, thus leading to production adjustments. This, indeed, seems to have been the basic thought behind the scheme as no provision is made for regulating directly the level of production. However, as there is no upper limit to the percentage of the moving average prices at

<sup>&</sup>lt;sup>7</sup>Joint Economic Committee, Policy for Commercial Agriculture, its Relations to Economic Growth and Stability, Papers submitted to the Subcommittee on Agricultural Policy. Washington, 22 Nov. 1957.

<sup>\*</sup>Ibid. Report of the Subcommittee on Agricultural Policy to the Joint Economic Committee, Washington, 10 Feb. 1958.

which the support price may be fixed, the effect may in practice be considerably modified. Thus, the first support prices established are at 84 percent of the ten-year moving average for pigs, 107 percent for butter and 110 percent for wool. The latter is to be implemented by a deficiency payment scheme similar to that in the United States. The reserve funds available for farm price supports have been increased from 200 to 250 million Canadian dollars. In the current fiscal year actual expenditures are expected to increase by about 5 million dollars.

## Western Europe

Although the problem is on a much smaller scale than in North America, agricultural policies in many countries of Western Europe are increasingly influenced by excess production, notably of milk and butter, and to a lesser extent of eggs, pig meat and wheat. The aim is not to reduce over-all production, but rather to divert it toward commodities for which market prospects are more favorable. At the same time, efforts are being made to prevent farm incomes falling further behind those in other occupations, partly by measures of price support, including the now common practice of direct or indirect subsidies on marginal exports to maintain domestic price levels, but increasingly by measures to encourage the efficiency of agricultural production and to reduce costs per unit of output. In the less wealthy countries of the region, however, where the demand for foodstuffs is still rising appreciably with rising incomes, policies aim at expanding

The United Kingdom affords a clear example of measures aimed at adjusting the pattern of production more closely to demand, and of the difficulty of doing so without lowering farm incomes. At the February 1958 price review the government decided to reduce the guaranteed prices of milk, pigs, and eggs, the production of which has been expanding at a substantial cost in imported feed, and the demand for which is fully satisfied by the domestic output together with less expensive imported supplies. On the other hand, beef production will be further encouraged by a higher guaranteed price. The government, recognizing that these price changes will create difficulties for many small farmers, has promised to find other

ways of helping them by direct grants outside the price system.

Exporting countries are having to modify their traditional policies as a result of increasing economic difficulties. In Denmark, in particular, the yield on agricultural investment is expected to fall to 0.5 percent in the 1958 crop year as a result of unfavorable prices and rising costs, compared with 4.2 percent in 1956/57 and a peak of 9 percent in the period 1949-53. A government bill before Parliament at the time of writing provides for the purchase of bread grains at a fixed minimum price in 1959 as well as for price equalization duties on imported feed grains at a sliding scale, geared to the price of pig meat in order to keep the present feed/pig price ratio as constant as The Minister of Agriculture will be authorized for the next three years to regulate the sale of agricultural products at home and abroad, and to fix taxes on both domestic and export sales at rates varying by product and markets. Assisted by a council from agriculture, commerce, and industry the Minister will co-ordinate exports of agricultural products. With the revenues from the new sales tax a fund will be built up to foster agricultural exports by a publicity campaign and by establishing new marketing agencies abroad; the fund is to be initiated by a government credit of 100 million kroner (14.5 million U.S. dollars).

Among the countries subsidizing exports of surplus butter, Austria has decided to build factories for dried milk, while Finland has reduced subsidies on concentrated feedingstuffs, restricted feed imports, and established a stockpiling program. Crop production, particularly bread grains, is to be encouraged at the expense of livestock production. Importing countries too are concerned at what has been called the "white flood" of milk. In Western Germany a subsidy on milk delivered to dairies has increased deliveries (largely at the expense of farm consumption and animal feeding) to such an extent that the total subsidy of 400 million deutsche mark will not suffice unless it is restricted to higher quality milk. In Belgium the government has temporarily permitted the producer price to fall.

Considerations of farm incomes and costs, however, militate against such measures, and in the Netherlands, in spite of the crisis in the international butter market, the government has felt obliged to increase the guaranteed producer price for milk. But it has also limit-

ed the amount of milk for which the price is guaranteed, as was done earlier in the United Kingdom for milk and in France for wheat. Higher farm prices for milk and butter have also been established in France and Finland, though the latter country still maintains a subsidy on butter to encourage consumption.

In France the third modernization plan aims at a further 20 percent increase in agricultural output between 1957 and 1961, and foresees further mechanization at the rate of 100,000 tractors per year. A new pricing policy is designed to limit further expansion of wheat production, in view of export difficulties, and to encourage beef and eggs through higher support prices for as long as four years ahead.

In Italy a new program of expanding forage crops to support the growing livestock industry has been announced by the Minister of Agriculture. Price policies introduced last year also aim at securing a better balance between the output of soft wheat, in surplus supply, and of durum wheat of which there is still a deficit. A number of long-term programs are in operation to increase agricultural productivity, e.g., by subsidies for land reclamation.

These latter policies reflect the growing demand for livestock products in France and Italy. In countries at a lower level of national income the gradual rise in purchasing power and increased demand for these and other agricultural products is reflected in recent policies. Yugoslavia's new five-year plan calls for a large increase in livestock production, and in that country as in Spain, Portugal, and Greece a larger share of public investment is to be directed toward agriculture.

Measures to increase agricultural productivity, however, are most developed in the more industrialized countries of Western Europe where national incomes and food consumption are already high, and where further rises in income lead to only a moderate increase in demand. This leads to difficulties since increased agricultural productivity usually implies a larger output as well, even in countries where the agricultural labor force is declining rapidly. This is notably the case in Sweden where there are doubts about the possibility of keeping agricultural incomes at the desired level, in spite of active measures to rationalize the farm structure and increase productive efficiency, since there is little room for any further expansion of the domestic market. Nevertheless, policies to improve the competitive efficiency of agriculture and to reduce costs are being maintained, e.g., in Western Germany and the United Kingdom, and indeed continue largely of their own momentum. For, with little likelihood of higher agricultural prices, there is no other means of maintaining farm incomes in the face of rising costs.

Although the inauguration of the European Common Market at the beginning of 1958 and the discussions around a free trade area had no direct bearing on agricultural policies in 1957/58, their expected influence is becoming increasingly important.9 During 1958 the six countries of the Common Market will begin working out common agricultural policies. At least during the first phase of the application of the Rome treaty these policies are likely to be both protectionist and directed. The markets of the principal agricultural products produced in the area will probably be controlled by marketing organizations, while the various protective tariffs now imposed by these countries will be progressively brought to one uniform level for the area as a whole. At the end of the transition period, agricultural products will move freely within the Common Market area, though for some of them this is likely to take place under the guidance of a marketing organization. The co-ordination of agricultural production policies which this implies seems likely to lead to an increased output of certain commodities within the Commón Market area, and probably to a reduced demand for imports of these products from outside.

The negotiations still in progress for a wider free trade area, related to the Common Market area, have revealed a number of difficult problems. The United Kingdom and some other industrial countries want to exclude agricultural and horticultural products from the free trading arrangements. Denmark, on the other hand, is primarily interested in having such products included and in having both the Common Market area and the United Kingdom as export outlets. Spain, Greece, Turkey, Ireland and some other countries would like to have free markets in other countries for

The likely impact of the European Common Market on agriculture is discussed in a special article in the FAO Monthly Bulletin of Agricultural Economics and Statistics, April 1958, and in Commodity Series Bulletin No. 29, FAO, Rome, 1957. Reprints are available upon request.

their agricultural products, but need protection and possibly aid for their less developed industries.

#### Australia and New Zealand

The near saturation of the market and slow growth of demand for certain agricultural products in the United Kingdom and other traditional importing countries of Western Europe. and the increasing competition for these outlets, is fraught with no less serious consequences for Australia and New Zealand than for the agricultural exporting countries of Western Europe. In November 1957 New Zealand held the first of what will be annual confrontation meetings with the United Kingdom. A New Zealand request for restricted quantities or higher import duties on competing imports from non-Commonwealth countries was unsuccessful. Nevertheless, the institution of such annual talks may well be an important development. The request of New Zealand to the United Kingdom to apply anti-dumping duties to subsidized butter exports from certain countries is discussed below. Meantime, payment difficulties, arising from low agricultural export prices, led to the reintroduction by New Zealand of comprehensive import restrictions in January 1958.

One problem facing New Zealand which may lead to lower farm incomes is the prospective exhaustion of the dairy products stabilization fund. Under present arrangements the payment price to farmers cannot fall by more than 5 percent below that of the previous year. As a result of the heavy payments necessitated by the low international price of dairy products the reserve, which stood at some 25 million pounds at the beginning of 1956/57, will be virtually exhausted by the end of the 1957/58 season.

Both Australia and New Zealand are attempting to meet their export difficulties by further increasing their already high level of productivity. For example, in Australia there has been discussion concerning a development bank, one of whose functions would be to provide farm finance. Both countries are also vigorously seeking new markets, particularly in Asia where slowly rising incomes are leading to a marked increase in the demand for agricultural products. This new trend is exemplified by a three-year trade agreement signed in the second half of 1957 between Australia and Japan, now Australia's second largest export market, which

covered among other things wool, wheat, barley, and sugar.

#### Latin America

Although the financial and economic difficulties of some countries of the region in 1957/58, resulting from the fall in prices of some of the main export commodities (coffee, meat, copper), reduced current rates of agricultural investment, considerable attention was still given to the improvement of agriculture. In Mexico, however, where conditions were relatively prosperous, the funds available for farm credit were increased 18 percent to 104 million dollars, while some 12 million dollars were assigned to price supports to producers and to subsidies on basic commodities for consumers. In this country about one eighth of the total federal budget is now devoted to agricultural, livestock, and forestry development.

Chile has adopted a new agricultural price policy in order to encourage production, which had shown very little progress for some years in spite of growing requirements. Prices of wheat, rice, sunflowerseed, and some other products have been decontrolled and, as a result, have risen to some 40 percent above the previous year's level. Agricultural machinery, fertilizers, and other production requisites have been exempted from restrictions on bank credits. Mention may also be made of the establishment of a new Ministry of Development and Production in Ecuador for the better co-ordination of agricultural development projects, and of a new government decree in Colombia to accelerate agricultural development which provides among other things for progressive taxes on uncultivated land. Colombia is also reorganizing its system of farm credit and taking steps to increase the funds available for this purpose from private banks. In Venezuela some 14 million U.S. dollars are being made available for replanting and improving coffee plantations and some 4 million dollars to develop high-quality cacao production. Special loans will be granted to coffee and cacao producers.

On the other hand, some progress has been made in Argentina in revising the price structure which in the past has hampered agricultural production. The planted acreage and livestock population increased rapidly when it was hoped that there would be scope for larger earnings in a free market. In fact, how-

ever, exports are still subject to an exchange rate of 18 pesos to the dollar, while purchases of machinery and equipment have to be made at the free rate, ranging from 34 to 47 pesos to the dollar in the past two years. attractive prices for grains and oilseeds, however, have brought about a considerable shift from pasture to crop cultivation, and many cattle raisers have disposed of their stock and are sowing flax, sunflower, and other crops, Nevertheless, in an attempt to correlate better the prices of the various agricultural products and to enable producers to maintain their purchasing power on the same levels as other producing sections of the economy, the government announced early in 1958 the minimum producers' prices of grains for the 1958/59 crops, which, for the first time in this country, have been calculated by the parity index system.

A similar situation has arisen in Uruguay where the subsidized wheat-growing program has led to a considerable shift from pasture to wheat. Greater returns from sheep breeding and wool exports and a ceiling on cattle prices has discouraged cattle improvement and led to extensive smuggling of cattle across the border. As a result of the fall in livestock numbers and slaughterings, two of the largest meat-packing plants decided to close down at the end of 1957, thus adding to the social and economic difficulties of recent years.

The proposed common regional market for Latin America was discussed at several international meetings, including the Conference of the Organization of American States, held at Buenos Aires in 1957. Later, a group of experts representing six Latin American countries gathered in Santiago, under the auspices of the United Nations Economic Commission for Latin America, to exchange more concrete views. the main points of agreement (not, however, government commitments) may be mentioned: (1) the proposed common market should be open to all Latin American countries; (2) in principle it should cover all goods produced by the member countries, and provide for a system of progressive tariff reduction, leading ultimately to a unified tariff system vis-à-vis the rest of the world; (3) special treatment should be afforded to the less developed countries; (4) a multilateral payments system would be necessary, but member countries should be given the right to apply temporary import restrictions; (5) credit facilities and technical aid would be necessary; (6) a consultative council and system of arbitration should be set up; (7) protective measures should be provided for agriculture. Another meeting is to be held in Mexico and, thereafter, further meetings in other Latin American capitals. In view of the many practical difficulties, some time is likely to clapse before official agreement is reached on concrete measures for the establishment of a common market. However, governments seem to be willing to accelerate the work required for an early achievement of this undertaking.

#### Far East

As a result of the rising trend both of population and of development expenditures, the demand for cereals and other foodstuffs increased in 1957/58, while harvests were generally smaller. Prices of foodstuffs rose appreciably in a number of countries, and there was an increase in both the volume and value of agricultural imports. At the same time the leveling off or decline in the volume of such exports as sugar, tea, and rubber, together with the fall in export prices, reduced earnings of foreign exchange and intensified both currency and budgetary difficulties. Because of the inadequacy of investment funds the tempo of economic, including agricultural, development, in a large part has had to be reduced. A number of countries, including India, Pakistan, and Mainland China, are now giving more attention to agriculture, though in some cases this has had to be effected by a proportionately larger scaling down of programs in other sectors.

New or revised plans were adopted in 1957 in seven Southeast Asian countries; Burma, Mainland China, Taiwan, Malaya, North Borneo, the Philippines, and Sarawak. On the other hand, due to the rapidity of economic growth the original 1956-60 program in Japan was abandoned, the targets for 1960 having been almost entirely reached by the end of 1956. In Ceylon the new plan is still being formulated. Adoption of a plan is still delayed in Indonesia owing to civil disturbances, and in South Korea and South Viet-Nam owing to budgetary difficulties. Some of the most comprehensive plans, the Indian Second Five-Year Plan and Pakistan's Five-Year Plan, are undergoing a period of further review.

Under the downward revision of India's Second Five-Year Plan, projects directly related

to increasing agricultural production are placed in the category accorded highest priority. A second category of projects, including the expansion of the community development program, is to be postponed. Two important Enquiry Committees<sup>10</sup> have proposed some reorientation of India's agricultural policies, including provisions to counteract the insufficient nse hitherto made of newly provided irrigation water by special credits for the change-over from dry to wet farming, and by reduction of water rates during the first years of use. It has also been proposed that, in community development work, increased emphasis should be given to better farming rather than to welfare activities, and that fertilizer factories should receive highest priority in the attribution of foreign credits.

Pakistan's revision of the Five-Year Plan 1955-60 continues to place the main emphasis on agriculture, although some cuts were found necessary in this sector as in others. The building up of an adequate food grain buffer stock is considered a main goal of food policies in both India and Pakistan.

Japan's new long-term economic program, which started in April 1958, is to aim at full employment and the improvement of the balance of payments. Agriculture is to contribute to this goal by greater emphasis on the labor-intenvive cultivation of fruit and vegetables, by increased attention to livestock husbandry, by improvement of tea production and exports, as well as by limiting the need for cereal imports. The future annual rate of growth of farming, forestry, and fisheries is estimated at 3 percent.

In Taiwan, the targets of the first Fonr-Year Plan were achieved in the main by 1956. A second Four-Year Plan, approved in March 1957, expects the share of combined rice and sngar exports to be reduced from 68 to 58 percent of total exports by increased exports of tea, fruit, cotton, tobacco, cassava, starches, groundnuts, etc.

As indicated in the section on agricultural production, Mainland China also claims to have achieved substantially the targets of its Five-Year Plan, which ended in 1957. Agricultural incomes are stated to have risen by 30 percent during the period of the plan, compared with an increase of 37 percent in industrial wages.

Drafts for the second Plan, as discussed by the National Planning Conference in December 1957, suggest a simultaneous development of industry and agriculture on the basis of priority to heavy industry. The percentage of State investment devoted to agriculture, according to the vice-chairman of the Planning Commission, will, however, be 10 percent, against 8 percent under the first Five-Year Plan. Industries serving the requirements of agriculture, such as fertilizer and farm equipment plants, are to receive special attention. Agricultural improvements are likely to concentrate on the country's vast mountainons areas and, as in India and Burma, on minor, rather than on major, irrigation schemes.

At the beginning of its first Five-Year Plan in 1952, Mainland China's was still essentially a peasant agriculture. By 1955, however, there were stated to be 633,000 co-operative farms covering 65 percent of farm families, though only 6 percent were of the so-called "higher" type. In 1957 it was claimed that 96 percent of farm families were included in co-operative farms, of which 60 percent were of the "higher" type, i.e., more or less completely collectivized. The pace of collectivization is also being stepped up in North Korea, where the number of farm co-operatives rose from 12,000 in 1955 to 16,000 at the beginning of 1957, while the percentage of farm families covered rose from 49 to 87 percent, nearly all of the "higher" type. In Northern Viet-Nam, collectivization began only in late 1956, but as a half-way stage, "associations for mutual aid" were begun in 1955 and at the end of 1956 were said to number 190,000 with 1.3 million members.

In countries in which prepared plans were shelved, or are under revision, a good deal of development work is proceeding. Thus in South Viet-Nam, more than half of the target to resettle 100,000 farmers from low-producing overpopulated coastal regions to fertile but sparsely populated areas was achieved by the end of 1957, and rice exports were resumed on a considerable scale. In Ceylon, the 1953 rubber subsidy scheme, under which replanting had surpassed its original target by 1957, was extended to 1960. A Five-Year Tea Scheme, for the replacement of old bushes by high-yielding plants, received government approval in late 1957.

Slow progress in the implementation of plans is reported from Laos and Nepal, where first priority is given to transportation projects link-

<sup>&</sup>lt;sup>10</sup> Report of the Food Grains Enquiry Committee, 1957, Report on Community Development and National Extension, 1957.

ed with agricultural development. The reform of the agro-economic structure provided for in Cambodia's Two-Year Plan (1956-57) has also been delayed. A Twenty-Year Project for the development of the Mekong River, from which Cambodia, South Viet-Nam, Laos, and Thailand will benefit, is nearing its first stage of realization. The four countries interested recently decided on five proposals on the basis of a detailed ECAFE study, which was developed further by a special United Nations mission.

In Thailand, where development is carried out on a departmental basis without an over-all plan, the construction of the Greater Chao Phya Dam, started in 1952, will be completed in 1958, bringing an additional 900,000 hectares under irrigation. A survey of Thailand's physical resources and economic potentialities is being carried out by a mission of the International Bank for Reconstruction and Development.

In Burma, emphasis is shifting toward larger exports of primary products (rice, rubber, timber) rather than to self-sufficiency. First priority is given to the paddy expansion project, to immediate irrigation of paddy land and to the repair of the Kabo Dam rather than to long-range projects. Next to rubber replanting, the greatest emphasis is given in Malaya to the transformation of irrigation schemes, most of which were designed for a one-crop system only.

Changes in consumer and producer price policies were closely linked in food grain importing countries. In Japan, an Enquiry Committee, set up to examine the existing food control system, recommended closer inter-relation of producers' and consumers' prices in price fixing. Following some of its recommendations, the consumer price for domestic rice was increased, but the deficit incurred by the government's food account continued. Producers' prices for wheat and barley were raised, a step not recommended by the Committee. In India, the upward trend of food prices, which began in 1955 and continued through much of 1957, called for measures counteracting food shortage many months before the Food Grain Enquiry Committee had handed in its report. Special zones were created to restrict the unregulated or speculative interstate movement of food grains, procurement of local surpluses was reinstalled, the right to requisition food grain stocks at the average market price was made widely applicable, and restrictions on

bank advances against food grain stocks were reimposed in order to discourage speculative hoarding. The food problem was intensified in late 1957 by crop losses due to droughts in the Northeast. In Pakistan, an increased procurement price for wheat was set for the first time for two succeeding crops and announced two seasons ahead. In Ceylon, a proposal that part of the guaranteed price for paddy should be credited against the cultivator's purchases of fertilizers and other equipment was abandoned because of sharp opposition from farmers. Even in rice-exporting Thailand, the smaller crop necessitated measures to forestall a domestic food grain shortage, and rice exports were placed under quota during the second half of 1957, but quotas were raised in early 1958.

A new grain loan system was introduced in South Korea in late 1957, under which the farmer deposits his grain for storage at a local warehouse, at the same time agreeing on the month of sale, and obtains a loan from the local branch of the Agricultural Bank against the warehouse receipt; it is hoped this will moderate excessive seasonal price movements. In the same field, the government's financial support to co-operatives and the foundation of the co-operatives own bank in Malaya, the creation of a central National Agricultural Credit Office in South Viet-Nam, and the establishment of an Agricultural Bank in Pakistan, may also be mentioned.

Under the important Paddy Lands Act in Ceylon, which came into force on 1 February 1958, many of the prerogatives of landlords are transferred to the Commissioner of the Agrarian Services and to local Cultivation Committees. These Committees, composed partly of government officials and partly of elected members, have the right to appoint tenants and to evict those who do not maintain a satisfactory standard of production. Three fourths of the elected members are to be chosen by cultivators (owners or tenants), and not more than one fourth by non-cultivating owners. The tenant cultivator is given the right of permanent, transferable and inheritable occupation of paddy land. The rent received by the landowner is to be determined by the Commissioner and shall not exceed one fourth of the total yield of paddy. A Fragmentation Act, passed by the same government in December 1957, prohibits the subdivision of tea and rubber estates of over 100 acres (40 hectares).

#### Near East

The relatively rapid rate of agricultural development of this region is in large measure attributable to revenues derived from oil production and transit and to various forms of foreign aid. Food production in most countries has tended to outstrip the high rate of population increase. Per caput consumption seems to be rising and there have not been general sharp rises in food prices. Exportable surpluses of grains, cotton, coffee, dates, and other products, however, have in some cases proved difficult to market.

In agriculture, emphasis has been on large capital works and much more attention is needed to the improvement of quality, the diversification of production and the better use of newly irrigated lands, in addition to further development of land and water resources. In 1957/58 there have been no marked changes in policy, but considerable progress has been made in carrying out specific projects. In a number of countries longer-range investment programs are being developed, but no comprehensive economic development plans have been produced. Greater government participation has stimulated development activities by higher budgetary allocations from local resources, a greater flow of foreign funds in grants and loans, and increasing revenues from oil.

Turkey's policy of massive investment is being pursued in spite of the strain on the country's finances. Public investment, which amounted to 900 million Turkish lire in 1952, or 27 percent of the total budget, increased to 1,300 million Turkish lire (or 32 percent of the budget) in 1957 and is to reach 1,500 million Turkish lire, or one third of the budget, in 1958. With a view to strengthening the financial position, a loan of 300 million dollars from the United States has been under discussion, while as a result of the Commodity Sales Agreement signed in January 1958 under Public Law 480 the equivalent in Turkish currency of 46.8 million dollars is being made available for local investment. Private foreign investments are being accelerated, especially from Western Germany. In 1958 some 39 percent of the investment budget is for agricultural development and the funds made available are 11 percent greater than in 1957. Much of the other investment, e.g., in transport and communications, is of indirect benefit to agriculture. Price supports for wheat have

continued to focus a large part of productive effort on this commodity.

In the United Arab Republic agreements for economic and technical assistance were concluded with the Soviet Union and Eastern European countries. It is reported that the Egyptian region's Five-Year Industrialization Program, which will largely be financed through U.S.S.R. aid, may be completed in less than three years. Preliminary work on the High Aswân dam continues and negotiations for technical and financial aid are being held with Japan and other countries. In the strictly agricultural sector agrarian reform is being accelerated, and price support policies continue to favor the production of wheat and cotton. In the Syrian region a Ten-Year Development Program has been prepared calling for a total expenditure of 2,300 million Syrian pounds (some 640 million U.S. dollars). This compares with 650 million Syrian pounds allocated in the Extraordinary Budget for the Five-Year Development expenditure commencing in 1955. Hydroelectric development, land reclamation, grain silos and other marketing facilities and transport have a major share in the total proposed development program. The Development Board has initiated a series of agricultural and industrial projects covered by the Syrian-U.S.S.R. agreement signed in 1957. The union of Egypt and Syria, although unlikely to result in immediate changes in the activities of each country, may create different possibilities for future development. The unification of existing organizations and plans is in progress and a new Ministry of Development has been established in each region, in addition to existing planning bodies.

In Iraq, where oil revenues play a predominant role in development financing, public investment expenditures are rising considerably. Whereas oil revenues had not recovered from the Suez crisis and stood at 48.9 million Iraqi dinar in 1957 as compared with 68.9 million in the previous year, development activities are being pursued. Many projects for the development of water resources are in progress, notably, among those initiated in 1957/58, a large drainage project in the Central Euphrates basin. A sixth technical section has been set up in the Development Board for establishing and financing rural welfare projects throughout the country.

In Iran, where oil revenues are also of major importance, the Plan Organization contemplates

an increase of 20 percent in its Seven-Year Program by raising total expenditure from 70,000 million rials to 84,000 million rials. Work has commenced on the very important Khuzistan development project which is among the major multipurpose hydroelectric schemes envisaged by the Plan, with an ultimate irrigation capacity of over 1 million hectares, i.e., roughly an additional 50 percent of the existing irrigated area in the country. In both Iran and Iraq interest is being displayed in the need to intensify the utilization of irrigated land to ensure increased yields and more adequate return from the high investment involved.

Development activities in Jordan progressed rather slowly in 1957 and the unsettled political atmosphere has further aggravated shortages of investment funds. Plans are being prepared to reorganize the existing Development Board and introduce a new development program.

In the Sudan a new five-year development program covering the period 1958-63 is under preparation and will call for a total expenditure of over 100 million Sudanese pounds. Expenditures allocated to various development projects during the fiscal year 1957/58 amounted to 19 million Sudanese pounds, or double the amount allocated in the previous fiscal year. These include on the agricultural side an extension of the Gezira cotton area by 200,000 acres (80,940 hectares) and other schemes to increase production, including intensified agricultural research.

In Israel, considerable changes are being proposed in the internal structure of the Development Budget, but with only a small increase in total appropriations from 413 million Israeli pounds in 1957 to 436 million Israeli pounds in 1958. Agriculture will take the largest share at 107 million Israeli pounds. A credit of 24.2 million dollars was obtained from the Export-Import Bank of Washington for the expansion of irrigation and other facilities for agricultural development. In addition, a four-year plan for industrial expansion calling for an investment of 500 million Israeli pounds is contemplated.

### Africa

The main agricultural problems in Africa South of the Sahara, together with the government programs and policies adopted to meet them, are fully reviewed in Chapter III of this report. Recent developments in this part of the region will therefore be only briefly mentioned here.

A principal feature of 1957/58, as in other regions, has been the continued need for governments to adjust to smaller revenues, derived in large part from export taxes, as a result of the generally lower world prices for agricultural and mineral exports. Most governments still have reserves accumulated during the boom period, but some have nevertheless had to announce reductions in the planned level of development expenditure, as in the Federation of Rhodesia and Nyasaland, for instance, following the sharp fall in the price of copper. Countries that rely heavily on overseas loans for their development capital are also experiencing an increased tightness in its supply.

In spite of these difficulties, however, public development activities are being maintained at a rapid tempo. While development programs in most areas are still directed primarily toward the provision of transport and other basic facilities, most of the more recent plans, as well as revisions to existing plans, have tended to devote an increased share of expenditure to the directly productive sector and especially to agriculture. A new round of development plans was begun in the majority of the British territories in 1955 and in most of the rest of the region south of the Sahara new plans are at present in preparation or being put into operation. Further four-year plans have been prepared in the French territories; that of the Ivory Coast allocates as much as one third of total expenditure to agriculture, while the very large sums required for its financing will be derived partly from loans and current revenues as well as the metropolitan assistance which has been almost the entire source of development finance in the past. For the Portuguese territories, new plans are being prepared for the period 1959-64 and in the Belgian Congo, although the current one still has some time to run, a further tenyear plan, with increased emphasis on agriculture, is already in active preparation. In Ghana, the 1956 deficit in the balance of payments prompted the postponement of the introduction of a new development plan and instead a two-year "consolidated" plan was begun in 1957. A second five-year plan costing 100 million pounds has recently been prepared, including, in the agricultural field,

measures for the diversification of production.

Information is still awaited on the proposed expenditure of 580 million dollars over five years by the European Economic Community on the development of the overseas territories of member countries. During the year under review some countries in the region have continued to express their concern at the possible effects of the Common Market. A recent reaction to the formation of the Common Market has been a decision to strengthen the economic solidarity of the Portuguese territories and to establish a preferential area not far short of full customs union.

The problems of the North African part of the region were accentuated by the poor harvests of 1957/58, which once more emphasized the precariousness of agricultural production in the highly variable rainfall conditions of this area. Urban unemployment, resulting partly from migration from rural areas, remains severe.

Both Morocco and Tunisia are still going through a difficult period of transition and adjustment, while in Algeria progress has been retarded by the political disturbances, which have also affected the other two countries. The rate of investment has fallen off in the last few years in Morocco and Tunisia and capital supplies for development programs, formerly very largely from French sources, remain uncertain. In Morocco an interim public investment program is being pursued and it is intended to begin the first national plan in 1960. In Tunisia a new development plan, consisting of two five-year phases, is in preparation, In the meantime, both countries have recently strengthened their development organizations by the establishment of a development bank in Morocco and of a planning board in Tunisia.

#### U.S.S.R. and Eastern European Countries

In their agricultural policies these countries must be grouped with the underdeveloped countries in the sense that emphasis is still on rapid expansion of output. The long emphasis on heavy industry in their economic development has left the supply of consumer goods, including foodstuffs and other agricultural products, far in arrears of demand. Ambitious efforts are now being made to make up the leeway, notably in the U.S.S.R., and these have involved sharp reversals of policy. In 1954, for example, began the large-scale opening up of virgin land in Siberia, primarily

for grain production on State farms, in contrast to the earlier policy of relying mainly on higher yields from the area already cultivated. In 1958 a major reorganization of the agricultural structure was decided on; the State tractor and machine stations, formerly the linehpin of Soviet agriculture, which not only provided all machinery services to the collective farms, but supervised their activities, are to be reduced to stations for machinery repairs and depots for tractor fuel. Apart from a few highly specialized machines, their tractors and other equipment are to be sold to the collective farms.

Economic development in the U.S.S.R. up to 1960 had been set out in the Sixth Five-Year Plan. In September 1957, however, in connexion with the general decentralization of the economic planning structure, it was announced that a new plan was to be established for the seven years 1959-65. The exact objectives are to be determined after July 1958. Their general trend on the agricultural side, however, appears to have been anticipated by the establishment of considerably increased targets for livestock production, published in June 1957 under the slogan "to exceed the per caput production of the United States for milk, meat, and butter." Broadly, the U.S.S.R. plans to exceed the 1956 level of production by 40 percent for milk, and to treble it for meat.

It is estimated that by 1958 milk production should reach 70 million tons (which would mean that the plan had already been fulfilled) by an increase of 18 percent in the number of cows and of 24 percent in average yields of milk. During 1955 and 1956 the number of cows is said to have risen by 12 percent, and average yields by 14 percent.

The targets for meat are expected to be reached in four to five years. From 1953 to 1956 meat production rose by 33 percent, and the new targets obviously mean a greatly accelerated rate of progress. Beef production is scheduled to rise from 2.2 to 6 or 7 million tons by means of an increase of 40 percent in the number of cattle, by keeping calves to some 18 months to 2 years before slaughter,

<sup>&</sup>lt;sup>11</sup>Fuller information may be found in two articles in the FAO Monthly Bulletin of Agricultural Economics and Statistics: "Economic Trends in The Dairy Soviet Industry," May 1958, and "The Place of Livestock Production in the Agricultural Policy of the U.S.S.R.," September 1958.

and especially by increased carcass weights as a result of more intensive feeding. The production of pig meat is planned to show an even larger increase, from 2.6 to 11 million tons, with a corresponding increase in the number of pigs. In addition, the output of mutton (now some 600,000 tons) is to be raised by some half million tons, and that of poultry meat (now about 500,000 tons) tripled. An important aspect of the plan is the shift in balance of livestock numbers, and still more of production, from the individual holdings of members of collective farms to the collective farms and State farms themselves.

An "appeal" issued by the authorities in March 1957 to workers on State farms indicated that the area of State farms should be gradually increased, both by bringing in uncultivated land and by the transfer to State farms from certain collective farms of land not fully used. State farms are to become the main suppliers to towns of potatoes, vegetables, and milk and are also to expand their meat production. Following this "appeal" nearly 850 new State farms were established, while the cultivable area on State farms is stated to have increased by 65 percent, their area under cereals by 73 percent, their area under potatoes and vegetables by 60 percent, and the number of their cattle by 82 percent, of pigs by 68 percent, and of sheep by nearly 100 percent. Correspondingly, the cultivated area of the collective farms, particularly the area under cereals, and also their numbers of livestock appear to have fallen.

By the beginning of this year, however, the position of the collective farms had been strengthened by the decision to transfer to them the machinery of the machine and tractor stations, thus giving the collective farms full possession of the means of production in the same way as the State farms. In some other ways also the structure of the collective farms is coming closer to that of the State farms: the amalgamation of smaller collective farms into larger units is proceeding rapidly (in 1957 the number of collective farms was reduced in this way from 85,000 to 78,000); collective farms have been asked to review the size of the private holdings of their members and to reduce those of families who do not contribute enough work to the collective enterprise; the abandonment of compulsory deliveries from private holdings, although apparently benefiting them, has to be compensated by an increase in the deliveries required from the collectives as such. These measures will increase payments in cash to the members of collective farms but decrease their gains in kind, strengthening the trend toward gradually transforming members of collective farms into wage earners.

The sale of agricultural machinery by the central tractor stations to the collective farms appears to be one of the most important changes in Soviet agriculture since the war. This reform was proposed as early as 1951, but was then rejected by Stalin, and in 1953 the central tractor stations were in fact strengthened by furnishing them with a permanent, rather than a seasonal, staff and by making them responsible for the general direction of the collective farms in their districts. More recently, however, their importance has tended-to decline. 12

The main reasons put forward for ending the tractor stations were as follows: the collective farms now had the means to buy and service their own machines, the separation of the tractor stations and the collective farms caused duplication of work and muddle and was wasteful of money and personnel. The change will take several years, the rate depending on the financial resources of the collective farms, which will have to meet three types of expense; (1) the purchase of the existing machinery, valued at 20,000 million rubles, (2) the cost of operation, estimated at about the same amount annually, and (3) future upkeep, replacements and extensions which may imply an annual outlay of some 15 to 20 million rubles. In 1956 the total income of all collective farms was estimated at nearly 95,000 million rubles, of which 16,700 million were set aside for investment. The new measure has thus necessitated a change in the existing collective regulations limiting investment to 20 percent of income. However, the collective farms will no longer have to pay for the services of the tractor stations and they can obtain credits from the State Bank, both for the purchase

<sup>12</sup>The number of central tractor stations which rose from 7,069 in 1940 to 8,994 in 1954, fell somewhat to 8,742 in 1956. Again, from 1953 to 1956 there was an increase of 76 percent in the number of tractors on State farms (90,000 to 158,000, but only 11 percent in those of the tractor stations (613,000 to 681,000). This increase consisted entirely of smaller tractors of under 15 horsepower (111,000 to 215,000), and the number of larger tractors (average horsepower about 31) fell from 502,000 to 466,000.

of machinery and for the planned expansion of livestock production.<sup>13</sup>

A further reform was announced on 20 June 1958 under which the four types of sales to the State (payment in kind for the services of machine and tractor stations, compulsory deliveries at low prices, selling under contract, and selling of surpluses at higher prices) are replaced by a single form of sale. The new system of payment is stated to imply no increase in the over-all cost to the State for the acquisition of agricultural products. It seems likely, however, to benefit collective farms with low or middle incomes, whose sales at the higher price levels have been small, at the expense of those with higher incomes which had larger surpluses for sales at more favorable prices.

The countries of Eastern Europe generally followed the same policies in 1957 as in the two previous years, attempting to encourage increased production, by making it possible for farmers to raise their incomes thereby. Latterly the volume of compulsory deliveries has tended to be lowered and prices raised. Among such measures may be mentioned higher payment in Czechoslovakia for early deliveries of large quantities of produce. Farmers were also encouraged by offers of credit and by increased supplies of fertilizers and building materials. In Hungary, Poland, and Romania revision of policies for compulsory and contractual deliveries was followed in 1957 by measures allowing greater choice to producers in filling remaining quotas and permitting them to pay arrears in cash rather than in kind. In Eastern Germany, the improved level of food supplies made possible the abolition of rationing.

There was a renewed drive for collectivization in 1957 in all countries of Eastern Europe except Poland. Economic advantages in the form of lower compulsory deliveries and higher prices, of prior claims and lower charges for the services of machine-tractor stations, more generous credits and investment grants and other preferential treatment were offered to cooperative as against private farms.

In Poland, and to a lesser extent in Hungary, land purchases by peasants from the State reserves grew in importance in 1957, and peasant farming was renewed in areas where col-

lective farms were dissolved. On the other hand, an extension of co-operative farming was particularly marked in Czechoslovakia, where the number of co-operative farms rose from 8,000 to 11,000 during the year and 1.2 million heetares were added to the area under co-operative farming, now about 60 percent of all arable In Bulgaria collective farms covered some 86 percent of the arable area by the end of 1957 and, as in the U.S.S.R., there was a move to enlarge the size of units by amalgamation; the average area of co-operative farms is now nearly 1,200 hectares. In Romania the number of co-operative farms of various kinds rose from 9,000 to 14,000 during 1957, and State and co-operative farms now account for over half the arable land. In Eastern Germany, however, a campaign to increase cooperative farming seems to have had smaller results. In Hungary, where in October 1956 some 2,300 co-operative farms out of a total of 3,900 were broken, up, the number and area covered by co-operative farms by the end of 1957 had been restored to about half the level of mid-1956. In contrast to the proposals to reduce the role of machine-tractor stations in the U.S.S.R., their position was strengthened in both Czechoslovakia and Eastern Germany on the grounds that their role in the process of collectivization had not yet been completed in the countries of Eastern Europe.

In Poland the widespread disappearance of collective farms has meant the reorganization of production on about 10 percent of the country's agricultural area. Altogether some 8,000 collective farms were liquidated, leaving only 1,724; however, 257 such farms were revived or newly established in 1957. Peasant farming now covers some 87 percent of the cultivated area, while some 700,000 hectares of State farms are to be reallocated to small peasant holdings.

As part of its agricultural policy the government has encouraged the formation of "local associations" which are self-governing bodies of individual farmers on a voluntary basis and mainly concerned with improving agricultural production. Although still at an embryo stage, there are already about 10,000 with 300,000 members and covering some 8,000 villages. About 50 machine-tractor stations were disbanded in Poland in 1957 as part of a policy of rationalization; State investment in those remaining, however, rose substantially, from 20 million zlotys in 1956 to 125 million in 1957.

<sup>&</sup>lt;sup>13</sup>By 1 July 1958, 65 percent of the *kolkhozes* (collective farms) had bought the necessary machinery: 406,000 tractors and 137,000 grain combines.

#### FOREST POLICY

In spite of the weaker demand for forest products in 1957/58, forest policies remain unchanged, since they are primarily of a longterm nature. Their most important feature is the emphasis given to afforestation, implemented in some areas by governments themselves. Afforestation by private owners is also favored by many factors: subsidies, loans and technical advice to landowners by the State, State banks and private forest industries; the attraction of quick-growing species yielding high revenues, particularly where natural sources of wood are lacking; the relatively high price of timber; the convenience, compared with distant natural forests, of easily accessible plantations situated near forest industries; the benefits derived by agriculture from protection hedges and wind belts. However, if the slower demand persists, afforestation policies may be hampered.

In less developed countries, this extension of forest area is more than offset by the clearing of natural forests for agricultural purposes. Because of the lack of technical personnel, proper guidance and rational soil surveys, such clearings too often cause severe loss of soil and become great erosion hazards.

#### North America

The results of a survey on long-term trends of timber production and consumption in the United States has recently been published. The demand for wood products is expected to roughly double by the end of the century and it is shown that the increased demand can be met, given a prompt acceleration of recent encouraging forestry trends. The Conservation Reserve Program of the Soil Bank may assist by encouraging the afforestation of marginal lands.

#### Western Europe

Afforestation programs have continued to develop throughout 1957/58, and even such forested countries as Norway now have programs of this kind, though in some countries the difficulty of finding convenient lands for afforestation has somewhat slowed down the rate of progress. In the United Kingdom studies have been made for the better co-ordination of agricultural and forestry interests. Another important item in Western Europe is the improvement of private forestry, since the largest

part of the forest area is privately owned. Important progress was made in 1957/58, particularly in northern countries, by strengthening forestry co-operatives, or by increasing facilities for the practical training of private owners.

#### Latin America

While progress in afforestation, particularly for industrial purposes, has been important in Latin America (to the point that Chile has difficulties in finding markets for the products of its Pinus insignis plantations), progress in the protection and development of natural and virgin forests has been slow. Although improvements have been made in the concentration and organization of forest services (Chile, Paraguay, Ecuador, Colombia), and numerous countries revised their forest legislation in 1957/58, technical personnel available is quite inadequate. Forest industries have developed, particularly for plywood and fibreboard, and further developments for pulp and paper are contemplated. But it is more and more clear, especially from experience in the Amazon Basin, that opening up new forest resources is dependent on the progress of general colonization, even though forest industries and exploitation may be the main economic asset of new settlements.

#### Far East

The most conspicuous development in afforestation is provided by Mainland China, where a Twelve-Year Plan was elaborated in 1956, aiming at "making China a green country." The afforestation of 92 million hectares is planned, bringing the proportion of forested area to the area of the whole country from 8 to 19 percent. Although these figures are very high, they could be reached, taking account of the results already obtained and the efforts being made to train technicians. Part of the afforestation work is done by the government itself, but a much larger part by the farmers.

In most other Far Eastern countries, the emphasis has been more on the development of forest industries. New sawmills, pulp and paper and fibreboard factories have been set up or are contemplated, particularly in India, Indonesia, Burma, and the Philippines. Mechanical exploitation has also made some progress. Thailand has taken measures to regulate the exploitation of teak, one of its most important export items. However, in many countries, particularly the Philippines and Thailand, the

development of forest policies is hampered by growing competition for land between agriculture and forestry. Little progress has been made toward solving the important problems of uncontrolled clearing and shifting cultivation.

#### Near East

In spite of adverse conditions some progress in forest policy was made in 1957/58. The development of forests and forest industries is included in the development plans of Iran, Iraq, and Turkey. Jordan has passed strong legislation on goat grazing in the forests. Ethiopia has organized a small forest service and consideration is being given in Afghanistan to the adoption of a forest policy. The emphasis in most countries is on afforestation and more particularly on the planting of quick-growing species in conjunction with agriculture and the development of irrigation. Poplar growing is now traditional in many countries of the region, and technical improvements and the need for more timber give incentives to such plantations.

# Africa

Afforestation, which has long been successful in South Africa, is progressing particularly in other African countries, including Madagascar and Tanganyika. Progress has also been made in the exploitation of natural forests, exports of timber and, to some degree, the development of forest industries. The main problem remains that of land use and competition between primitive agriculture and forestry. The successful development of cash crops, such as cacao in Ghana, implies all too often indiscriminate clearing of forest lands, while programs for forest reservation are not yet complete, or are restricted to areas insufficient even to ensure soil protection.

# U.S.S.R. and Eastern Europe

In the U.S.S.R. the afforestation policy is closely linked with agricultural development, and the opening of new lands for agricultural purposes normally means planting new shelter belts and afforesting eroded or poor lands. The shift of forest exploitation from central and western parts of the country to the large forest resources of Siberia and the Far East has been accentuated and facilitated by the increasingly complete mechanization of the lespromkhozes. The entire separation of these exploitation

teams and of the leskhozes had, however, some inconveniences: large areas were left without care after cutting and regeneration lagged for many years. Leskhozes in other regions have recently been given the possibility of controlling cutting operations; they are given more personnel and are also being mechanized.

# AGRICULTURAL REQUISITES

# Farm Machinery

There is little doubt that the increase of mechanization has been a potent factor in the growth of agricultural production in the postwar period. In some cases mechanization has enabled new land to be brought into production; in others it has enabled production to be increased with the same area of land under cultivation or with a static or declining labor force. In most countries there have been notable increases in per caput productivity based on increasing mechanization. It is, however, difficult to pin down in quantitative terms the extent of the growth in mechanization.

The most readily available and easily comparable figures of farm machines relate to tractors. These figures show that the number of tractors in the world increased by nearly 50 percent between 1949-52 and 1956. This increase was, however, very unevenly spread between regions. For instance, in North America there was an increase of about 20 percent, while in Europe it was about 120 percent, in spite of the fact that tractor numbers were already fairly high there.

Although all regions except North America are increasing the number of tractors very rapidly, there are, of course, very large disparities between the regions, as regards both total numbers and area of arable land per tractor. The region with the largest percentage of tractors and the smaller area per tractor was North America, both at the beginning and end of the period. Furthermore, although some of the underdeveloped regions have increased the number of tractors rapidly in percentage terms, total numbers still remain very small, especially in relation to the agricultural area. In these regions mechanization, in terms of tractors, can scarcely be said yet to be having an impact on individual farms.

It must be borne in mind that the number of tractors by itself is not an altogether satis-

TABLE II-17 - WORLD TRACTOR NUMBERS, BY REGIONS 1

Region	1949-52	1956	Percentage of total tractors in 1956	Increase from 1949-52 to 1956	Arable land per tractor in 1956
	Thor	ısands	Per	cent	Hectares
Europe	1 055	2 316	25.1	120	65
North America	4 195	5 176	56.2	23	45
Latin America	144	273	3.0	90	400
Near East	32	66	0.7	106	1 520
Far East	19	39	0.4	105	11 000
Africa	97	173	1.9	78	1 435
Oceania	176	292	3.2	66	90
U.S.S.R	595	877	9.5	47	252
TOTAL	6 313	9 212	100	46	151

<sup>&</sup>lt;sup>1</sup>As far as possible, the figures given here refer to agricultural tractors, but in some cases no clear separation from horticultural tractors and tractors used for non-agricultural purposes can be made.

factory indicator of the progress of mechanization of agriculture. In the first phase of development, mechanization is a misnomer, since development mainly consists of relatively simple improvements to hand and animal equipment. Many of the more backward countries are still in this stage, and are showing considerable benefits from it in increased agricultural output. At the other extreme, when farms are relatively fully equipped with tractors, mechanization takes the form of "automation", with the introduction of specialized machinery for individual farm operations, such as combine harvesters, automatic hay balers, and manure spreaders. At both these extremes the increase in tractor numbers is relatively slow, while in between, when tractors are introduced as prime movers instead of draft animals, there is a very rapid build-up of tractor numbers. It seems true to say that most Far and Near Eastern countries and some Latin American countries are in the first phase; many European countries and some Latin American countries are in the second phase; while only a few countries have reached the last phase of mechanization. This is, of course, a very broad generalization and there are no doubt instances of all three phases going on at the same time in one country.

In the Far East, mechanical equipment has mostly contributed to increased production by enabling what was previously waste land to be cleared and brought into bearing. For example, in the Gal Oya Development Project in Ceylon 100,000 hectares of new land are being brought into production almost entirely by mechanical means. It may be noted in passing that use of machinery in this way creates rather than destroys labor opportunities in agriculture. It is also perhaps easier to use tractors for large-scale operations rather than on farms where institutional obstacles, such as bad land tenure systems, lack of capital, and lack of "know-how" combine to make the introduction of machinery very difficult.

In the Near East, the extent of utilization of mechanical equipment and the types of machines being used are at present undergoing a rather marked change. In most countries in this region, by far the greatest land area is and will continue to be farmed under natural rainfed conditions. The intensity and seasonal period of major precipitation is such that dry-land farming can be greatly expanded if proper cultural practices and Unfortunately the machines are utilized. majority of machines which were introduced during the initial stages of mechanization in these countries had their origin in Europe and Eastern America, where rainfall conditions and cultural methods are completely different. In many cases, machines did not increase either the quantity or efficiency of agricultural production and often contributed to soil erosion. More recently, surface-type tillage equipment and special seeding machines,

which have been developed specifically for dryland cereal production, have been introduced and are rapidly gaining in popularity.

Striking progress has been made in agricultural mechanization in Latin America. In that region the production of grain and fodder crops in the more important producing areas has been almost completely mechanized. In Argentina and Brazil, mechanization has reached such an extent that a farm machinery manufacturing industry has been established to supply the local demand.

In countries which have reached the last phase of mechanization, the percentage increase in number of tractors is outstripped by that for other machinery. In the United Kingdom, for example, tractor numbers rose by only 7 percent between 1954 and 1956, while the number of pick-up balers increased 89 percent and combine harvesters by 47 percent. At the same time, simple tractor or horse-drawn machines decreased - hay mowers by 11 percent, hay rakes by 17 percent, and grain binders by 5 percent. In North America also the percentage increase in tractor numbers has been relatively small, while per caput output has been increasing rapidly. In countries in this phase of mechanization, the application of electricity to agricultural operations also begins to play a part in raising productivity. For example, in the United States, in 1956, 93 percent of the farms were supplied with electrical energy, and for the period 1954 to 1956, the consumption

of electricity on farms rose from 20,000 million kilowatt-hours to 22,000 million, an increase of 10 percent. In Europe also the use of electricity has contributed considerably to the increase in production as in the United Kingdom, where electrically-operated milking machines increased in numbers by 15 percent from 1954 to 1956. It is perhaps significant of the rate of progress in mechanization in Japan that electricity consumed for agricultural purposes rose by 10 percent from 1953 to 1954.

#### Fertilizers

During the four-year period 1952/53 to 1956/57 total consumption and production of fertilizer rose markedly. To a varying degree, all regions shared in the increased consumption of fertilizers (Table II-18). It is, however, noticeable that the average intensity of fertilizer application on farm land in the developed countries still remains very much greater than in the underdeveloped countries. The average rate of fertilizer consumption per thousand hectares of agricultural land is more than seven times higher for the former than it is for the latter.

Consumption of nitrogen fertilizer rose most and phosphorus fertilizer least. As a result, the  $N: P_2O_5: K_2O$  ratio, representing world nutrient consumption, has changed from 1:1.25:1 to 1:1.1:0.9. In terms of tonnage, consumption of all three classes of fertilizer (N,  $P_2O_5$ ).

Table II-18. Consumption of Nitrogenous, Phosphatic, and Potash Fertilizers in 1952/53 and 1956/57 and Percentage Increase

70	]	N	P	P2O5 I		. <sub>2</sub> O	Percentage Increase 1956/57 over 1952/53					
REGION	1952/53	1956/57	1952/53	1956/57	1952/53	1956/57	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O			
	Thousand metric tons Percent											
Europe	2 108	3 067	2 658	3 504	2 862	3 555	45	32	24			
North America 1	1 673	1 799	2 277	2 237	1 649	1 808	7	-2	10			
Latin America	138	322	153	163	65	107	134	6	65			
Far East	775	1 124	324	466	250	552	45	44	121			
Near East	132	175	37	103	7	48	32	178	546			
Africa	36	77	153	197	30	62	115	29	102			
Oceania	21	36	490	653	19	40	73	33	108			
World total <sup>2</sup>	4 883	6 600	6 092	7 324	4 883	6 172	35	20	26			

Source: FAO, Annual Review of World Production and Consumption of Fertilizers, 1954 and 1957.

Canada and United States, including the U.S. Territories of Hawaii and Puerto Rico.—'Totals of unrounded regional figures.

and K<sub>2</sub>0) increased most in Europe and even on a percentage basis the increases, especially for nitrogen, were noteworthy. Nearly all the countries of Europe substantially increased their use of fertilizer nutrients, the chief exceptions being the Netherlands, where there was no increase in consumption of phosphorus and potassium fertilizers, Switzerland, where there was no increase in the consumption of nitrogen and potassium fertilizers, and the United Kingdom with no increase in phosphorus fertilizer.

In North America there were only slight gains in the use of nitrogen and potassium fertilizers and a slight decline in the consumption of phosphorus fertilizer. On a percentage basis this region shows the smallest gain of any in the world, perhaps partly because there had previously been phenomenal increases in the use of all fertilizer nutrients in the United States, and partly because of the appearance of agricultural surpluses.

Latin America showed notable increases in the use of nitrogen and, to a lesser extent, in potassium, the rise in nitrogen consumption being largely due to Mexico. No significant increase in the use of phosphorus was recorded even though many of the soils of the region are known to be deficient in this element. With the exception of a few countries, fertilizer consumption in Latin America continues at a very low level.

The figures for the Far East appear optimistic, but are misleading. The increased consumption of nitrogen, and particularly of phosphorus and potassium, is mainly due to Japan where in 1956/57 1.4 million metric tons of plant nutrients were used. This tonnage is equivalent to 52 percent of the total regional consumption of nitrogen, 71 percent of phosphorus, and 85 percent of potassium. At present Japan leads the world for intensity of fertilizer application (215 metric tons of fertilizer nutrients per thousand hectares of agricultural land). There was also a 50 percent increase in nitrogen consumption in India, but consumption of all elements remains extremely low and does not match the agronomic needs of the country.

Other countries in the Far East which have shown some increases are; South Korea, the Philippines, and Taiwan in the use of nitrogen, and South Korea in the use of phosphorus. With the exception of Japan, Taiwan, and South Korea and a few other areas where fertilizers are generally used to a limited extent

for specific crops, fertilizer consumption remains at a low and unsatisfactory level.

In the Near East only three countries use fertilizers intensively, Israel, Egypt, and Lebanon (111, 76, and 48 metric tons of fertilizer nutrients per thousand hectares of agricultural land, respectively) and the recorded increases in fertilizer application mainly reflect the changes in these countries. Specifically, there has been a very large increase in the use of phosphorus in Egypt and of potassium in Israel. It is hoped that with the modernization and improvement of agricultural production other countries in this region will make greater use of fertilizers.

In Africa, the most intensive fertilizer use is on the Islands of Mauritius and Reunion where 80 and 52 metric tons, respectively, of fertilizer nutrients are used per thousand hectares of agricultural land. The Union of South Africa annually applies by far the largest tonnage of fertilizer nutrients, but intensity is low (1.8 metric tons of fertilizer nutrients per thousand hectares of agricultural land) although it is still the highest in continental Africa. The countries in Africa which materially increased their use of fertilizer from 1952/53 to 1956/57 are the Union of South Africa, Rhodesia, Nyasaland, and Algeria.

The soils of Australia and New Zealand are known to be deficient in phosphorus and the use of this element continues to rise although, on a percentage basis, the increases for nitrogen and potassium are more spectacular. Up to date, however, the consumption of these two elements is relatively low, partly due to the prevailing view that with the well-developed livestock industries, it is better economically to obtain nitrogen from legumes than from chemicals.

# COMMODITY SURVEY AND OUTLOOK14

# Wheat

Wheat supplies in 1957/58, that is, production during the year and stocks in the major exporting countries at the beginning of the year, were much the same as in 1956/57. But the volume of trade fell because importing countries produced much more themselves than in 1956/57 when crops were bad. Some exporting countries produced much less, and in addi-

<sup>&</sup>lt;sup>14</sup>Unless otherwise stated, these remarks refer to countries outside the Soviet bloc and China.

tion the United States reduced exports under special disposal programs. The net effect of lower production, partially offset by lower exports, in the four major exporting countries has been to reduce their carry-over stocks for 1958/59. Filling in the details of this picture, stocks of the four major exporting countries at the beginning of their respective trading seasons were practically unchanged at nearly 48 million tons despite the large volume of trade in 1956/57, declines in the United States and Australia being offset by increases in Canada and Argentina (Table II-12).

World production in 1957/58, estimated at 123 million tons, showed no change, but there were significant shifts in the distribution of production. Output in Western Europe, due mainly to more normal acreage in France and a large crop in Yugoslavia, increased 7.8 million tons, while it declined 10 million tons in the four major exporting countries. In Canada lower yields reduced output by a third but in the United States output fell by only about 5.5 percent despite an 18 percent reduction in acreage. The Australian crop declined for the second successive year and resulted in a shortage of wheat for export during the current trading season. Harvests were larger in the Near East, especially in Turkey, with an increase of nearly 2 million tons.

Table II-19. World Wheat Production - Prewar and 1951-58

Country	Prewar avcrage	1951/52- 1955/56 average	1956/57	1957/58 (prelim.)
		Millio	n tons.	
Argentina	6.6 4.2 7.2 19.5	5.8 $5.0$ $14.5$ $29.3$	$\begin{array}{c c} 7.1 \\ 3.7 \\ 15.6 \\ 27.3 \end{array}$	$ \begin{array}{c c} 5.8 \\ 2.6 \\ 10.1 \\ 25.8 \end{array} $
Total 4 countries.	37.5	54.6	53.7	44.3
Western Europe Importing countries	31.1	34.3	32.0	39.8
outside Europe <sup>2</sup> . North Africa and	12.4	13.7	15.9	16.5
Near East <sup>3</sup>	7.6 6.4	12.0 7.6	12.8 8.8	14.9 8.0
World	95.0	122.2	123.2	123.5

¹Production for the years 1934-38 was low owing to droughts in 1934 and 1936. The 1937-41 averages for Canada and the United States were 10.4 and 23.4 million tons, respectively. — ¹Japan, India, Pakistan, Brazil and Mexico. — ³Algeria, Morocco, Tunisia and Egypt, Iraq, Syria, Turkey. — 'Excluding the U.S.S.R., Mainland China, and Eastern Europe.

Table II-20. Wheat Exports - Prewar and 1951-58

COUNTRY	1934/35- 1938/39 average	1951/52- 1955/56	1956/57	1957/58 July- June (prelim.)
		Millio	n tons .	
Argentina	3.3 2.9 4.8 1.5	2.3 2.5 8.5 8.8	2.7 3.4 7.7 14.9	2.0 1.8 8.1 10.6
Total 4 countries .	12.5	22.1	28.7	22.5
Others¹	5.6	4.4	3.5	5.5
World	18.1	26.5	32.2	28.0

<sup>&</sup>lt;sup>1</sup>Including U.S.S.R., Eastern Europe, Mainland China.

As regards trade, in 1957/58 there was a decline from the unusually high levels of 1956/57. United States exports fell by over 4 million tons and Australia exported only about half as much. Canada increased exports by nearly a million tons and Argentine exports declined by 25 percent. France re-entered the market, exporting 1.7 million tons in the first three quarters of the current year.

Preliminary indications for the 1958/59 crop are that in the world as a whole production will rise. The net effect of possible increases in some regions, mainly North America and Europe, and decreases in others in 1958/59 will be not only much more wheat available for export from surplus areas, but also less demand from the chief deficit countries, and a considerable increase in carry-over stocks in North America in 1959. Prices fell early in 1958, as a result of the continued pressure of large stocks, the small European imports, and the expected large harvests in North America and Europe in 1958; c.i.f. prices in Europe (down 14-18 percent) were further reduced by the fall in freight charges.

#### Coarse Grains

Supplies of coarse grains in 1957/58 were much larger than in 1956/57; stocks from the previous season in North America were nearly 8 million tons higher and world production rose by about 4 million tons to reach a record level.

Production in Canada declined 25 percent due to lower yields, but in the United States output of sorghum expanded by 9 million tons, and barley and oats by 3.4 million tons, while maize output declined by 1.3 million tons due to acreage reduction under the Soil Bank Scheme. In Argentina, on the contrary, production of small coarse grains fell, whereas a maize crop of nearly 5 million tons (compared with 2.7 million tons last year) was harvested; the maize crop in the Union of South Africa was good. In the Near East larger supplies became available for export, and there was a fall of 4.5 million tons in French output of barley and oats.

In 1957/58 European imports increased, United States exports of maize expanded and, in addition, many prewar suppliers of maize from southeastern Europe re-entered the market. Nevertheless, United States carry-over stocks of coarse grains, which have been continuously rising since 1952/53, were likely to have risen a further 12 million tons to 57 million tons by the end of the 1957/58 season. Canadian carry-over stocks due to last season's lower output, declined during the course of the current trading season by about 1 million tons.

Because of the heavy supplies, prices in 1957/1958 were at the lowest level since the Second World War. In the early months of 1958 they were 15-20 percent lower than the previous year in North America, while c.i.f. prices in Europe declined by 30-40 percent during the same pe-

Table II-21. World Production of Coarse Grains<sup>1</sup> - Prewar and 1951-58

Country	Prewar average	1951/52- 1955/56 average	1956/57	1957/58 (prelim.)
		Million	n tons.	
Argentina	$ \begin{array}{c c} 9.2 \\ 0.7 \\ 7.7 \\ 72.8 \end{array} $	$\begin{array}{c c} 5.2 \\ 1.7 \\ 13.5 \\ 109.8 \end{array}$	$\begin{array}{c} 5.4 \\ 2.2 \\ 15.9 \\ 118.0 \end{array}$	$ \begin{array}{c c} 7.3 \\ 1.3 \\ 12.6 \\ 129.1 \end{array} $
Total 4 countries .	90.4	130.2	141.5	150.3
Western Europe Importing countries	37.4	40.4	48.8	46.2
outside Europe <sup>3</sup> .  North Africa and Near East <sup>4</sup>	28.6	34.5 11.4	36.4 14.1	35.5 13.6
Others	25.0	32.8	31.3	30.1
WORLD	190.1	249.3	272.2	275.7

<sup>&</sup>lt;sup>1</sup>Barley, oats. maize, sorghums, millets, and mixed grains.—<sup>2</sup>Production for the years 1934-38 was abnormally low owing to the extreme droughts of 1934 and 1936. The 1937-41 averages for Canada and the United States were 9.7 and 89.9 million tons, respectively.— <sup>3</sup>Japan, India, Pakistan, Brazil, Mexico.— <sup>4</sup>Algeria, Morocco, Tunisia and Egypt, Iraq, Syria, Turkey.

Table II-22. Coarse Grain Exports<sup>1</sup> - Prewar and 1951-57

Country	1934/35- 1937/38 average	1951/52- 1955/56 average	1956/57				
	I	Million tons					
Argentina	7.3 — 0.5 1.1	$egin{array}{c} 1.7 \\ 0.6 \\ 2.6 \\ 4.8 \\ \end{array}$	$2.0 \\ 0.8 \\ 2.1 \\ 5.9$				
Total 4 countries	8.9	9.7	10.8				
Others $^2$	5.5	3.5	5.5				
World	14.4	13.2	16.3				

<sup>&</sup>lt;sup>1</sup>Barley, oats, maize, sorghum. — <sup>2</sup>Including, U.S.S.R., Eastern Europe, and Mainland China.

riod. Lower prices are likely to continue as there will be abundant world supplies of coarse grains in 1958/59. United States coarse grain acreage has contracted, but production is unlikely to decline significantly. In Canada, acreage has expanded and an increase in output is expected.

#### Rice

There were smaller crops in South and Southeast Asia in 1957/58. The two leading exporters, Burma and Thailand, suffered particularly heavy losses, while in importing countries rainfall was inadequate in Northeast India, and Ceylon was afflicted by both drought and floods. Crops in the Asian temperate zone were, however, good, especially in Japan. Outside Asia, Egypt was the only important exporter to harvest substantially more rice than in 1956/57; the United States and Italy produced less, mainly because of acreage restrictions, and in the United States there is now much less rice for export on special terms.

Quantities available for export in 1958 will be almost certainly smaller than in 1957, reflecting poor crops and smaller carry-over stocks in exporting countries, but there is thought to be a more marked reduction of lower than higher grade supplies. Although potential demand for rice is likely to be well maintained throughout 1958, governmental import programs may be revised since alternative cereals are available in very large quantities and, to a

Table II-23. Gross Imports of Rice (Milled) into Selected Countries 1955, 1956 and 1957

Coun	COUNTRY			_	1	955	1956	]	1957	1955	1956	1957
				_	<u> </u>	Thou	sand tons	me	tric	Index .	1957	= 100
India						286	330	)	748	38	44	100
Indonesia						127	814		680	19	120	100
Japan					1	246	760	)	400	311	190	100
Pakistan.							440	)	410		107	100
TOTAL.					1	659	2 344	2	238	74	105	100

large extent, on special terms. In so far as importing governments are successful in deflecting demand from rice to other cereals, there will be further changes during 1958 in the pattern of world trade which has already shown striking fluctuations recently. While some countries have maintained a steady intake, in particular those which grow very little or no rice (for example, Hong Kong, Singapore and Northwestern Europe), imports into the four main importing countries have varied widely over the last three years (Table II-23).

The reduction in Japanese purchases coincided with the sharp expansion in imports of the other three countries, thereby reducing total fluctuations in world trade. In this period the quantities exported by individual countries have generally fluctuated less, the main exceptions being Cambodia and Viet-Nam. In 1958, however, exports from Burma and Thailand, as well as from the United States, are likely to fall sharply.

Export prices kept remarkably steady during 1957 and even by the middle of 1958 the rise had been moderate. The basic Burmese export price for the smaller new crop was set at 37 pounds sterling per long ton (102 dollars per metric ton).

The relative scarcity of rice this year is probably a temporary phenomenon. When production recovers it is likely that markets will be able to absorb the rice produced, since consumption will continue to increase as a result of the constant rise in world population and incomes.

# Sugar

In 1957 world sugar consumption continued to rise, though more slowly, reaching 34 million tons.

All regions except North and Latin America showed gains both in total and per caput consumption and, as in past years, the increases have been more marked in the low-consumption countries of Asia and Africa and in Western Europe. The lower rate of increase in consumption was certainly due to the very high prices prevailing early in 1957; the Cuban f.o.b. price averaged 6 cents per pound during the first six months of the year, but fell later and ended the year at 3.85 cents per pound. All quotas and limitations on exports under the International Sugar Agreement remained inoperative from 25 January to 19 November 1957.

Trade in 1957 was probably 1 million tons higher than in 1956. Italy entered the market and sold some 350,000 tons from surplus stocks. India shipped 150,000 tons, while Brazilian exports rose to 400,000 tons. There were substantial increases in imports into France, Germany, the Netherlands, the United Kingdom, and the U.S.S.R.

In the final reckoning, it is expected that production in 1957/58 <sup>15</sup> will be 35.6 million tons, 2 million tons higher than in 1956/57. Western Europe is expected to produce 7.1 million tons of sugar, 600,000 tons more than last year, mainly reflecting increases in Western Germany and France. In Cuba, a presidential decree fixed production at 5.5 million Spanish tons (5,667,000 metric tons), while Mexico, Brazil, Peru, and Indonesia together will probably produce about 500,000 tons more than last year. As a result, international prices continued to decline in early 1958, but in the long run increased consumption mainly depends on a rise in per caput income.

#### Meat

The expansion of world production was temporarily halted in 1957, after five years of pronounced growth.

Total meat production, including poultry meat, was 50 percent above prewar and 27 percent above 1950. In 1958 a slight further rise is expected, mainly owing to larger production in Europe. In North America, higher pig meat production will be offset by lower United States beef output. Total output in Oceania is not likely to change markedly, while in South America there may be a slight decline.

<sup>&</sup>lt;sup>16</sup>The sugar year runs October-September, and at the time of writing only very preliminary indications are available as to the final outcome of 1957/58.

In Eastern Europe and the U.S.S.R., meat production is now much above the low levels at the beginning of this decade, Poland and the U.S.S.R. recording the greatest progress.

During 1957 world trade expanded appreciably and exports of all meats were nearly 2.5 million tons (product weight), nearly 40 percent more than the annual average in 1948-50. Exports from Denmark and Australia were much larger and imports into all the main consuming regions rose, United Kingdom imports being 5 percent above the high 1956 level (see Table II-24). By contrast, in 1958 trade is not likely to change much. The major importing countries (United Kingdom and Western Germany) have substantially increased domestic output of pig meat of which large exportable supplies are available. On the other hand, with beef, where demand for imports into the United Kingdom and the United States is likelyto remain strong, there will probably not be extra supplies available for exports from the Southern Hemisphere. Imports into continental Europe may be less than in 1957, largely because of growing domestic output in Western Germany. It is true that there will be an increase in trade in mutton and lamb, as a result of larger supplies, but this is only a minor part of the total trade volume.

World market prices for beef and lamb were higher in 1957, but pork and bacon prices were about 10 percent lower than in the previous

Table II-24. Imports of Meat¹ into Major Importing Countries, 1948-50 and 1953-57

Major importing countries	1948- 50 aver- age	1953	1954	1955	1956	1957
Belgium - Luxem-		I	1		tons .	
$\mathbf{T}$ bourg	55			15	1	31
France	16					
Germany, Western	75			1	191	169
Italy	22					124
${ m Netherlands}$	28		21	23		31
Spain	13	1		3	20	33
Sweden	17	17	32		E .	}
United Kingdom .	1 198	1  307	1 209	$1 \ 352$	1 408	1 479
Canada	9	20	25	29	30	30
United States	106	144	139	133	119	178
Japan	2	-	1	2	3	26
TOTAL	1 541	1 648	1 592	1 778	1 976	2 198

<sup>&</sup>lt;sup>1</sup>Beef and yeal, mutton and lamb, pork, poultry, offal, game, horse meat and other meat, fresh, chilled or frozen; prepared meat; bacon, ham and salted pork; other dried, salted, or smoked meat; canned meat. Figures generally exclude unrendered pig fat, meat extracts and sausage casings.

Table II-25. Exports of Meat¹ from Major Exporting Countries, 1948-50 and 1953-57

Major exportin countries	rG	1948- 50 rave- age	1953	1954	1955	1956	1957
			. Tho	usand	metric	tons .	
Denmark		153	359	396	415	365	438
France		28	26	69	78	44	42
Ireland		27	85	107	64		70
Netherlands		46				153	
Poland <sup>2</sup>		*36		84	81	97	96
Yugoslavia		7	4	$\frac{24}{24}$	$2\hat{1}$	31	*37
Canada		125	$5\overline{2}$		$\frac{21}{45}$	40	49
United States	•	64	86		104		
Argentina		444					147
TT .	•						606
Uruguay, Australia	•	88				46	
	•	272					
New Zealand.		354	347	391	409	431	400
		<b> </b>					
TOTAL		1 644	1 837	Ì 975	2 065	2 219	2 404

<sup>\*</sup> Estimates.

year and are likely to remain low in Europe this year; by late antumn, however, production and demand for pigs may be in better balance. Lamb prices have fallen and will be markedly lower than in 1957. For beef supplies, imports and prices are likely to remain much the same as last year.

In North America beef prices are expected to average slightly higher than in 1957. In the United States pig meat prices will remain relatively high until autumn, whereas in Canada they will be considerably lower in 1958 than last year, following a large increase in output.

# Eggs

World production again expanded in 1957, mainly due to considerable increases in output of the United Kingdom, Western Germany, the Netherlands, and Canada. Exports of shell eggs were about 5 percent larger than in 1956, reflecting larger shipments from Netherlands, Belgium, Canada, and Eastern Europe. United States exports were reduced by one third, largely because of action to protect domestic producers in some of the major United States ontiets. Western Germany again increased imports in 1957, accounting for 55 percent of the estimated world total, while Italy ranked second. United Kingdom imports were insignificant, home production being sufficient to meet practically all domestic requirements.

<sup>&</sup>lt;sup>1</sup>See footnote to Table II-24. — <sup>2</sup>Figures for the years 1953-57 include the meat equivalent of exported live pigs but do not include poultry meat.

The severe decline of egg prices early in 1957 checked the expansion of laying flocks in several countries and it is unlikely that production in 1958 will be much above last year. In the United Kingdom a reduction of about 3.5 percent in the guaranteed price in March 1958 reflects the desire of the government to prevent further substantial increases in production. Exportable supplies in Denmark and the Netherlands, which together account for three fifths of world egg exports, will not rise much above last year, and the increase in trade in 1958 may therefore be small. It is expected that for the major part of the current year prices will be above 1957 levels. However, 1958 hatchings were probably larger because of improved egg/feed price ratios, and production may expand again in the 1958/59 season.

#### Dairy Products

In 1957, in countries for which reliable data are available, milk production rose by 2 percent. Most developed countries shared in the increase, with a continuation of slowly declining or static cow numbers (the U.S.S.R. was the main exception), increasing yields and higher milk fat content, leading to a proportionately greater increase in the output of full-fat products, notably butter.

International commercial trade continued to expand in 1957 and in the first part of 1958 (Table II-26).

The major development was the large expansion of butter exports from a number of countries which, in earlier years, exported only very small amounts. On the other hand, non-commercial United States exports declined

Table II-26. Estimated Exports of Dairy Products, 1954-57

Product	1954	1955	1956	1957 (prelim.)
	T	'housand	metric t	ons
Butter	423	452	459	502
Cheese	355	340	355	362
Condensed and evaporated milk Dried milk	373 238	423 282	437 326	430 328
			020	020

¹Number of countries covered: butter 14, cheese 13, condensed and evaporated milk 12, dried milk 13. United States butter and cheese exports, for which total figures were not available for 1957, are excluded for all years. Condensed and evaporated and dried milk exports, other than for relief or charity by individuals or private agencies, are included for all years.

TABLE II-27. BUTTER SUPPLIES IN THE UNITED KINGDOM

				. ——
ITEM	1954	1955	1956	1957
	Ti	housand	metric to	ns
Imports:				
4 major suppliers <sup>1</sup>	270.5	295.0	334.9	304.1
$9 \text{ smaller suppliers}^2$	14.1	12.4	23.3	65.9
Domestic production	23.2	15.0	25.5	34.6
Total supplies <sup>3</sup>	308.9	327.5	385.8	405.8

<sup>&</sup>lt;sup>1</sup>Australia, Denmark, New Zealand, Netherlands. —
<sup>2</sup>Argentina, Austria, Finland, Hungary, Ireland, Norway, Poland, Sweden, Union of South Africa. — <sup>3</sup>Including minor quantities of imports from countries not listed.

steeply. The bulk of the increase in exports was placed on the United Kingdom, where not only were there average supplies from traditional exporters, except for Australia, but also much increased domestic production. As a result, total supplies exceeded the previous year's very large volume.

Under the influence of large supplies and the continued existence of stocks in most exporting and importing countries, free market prices continued their long downward trend. In February 1958, New Zealand, with the support of Denmark, asked the United Kingdom to impose anti-dumping duties on imports from a number of European countries.

As from 20 May 1958, the United Kingdom Government requested the Governments of Finland, Sweden, and Ireland either to eliminate subsidies on butter exports to the United Kingdom or to keep these exports within agreed limits; otherwise the United Kingdom Government would impose countervailing duties under the Dumping and Subsidies Act of 1957. Subsequently, Finland and Sweden agreed to limit exports to the United Kingdom for 12 months to 75 percent of average exports in 1936-38 or 1955-57, whichever was the higher. Irish exports in the same 12 months will not exceed the 1957 volume.

The severe fall in world butter prices and the probability that any increase in dairy supplies could not be profitably sold abroad led to efforts in some countries to increase consumption and to restrain the expansion in milk output. For example, in Denmark there were domestic sales of stored butter at lower prices than newly produced butter and in the United Kingdom

producer price guarantees were reduced. Efforts to increase consumption were intensified in the first half of 1958 in a number of European countries. Generally, however, governments avoided reducing substantially either producer or consumer prices which, except in some countries where international trade plays an important role in the procurement or disposal of dairy products, remain insulated from world prices.

Cheese production increased during 1957 and prices fell: the London price of New Zealand cheese in March 1958 was one third lower than a year earlier. United States production of skim milk powder was at a record level last year, and CCC stocks at 31 March 1958 were higher than a year ago. United States special aid exports of dried and canned milk rose markedly in 1957, particularly to Asia. Canadian production of dried skim milk in 1957 was about 60 percent larger than in 1956.

Recent events demonstrate clearly that in developed capitalist countries, as a whole, the dairy economy is getting out of balance. Various incentives, particularly price support policies, backed by export subsidies or import limitations, have resulted in a level of supply in excess of demand at prices which would be profitable to most farmers. Countries in which a large part of dairy incomes is normally derived from export sales have been most affected, but there are indications of imbalance in other countries also. Although remedial action, especially for butter, has been taken in some exporting countries, no permanent improvement can be expected until there has been some check to the recent rate of expansion in production, or a sustained increase in consumption.

In the majority of the underdeveloped countries, however, policies are necessarily still aimed at development of the milk industry. Furthermore, it should be mentioned that a sharp increase in production of milk and dairy products is taking place in some Eastern European countries and, particularly, in the U.S.S.R.

# Fishery Products

Fresh and Frozen Fish

Trade in fresh and frozen fish products was well maintained in 1957. Among notable trends in North America, production of frozen fishsticks in the United States appears to have leveled off in 1956 after a very rapid growth in consumer acceptance in a few years. Imports

of ground fish fillets and blocks into the United States, mainly supplied by Canada, reached a new record in 1957 and continued high in 1958. Frozen tuna and, especially, albacore imports also were higher than ever before. Prices in the United States for fresh and frozen fishery products during April 1958 were generally slightly higher than those of a year earlier, and the market for these products and for commodities of high unit value, such as precooked and otherwise prepared seafood dishes, was regarded with some confidence.

The best markets for Norwegian iced and frozen herring continued to be Western Germany, Eastern Germany, Czechoslovakia, Poland, the United Kingdom, and the U.S.S.R. In Iceland, output of frozen products, mainly for Eastern European markets, continued to increase with corresponding declines in the production of iced fish for the United Kingdom.

# Dried, Salted, and Smoked Fish

Shipments of Norwegian salted cod to Portugal, Spain, and Cuba were lower, though Brazil, by far the biggest buyer, took about as much in 1957 as in 1956. Due to lower production, Icelandic exports of salted cod, both to European and Latin American countries, were smaller than in 1956, as were also those of France and Denmark. Canada, however, maintained its sales at the same level as in 1956, but prospects were not good in the first few months of 1958. Total demand for dried, unsalted products prepared from cod and similar species remained strong, slight declines in some markets being offset by increased purchases by the West African countries.

Salted herring exports from the Netherlands were slightly higher than in 1956, although production was lower, while in Norway both production and exports were smaller than in previous years. The U.S.S.R., the principal market for this commodity, bought much less in Norway, slightly less in Iceland, but almost twice as much in the Netherlands.

#### Canned Fish

In North America shortage of fish continued to limit the pack of canned salmon, and salmon prices, therefore, remained strong; however, costs are steadily rising in this fishery. Japanese salmon fishing and canning rose again and the pack probably attained a new postwar record in 1957.

The well-developed United States market for canned tuna continued to absorb substantial domestic supplies. Imports, mostly from Japan and Peru, also increased by over 15 percent, as did imports of frozen tuna for canning from the same countries, to over 63,000 tons.

In the United States output of canned Maine sardines was somewhat lower than in 1956 and production of canned pilchards in California remained very low, due to the lack of fish. Consequently, imports of canned sardines, mainly from South Africa, rose by nearly 30 percent. In the Union of South Africa and in South West Africa, where strong local and foreign demand continued and inventories were low, prospects for the industry depended primarily on the abundance of fish. This appeared satisfactory early in 1958. Portuguese exports of canned sardines declined for the second year in succession. The United Kingdom, Italy, and France reduced imports of canned sardines, whereas Western Germany bought slightly more than in 1956.

The Norwegian canning industry did not do too well in 1957 and exports of canned herring declined.

#### Fish Meal

Production of fish meal, which continued to be one of the most important fishery commodities, was probably below the 1956 level of over 1.3 million tons. The decrease was mainly due to there being fewer fish on certain of the principal fishing grounds. In the United States the 1957 menhaden catch was about 20 percent less than in 1956. The 1957/58 Norwegian winter herring season was much worse than the rather poor season of the previous year; in the first three months of 1958 178,000 metric tons of herring, out of a catch of 342,000 tons, went for fish meal production compared with 585,000 tons, out of a catch of 796,000 tons, during the same period in 1957.

This decline in production in two of the most important fish meal industries of the world was not offset by the continued expansion in other countries, e.g., Peru, Denmark, and Angola. The disastrous winter herring season in Norway, which is the world's second largest producer and the largest exporter of meal, will have a significant bearing on world trade, and fish meal prices, which are now slightly lower than they have been during the past few years, are not expected to weaken further to any appreciable extent.

#### Fats and Oils

As a whole, in 1957 there were expanding production and peak levels of trade, while prices generally declined from the beginning of the year (Table II-28). World production rose by 4 percent to nearly 27 million tons, thus maintaining the slow increases in per caput supplies for all uses—about 12 kilograms as compared with less than 11 kilograms in 1948-52. World exports remained at the 1956 record level of 7.3 million tons. The halt in the long upward movement in international trade largely reflects influences on the supply side, rather than in the demand situation. The Nigerian groundnut crop was very poor, copra sup-

TABLE II-28. FATS AND OILS: WORLD PRODUCTION AND TRADE, AND INTERNATIONAL MARKET PRICES, BY TYPE OF USE, 1950-54 AVERAGE AND ANNUALLY 1955-58

ITEM	1950- 54 aver- age		1	955	1956		1957 (prel.)		1958 (fore- cast)	
	<b> </b>		. T	house	ind	met	ric	tons		
Production			1		1		1		1	
Principally used for:										
$\mathrm{Food}^{\scriptscriptstyle 1}$	15	179	16	834	17	139		871	18	000
Food or soap <sup>2</sup>	6	+ 0		823		,		189		020
Non-foods	1	438	1	478	1	553	1	724	1	680
Total	22	777	 25	135	$\frac{-}{25}$	870	26	784	26	700
$\it Exports$										
Principally used for:										
$Food^1$	2	044	2	752	3	099	2	934		
Food or soap <sup>2</sup>		985		257		526		505		
Non-food <sup>3</sup>		710		828		721	Ű	864		
Total	 5	739	6	837	7	346	7	303		• • • •
		1	nde	3x ; 1	195	2-54		100		
Prices		1		İ		1		1		
Food and soap		1								
oils and fats4		114		93		103		101		
Drying and tech-						- 00		-01		
nical oils5		115		85		111		102		
All fats and oils		114		92		104		102		

<sup>&</sup>lt;sup>1</sup>Includes butter, lard, soybean, groundnut, rapeseed, cottonseed, olive, sesame, sunflower-seed, maize-germ, and teaseed olls. — <sup>2</sup>Includes tallow and greases, whale (excluding sperm), palm, palm-kernel, coconut, babassu, niger-seed, poppy-seed, shea nut, rice-bran, mowrah, murunuru and tucum-kernel oils. — <sup>3</sup>Includes linseed, castor, tung, oiticica, fish, hemp-seed, perilla, stillingia, and safflower oils. — <sup>4</sup>Includes series for lard,groundnut, soybean, cottonseed, olive, coconut, palm-kernel, whale, and palm oils and tallow. — <sup>4</sup>Includes series for linseed, castor, and tung oils. — <sup>4</sup>Includeing fish oil.

plies for export, palm kernel sales to the Nigerian Marketing Board, and tallow supplies in the United States were lower; and as a result shipments fell. Moreover, exports of United States soybean oil under Public Law 480 dropped sharply in 1957. The decline was accentuated by government policies in some countries with a low level of fat consumption, such as India and China, where larger quantities of fats were consumed locally and exports showed a sharp decline, although output was apparently larger than in the previous year.

Western European demand remained strong in 1957, but imports rose by only 2 percent to 4.6 million tons, in contrast to a higher rate of increase in previous years. Margarine production declined slightly after several years of rapid expansion, and larger quantities of butter were consumed. In the United States total domestic use of fats and oils continued to rise, but imports, mainly for non-food use, remained the same as in 1956. Total non-food use was a little higher, but use per caput continued to fall.

The general level of fats and oils prices in international markets has shown no upward trend over the past decade, although there have been wide fluctuations. Prices fell after the Suez Canal was reopened, and at the end of the year the FAO index for all fats and oils, excluding butter, after reaching its lowest point in October, stood at 102 (1952-54 = 100), compared with 112 in January 1957. After October 1957 some decrease in prices of "soft" oils was accompanied by higher lauric oil prices, because of the unsettled Indonesian situation, reports of drought from the Philippines and the removal of the processing tax on copra in the United States. The subindex for drying oil prices fell steadily during 1957, but turned upwards in March 1958; linseed oil prices recovered when it became evident that world supplies would be relatively small until the mid-1958 harvests.

Fats and oils demand is unlikely to be quickly affected by a moderate decline in economic activity, since the main uses are in food and soap and no significant weakening has been seen yet or is expected later this year, unless there is severe and widespread unemployment. In fact, in the United States, although imports were slightly lower in the early months of 1957/58, use of food fats and oils was higher, and total domestic use in 1957/58 is expected to be 3 percent more than last season. United

States exports were relatively low in the period October to March, but larger shipments of edible oils and fats under Public Law 480 are thought to have taken place in the remainder of the year.

Fats and oils supplies will continue to be large in 1958, particularly liquid edible oils, and United States production of animal fats and soybeans is already forecast at near-record levels for the next marketing year. Technical and drying oils will be affected by the continuance of the long-term technical changes in detergent and paint manufacture, as well as by the changes in industrial activity. However, since prices for most fats, oils, and oilseeds were relatively low early in 1958, and carry-over stocks in the United States and other major exporting countries were small, any substantial further lowering of the general price level appears unlikely.

#### Fresh Fruit

International trade in apples and pears in 1957/58 was characterized by an increase in imports into Europe, as a result of poor domestic crops. Mainly because of the declines in Europe, total apple production decreased by 24 percent, and world output of pears was 15 percent lower. In view of the scarcity of domestic supplies, several European countries relaxed import restrictions and temporarily reduced or abolished import duties. Fruit prices rose sharply during the second half of 1957 and more than doubled in some countries.

World production of oranges in 1957/58 was 14 million tons, about the same as in 1956/57. The recovery of orange trees from the 1956 frost in Spain was rapid and production and trade returned almost to former levels. increase in Mediterranean and Brazilian production was counterbalanced by a decline in the United States, where frost in Florida caused a loss of 780,000 tons of oranges and tange-World production of lemons was not rines. greatly different from last year's output (1.9 million tons), but grapefruit production is expected to decrease in line with the fall in the United States crop. Quick recovery of orange and grapefruit production in Florida is unlikely and less than normal supplies are expected in 1958/59. Given normal weather, however, production in the Mediterranean, South Africa, and South America will rise as new plantings reach the bearing stage.

International trade in bananas expanded further in 1957. The downward trend in United States imports was checked while Canadian and European imports reached a new record. Prices were slightly higher than the year before. Extensive storm damage in some countries will probably reduce output in 1958.

# Dried Fruit and Wine

World production of raisins in 1957/58 was about 520,000 tons, 10 percent less than the year before. United States production continued to decline and there was a poor crop in Turkey. Output of currants was also reduced because of a small crop in Greece, the largest producer. Exports of raisins and currants in 1957/58 are expected to be approximately the same as the year before. No unsold stocks of dried vine fruit are likely to remain at the end of the 1957/58 season, the Turkish carry-over of raisins having been sold in late 1957, and the considerable carry-over of currants in Greece used largely for distillation.

Prices for raisins have risen above last season's level since September 1957. In the United Kingdom, price prospects depend on the result of the new Australian crop, which is expected to be abundant, while the situation in the United States and in continental European countries is likely to remain unchanged until autumn 1958, when the Northern Hemisphere crop comes on the market.

Date production in 1957 is not yet known for most of the producing countries, but world output is not likely to be much changed. World date exports, which have been slightly above the 1948-52 average during recent years, declined in 1957 and a further decline must be anticipated in 1958. Small crops and depleted stocks in Iraq account for the major part of this decrease.

World wine production was about 50 million hectoliters lower (nearly 25 percent) in 1957 than in 1956. Production fell by about 38 million hectoliters in both France and Italy, and there were smaller declines in Spain, Algeria, and Portugal, totaling about 10 million hectoliters. German production recovered but still remained below average. World exports of wine were moderately lower than in 1956 and prices rose sharply in most countries during the second half of 1957. Because of the shortage of wine in France the price rose by 95 percent for producers and 43 percent at the retail level between May and December 1957,

in spite of the whole production being released for the market and there being no compulsory distillation. The government further intervened to compel producers to sell one third of their stocks of common wine at a fixed price before May 1958. In Italy, the wholesale price index rose from 78 in August 1957 (basis 1953 = 100) to 113 in January 1958. Similar price developments occurred in Algeria, Spain, and Greece where prices advanced in anticipation of greater demand for exports.

#### Cacao

After several years of steady expansion in production and a marked rise last season, the 1957/58 crop was one of the poorest in ten years. Bad weather and disease reduced output in all the main West African producing countries. Ghana and Nigeria are expected to produce only 205,000 and 86,000 tons, respectively, compared with 268,000 and 137,000 tons last year; production in the French territories will be around 110,000 tons, 30,000 tons below 1956/57; and São Tomé, Sierra Leone and Spanish Guinea wili also show declines. In Latin America, on the other hand, Brazil is the only country where production is expected to decline, and this decrease will probably be offset by slight increases in all other countries of the region. The final figure of world production in 1957/58 will perhaps be about 750,000 tons, 17 percent below the 1956/57 level.

As a result, prices rose in 1957, and at the end of the year the New York market price reached 40 cents a pound (330 shillings per hundredweight in the London market), compared with 23 cents during January-March 1957. In accordance with past experience, consumption was slow in adjusting to prices, and continued its upward trend to reach an estimated 890,000 tons last year. Grindings of raw cacao have been higher in practically all parts of the world, in particular in Western Europe. The biggest increases were in the United Kingdom, the Netherlands, and France, followed by the United States and Germany. International trade in cacao beans rose, and net imports during 1957 are provisionally estimated at about 780,000 tons, the bulk of the increase coming from the Dominican Republic, the French Cameroons, Ghana, and Nigeria, which together exported some 65,000 tons more than in 1956. All Western European countries, with the exception of Norway and Sweden, imported more than in 1956, and the U.S.S.R. and Eastern Europe seem also to have increased their purchases. On the other hand, United States imports fell by more than 20,000 tons.

Prospects are difficult to judge. At the current level of prices a modest decline in consumption has started. The other two factors which will affect the outlook are the size of the Brazilian winter crop and the prospects for the 1958/59 crops in Africa; if these crops are average, world supplies may be slightly above 800,000 tons, which would be below the high 1956/57 level, but substantially more than last season.

# Coffee

World production in 1957/58 in likely to approach 3 million tons, as a result of an estimated 300,000-ton increase in the 1957 Brazilian harvest over the short 1956 crop (1,066,000 tons), and higher output in some other Latin American countries and in Africa. In Central America and Mexico, production showed little change. World trade in 1957 lagged behind the increase in production and prices fell.

In anticipation of lower prices, imports in 1957 were limited to requirements for immediate consumption and replenishment of stocks. Imports into the United States declined less than 2 percent to 1,251,000 tons. For the first time in the past decade, imports into Europe did not expand, the rise in Western Germany's net imports (11 percent) being offset by lower imports into Belgium and France. Total world imports may not have reached more than 2.2 million tons, 2 percent less than in 1956. Commercial stocks were well maintained, and per caput consumption was probably lower in nearly ali countries. In the United States, it is provisionally estimated at 7.1 kilograms as compared to 7.6 kilograms in 1956.

Exports from Brazil were only 859,000 tons, 15 percent less than in 1956, and Colombian exports fell by 5 percent (from 304,000 tons to 289,000 tons). African Robusta coffee, however, was in active demand throughout the year.

Prices in 1957 were influenced by two opposing factors: the outlook for higher crops tended to depress prices while the principal Latin American producing countries took co-ordinated action to maintain existing price levels. Between January and September 1957, prices for Brazilian and mild coffees declined by 12 and 18 percent, respectively. The conclusion

in October 1957 of the Mexico Agreement which provided for the retention of 20 percent of exportable production in Brazil and 10 percent in the participating mild coffee producing countries (Colombia, El Salvador, Guatemala, Mexico, Costa Rica, Nicaragua) as well as for regulation of exports, had an immediate but shortlived effect in boosting prices. The Coffee Conference held in Rio de Janeiro in January 1958 set up an International Coffee Organization to promote world coffee consumption and safeguard the world's coffee economy. However, the failure to associate other, especially African, producers with the regulation of exports forced the member countries of the Mexico Agreement to accept further cuts in export quotas, as well as the establishment of minimum export prices by Colombia. Nonetheless, Latin American coffee prices came under renewed pressure in February 1958, Robusta coffee was actively traded at prices 10 to 15 percent higher than a year previously,

The outlook for 1958 is overshadowed by the foreseeable rise in world production, as a result of exceptionally large crops in Brazil where the 1958 harvest is forecast at 1.5 million tons - and in French West Africa, and some further expansion in other countries. Littie change can be expected in the attitude of buyers. United States imports in the first months of the current year were, in fact, comparatively small. The Mexico Agreement countries appear determined to continue price support measures in spite of the evident disadvantages of heavy government financial obligations, the incentive to competing exporting countries, and high and rapidly rising stocks. (The Brazilian Coffee Institute held 500,000 tons at March 1958, and the total Brazilian carry-over amounted to more than 800,000 tons by 30 June.)

Among remedial measures taken by countries themselves are the establishment of soluble coffee industries in producing countries, and the intensification of trade relations with Eastern European countries. Unless consumption resumes the upward trend of the past decade, there is little likelihood that prices will resist the pressure of rising supplies.

#### Teα

World production in 1957 probably reached approximately 700,000 tons, 3 percent above the preceding year. This was the net effect

of a reduction in North India and Pakistan, an increase in South India, Indonesia, and Africa, and a record crop in Ceylon. Higher production was not matched by higher exports. India, which had shipped unusually large quantities during the Suez crisis, exported in 1957 about 40,000 tons (17 percent) less than in 1956. Pakistan exports fell to one third. Exports from Ceylon, Indonesia and Africa, on the other hand, were well maintained. Total world exports (including China's exports to other than Eastern bloc countries) are estimated at around 470,000 tons, 9 percent below 1956. End-of-year stocks in producing countries were estimated at 80,000 tons, as compared to 65,000 tons a year earlier.

World imports were inflated to some extent by the late arrival of 1956 shipments around the Cape. United Kingdom net imports reached a new record of 256,000 tons, 17 percent more than in 1956. Imports into the United States, Australia, Ireland, and some North African markets, were larger than in the previous year, but the Netherlands, the biggest continental European market, imported less.

The increase in United Kingdom imports went almost entirely into stocks, and per caput consumption is estimated to have risen only very slightly (from 4.48 kilograms in 1956 to 4.52 kilograms in 1957). The improvement in imports into the United States and Canada was absorbed by population growth. Per caput consumption appears to have risen in some Commonwealth markets and other smaller consuming countries; and India and Pakistan also had higher domestic consumption.

Prices at all auctions remained in general slightly below the 1956 levels. High-quality teas were scarce and fetched exceptional prices whereas plain tea from India, Pakistan, and Ceylon often had to be sold at or near, production costs. In the last quarter of 1957, the Colombo dock strike and the uncertain political situation in Indonesia led to a temporary rise of prices in London, but they subsided in the early months of 1958.

Output in 1958 may not reach last year's high level because, of the droughts in 1957 in India, Palkistan, and some East African growing regions. The 1957 record crop in Ceylon is unlikely to be exceeded, although the floods at the end of 1957 apparently have done little harm to the tea-growing regions. United Kingdom stocks — an important factor influencing prices — are not excessively

high for the time of the year (54,300 tons at the end of March 1958). However, buying is likely to remain selective, and common tea will continue to meet strong competition from lower-cost African growths.

In the less immediate future, two important factors are rising costs of production and the slow growth of consumption in importing countries. Steps to cope with these two developments include the formation by the Indian Government of a Promotion Committee, to help expand internal consumption, and the establishment of a replanting fund in Ceylon to rehabilitate low-yielding areas.

#### Tobacco

In 1957, the upward trend in world production was checked, mainly as a result of a reduction in the United States; output in the Federation of Rhodesia and Nyasaland was also smaller. On the other hand, world production of oriental-type cigarette leaf rose sharply to a new record level. The increase was mainly in Greece and Yugoslavia, where plantings were larger and yields higher. Consequently, while exports of flue-cured tobacco will be lower, exports of oriental leaf are expected to rise. For the 1958 production season now in progress. output in Rhodesia recovered almost to the record 1956 level of 95,000 tons, but planting intentions in the United States point to a further slight reduction in acreage.

Tobacco prices were generally higher in 1957. Prices for flue-cured leaf at United States auctions were 7 percent above 1956 levels and prices for Burley leaf were substantially higher than all previous years except the record prices of 1956. Rhodesian auction prices were considerably higher than in 1956. Export unit values in Greece remained the same as in 1956, but prices for high quality leaf of the 1957 crop were reported to be higher in both Greece and Turkey.

The United States carry-over of leaf tobacco at the beginning of 1957/58 was 2 million tons, but some reduction is likely following the smaller 1957 crop. Total Greek stocks of oriental tobacco on 1 February 1958 were substantially lower than a year earlier. In the United Kingdom at the end of December 1957 working stocks amounted to 241,500 metric tons dry weight, the highest figure since the war.

The number of cigarettes smoked continued to rise, but consumption of smoking tobacco

decreased again in a number of countries. As regards cigars, in the Netherlands, Belgium, and Denmark the downward trend has been reversed during recent years, but in other countries consumption remained unchanged. Although the outlook for a further expansion of cigarette consumption is good, requirements of raw leaf may increase more slowly, reflecting the shift of demand toward filter cigarettes and new production techniques permitting the use of what was previously waste.

#### Cotton<sup>16</sup>

World supplies, that is, production during the season plus stocks at the beginning of the year, were lower in 1957/58 than in 1956/57. Production fell from 8.95 to 8.52 million tons, mainly because of the smaller United States crop, though output elsewhere rose slightly. Opening stocks were 5.01 million tons, 0.26 million tons less than at the beginning of 1956/57. Consumption in 1957/58 was only a little lower than the previous year, though this over-all stability conceals a declining trend in the major importing countries and the United States, and an increase in most cotton-growing countries (see Table II-29).

Table II-29. Cotton: World Supply and Disappearance

ITEM	1955/56	1956/57	1957/58	1958/59 (esti- mate)		
	Million metric tons					
Stocks		1				
United States Elsewhere	$2.43 \\ 2.36$	$3.14 \\ 2.13$	$2.45 \\ 2.56$	$1.86 \\ 2.59$		
Total	4.79	5.27	5.01	4.45		
Production						
United States Elsewhere	3.19 6.07	$2.82 \\ 6.13$	2.36 6.16	2.25 6.40		
Total	9.28	8.95	8.52	8.65		
Total supply Consumption	14.07 8.76	14.22 9.11	13.53 8.98	13.10		

SOURCE: International Cotton Advisory Committee. Including the Soviet bloe and China.

These various developments had two consequences. First, international trade declined in 1957/58 in comparison with 1956/57, a trend accentuated by balance-of-payment difficulties, partly mitigated by United States aid for cotton exports. Nevertheless, United States exports fell from the abnormally high figure of 1.68 million tons in 1956/57 to 1.24 million tons in 1957/58; exports from other countries were somewhat higher than the 1.45 million tons in 1956/57, the main increases being from Mexico and Egypt. Secondly, world stocks fell quite substantially to 4.45 million tons during 1957/58. The main decrease was in the United States, where there was a decline from 2.47 to 1.88 million tons, CCC stocks especially falling to 0.85 million tons at the end of May (mainly of the less desirable staples) well under half the volume of 12 months earlier. Importing countries also reduced their stocks, but there will be some increase in other exporting countries, despite the growing market opportunities offered by the U.S.S.R. and Eastern European countries.

The price of United States cotton in world markets has continued to be 15 to 20 percent below the domestic level. In the first half of 1957/58 prices of most American-type cottons were steady or tended to rise; at the same time, prices of Egyptian and Sudanese extra long staple cottons continued to fall to nearer their pre-Suez relationship with American-type cottons. Prices fell in the early months of 1958 but recovered somewhat in April and May; prices of United States medium staples were still 2 to 3 percent higher than a year earlier.

The production outlook is very uncertain. United States acreage allotments remain at the minimum, and curtailment on account of Soil Bank payments may well be substantially larger than in 1957/58; at present, next season's crop is not expected to exceed 2.3 million tons. On the other hand, a moderate increase is forecast in the production of other countries. Any increase in the world crop is therefore likely to be modest, and output may well remain below consumption — especially if the United States recession is halted, as this would exert an upward influence on cotton prices in world markets. In the United States, the current program of releases from CCC stocks for exports is to be supplemented by a "payment-in-kind" program, under which exporters are to receive payment in the form of cotton from CCC stocks,

<sup>&</sup>lt;sup>16</sup>Including the Soviet bloc and China.

thus assisting in the liquidation of CCC inventories.

#### Wool 17

A decline in world consumption began in mid-1957. Activity in the wool textile industry was very sharply reduced in the United States and, to a lesser extent, in the United Kingdom, some European countries, and Japan. The fall in consumption was accentuated by increasing use of man-made fibers, notably in the United States industry. Trade was restricted by the credit stringency and in some countries, particularly France and Japan, shortage of foreign exchange. World exports declined by about 6 percent in the latter part of 1957, mainly reflecting reduced shipments from South America. Since the beginning of the 1957/58 season, prices of Dominion wools have shown an almost continuous decline (Figure II-13). By the end of the season (June), both merino and crossbred prices were 20 percent below the average for the previous season and stabilization schemes came into operation in South Africa and New Zealand, while in South America export taxes were cancelled and in February concessions were made in foreign exchange provisions affecting wool exports. In import markets the disposal of United States CCC stocks was completed by the end of 1957 and release from the United Kingdom government stockpile was suspended after April.

World supply of wool is estimated to have been slightly smaller in 1957/58 than in 1956/57, with lower opening stocks and the clip being 1.31 million tons (clean basis) as against 1.33 million tons in 1956/57. Drought reduced clips in Eastern Australia and the Kar. oo, but clips were larger in both Argentina and Uruguay as a result of the increase in flock numbers. Among importing countries, the United States clip declined but sheep numbers are increasing. A further increase is reported in U.S.S.R. production.

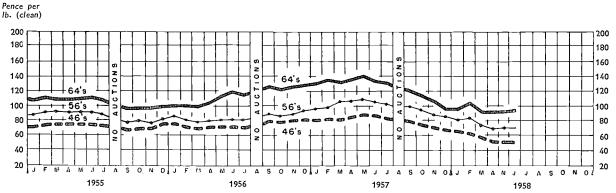
Immediate prospects are not unfavorable since the recession in wool textile activity may be short-lived. It represents mainly the working down of stocks of manufactured goods and may be completed during 1958/59, in which case demand for raw wool would revive.

Longer-term prospects for the consumption of wool are good so long as standards of living continue to advance. Per caput consumption of apparel and textiles may increase more slowly in regions where it is already high, but this should be offset elsewhere. The supply of competitive man-made fibers seems likely to increase, but experience has shown that the displacement of wool on utility grounds has not prevented complete absorption of wool clips and that substitution has become more important only at times and in countries where wool prices are relatively high.

#### Jute

Supplies available in 1957/58 were much the same as in 1956/57, with only small changes in stocks and production. The crop is estimated at about 1.2 million metric tons in Pakistan and 740,000 tons in India. In addition, India produced 220,000 tons of mesta (an allied fiber). Output in minor producting countries (Brazil,

FIGURE II-13. Dominion Wool Prices 1



SOURCE: New Zealand Wool Commission.

<sup>1</sup>Unweighted average of quotations for super, good, and average noble combing fleece and skirtings (free and light burry) sold in the United Kingdom and in the Dominions.

<sup>&</sup>lt;sup>17</sup>Including the Soviet bloc and China.

TABLE II 30. ESTIMATED JUTE CROPS AND DISAPPEARANCE IN PAKISTAN AND INDIA

ITEM	1955/56	1956/57	1957/58	
	Million metric tons			
$Estimated\ crop$		1		
Pakistan Jute India	1.27	1.18	1.25	
Jute	$0.76 \\ 0.21$	0.78 0.27	0.22	
Total, India and Pakistan	2.24	2.23	2.21	
Estimated commercial dis- appearance Exports				
Fakistani exports overseas Mill consumption -	0.79	0.63	0.7	
India	$ \begin{array}{c c} 1.19 \\ 0.13 \end{array} $	$0.18 \\ 0.16$	1.13 0.19	
TOTAL	2.11	2.08	2.07	

Sources; Pakistan Jute Association and Indian Jute Mills Association.

Taiwan, Nepal, Burma) was practically unchanged. Latest production figures are not yet available for China where production has risen considerably in recent years (Table II-30).

Although jute manufacturing generally has become less remunerative, Pakistani mills increased their consumption by 20 percent in 1957/58. Indian mills are estimated to be consuming almost as much jute in 1957/58 as in the two preceding seasons, possibly as a result of a recent minimum gunny price agreement. European mills, on the other hand, have had to reduce activity more drastically and the decline in consumption begun in 1957 has continued. Nevertheless, 1957/58 prices averaged the same or slightly higher than in 1956/57. Demand was active, apparently not only for consumption but for stock, and total exports from Pakistan were the same as in 1956/57, though exports to overseas destinations fell by 4 percent.

If official objectives are realized, the 1958/59 season will see a significant reduction in the Pakistani jute crop — acreage for only 1 million tons being licensed — and an almost equally significant expansion in the Indian jute crop, where an increase of about 20 percent in output is projected. Actual production, however,

tends to be determined by the relative advantages of planting jute or rice. In 1957/58 jute prices were much the same as in 1956/57; in Pakistan rice prices are somewhat lower than in 1956/57, though they have risen slightly in India.

Thus, the immediate outlook is for not much change in acreage, but expectations of bumper harvests in both India and Pakistan at the beginning of 1958/59 point to some increase in the new crop. Both Pakistan and India have longer-term plans for increased output. In Pakistan the extra output will be less than necessary for the planned increase in manufacturing, and export availability of raw jute seems likely to dwindle. In India the increase in production is planned not only to meet a considerable increase in jute manufacturing, but also to reduce imports from Pakistan to residual qualities. Growing domestic markets may be expected to absorb some of the additional manufactured jute, but it may be difficult to dispose of additional export supplies at remunerative prices.

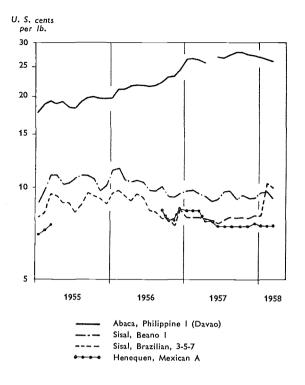
#### Hard Fibers

Hard fiber production reached a new record of some 825,000 tons in 1957, but has tended to level off in the past two years. Abacá output, at about 140,000 tons, fell slightly due to a reduction in Philippine production; output in North Borneo and Central America increased. Sisal production (over 500,000 tons) increased slightly because of larger crops in Brazil and Portuguese Africa. Henequen production rose slightly to 120,000 tons, due to larger cuttings in Mexico.

Sisal consumption was at a peak in 1957, while the supply of henequen tended to be excessive, with the excess concentrated in henequen fiber stocks in Mexico. Demand for sisal was smaller in the United States, but better harvests in Europe and elsewhere increased requirements of farm twines, while other uses also expanded. Only marginal quantities of henequen now enter world trade. Prices of both sisal and henequen continued their sixyear-long decline. Demand for abacá, mainly for shipping ropes, continued strong in 1957 and prices were on an average 20 percent higher than in 1956 (Figure II-14).

There was already some weakening of demand for abacá in the latter part of 1957 and prices

FIGURE II-14. Hard Fiber Prices, New York 1955-58



declined steadily in early 1958 under the influence of the industrial recession in the United States, the major importer. Moreover, a considerable tonnage of shipping in various parts of the world has been laid up and shipyards in a number of countries have recently had orders canceled. A further factor is the growing use of synthetic fibers for cordage and fishing nets. It seems unlikely that any sharp drop in demand for abacá would be equally matched by adjustment in output. The demand for sisal and henequen is less directly affected by the industrial recession and in the long run there are technological factors favoring expanded consumption and new markets. Operations on estates where production has become uneconomic, especially in Indonesia, are being curtailed, while production capacity in some other areas, notably Brazil, is becoming fairly fully utilized. It is too soon to say, however, that the downward drift of prices is coming to an end. In the more immediate future, the amount of farm twine necessary for grain and hay harvests will be a major factor influencing spinners' demand, while the disposal of accumulated henequen stocks could adversely affect prices.

#### Rubber

Production of natural rubber (1.9 million tons) in 1957 was substantially unchanged for the second year running (see Table II-31). There was some improvement in Malaya, due to increased output from estates, and also in Ceylon. Estate production in Indonesia, however, continued to decline, being scarcely offset by a small increase in smallholders' output. Production elsewhere in Southeast Asia showed virtually no change, but expansion outside the region continued. After some stability in the first half of 1957, international prices fell steadily from August onwards, with a temporary recovery in December, and continued to fall in early 1958. Rubber requirements of the United States, the United Kingdom and the Soviet bloc were smaller but demand in other countries was well maintained. Domestic United Kingdom consumption fell only slightly in 1957, but entrepot trade, particularly to the Soviet Union, declined sharply. United States and United Kindom consumption of natural rubber has been falling fairly steadily over the past two years, while consumption of the synthetic product has been well maintained.

The short-term outlook is clouded by the recession in the United States automobile industry and by rather ample tire stocks, but more active buying by the Soviet Union and China has been reported and, unless European and Japanese industries suffer a recession, overall requirements for natural rubber should be maintained in 1958.

In the long run, expansion in rubber requirements seems fairly well assured, although in

TABLE II-31. NATURAL RUBBER PRODUCTION, CONSUMPTION, AND STOCKS

ITEM	1955	1956	1957	
Production	Thous	and metric	tons	
Indonesia Elsewhere	749 1 200 1 950	698 1 220 1 920	695 1 225 1 920	
United States Elsewhere	$ \begin{array}{r}     645 \\     1 270 \\     \hline     1 915 \end{array} $	$ \begin{array}{r} 571 \\ 1 365 \\ \hline 1 936 \end{array} $	548 1 350 1 900	
Closing stocks (commercial)	765	740	760	

Source: International Rubber Study Group.

the past ten years synthetic rubber consumption has expanded faster than natural. An important expansion in synthetic rubber is now under way in Western Europe; whether there will be enough natural rubber to maintain its share of the market in the future depends largely on the possibility of increasing productivity. There has already been extensive replanting with high-yielding trees in Malaya and Ceylon, and special schemes encourage this development among small holders. put in these countries may keep pace with the rate of market expansion during the next decade. But Indonesia is likely to hang back pending more extensive replanting under more settled conditions.

#### Forest Products

#### Roundwood

In 1957, world roundwood production was about 1,560 million cubic meters, as against some 1,590 million cubic meters in 1956. Production of sawlogs, notably in North America, but also in Europe, declined and in North America pulpwood fellings were also reduced. The relatively small increase recorded in roundwood production in the Soviet Union and Asia could not offset the influence of European and North American developments on total world production.

The demand for sawnwood in North America had gradually been reduced as a result of falling building activity since 1955 in the United States, and led to smaller requirements for new log supplies. This trend was further accentuated by the United States recession. Thus, North American production of sawlogs, which in 1956 had fallen by 7 million cubic meters, declined further by close to 20 million cubic meters in 1957. Production of pulpwood in North America, however, declined by only about 1 percent from the 1956 level, since the effect of the recession on the pulp and paper industry was only partly felt in 1957, though a marked increase in pulpwood stocks was already noticeable at the end of that year.

In Europe also production of sawlogs again fell in 1957, in fact proportionally more than shown by declining sawnwood output, as mill stocks in many of the principal producing countries were reduced in the course of the year. As to pulpwood and other small-sized round-wood, production in 1957 did not show any significant change from 1956.

The volume of world trade in roundwood in 1957, on the other hand, did not change much from that of 1956. Exports by North America generally declined somewhat, but exports by Europe were maintained on the whole. The Soviet Union increased roundwood exports slightly, and exports of hardwood logs from Africa showed a certain rise over the 1956 level. Export prices were maintained during most of 1957, partly because of falling freight rates which reduced the landed cost of imported roundwood. Toward the end of the year, a marked weakening of pulpwood export prices was, however, noticed in Europe.

For 1958, although the raw material required by certain forest industries for current production may be smaller than in 1957, particularly in Europe, a small increase in world roundwood production can be foreseen, since mill stocks, depleted in 1956/57, have to be replenished. The key factor, however, is the United States recession, which, if it intensifies, could lead eventually to a further decline in roundwood production.

#### Sawnwood

In 1957, North American output dropped by 11 percent compared with 1956. In Western Europe the fall was almost 4 percent and in Latin America close to 3 percent. In other regions as a whole production again slightly increased, but not sufficiently to prevent a further fall of some 10 million cubic meters, or over 3 percent, in total world production of sawnwood.

In North America the reasons for the decline in sawnwood production were the same as for roundwood, namely the economic recession of 1957 in the United States, superimposed on a continued fall in building activity in the United States. Thus, United States demand for sawnwood was depressed, and production followed suit, being 7 percent lower in the first quarter of 1958 than it was a year earlier.

Until 1957, annual consumption of sawnwood in Europe had slightly increased because of the steady growth of building and industrial activity which offset the effects of more rational utilization of wood and substitution of other materials. In 1957, however, Europe's sawnwood consumption remained at the 1956 level. A small decline in the region's own

production was compensated by higher imports, and, to a certain degree, particularly in the exporting countries, by stock reductions. Toward the end of 1957, a check to industrial expansion and house-building activities became apparent, and there were even small declines in some countries. These trends, together with the probable effects of the United States recession, still hardly felt in Europe, indicate that European requirements for new supplies of sawnwood in 1958 will also be reduced.

In Africa and Asia, production of sawnwood in 1957 rose somewhat from the 1956 level, while in Oceania there was a small decline.

In 1957, the volume of world trade in sawn-wood showed little change from 1956. The European market remained rather active throughout 1957, while in North America the declining trend continued. In 1958, however, the European market opened on a distinct note of uncertainty. Importers, in the face of the less favorable general economic outlook, were unwilling to make major forward commitments or to replenish stocks. Consequently, the principal exporting countries, with the exception of the Soviet Union, sold considerably less in the first half of 1958 than a year earlier.

Sales by North America to Europe did not show any marked change from 1957, despite the potential surplus availabilities and the exceptionally low ocean freight rates, which normally should have made North American sawnwood quite attractive to European importers.

There was some increase in activity on the European sawnwood market toward the end of the spring of 1958, as a result of competitive price cutting by the U.S.S.R. and Finland. But even so the present outlook for 1958 is for lower consumer demand in Europe and probably for reduced output. As demand prospects in North America also remain relatively unfavorable, total world demand as well as output is likely to show a further decline in 1958. Further developments, however, depend chiefly on the general state of industrial and economic activity in North America and Europe and the extent of repercussions on other regions.

#### Wood Pulp

A sharp check to the postwar rate of growth in production by the pulp, paper and board, and fibreboard industries took place in 1957. World production of wood pulp increased in 1957 by less than 1 percent compared with an increase of close to 7 percent in 1956 and

about 8 percent annually from 1947 to 1955. World pulp production nevertheless passed, for the first time in history, the level of 50 million tons. For many years, voracious world demand tended to keep a step ahead of supply, in spite of the remarkable expansion of production capacity. During the past year or two, however surplus capacity has gradually emerged. In North America, reduced demand in 1957 caused production to decline about 3 percent as compared with 1956 but new capacity, earlier planned, continued to come into operation and operating ratios fell. In Europe, output of wood pulp rose by 4 percent compared with 1956; there was, however, a slackening in the rate of growth during the second half of the year. In other parts of the world, notably in Japan and in the Soviet Union, the steady growth of pulp production seems to have continued uninterrupted throughout 1957.

In the first half of 1958, however, the check to expansion and even cuts in production, both in Europe and North America, became more marked, and the level of total output was somewhat lower than in corresponding periods of 1957. In the principal pulp-exporting countries, output fell, particularly of unbleached grades of chemical pulp and mechanical pulp, the latter because the world newsprint market weakened after mid-1957. The general emergence of surplus capacity also led to increased price competition.

The volume of world trade in pulp and its products in 1957 showed little change from 1956, with a 20 percent increase in United States exports and some decline in European and Canadian exports. The decline in these countries' exports of mechanical pulp and unbleached grades of chemical pulp was particularly marked, and contrasts strongly with the substantial growth of North American overseas exports of chemical pulps. These have, in fact, trebled from 1953 to 1957 and risen to close on 1 million tons.

The outlook for 1958 indicates continuation of production at the same level as in 1957. New capacity planued earlier is still coming into operation and will increase the temporary unbalance between world demand and production capacity.

#### Newsprint

In 1957 world production of newsprint rose by only some 300,000 tons to 12.3 million tons.

The decline in the rate of production increase in all regions is clearly illustrated by the following figures. In North America the annual growth from 1947 to 1955 was 4.9 percent, from 1955 to 1956, 5.8 percent and from 1956 to 1957, 1.4 percent; in Europe the corresponding percentages were 8.6, 9.7 and 1.5, respectively; and in the rest of the world 15.9, 14.0 and 7.7 respectively.

Reduced demand in the United States led to a gradual accumulation of stocks there toward the middle of 1957, when they reached all-time record levels, both in actual volume and in terms of days' supplies. The immediate effect was a gradual curtailment of Canadian output, which for the whole year 1957 showed a small decline on 1956. United States production, on the other hand, further increased, giving a small rise in total North American output for the year as a whole; in the second half of 1957 it was, however, already lower than in the two preceding six-month periods. In other regions of the world, newsprint output generally showed minor increases over the 1956 level, though in a few European countries (Austria, Western Germany, and Norway) small declines were observed.

In 1957, while the expansion in world demand for newsprint slowed down, capacity in this industry also continued to expand. Operating ratios, therefore, had to be reduced, first in North America, but later also in the other principal producing and exporting countries, as the effects of the North American excess capacity were felt more strongly. In Canada, the operating ratio in the newsprint industry, which had for the past ten years been at or above 100 percent, fell to 95 percent as an average for the whole of 1957; by the end of 1957 it had fallen to 81 percent. Since then there has been some recovery, but the ratio still remains under 90 percent. In the United States, where the newsprint industry is less dependent on exports, the operating ratio at the beginning of 1958 had nevertheless fallen below 90 percent. In Northern Europe the newsprint industry, after many years of high operating ratios, also experienced lower ones, varying about 90 percent.

The changing situation in the world newsprint market in 1957 also affected the output of mechanical pulp and particularly the production of market pulp, which was heavily curtailed toward the beginning of 1958 in the

principal exporting countries, notably Finland and Norway.

The outlook for 1958 indicates some possibility of further reductions in operating ratios as more new capacity comes into operation. Consumption in the United States, which accounts for about half of total world consumption, was at a lower rate in the first half of 1958 than in 1957. The longer-term outlook, however, is favorable; although the 1957/58 downturn on the market may put a brake on many further immediate expansion projects, demand will soon eatch up with capacity as population grows and per caput consumption increases.

# Other paper and board

In 1957, world production of paper (other than newsprint) and board (paper and fibreboard) further rose, by over 1.1 million tons, to about 52.28 million tons. The decline in North America of 460,000 tons of paper and 400,000 tons of board was more than compensated by increases in Europe and Asia (respectively 1.24 and 0.52 million tons more paper and board than in 1956). It is worth noting that the decline in North American production due to the United States recession was still much smaller, both in actual volume and in percentage of total production, than the declines recorded in 1949 and 1952. In the former year, output in other regions had not been affected at all by the decline in United States demand, while the post-Korean depression hit all the principal producing regions and countries alike. The 1953/54 recession in the United States, on the other hand, was short-lived and coincided with the beginning of the general economic upswing in Western Europe. Paper and board production in Europe and other parts of the world was consequently not affected by the 1953/54 developments in the United States. Today, the United States recession, generally considered more serious than the previous postwar ones, together with the falling off of Europe's economic expansion, may affect the paper and board industry more in the course of 1958 when the full impact of the changing economic situation becomes more apparent. During the early months of the year, however, consumption and production of paper and board in Europe was well maintained, contrary to expectations. Trade in these products also seemed to have been relatively little affected so far.

# Chapter III - FOOD AND AGRICULTURAL DEVELOPMENTS IN AFRICA SOUTH OF THE SAHARA

FAO has published several studies of food and agricultural developments in the Far East, Latin America, and the Near East, but this chapter is its first review of the over-all situation in Africa, the fourth of the major economically underdeveloped regions. The chapter is confined to Africa South of the Sahara. 1 for although this region is far from homogeneous it presents less diversity than the continent taken as a whole. It is intended as a preliminary review of the whole field of postwar food and agricultural developments in this vast region and it is therefore not possible to include more than the briefest account of many important problems. It is hoped, however, that this summary will bring out the main similarities and differences between the food and agricultural situation and problems of Africa South of the Sahara and those of the other underdeveloped regions and will help to focus attention on the many questions requiring further study.

The chapter includes a fairly full account of the main postwar developments in production and trade in agricultural, fisheries, and forestry products. Food consumption and nutrition, where improvements are fundamental in raising levels of living, are also analyzed in some detail, as this is a field in which FAO already has a relatively long experience in the region. Problems and progress in land utilization, soil fertility and the technical aspects of agricultural, fisheries, and forestry production are reviewed, together with the organization of research and of the training and extension services required to translate technical advances into actual production. Institutional changes

are then outlined, including adjustments in land tenure systems, the development of co-operatives, the organization of marketing and the widespread establishment of schemes for the stabilization of producer prices. An account is also given of the organization and financing of agricultural development, especially the economic development plans that have been an important influence in the postwar period, and of some aspects of agricultural, fisheries, and forestry policies. A concluding section emphasizes some of the major problems that emerge in the course of the chapter.

Before embarking on this review it is necessary to set out briefly certain background factors and to indicate some of the main respects in which Africa South of the Sahara differs from the other economically underdeveloped regions, whose characteristics are more familiar to most readers of this report.

# INTRODUCTION

The region contains as many as 32 different countries and territories or no less than 47 if the individual territories in the Federation of Rhodesia and Nyasaland, French Equatorial Africa and French West Africa and the regions comprising the Federation of Nigeria are counted separately.<sup>2</sup> Ghana, Liberia, and the Union of South Africa are independent countries. The Federation of Rhodesia and Nyasaland is self-governing, with two of its component territories administered, however, by the United Kingdom. All the rest of the region is under

<sup>&</sup>lt;sup>1</sup> For the purpose of the present study, Africa South of the Sahara is defined as covering all countries and territories (including islands) that form part of the continent of Africa, except Algeria, Egypt, the Federation of Ethiopia and Eritrea, Libya, Morocco, the Somalilands, Spanish West Africa, Sudan. and Tunisia.

<sup>&</sup>lt;sup>2</sup> Federation of Rhodesia and Nyasaland: Northern Rhodesia, Nyasaland, and Southern Rhodesia; French Equatorial Africa: Chad, Gabon, Middle Congo, and Ubangi-Shari; French West Africa: Dahomey, Gninea, Ivory Coast, Mauritania, Niger, Senegal, Sudan, and Upper Volta; Nigeria: Eastern, Northern, and Western Regions and Southern Cameroons.

the jurisdiction of either Belgium, France, Portugal, Spain or the United Kingdom; these areas differ greatly in their precise status, but for convenience they will all be described in the course of this study as the dependent or overseas territories of the respective metropolitan countries.

As a result of this predominance of dependent territories, a very large part of the trade of the region is with the metropolitan countries. Grants and loans from metropolitan governments and loans guaranteed by them are an important source of finance for the development plans of some territories, while there has also been a considerable flow of private capital from the metropolitan countries, especially for mining and latterly also industry. Agricultural and other services are staffed largely by technicians from the metropolitan countries, whose educational facilities are also available for the training of African personnel. Some territories share various common services, such as the numerous interterritorial institutes for different branches of agricultural research.

Agricultural and other resources vary greatly. Some areas with considerable mineral resources are now among the more developed parts of the region, for minerals have attracted capital and stimulated the building of railways. The rapid development of the Union of South Africa, now economically the most developed country in Africa, was initially founded on its mineral wealth, especially gold, diamonds, and coal. The Copper Belt of Northern Rhodesia and the Katanga and Kasai areas in the Belgian Congo are other very important centers of the mineral industry. Minerals also figure prominently in the exports of Angola, French Guinea, Ghana, Liberia, Nigeria, Sierra Leone, Southern Rhodesia, South West Africa and Swaziland, for instance, while in some other areas there are mineral deposits which have as yet been little exploited.

Known coal resources are relatively small and the great bulk of the region's forest production is therefore used as fuel. Coal mining is mainly concentrated in Southern Rhodesia and the Union of South Africa, where an abundance of low-cost coal has enabled the rapid development of both mineral and secondary industries. Elsewhere the lack of power supplies has been a factor limiting the growth of industry, but since the war a number of large schemes have been undertaken to harness the region's great hydroelectric potential, many of them also opening

np irrigation possibilities and some making possible the local production of fertilizers.

Some areas in the center of the region are more than 2,500 kilometers from the coast. Transport is everywhere a crucial problem and has received top priority in most of the postwar development programs. Natural deep-water harbors are rare, sand bars and breakers generally entailing the transfer of goods by lighter or surfboat. Navigable stretches of river are separated by frequent rapids. The use of animal transport is limited both by the tsetse fly and by water supplies, and head-loading remains an important means of transport, especially of agricultural products. Railways still serve only rather limited parts of the region, while in many areas roads are impassable in the rainy season.

Comparable national income estimates are as yet available for only few parts of the region. The United Nations has recently compared estimates of the per caput net national product at factor cost of 55 countries in terms of United States dollars 3 and, while such international comparisons have many limitations, these estimates give an approximate idea of the position of Africa South of the Sahara in relation to the rest of the world. It was estimated that in the Union of South Africa the per caput net national product averaged about 300 United States dollars per annum in 1952-54, in the Federation of Rhodesia and Nyasaland 100 dollars, the Belgian Congo 70 dollars, Kenya 60 dollars, and Uganda 50 dollars. The Union of South Africa fell into the same class as Austria, Ireland, Italy, and a number of countries in Latin America, while the other areas were in the lowest income group, together with most of the underdeveloped countries for which comparable data were available. The range of 50 to 70 dollars found for the Belgian Congo, Kenya, and Uganda was the same as for Burma, India, Korea, and Pakistan.

# **Population**

Demographic data remain very inadequate, in spite of recent improvements, and their lack is an important obstacle to realistic development planning.

<sup>&</sup>lt;sup>2</sup> Per Capita National Product of Fifty-five Countries: 1952 1954, Statistical Papers, Series E, No. 4, United Nations, Sales No. 1957.XVII.2, New York, 1957.

According to United Nations estimates, the total population of Africa South of the Sahara increased from about 109 million in mid-1936 to about 148 million in mid-1956, or by rather more than one third in 20 years. Even in this short period and bearing in mind the inaccuracy of the statistics, it is clear that there has been an acceleration in the rate of growth, the calculated annual average rate rising from 1.4 percent between 1936 and 1950 to 1.9 percent in the more recent period. Though substantially above the world average, this latter figure is much less than the high rates estimated for Latin America and the Near East and it seems probable that, with improvements in medical services, incomes, and nutrition, there will be a continued acceleration for some time.

A major feature of the region is the low population density in most areas, which is one of the reasons why accurate demographic and also agricultural statistics are so difficult and costly to obtain. It is estimated that in 1956 there were on an average only just over seven persons to the square kilometer (including inland water), compared with an average of 20 for the world as a whole, while among the main regions only Oceania was more sparsely populated. Thus, in many territories labor shortage and the small size of the local market are yet further limitations on the development of industry. Apart from certain densely populated small islands and also the industrial and mining areas of the Union of South Africa, the highest population densities are found in Nigeria (with an average of almost 100 per square kilometer in the Eastern Region) and Ruanda-Urundi.

Urbanization is occurring rapidly in some parts of the region. Dakar (French West Africa) and Leopoldville (Belgian Congo), for example, now have populations of more than 300,000, compared with only about 90,000 and 46,000, respectively, before the war. In the Union of South Africa the urban population is estimated to have risen from 33 percent of the total in 1936 to 42 percent in 1951, the urbanized proportion of the indigenous population increasing from 19 to 27 percent. In many cases there is a steady turnover of population between urban and rural areas. The mines of the Union of South Africa, for instance, draw their labor from a very wide area, including neighboring territories, men coming without their families to work for a period before returning to their villages. This exodus of able-bodied males has affected agricultural production in some areas.

Data on agricultural population are very scarce. Official estimates indicate that 77 percent of the population in Northern Rhodesia, 92 percent in Nyasaland, and 84 percent of the indigenous population in the Belgian Congo are agricultural. FAO's approximate continental estimates give a figure of 74 percent for Africa in 1950, compared with 70 percent for Asia and 60 percent for South America.

Mention must be made of the European population of the region, for although this constitutes only about 2 percent of the total, in some areas Europeans play an important part in agricultural production as well as in mining and industry. In the Union of South Africa 21 percent of the population is of European origin; Europeans hold about 89 percent of the agricultural land and are responsible for the bulk of agricultural production, including most of the maize, which is the staple food of the African population of the country. In South West Africa 12 percent of the population is European, in Southern Rhodesia 7 percent, and in Northern Rhodesia 2 percent; in these territories also they produce the major part of agricultural output, including much of the staple food of the indigenous population. While elsewhere Europeans number less than some 1 to 2 percent of the total population, in such territories as Angola, the Belgian Congo, Kenya, Mozambique, Spanish Guinea, Swaziland, and Tanganyika, for example, their agricultural production is substantial. In most of West Africa, however, their numbers are very small. The other immigrant populations that are important in some areas play little part in agriculture, except in the marketing of export produce (e.g., the Lebanese and Syrian traders in West Africa).

#### Physical Factors

The main physical factors that influence and set limitations on the agricultural production of Africa South of the Sahara can be introduced only briefly, though some of the more important factors will be discussed in more detail in later parts of this chapter.

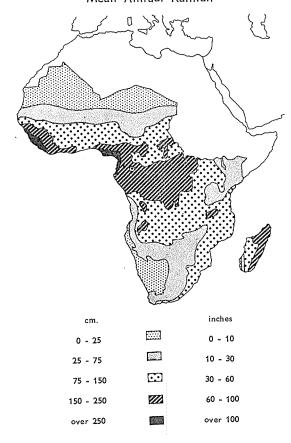
Except for the most southerly part of the region, Africa South of the Sahara lies within the tropics. Rainfall, in which there are great variations within the region, is the main limiting factor for plant growth. At one extreme, on the Sahara borders and in the Kalahari desert, the mean annual rainfall is less than 25

centimeters, while at the other extreme large areas, mainly in West and Central Africa, receive an average of more than 150 centimeters, rising as high as 1,000 centimeters in a few places (Figure III - 1 [a]).

In the drier parts of the region average rainfall figures based on a period of years are misleading, as there are sharp fluctuations from year to year, both in the quantity of rainfall and in the timing of the short rainy season. Crop production in these areas is therefore very uncertain in the absence of irrigation and storage, and water supplies also limit the number of livestock that can be maintained. Where the rainfall is adequate, drainage and flood control are often necessary and sharp tropical downpours cause erosion when the soil has been denuded of adequate cover. Here the tsetse fly, rather than water supply, is often the main obstacle to livestock production.

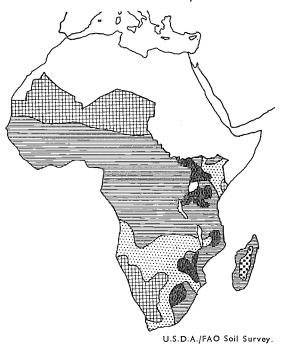
Except for limited areas, relatively little is known about the behavior and management of the soils of Africa South of the Sahara. The predominant soil group is the combined Latosol and Red-Yellow Podzolic one. Latosols (mainly

FIGURE III-1 (a). Africa South of the Sahara: Mean Annual Rainfall



Red and Reddish-Brown Lateritic soils) are characterized by being strongly weathered. highly leached, rich in clay, and are usually acid. They are generally less erosive than other soils and they are potentially very productive, though requiring a very high standard of management. The Red-Yellow Podzolics are low in mineral plant food and, like the Latosols, are highly leached. The erosion hazard is greater than on the Latosols, but their potential also is high, although fertilizer applications and other management practices are essential for increased production. While the Dark Gray and Black soils occupy a relatively small area, they are important to the agricultural development of the region. The soils are characterized by a high clay content, poor structure, and inadequate natural drainage; improved drainage and irrigation methods, use of fertilizers, and better tillage equipment are required for these soils. In much of the southern part of the region there are Chestnut, Brown, and

FIGURE III-1 (b). Africa South of the Sahara: Schematic Soil Map

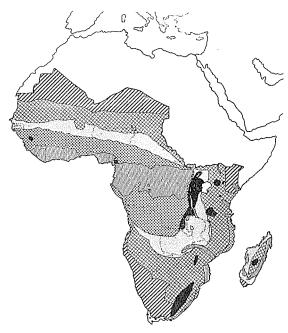


- Dark Gray and Black soils of the Tropics and Subtropics
- Chestnut, Brown, and Reddish-Brown soils
- Sierozems, Desert, and Red Desert soils
- Latosols and Red-Yellow Podzolic soils
- Soils of Mountains and Mountain Valleys (Complex)

In addition to the above soil groups, small but important areas of Alluvial soils, not shown on the map, occur in various parts of the region.

Reddish-Brown soils. They all have a relatively good supply of organic matter and are moderately high in fertility, although they are not usually productive without irrigation, while conservation practices are also necessary to conserve moisture and prevent the soil from blowing. The Sierozems, Desert, and Red Desert soils found in the driest part of the region have an excellent potential, though many problems are involved in their utilization. Water is the dominating limiting factor, although erosion can be a problem because of scanty surface cover, wind, and occasional torrential rainstorms. The Alluvial soil areas are normally not extensive, but are intermixed within the other great soil groups. They come from a wide variety of materials and are mostly inherently fertile, the major management problem usually being water control. Their proper management can

FIGURE III-1 (c). Africa South of the Sahara:
Schematic Vegetation Map



Reproduced by kind permission of the author, J.P. Harroy, from his Afrique, terre qui meurt.

- Rain forest
- Seasonal forest
- Tree savannah
- Shrub savannah and thorny savannah
- Desert and subdesert
- Montane formations
- Mediterranean vegetation

enhance the agricultural potential of any area in which they occur (Figure III - 1[b]).

Several different classifications have been attempted of the vegetation cover of Africa South of the Sahara. A detailed discussion of this subject would not be appropriate here, but one of these classifications is shown in Figure III - 1(c) in order to indicate the position in the region of the main areas of forest, savannah, and desert. A comparison with Figure III - 1(a) clearly brings out the dominant influence of rainfall on vegetation conditions and thus on agricultural production.

# The Agriculture of Africa South of the Sahara

Africa South of the Sahara contains about 15 percent of the total land surface (including inland water) of the earth and only about 5 percent of the total population. Its share of the world's total of arable land and land under tree crops is also about 15 percent, of forested land 17 percent, and of pasture 18 percent. It is estimated that the region contains some 200 million hectares of arable land and land under tree crops, 450 million hectares of pasture, and 640 million hectares of forests.

Purely on the basis of these figures the region would appear to have a very great agricultural potential, but it is already clear from the physical factors mentioned above that there are many limitations on the realization of this potential. In addition, further limitations are imposed by the primitive techniques of production at present practiced in most of the region. Different forms of shifting cultivation are widespread; not only are they destructive of forest resources but they require very extensive areas of land and, with increasing population pressure, are thus inadequate to maintain the fertility of the soil. In the climatic. soil, and social conditions of Africa South of the Sahara, however, these methods cannot simply be replaced by those found successful in other regions. Much further study is needed of African agricultural techniques and of the ways in which they are adapted to local conditions. A further obstacle to increased agricultural production is the tribal systems of land tenure, ill adapted to the production of surpluses for sale and to improved techniques, that still prevail over most of the region. The inadequacy of marketing and transport facilities also hampers agricultural development in many areas. Two thirds of the forests are inaccessible and less than half of the accessible ones are at present exploited; their heterogeneous nature is a major difficulty in commercial exploitation.

Thus Africa South of the Sahara produces only about 4 percent of the world's total agricultural output4 and about 6 percent of total removals of roundwood, while as much as nine tenths of the latter is used for fuel. About 5 percent of the world total catch of fish comes from Africa South of the Sahara and two thirds of this is concentrated in only three adjacent areas: Angola, South West Africa, and the Union of South Africa. In world trade in agricultural products the region looms a little larger and is estimated to account for nearly 10 percent of its total value. In 1954-56 it was responsible for about 90 percent of world exports of palm kernels and oil, 70 percent of groundnuts and oil, 65 percent of palm oil and of cacao, and 60 percent of sisal. Among forestry exports, only broadleaved logs, with 35 percent of the total, are important in world supplies.

Most territories are very largely agricultural and depend on agricultural exports for their foreign earnings. Their economies are therefore dominated by fluctuations in the world prices of the above and other export commodities, while in many cases their vulnerability to these fluctuations is increased as their exports consist almost entirely of only one or two products. The diversification of exports, supported by international and national measures for price stabilization, is thus of major importance in the region. Furthermore, most of the output of the chief export crops comes from small-scale indigenous producers. Groundnuts, cacao, and cotton in particular are mainly produced by small indigenous units. At the other extreme, the export production of bananas, citrus fruit, and sisal comes largely from European plantations, while almost all of the region's wool is the product of European farmers in the Union of South Africa. Most other exports fall into an intermediate position; the bulk of their production comes from African farmers, but there is also a substantial production by Europeans in some areas, especially in Central, East, and Southern Africa.

It is of interest that a large number of the main export crops, for example cacao, ground-nuts, rubber, and tobacco, have been introduced from other regions, in some cases comparatively recently. Even more striking, however, is the fact that maize, cassava, and sweet potatoes, which now form a very substantial part of the food supplies of the region, were all introduced from America. The rapid spread of these products suggests that African habits, and notably dietary patterns, are more susceptible to change than is often supposed.

In spite of the importance of export crops and the fact that technical and marketing improvements have so far been chiefly concentrated on this sector, the great bulk of agricultural production is for local consumption. Much of it, possibly a larger proportion than in any other region, is for subsistence. For this reason and also because of the prevalence of mixed cropping and of irregular plots (especially in the forest zone), accurate statistics of the production and consumption of local food crops are very difficult to obtain. Another special difficulty is that the yield of cassava, a very important food crop in many parts of the region, varies substantially according to how soon it is harvested. A major postwar development, however, has been a great improvement in the collection of agricultural statistics through the application of modern sampling methods, though in most areas these statistics are still far from adequate.

Local food crops are also receiving increased attention through the relatively large number of dietary surveys and general enquiries into consumption and budgets that are now being conducted in many parts of the region. Mostly, these surveys reveal that local food production is almost as lacking in diversity as is production for export. In most areas proteins (especially of animal origin) and also certain vitamins and minerals are found to be lacking in the diet, while the pre-harvest shortage or "hungry season" is still a problem in many of the drier parts of the region. It is clear that some sharp readjustments in production patterns are needed in order to provide more adequate diets. Together with the generally low levels of productivity and consequently of income, this is the most disquieting aspect of the otherwise fairly encouraging picture of recent food and agricultural developments that emerges from the following review.

<sup>&</sup>lt;sup>4</sup> Based on the price-weighted aggregates of the FAO regional and world production indices.

# POSTWAR TRENDS IN AGRICUL-TURAL PRODUCTION, TRADE, AND PRICES

The production and exports of agricultural, fishery, and forestry products appear to have increased very rapidly in Africa South of the Sahara since the war. While the region is a substantial net exporter of agricultural products, the smaller volume of agricultural imports has also increased at a similar rate. World prices for the major agricultural exports of the region have fluctuated sharply during the period under review; following a rise to unprecedented levels in 1951, they have been falling in the last few years and there have been sharp reductions in the export earnings of many territories. In many cases, however, producers have been to some extent protected from these fluctuations by various schemes for the stabilization of producer prices.

Before examining these trends in more detail, together with some of the basic characteristics of the agricultural production and trade of Africa South of the Sahara, certain more general trends, including those in the growing non-agricultural sector, will first be outlined.

#### General Economic Trends 5

The postwar period has seen a rapid growth in economic activity in the region. The expansion has resulted chiefly from a strong demand in the industrialized countries for agricultural and mineral exports, though this has tended to slacken in the last few years, and from the comparatively high level of investment that has been sustained, in part through public expenditure on development plans.

Production has increased rapidly in all sectors, the output of most minerals rising even faster than agricultural production. The rather small output of electric power has also shown a very sharp increase, while several large hydroelectric schemes are at present under construction. Although most of the expansion in manufacturing has been in the Union of South Africa and the Federation of Rhodesia and Nyasaland, there has also been significant growth, especially in the manufacture of construction materials

and textiles, in other areas where industrialization is less well established. A further indication of the progress of the money economy is that the total number of wage earners is increasing in most territories for which data are available.

While agricultural production in the Union of South Africa is very substantial, agriculture, forestry, and fishing accounted for only 14 percent of the net domestic product in 1955/56. Private manufacturing and construction contributed as much as 23 percent and mining, which before the war was still the largest sector, only about 13 percent. Mining is by far the biggest contributor to the net domestic product of Northern Rhodesia, but in all other territories for which data are available agriculture is still the largest single sector of the economy, though mining is important in the Belgian Congo, Sierra Leone and some other areas. It is of interest that in Ghana, transport and trade together already account for a slightly larger proportion of the national income than agriculture, forestry, and fishing.

With the notable exception of gold, world prices for the region's agricultural and mineral exports have fluctuated considerably during the postwar period. Most prices rose to exceptional levels under the influence of the Korean boom but have subsequently been falling more or less steadily, so that the export revenues of many territories have recently declined. As imports have in most cases continued to grow in volume and value or have fallen more slowly, trade balances have tended to deteriorate. Among the larger territories, only Angola, the Belgian Congo, the Federation of Rhodesia and Nyasaland, Ghana, Liberia, Nigeria, and Tanganyika regularly have favorable trade balances, but in some recent years several of these areas also have shown a deficit. Government revenues, of which a large part comes from export and import duties, have also declined from the high levels of the boom years; in some territories these revenues are an important source of development finance.

In recent years the proportion of recorded intra-regional trade has remained roughly constant at some 10 to 12 percent of the total value of trade. Trade within the region is limited, as most territories export primary products and import manufactured goods and also because of poor communications. A large part of this trade consists of exports from the Union of South Africa to the Federation of Rhodesia and Nyasaland. Exports, mainly of manufac-

<sup>&</sup>lt;sup>5</sup> This summary is based mainly on data in *Economic Developments in Africa 1955-1956*, United Nations, Sales No. 1957.II.C.3, New York, 1957, and earlier documents in the same series, to which reference should be made for fuller details of the growth of economic activity.

tured goods and food products, from the Union of South Africa to this and other areas within the region, have increased quite rapidly, especially in the earlier part of the postwar period. The rest of the region took about 20 percent of the total value of exports of the Union of South Africa in 1956, as against 10 percent before the war; this country's imports from within the region increased from 2 to 7 percent in the same period.

The main postwar tendencies in the direction of exports from Africa South of the Sahara have been efforts to increase exports to the dollar area, coupled with dollar-saving by the metropolitan countries, who have tended to import from their overseas territories a larger share of commodities normally derived from dollar sources. Exports to the metropolitan country in 1955 were 60 percent of the total value in the French territories, 51 percent in the Belgian, 47 percent in the British, 6 and 30 percent in the Portuguese territories, though in some of these cases part is re-exported, sometimes after further processing. In 1955, as much as 20 percent of the total value of exports of the Portuguese territories went to the dollar area; for the other groups of dependent territories the proportion was of the order of 10 to 15 percent. The dollar area accounted for 20 percent of the imports of the Belgian Congo and for 12 percent of those of the Portuguese territories, but in other areas this proportion was much smaller.

With the incidence of exchange and import control, the metropolitan countries have tended to be more important sources of imports for their dependent territories than before the war; in more recent years, however, the overall trend in their contribution to imports has been downward, though there have been sharp fluctuations from year to year. In 1955, France supplied as much as 65 percent of the imports of its overseas territories in Africa South of the Sahara, while at the other extreme Belgium supplied only 36 percent of those of the Belgian Congo, where, as mentioned above, there are substantial imports from the dollar area.

Of the remaining parts of the region, Liberia is in the dollar area and in 1955, 87 percent of its export trade and 62 percent of its import trade was with the United States. In the same year the United Kingdom accounted for about

one third of both the imports and exports of the Union of South Africa, though before the war the proportion was as high as 43 percent for imports and 38 percent for exports. About one quarter of the imports of the Union of South Africa were from the dollar area in 1955, but less than 10 percent of its exports went to this destination.

A recent development which may influence the trade patterns outlined above is the creation of the European Economic Community. The Belgian and French territories are within the Common Market as associated territories, but the rest of the region will face the common tariff barrier of the six European countries. The other territories in Africa South of the Sahara also fear increased competition in other markets from the Belgian and French territories, where they expect production to be stimulated. It appears, however, that the effects of the Common Market are likely to be exceedingly gradual, while, for the main exports from non-associated territories in Africa South of the Sahara to the Common Market countries, the common tariff has been set relatively low for cacao and coffee and at nil for oilseeds.

# **Agricultural Production**

In studying trends in agricultural production in Africa South of the Sahara, the unreliability of much of the statistical material must always be borne in mind. The special difficulties of estimating the production of commodities other than the few that are almost entirely exported have already been emphasized. Most prewar statistics are particularly suspect and, while some will be quoted for comparison, the present analysis will be based mainly on the more recent years, for which data are probably at least adequate for the evaluation of broad trends and orders of magnitude.

Agricultural production appears to have increased remarkably rapidly since the war in the region taken as a whole. The estimated average annual rate of increase of about 3 percent since 1948-52 exceeds that of all the other major regions except the Near East. The upward movement is estimated to have been particularly sharp in 1952/53 and 1954/55, partly because of especially good harvests in the Union of South Africa. In spite of an acceleration in population growth, per caput agricultural production appears now to be about 20 percent better than before the war, though it seems to

<sup>&</sup>lt;sup>6</sup> Including also the exports of the Federation of Rhodesia and Nyasaland and of Ghana to the United Kingdom.

TABLE III-1. AFRICA SOUTH OF THE SAHARA: INDICES OF VOLUME OF AGRICULTURAL, FISHERIES, AND FORESTRY PRODUCTION COMPARED WITH GROWTH OF POPULATION

	A	erage 34-38 1953/54	1954/55	1955/56	1956/57	1957/58 (Prelimin.)	Average annual increase	
	1934-38						Prewar to 1948-52	1948-52 to 1957/58
	Indices: 1948-52 average = 100 Percentage					entage		
TOTAL PRODUCTION								
Agriculture	75 <sup>2</sup> 44 	112 153 103	118 158 108	121 162 108	123 176 107	124	2.0 37.1	3.1 49.9 41.2
Population	82	106	108	110	112	114	1.4	1.9
PER CAPUT PRODUCTION								
Agriculture Fisheries $^1$	91 <sup>2</sup> 52 ···	106 145 97	109 147 100	110 149 98	110 159 96	109	0.6 35.7	1.2 48.0 40.7

<sup>&</sup>lt;sup>1</sup> Total catch (whole fresh weight), calendar year. — <sup>2</sup> 1938. — <sup>3</sup> 1938 to 1948-52. — <sup>4</sup> 1948-52 to 1956. — <sup>5</sup> Total removals of roundwood, calendar year.

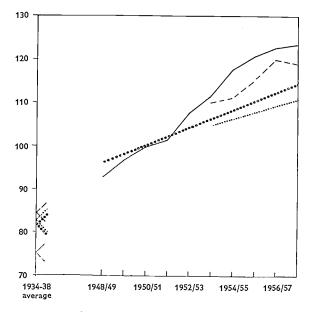
have leveled off since 1955/56 with a slight slowing down in the rate of increase of total production. The estimated expansion in the total catch of fish is even more striking than in agricultural production, while total removals of roundwood from the region's forests, although still very largely used for fuel, appear to have increased slightly in the last few years (Table III-1 and Figure III-2).

Little information is available on trends in total agricultural production in individual areas, but the official indices of the volume of agricultural production published for the Belgian Congo and the Union of South Africa tend to confirm the high rate of increase indicated by the FAO index for Africa South of the Sahara shown in Table III-1. In the Belgian Congo, crop production 7 in 1956 was estimated at 148 percent of the 1947-49 average, indicating an annual increase of about 5 percent. In the Union of South Africa, which may account for as much as one fifth of the total agricultural production of the region, 8 the index in 1956/57 reached 176 percent of the 1936-38 average, the annual increase over the 1948-52 average being about 5 percent.

The rapid growth of agricultural production in Africa South of the Sahara, though satisfactory, should not, however, be allowed to obscure its low level. While no precise measure of agricultural productivity is possible, the priceweighted aggregates of the FAO production index suggest that the actual level of per caput production is less than three quarters of the already very low world average and only about one third more than in the Far East.

FIGURE III-2. Africa South of the Sahara: Trends in Agricultural Production and in Population Compared with the World as a Whole

Indices: 1948-52 Average = 100



Africa South of Sahara: Population Africa South of Sahara: Agricultural production World: Population

World: Agricultural Production

<sup>7</sup> Livestock products are not included in this in-

<sup>&</sup>lt;sup>8</sup> Based on the comparison of the price-weighted aggregates of the FAO production index for the Union of South Africa with those for Africa South of the Sahara.

Subsistence Production. A principal characteristic of agricultural production in Africa South of the Sahara is the very high proportion of total output that is not marketed but is consumed by the producers and their families.

It has been estimated that in a sample of nine of the larger territories, 10 representing about two thirds of the total population of the region, subsistence agricultural production accounted around 1950 for some 65 to 75 percent of the total land area cultivated by the indigenous population.11 The proportion was upwards of 60 percent or so in all areas except Ghana, where it was estimated to be as low as 20 to 30 percent. It was also estimated that about 60 percent of the total adult male population of these territories was engaged in subsistence production. While comparable estimates of the place occupied by subsistence agriculture are not available for other parts of the world, it seems unlikely that these high figures are exceeded elsewhere. $^{12}$ 

The movement from subsistence to an exchange economy is the most basic aspect of agricultural development in Africa South of the Sahara, but data indicating the rate of this movement are very scarce. The only indication is given by the statistics of production and sales published annually for the Belgian Congo. In this territory, total indigenous crop production and the quantity sold are estimated to have increased at about the same rate up to 1954, but in the two following years sales, especially of maize, rice, cassava, and peas and beans, appear to have risen much more sharply than production and in 1956 the index of quantities sold stood at 173 (1947-49 = 100), compared with 136

for the index of indigenous crop production.<sup>13</sup> The apparent stability in the earlier years of the proportion of production that is marketed, suggests that in the region as a whole, in most of which the growth of urban markets is occurring less rapidly than in the Belgian Congo, there has probably been rather little change in the proportion of total agricultural production accounted for by subsistence.

Production for Local Consumption and for Export. While in many areas research, marketing improvements, etc., have been focused to a large extent on export crops, it appears that the relative magnitude of agricultural resources devoted to these crops is rather less than is often assumed. Export crops are estimated to account for only about 15 percent of the total area cultivated by the indigenous population, or about the same as crops sold on domestic markets.<sup>14</sup> In French Equatorial Africa, Ghana, and Uganda, however, the area of export crops was estimated to exceed substantially that of crops marketed for domestic consumption, while in Ghana it was even greater than the subsistence category. In a few other territories, mostly small ones such as Gambia, Mauritius, the Seychelles, and Zanzibar, agricultural census data indicate that export crops occupy a greater area than crops for local consumption (i.e., subsistence plus crops marketed locally). In some of these cases, especially Mauritius, where sugar cane occupies about 85 percent of the arable land, the bulk of food supplies is imported.

In terms of value, the share of export crops in the production of the region as a whole is, of course, much greater, though no precise estimate is possible. The total value of the higher-priced and generally higher-yielding export crops is likely to exceed greatly that of crops marketed locally, but it is probably much less than the total value of subsistence and local marketings together.

Similarly, it is difficult to assess trends in the relative production of crops for export and for local consumption, as statistics for the latter

<sup>&</sup>lt;sup>9</sup> Enlargement of the Exchange Economy in Tropical Africa, United Nations, Sales No. 1954.II.C.4, New York, 1954.

<sup>&</sup>lt;sup>10</sup> Belgian Congo, French Equatorial Africa, French West Africa, Ghana, Kenya, Nigeria, Southern Rhodesia, Tanganyika and Uganda.

<sup>&</sup>lt;sup>11</sup> It appears that the inclusion of the relatively small area cultivated by the non-indigenous population would not greatly lower this proportion.

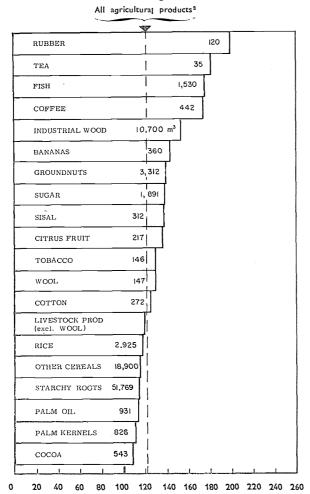
<sup>&</sup>lt;sup>12</sup> In India the National Sample Survey (1952) suggests that nearly half the economy in rural areas is non-monetized and perhaps a little more than one third of the economy as a whole. It is also estimated that for the main food grains (which cover three quarters of the cultivated area) some 55 to 76 percent of the total tomage, depending on the crop, is not marketed (*Indian Agriculture in Brief*, Ministry of Food and Agriculture, Delhi, 1956, p. 56).

<sup>&</sup>lt;sup>13</sup>La situation économique au Congo belge et au Ruanda-Urundi en 1956, Ministère des colonies, Brussels, 1957, pp. 31-35, and earlier issues of this report.

<sup>&</sup>lt;sup>14</sup> Enlargement of the Exchange Economy in Tropical Africa, United Nations, Sales No. 1954.II.C.4, New York, 1954. Approximate calculations indicate that the inclusion of non-indigenous production would make little difference.

FIGURE III-3. Africa South of the Sahara: Indices of the Production of the Main Commodities and Commodity Groups

1956/57-1957/58 Average as Percentage of 1948/49-1952/53 Average<sup>1</sup>



NOTE: Figures on chart represent thousand metric tons, except for industrial wood. For livestock products, increase estimated on basis of price-weighted aggregates.

For fish and industrial wood, 1956. — Excluding fisheries and forestry products.

category are so unreliable. Even the total production of some of the main exports is not accurately known, for only in the case of cacao, coffee, palm kernels, and sisal is there now no significant local consumption. Generally speaking, in the absence, as in most of Africa South of the Sahara, of severe population pressure on land resources, subsistence production may be assumed to increase at least as fast as population, except when there are occasional crop failures. As is indicated in Figure III-3, the available estimates suggest that some of the commodities that are mainly exported (especially rubber and coffee) are tending to increase

somewhat faster than those which are largely or partly consumed locally. It is probable therefore that in the region as a whole the relative importance of export products may be growing, though only gradually in view of the much greater volume of production for domestic consumption.

Because of the great preponderance of production for local consumption, in most areas an increase in the proportion of exports means some diversification of the production pattern. Only in the few cases mentioned above, where food production is very small, might diversification imply a contrary movement towards an increased proportion of local food crops. More often, however, the diversification of production, which occupies much attention in agricultural policymaking in some parts of the region, is envisaged within rather than between the two sectors of production for local consumption and for export. The general lack of diversity in the food produced for local consumption is discussed in the consideration of nutritional matters in another part of this chapter, while the diversification of export production is best dealt with in connection with the agricultural trade of the region.

# Trade in Agricultural Products

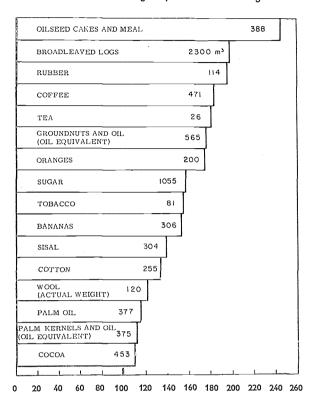
Agricultural Exports. The over-all volume of agricultural exports appears to have grown at an even faster rate than the volume of production, a further indication that export production is tending to increase faster than production for local consumption.

Much of the growth in the volume of exports was concentrated in the years 1954-56, when there was a very sharp upward movement. While production and exports roughly kept pace up to 1953, exports then grew much faster and by 1956 were 144 percent of the 1948-52 average, compared with 123 percent for production. Preliminary data indicate that in 1957, however, the previous year's very high level of exports was not quite maintained. the world as a whole the volume of agricultural exports stayed more or less at the prewar level until 1954, since when there has been a fairly rapid rise, but in no region has it been as fast as in Africa South of the Sahara, both in the more recent period and in comparison with the prewar level (Table III-2).

Most of the main products have shared equally in the recent upsurge in the volume of the region's agricultural exports with the principal

# FIGURE III-4. Africa South of the Sahara: Indices of the Volume of Exports of the Main Agricultural Products

1956 as Percentage of 1948-52 Average



Note: Figures on chart represent thousand metric tons, except for broadleaved logs.

exceptions of cacao and oil palm products (Figure III-4).

The total value (at current prices) of agricultural exports from Africa South of the Sahara has moved much less evenly, as is shown in Table III-2 and Figure III-5. This uneven trend has resulted mainly from the sharp fluctuations that have occurred in world prices. Table III-3 shows indices of the average unit values realized by the major agricultural exports of Africa South of the Sahara. Average unit values rose by as much as 30 percent in 1951 under the influence of the Korean boom, almost every product sharing in this increase. In 1952 and 1953 they fell fairly sharply, recovering in 1954, however, to a level only about 4 percent below the 1951 peak, almost entirely as a result of a 60 percent rise in cacao prices. In 1955 average unit values fell by 14 percent, the most abrupt fall in any single postwar year, and there was a further large decline in 1956, decreasing prices for both caeao and coffee being the main factor in these two years. In 1952 and 1953, however, the rise in volume was sufficient to offset the decline in unit values. and in 1956 it was so great as to cause a slight rise in the total value as well, in spite of the substantial drop in unit values (Figure III-5).

The figures quoted for total and unit values of agricultural exports are at current prices. While no precise calculation in "real" terms

Table III-2. Africa South of the Sahara: Trends in Agricultural Exports Compared with the World as a Whole and with the Volume of Production

ITEM	1934-38 Average	1953	1954	1955	1956	1957 (Prelim.)
		In	dices: 1948-5	2 average =	100	
Africa South of the Sahara	1				1	
Volume of agricultural production <sup>1</sup> Volume of agricultural exports Total value of agricultural exports Average unit value of agricultural exports "Real" average unit value of agricultural exports <sup>2</sup>	75 81 22 28 53	112 114 118 104	118 123 140 114	121 129 129 100	123 144 131 92 88	124 143 
World						
Volume of agricultural production <sup>1</sup> Volume of agricultural exports Total value of agricultural exports Average unit value of agricultural exports "Real" average unit value of agricultural exports <sup>2</sup>	107 33 31 60	110 107 106 99	111 107 107 100 101	115 114 108 95	120 125 115 92 88	119 127 120 95 88

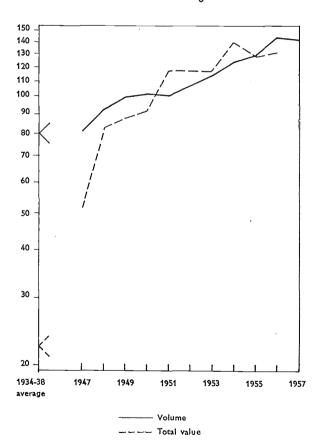
<sup>&</sup>lt;sup>1</sup> Crop year, beginning in the year stated. — <sup>2</sup> Deflated by United Nations index of the average unit value of manufactured products in world trade.

Table III-3. Africa South of the Sahara: Indices of Average Export Unit Values of Major Agricultural Exports

PRODUCT	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
	j			Indice	es: 1948-52	average =	= 100			• • • • • • • •
Sugar	84 82 157	102 81 120	$\begin{vmatrix} 99 \\ 92 \\ 122 \end{vmatrix}$	88 92 94	97 107 89	112 128 87	114 101 90	106 107 91	105 95 91	104 104 86
Palm kernels	76 69 66	90 104 88	103 95 102	82 81 79	$118 \\ 124 \\ 110$	108 98 126	105 72 117	95 74 114	84 81 101	85 89 106
Coffee	47 57 103	52 111 108	64 78 111	107 87 93	$128 \\ 115 \\ 90$	135 112 104	142 107 104	160 173 101	120 140 109	114 97 91
Cotton	64 62 49	83 86 76	86 86 82	81 82 116	125 134 143	121 106 90	92 58 106	90 51 93	91 46 80	87 46 85
All agricultural products .	63	90	89	91	118	110	104	114	100	92

FIGURE III-5. Africa South of the Sahara: Volume and Total Value of Agricultural Exports

Indices: 1948-52 Average = 100



is possible, if the average unit value of agricultural exports is deflated by the United Nations index of the average unit value of manufactured products in world trade, as in Table III-2 above, it is still about two thirds greater than before the war, although some ground has been lost in the last few years as agricultural export prices have declined from the exceptional levels reached earlier.

The Diversification of Agricultural Exports. Fluctuations in the world prices of agricultural exports have profound effects on the economies of most of the territories in the region. Attempts to mitigate the effects of these fluctuations, especially at the national level, have been a major feature of the postwar period. At the international level, much of the sugar exported has moved under either the International or British Commonwealth Sugar Agreements and it is noticeable from Table III-3 above that average unit values for this commodity have fluctuated rather less than for almost all others. Also, in the earlier postwar years, many of the major exports of the British territories were purchased by the United Kingdom Government under long-term contract, which contributed an element of stability at that time. At the national level, the many schemes for the stabilization of producer prices will be described in the discussion of marketing organization later in this chapter.

Producers' revenues are now protected, in most territories, from the worst fluctuations in world prices, but the export revenue of a territory has no such protection, except to some extent in the case of sugar. The level of export revenues not only determines the quantity of goods it is possible to import but, with much of government revenue coming from export and import taxes, the sums that can be devoted from current resources to development expenditure.

In many territories the position is particularly serious as exports consist of little more than one or two major agricultural products. Table III-4 shows the extent to which some territories are dependent on their principal agricultural exports, including all those where in recent years one product has accounted for more than 40 percent of the total value of exports, or two products for more than 50 percent. While the extreme cases are found in territories that are relatively small or are sparsely populated, many of those in the lower part of the table are fairly large (both in size and population), while the sheer number of territories whose exports show this lack of diversity is also impressive. Among the larger territories, while the exports of French West Africa and Nigeria cover a fairly wide range,

those of some of the individual territories and regions composing them are much less diverse.

It is clear from Table III-3 above that, except in 1951 and 1952, world prices of the main agricultural exports have tended to follow somewhat different patterns. A territory exporting a range of products may therefore be liable to less fluctuation in its total export earnings than one depending heavily on a single main export and may sometimes be able partly to offset the effect of a fall in the price of one product by increased earnings from others. On the other hand, when there is a sharp change in demand as in 1951 and 1952, all commodity prices tend to move together; thus diversification alone cannot always safeguard export earnings, but needs to be backed up by measures to stabilize producer prices (including, where possible, schemes for the stabilization of world prices) and by setting aside reserves from government revenues in good years for expenditure when these revenues are lower. Furthermore, the encouragement of the most suitable export crop is generally the quickest way of building up producers' and governments' incomes, while the alternative of developing a range of crops may sometimes prove rather costly as a form of insurance. If the introduction of

Table III-4. Africa South of the Sahara: Composition of the Value of Domestic Exports of Certain Territories, 1952-56 Average

TERRITORY	Major agricultural commodity exported	Major agricultural export	Two major agricultural exports
		Percentage of total	al value of exports
Mauritius Gambia Reunion Zanzibar. São Tomé and Principe. Seychelles Liberia 1 Ghana Bechuanaland 3 Basutoland 4 Ruanda-Urundi. Uganda French Cameroons Spanish Guinea 5 Angola Madagascar French Togoland Southern Rhodesia 6 Nyasaland French Equatorial Africa French West Africa.	Sugar and products Groundnuts and oil Sugar and products Cloves and products Cacao Coconut products Rubber Cacao Cattle Wool Coffee Cotton Cacao Cacao Cacao Cacao Cacao Cacao Coffee Cotton Cacao Coffee Coffee Cotton Cacao Coffee Coffee Corfoe Coco Coco Coco Coco Coco Coco Coco Co	98 92 89 82 74 72 71 68 66 60 55 51 49 45 44 43 40 38 37 32	98 95 90 96 83 89 75 275 70 77 58 87 65 49 52 51 64 42 64 272 59

<sup>1 1953-56. —</sup> The second "agricultural" export is timber. — 3 1952-54. In 1955, with the opening of the Lobatsi abattoir, carcass meat accounted for 49 percent of the total value of exports. — 4 1952-55. — 5 1954-55. — 6 1952-53.

a new export crop is to prove economically successful, a sound assessment of world market prospects is also necessary. In addition, it usually takes a long time before the production of a new or hitherto minor crop can be developed to a level at which it appreciably affects the degree of dominance of the present major crop.

Some governments are endeavoring, in spite of these difficulties, to encourage the diversification of production for export. Because of the rather long-term nature of diversification and because of the effects on export values of yearto-year changes in world prices, progress towards diversification is not easy to determine. Comparing the prewar period with 1952-56, however, Gambia's extreme dependence on groundnuts appears to have fallen from 98 to 92 percent of total exports, in French West Africa the proportion of groundnuts and oil in the total value of exports fell from 46 to 32 percent, in Nyasaland that of tobacco from 45 to 38 percent, and in Uganda that of cotton from 79 to 51 percent. In the latter territory, however, the place occupied by the two main exports together (cotton and coffee) increased during this period.

In some territories, on the other hand, exports appear to have become less diverse since the war. Sometimes this has probably been advantageous, the relatively small prewar exports having been developed to their present higher level largely through a rapid expansion of the main crop. This appears to be the case in French Equatorial Africa, for instance, where cotton increased from 16 to 37 percent of the total value of exports, and in Madagascar, where coffee increased from 27 to 44 percent.

Agricultural Imports and the Net Trade Position. Africa South of the Sahara is a substantial net exporter of agricultural products, its gross imports probably amounting to no more than one fifth (by value) of its gross exports of these commodities. The volume of imports appears to have grown even faster than exports, having increased by more than 50 percent since 1948-52 (Table III-5).

There are large net imports only of wheat and flour, rice and wine, though the imports of condensed and evaporated milk are also beginning to assume important proportions. Smaller net imports include potatoes, some vegetable oils, prepared and canned meat and cheese. With the notable exception of rice, gross and net

TABLE III-5. AFRICA SOUTH OF THE SAHARA:
TRENDS IN GROSS IMPORTS OF AGRICULTURAL
PRODUCTS

ITEM	Average 1934- 38	1953	1954	1955	1956
	Indic	es: 194	8-52 ave	rage =	100
Total volume	65	128	137	149	153
Total value	21	134	133	144	144
Average unit value .	33	104	97	96	94

imports of most of these commodities have grown rapidly (Table III-6).

With the worldwide shortage of rice after the war, gross imports fell to less than a third of their average prewar level, but in 1955 and 1956 they recovered sharply to approximately the same as before the war, reflecting the general improvement in supplies. The main importers of rice are French West Africa, Mauritius, the Union of South Africa, Reunion, and Zanzibar.

Gross imports of wheat and flour are now more than five times as high as before the war; this, and also the substantial increases in imports of potatoes, prepared and canned meat, and dairy products, are to some extent an indication of changes in African diets that are occurring with urbanization and rising incomes. Only about one third of the imports of wheat and wheat flour go to the Union of South Africa, with its large European population. In this country imports of wheat and flour were unnecessary in 1957, as a result of two successive record harvests, but imports into almost all other territories are increasing steadily. The increases in potatoes, canned meat, and dairy products are also spread over most of the region, though imports of prepared meat go mostly to Ghana.

Already before the war Africa South of the Sahara had the largest net import of wine of any underdeveloped region. These imports, which go largely to the French and Portuguese territories, have increased with great rapidity and in 1956 the net import was seven times the prewar average.

Of the products for which the region is on a net export basis, there is regularly a substantial gross import only of sugar. This rose from about 60,000 tons per year before the war to 140,000 tons in 1948-52 and as much as 320,000 tons in 1956. This very rapid increase also

TABLE III-6. AFRICA SOUTH OF THE SAHARA: GROSS AND NET IMPORTS OF CERTAIN AGRICULTURAL PRODUCTS

			Gross i	mports					Net in	nports 1		
Product	1934- 38 Aver- age	1948- 52 Aver- age	1953	1954	1955	1956	1934- 38 Aver- age	1948- 52 Aver- age	1953	1954	1955	1956
	<b> </b>				The	nusand 1	netric te	ons				
Wheat and wheat flour 2 Maize	129 16	491 113		$\begin{array}{c} 630 \\ 37 \end{array}$	$708 \\ 42$					620 - 694		
Rice (milled)	313 58 47	166 141 121	206 209 223	$220 \\ 289 \\ 272$	329 295 287		- 596	- 537	- 603	$   \begin{array}{r}     192 \\     -685 \\     259   \end{array} $	- 722	- 729
Potatoes	3	29 5 10	40 8 6	$\frac{43}{7}$	51 7 10	51 7 10	$\begin{array}{c}2\\1\\2\end{array}$	9 1 1	$\begin{bmatrix} 26 \\ 3 \\ - 3 \end{bmatrix}$	${24} \ {3} \ {1}$	$\frac{30}{4}$	23 4 6
Condensed and evaporated milk	8 1 8	18 3 12	27 4 15	30 4 16	36 5 14	5		18 3 - 2	27 4 —	30 2 5	$\begin{array}{cc} 36 \\ 4 \\ - & 9 \end{array}$	5

<sup>1 -</sup> sign denotes net export. — 2 Wheat equivalent.

reflects urbanization and rising incomes and is spread over most of the region except for the few areas where there is substantial local production. There has also been a fairly large gross import of maize in the immediate postwar years and from 1951 to 1953; in 1947 and again in 1953 the region was actually a net importer. This position has mainly been determined by harvests in the Union of South Africa and, following very large crops in that country from 1952/53 onwards, net exports from the region have recovered to prewar proportions. In many territories in East and Central Africa the maize supply position fluctuates rather sharply from year to year. Gross imports of tea, chiefly into the Union of South Africa, have grown steadily, but the region has been a net exporter since the war.

# Main Commodities

Information on a commodity basis is already published regularly by FAO for most of the more important agricultural products of Africa South of the Sahara. The main commodities will therefore not be examined in detail here, though a brief summary is required in order to fill in the background of the overall trends in production and trade discussed above.

Local Food Crops. It is here that the limitations of the statistical data are greatest and little can be said about trends except that the available information indicates a fairly steady

increase in the production of all the main crops that are produced primarily for local consumption. As was pointed out above, the production of crops which are largely for subsistence may generally be expected, under conditions prevailing in the region, to increase at least as fast as population.

The statistics are probably adequate for a broad comparison of the relative orders of magnitude of the principal staple food crops. Table III-7 compares estimates of the total area and production of these crops. As will be shown in the discussion of food consumption and nutrition later in this chapter, the starchy staple crops included in the table account for a very large part of the total calorie intake in the region.

Millets and sorghums appear to occupy by far the largest part of the area, with maize a long way behind, while the chief cereals are grown on an area more than three times as great as that of the starchy roots and plantains. In terms of production, however, cassava accounts for more than one third of the total tonnage and the production of the high-yielding starchy roots and plantains is about three times that of the grain crops, a complete reversal of the relative position of the two groups in terms of acreage. A comparison of the ton-

<sup>&</sup>lt;sup>15</sup>While the yields of the starchy roots are generally higher than those of the cereals, it should be remembered that in certain areas two cereal crops can be obtained in the year.

Table III-7. Africa South of the Sahara: Estimated Relative Importance of the Main Staple Food Crops, 1948-52 Average

Crop	Area	Gross production	Gross calorie production	Area	Gross production	Gross calorie production
	Million hectares	Million metric tons	Million millions	I	Percentage of to	tal
Maize	$8.8 \\ 15.0 \\ 2.6$	$6.5 \\ 8.8 \\ 2.5$	23.1 26.9 6.5	26 44 8	9 12 3	21 24 6
TOTAL	26.4	17.8	56.5	78	24	51
Cassava	$egin{array}{c} 3.3 \\ 2.4 \\ 0.6 \\ 1.2 \\ \end{array}$	27.4 16.9 2.0 10.5	29.9 15.5 1.8 7.9	10 7 2 3	37 23 3 14	27 14 1 7
TOTAL	7.5	56.8	55.1	22	76	49
Total, main staple crops	33.9	74.6	111.6	100	100	100

Note: In the FAO Yearbook of Food and Agricultural Statistics, Part 1, Production, regional totals are not yet estimated for millets and sorghums, eassava or sweet potatoes and yams, while no data at all are shown for cocoyams or plantains. The present estimates for these crops should therefore be regarded as highly tentative and used only for the comparison of relative orders of magnitude. The 1948-52 period was chosen as it includes the 1950 World Census of Agriculture.

nage of root crops and cereals is, of course, rather unrealistic, as the gross calorie yield per ton of the latter is some three to five times that of the former. On the basis of the approximate gross production of calories, the starchy roots and plantains are reduced to about equal importance with the grains; cassava appears to be the main provider of calories in the region, followed by the millets and sorghums group and then maize.

While the above estimates are subject to a wide margin of error,16 they are probably nearer the truth than any estimates of year-to-year trends for the region as a whole or for most individual territories. For maize, the statistics for the Union of South Africa, by far the largest producer in the region, are more reliable than for most other areas, though here also the acreage figures generally exclude non-European plantings. Maize production in the Union of South Africa rose sharply in 1952/53 to a record level of 3.3 million tons and again in 1953/54 to 3.6 million tons, while subsequent harvests have also been large, with a new record of 3.7 million tons in 1956; prewar production averaged about 2 million tons. Increases appear to have been rapid in other producing territories also, though there have been considerable fluctuations from year to year.

Statistics of rice production are better than for most of the other local food crops. Table III-8 indicates that the region's rice production is now almost double the prewar level. Many goverments have encouraged the production of rice, because of the difficulty of obtaining imports in the earlier postwar years and its increasing popularity in African diets. Madagascar, the largest producer in the region, has had an annual export surplus of up to about 40,000 tons of milled rice in the last few years.

Among the other main staple food crops, Nigeria and French West Africa appear to be the largest producers of millets and sorghums, with an average production of 2.7 and 2.3 million tons, respectively, in 1948-52. The largest producers of cassava are Nigeria with more than 10 million tons and the Belgian Congo with about 6 million tons; this crop has been specially encouraged in some territories because of its value as a famine reserve. Nigeria is also the largest producer of sweet potatoes and yams (chiefly the latter), of which production is estimated to be about 10 million tons. According to official statistics, the average 1948-52 production of plantains in the main producing territories was as follows: Uganda, 2.7 million tons; Belgian Congo, 1.6 million tons; Tanganyika, 1.4 million tons; and 1.2 million tons in both Ghana and Ruanda-Urundi.

Mention should also be made of the pulses

<sup>&</sup>lt;sup>16</sup> Area figures are particularly doubtful because of the prevalence of mixed eropping.

TABLE III-8. AFRICA SOUTH OF THE SAHARA: PRODUCTION OF RICE (PADDY)

COUNTRY	1934-38 Average	1948-52 Average	1953/54	1954/55	1955/56	1956/57	1957/58 (Prelim.)
			Millio	n metric ton	ıs		
Madagascar	$0.61 \\ 0.40 \\ 0.19$	$\substack{0.83\\0.52\\{}^{1}0.26}$	$\begin{array}{ c c c } 1.03 \\ 0.51 \\ 0.22 \end{array}$	$1.00 \\ 0.56 \\ 0.22$	$egin{array}{c} 1.03 \ 0.67 \ 0.22 \end{array}$	$0.96 \\ 0.68 \\ 0.22$	1.25 0:67 0.22
Nigeria	0.06	$^{20.25}_{0.15}$	0.25 0.18 0.12	$0.25 \\ 0.18 \\ 0.12$	$0.25 \\ 0.20 \\ 0.12$	$0.25 \\ 0.19 \\ 0.12$	$0.25 \\ 0.19 \\ 0.12$
Other		0.32	0.32	0.36	0.35	0.37	0.36
TOTAL	1.59	2.48	2.63	2.69	2.84	2.79	3.06

<sup>&</sup>lt;sup>1</sup> Average of four years. — <sup>2</sup> 1950. — <sup>3</sup> Average of two years.

that are an important source of protein in some areas, especially in the highland parts of the Belgian Congo, Ruanda-Urundi, and Uganda. Recorded production has generally increased in recent years, but there is probably considerable scope for further increases in many territories where production is at present insignificant. No information is available on trends in the production of other nutritionally important food crops, such as fruits and green vegetables.

European farmers in the Union of South Africa and Kenya are the only substantial producers of wheat in the region, though the small production in a few other territories is increasing. Production in the Union of South Africa reached a record level of more than 800,000 tons in 1956/57, while in Kenya the average harvest is somewhat over 100,000 tons.

Export Crops. For those crops which are mainly or partly exported, trends can be examined in more detail, though only approximate estimates are available of the quantities consumed locally, and thus of total production, and the present analysis will be based mainly on export figures. Table III-9 shows recent trends in the exports of the principal crops in the major producing territories and in the region as a whole.

Sugar is almost the sole export of Mauritius and Reunion and in both territories production and exports are now more than double the prewar level. The largest producer in the region, however, is the Union of South Africa, where production reached the record level of 850,000 tons in 1955/56; domestic consumption increased so rapidly that exports fell far below

their prewar level, but from 1954 they have again been at high levels. Mozambique and Angola also have small export surpluses, but elsewhere the relatively small output is mainly consumed locally.

Banana exports, mainly from West Africa, increased very sharply in 1953, but in the last few years have remained fairly stable, apart from a big rise in 1957. The Union of South Africa accounts for almost all of the region's exports of citrus fruits; production and exports have grown remarkably rapidly. This country is also an important exporter of deciduous and dried fruits and has a small export of wine.

Africa South of the Sahara supplies a large part of world exports of some vegetable oils and oilseeds, its share having become more important with the postwar reduction in exports from the Far East. The production and exports of groundnuts have increased rapidly in Nigeria, but in French West Africa, the other major producer, the prewar level of production was regained only in 1955. Production has also grown rapidly in the Belgian Congo, Southern Rhodesia, Uganda and, especially, French Equatorial Africa and the Union of South Africa. Oil palms are a wild crop of the forest zone of West and Central Africa and it is only in the Belgian Congo that a large part of the output of oil palm products comes from plantations. Exports of palm oil rose sharply in the Belgian Congo after the war, and to a smaller extent, in Nigeria, but in the last few years the region's total export has changed little. Exports of palm kernels and palm-kernel oil from these and other West African territories have shown

Table III-9. Africa South of the Sahara: Volume of Exports of Principal Crops in the Main Producing Territories and in the Region as a Whole

ITEM -	1934-38 Average	1948-52 Average	1953	1954	1955	1956	1957 (Prelim.)
			Thousan	d metric to	ns	•••••	
Sugår (tel quel)							1
Mauritius	261	431	477	502	475	539	585
Union of South Africa	177	37	87	211	245	183	146
$egin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 75 \\ 70 \end{array}$	$\frac{102}{60}$	$\begin{vmatrix} 150 \\ 69 \end{vmatrix}$	$\begin{array}{c} 169 \\ 52 \end{array}$	$\begin{array}{c} 164 \\ 86 \end{array}$	185	197
Angola	$\frac{70}{27}$	38	24	$\frac{32}{34}$	31	$\begin{array}{c} 98 \\ 32 \end{array}$	41
Other	44	10	5	6	16	18	
$Total. \ . \ . \ . \ . \ . \ . \ .$	654	678	812	974	1 017	1 055	1 120
Bananas							
French West Africa	47	67	93	104	125	116	(108)
Guinea	• • •	(48)	(72)	(83)	(98)	(91)	(73)
Ivory Coast	$^{\cdot\cdot\cdot\cdot}_{45}$	$(18) \\ 65$	$\begin{pmatrix} (21) \\ 92 \end{pmatrix}$	$\begin{pmatrix} 21 \ 83 \end{pmatrix}$	(27)	(25)	(35)
French Cameroons	15	45	72	74	$\begin{array}{c} 68 \\ 76 \end{array}$	70 <b>6</b> 0	81 85
Belgian Congo	1	12	25	17	30	39	36
Other	12	13	20	23	15	21	21
Total.	120	202	302	301	314	306	331
Oranges							
Union of South Africa	84	114	147	188	185	198	222
$egin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{9}{93}$	$\frac{3}{117}$	4	3	2	2	2
		117	151	191	187		224
Groundnuts and Oil (oil equivalent)							
French West Africa Senegal, Sudan, Mauritania .	182	147	192	207	160	225	251
Nigeria	iòi	121	$\begin{array}{c c} (169) \\ 162 \end{array}$	$\frac{(184)}{218}$	$\begin{array}{c} (130) \\ 208 \end{array}$	$\begin{array}{c} (178) \\ 231 \end{array}$	(217)
Gambia	17	21	16	16	20	16	169
Union of South Africa		3	19	30	36	49	
Other	32	33	38	35	37	44	
$Total. \; . \; . \; . \; . \; . \; . \; . \; . \; . \;$	332	325	427	566	461	565	536
Palm Oil							
Nigeria	137	162	204	212	185	188	169
Belgian Congo French West Africa	$\begin{array}{c} 60 \\ 21 \end{array}$	127	132	137	149	151	155
Dahomey	<i>Δ</i> 1	11 (10)	$\frac{16}{(15)}$	$\begin{pmatrix} 14 \\ (13) \end{pmatrix}$	18 (16)	18	$\frac{12}{120}$
Other	25	28	21	25	19	$\begin{pmatrix} 16 \\ 20 \end{pmatrix}$	$\frac{(10)}{21}$
$Total. \ . \ . \ . \ . \ . \ .$	243	328	373	388	370	377	357
Palm Kernels and Oil (oil equiv.)							
Nigeria	150	168	184	212	198	206	186
French West Africa	34	34	39	37	38	39	35
Dahomey	• • •	(18)	(21)	(22)	(23)	(22)	(20)
Guinea	• • •	$\begin{pmatrix} (11) \\ (4) \end{pmatrix}$	(12)	$\begin{pmatrix} 11 \\ 2 \end{pmatrix}$	(10)	(10)	(9)
Sierra Leone	$\frac{\cdots}{34}$	33	$\begin{pmatrix} 5 \\ 32 \end{pmatrix}$	$\begin{pmatrix} 3 \\ 31 \end{pmatrix}$	$\begin{pmatrix} 5 \\ 26 \end{pmatrix}$	$\begin{pmatrix} 6 \\ 26 \end{pmatrix}$	$\begin{pmatrix} 5 \\ 24 \end{pmatrix}$
Belgian Congo	35	53	54	58	63	60	69
Other	49	47	44	38	42	45	36
$Total. \ . \ . \ . \ . \ . \ . \ . \ .$	302	335	353	376	367	375	350
Oilseed Cakes and Meal							
French West Africa		82	127	131	125	141	141
Belgian Congo	1	29	40	55	61	82	141 89
Uganda	2	18	35	62	50	61	
Nigeria		2 20	10	42	40	44	44
Total	<u></u>	<u>29</u>	$-\frac{41}{252}$	53	55	60	
	1.4	160	253	343	331	388	395

Table III-9. Africa South of the Sahara: Volume of Exports of Principal Crops in the Main Producing Territories and in the Region as a Whole (concluded)

ITEM	1934-38 Average	1948-52 Average	1953	1954	1955	1956	1957 (Prelim.)
			Thousan	d metric ton	18	• • • • • • • • • • • • • • • • • • • •	
Coffee		1			1		Į
French West Africa	8	62	56	95	95	131	112
Ivory Coast		(59)	(50)	(88)	(85)	(119)	(101)
Madagascar	24	32	`36	42	48	52	48
Angola	15	50	72	44	58	84	76
Belgian Congo	17	32	34	34	43	51	67
Uganda	} 27	$\begin{cases} 36 \\ 19 \end{cases}$	36	35	76	63	
Tanganyika	, 15	12	15 16	$\begin{bmatrix} 11 \\ 20 \end{bmatrix}$	20	27	
Other	8	21	$\begin{array}{c c} 10 \\ 21 \end{array}$	31	$\begin{bmatrix} 19 \\ 31 \end{bmatrix}$	$\begin{array}{c} 22 \\ 40 \end{array}$	• • • •
Total.	114	260	286	$-\frac{31}{312}$	389	$\frac{40}{471}$	400
Tea		-	200		909	4/1	469
	9						
Nyasaland	3	$\begin{array}{c c} 7 \\ 2 \end{array}$	6	8	8	9	9
Kenya	1 -	3	$\begin{array}{c c} 4 \\ 3 \end{array}$	5 5	5 6	6	6
Uganda	3	}	1	$\frac{3}{2}$	$\frac{6}{2}$	$\frac{7}{2}$	10
Other	1 1	i i	1	1 1	$\overset{2}{2}$	$\frac{2}{2}$	) 2
Total.	7	14	15	$-\frac{1}{21}$	$-\frac{2}{23}$	26	$\frac{2}{27}$
Cacao	· ·					·	
Ghana	266	041	041	910	000	000	
Nigeria	91	$\frac{241}{108}$	241	218	209	238	272
French West Africa (Ivory Coast)	47	53	$\frac{106}{72}$	$\frac{100}{53}$	90 75	$\begin{array}{c} 119 \\ 76 \end{array}$	137 66
French Cameroons	$\frac{1}{25}$	48	61	50	56	46	54
Spanish Guinea	$\overline{12}$	16	17	18	17	20	
French Togoland	9	4	8	12	14	1 4	3
São Tomé and Principe	10	8	] 11	7	. 6	9	
Other	2	5	7	8	9	11	
Total.	462	483	523	466	476	523	568
Tobacco							
Federation of Rhodesia and							
Nyasaland	16	49	53	60	56	75	63
Other	4	4	4	8	8	7	7
$Total. \dots \dots \dots$	20	53	57	68	64	81	70
Cotton (lint)							
Uganda	60	59	60	71	56	68	61
Belgian Congo	30	46	46	41	40	51	38
Mozambique	5	27	38	38	$\tilde{3}\tilde{3}$	23	
French Equatorial Africa	7	27	25	33	33	38	34
Chad			(13)	(22)	(21)	(24)	(21)
Ubangi-Shari			(12)	(12)	(12)	(14)	(13)
Nigeria	9	13	18	26	34	28	26
Tanganyika	10	10 11	15 19	$\begin{array}{c c} 12 \\ 16 \end{array}$	$\begin{array}{c} 21 \\ 16 \end{array}$	28 19	28
Total.	131	193	221	237	233	255	234
Sisal							
Tanganyika	90	136	174	170	177	189	184
Kenya	32	38	36	34	35	37	41
$Angola. \dots \dots \dots \dots$	6	21	31	31	41	38	40
Mozambique	22	18	23	25	27	28	31
Madagascar	3 5	6	4	$\frac{12}{2}$	$egin{array}{c} 12 \\ 1 \end{array}$	$\frac{10}{2}$	11
Other	158	$-\frac{-}{219}$	268	$\frac{2}{274}$	293	304	307
Total.	158		208	2/4	295	304	307
Rubber (natural)							
Liberia	2	31	35	38	39	40	40
Nigeria	2	14	22	21	30	38	41
Belgian Congo	1	10	18	23	$\frac{26}{4}$	33	34
Other	4	3	3	3	4	3	3
Total.	9	58	78	85	100	114	118

only a relatively small increase over the prewar level. These trends contrast sharply with the considerable attention that has been paid to the improvement of oil palms in many territories. A number of other oilseeds, including sesame, coconut products, castor beans, sunflower seed and tung are important in certain areas. A significant postwar tendency has been the increased local processing of oilseeds, especially of groundnuts in French West Africa. As a result, in addition to a substantial growth in oil exports, the region's exports of oilseed cakes and meal, negligible before the war, are now around 400,000 tons annually.

Coffee has shown the most striking postwar expansion of all the region's major exports. The increase has been spread over a large number of territories, but has been especially rapid in the Ivory Coast, Madagascar, Angola, the Belgian Congo, Uganda and Kenya. Cacao, on the other hand, has expanded less than any other major export. Production increased very little above the prewar level until 1956, in part because of disease (chiefly Swollen Shoot Disease in Ghana) and the low rate of planting in the period of low world prices in the nineteen thirties. In Ghana (the world's largest producer) production has, in fact, been less than before the war in most postwar seasons and only in the Ivory Coast and the French Cameroous has there been any substantial increase. The small production of tea in East and Central Africa has risen sharply. Tobacco is produced in small quantities for local consumption in many territories; export production is mainly confined to European estates in the Federation of Rhodesia and Nyasaland, where there has been a very rapid expansion, stimulated by long-term contracts with manufacturers in the United Kingdom, Australia, and the Union of South Africa.

Cotton is an important cash crop for the indigenous population of several territories. Production and exports have increased rapidly except in Uganda, the major exporter in the region. Sisal production and exports are now double the prewar level, though most of the increase occurred in the earlier part of the postwar period; further potential increases have been limited by low prices in recent years. Tanganyika, where there are large European estates, is the world's major producer. There has been a remarkable expansion in the production of plantation rubber in Liberia, where although the bulk of output is still from the

estates of the Firestone Company the share of smaller producers is also increasing, and also in the Belgian Congo and Nigeria.

Livestock Products. Cattle are relatively numerous in Africa South of the Sahara, especially in relation to the human population in some areas (Table III-10). As will be seen in the section on technical problems and progress later in this chapter, cattle are barred from large areas by trypanosomiasis and problems of water supply, so that they are fairly densely concentrated in the more favorable places. Sheep, which can thrive in drier areas, appear to be slightly more numerous than cattle in the region as a whole, their numbers being estimated at about 75 million in 1956, though as many as 37 million were concentrated in the Union of South Africa, where they are mainly owned by European farmers. Goat numbers were estimated at about 50 million in the same year and pigs about 4 million. Estimates of poultry numbers are available for very few territories; the largest numbers appear to be in French West Africa, the Union of South Africa and Madagascar, with some 13 to 16 million chickens each.

In spite of these large numbers of livestock, the output of livestock products is very limited and accounts for only about one quarter of the

TABLE III-10. AFRICA SOUTH OF THE SAHARA: CATTLE NUMBERS COMPARED WITH POPULATION

	Cati	le Numl	ers
Country	1948-52 Average	1956	1956
	Mtu	ions	Per person
Union of South Africa French West Africa	11.9 8.9 6.3	$   \begin{array}{c}     11.6 \\     9.5 \\     7.5   \end{array} $	$0.8 \\ 0.5 \\ 0.9$
Kenya	5.5 6.0 5.7	$6.8 \\ 6.1 \\ 6.1$	$1.1 \\ 0.2 \\ 1.2$
French Equatorial Africa . Uganda	$\begin{bmatrix} 3.3 \\ 2.6 \\ 2.9 \end{bmatrix}$	$3.4 \\ 3.2 \\ 3.1$	$0.7 \\ 0.6 \\ 1.2$
South West Africa French Cameroons Angola	$1.5 \\ 1.2 \\ 1.3$	$1.7 \\ 1.3 \\ 1.2$	$\begin{array}{c} 3.4 \\ 0.4 \\ 0.3 \end{array}$
Bechuanaland	1.0 0.9 1.0	$\frac{1.2}{1.0} \\ 0.9$	$egin{array}{c} 4.0 \ 0.4 \ 0.2 \end{array}$
Total	63.3	68.7	0.5

price-weighted aggregates of the FAO production index, a lower proportion than in any region except the Far East. The share of live-stock products would be even lower with the exclusion of the Union of South Africa, where they generally account for about half of the gross value of agricultural output. European farmers have also developed a livestock industry in Kenya, the Federation of Rhodesia and Nyasaland and some other limited areas, but elsewhere the output of livestock products is very small, for reasons discussed later in this chapter.

Data on the output of livestock products are highly inadequate, most village slaughterings going unrecorded, though such data as are available suggest a fairly steady increase in the region's small production of meat, milk, and eggs. There has been a substantial postwar expansion in recorded intra-regional trade in eattle, imports into Ghana, Northern Rhodesia, and the Union of South Africa increasing particularly sharply. Hides and skins are also an important export of a number of territories. The Union of South Africa, where statistics are more complete, is probably responsible for a substantial proportion of the region's output of livestock products, for it contains about 50 percent of the total sheep population and about one sixth

of the cattle. Although meat production in this country is much greater than before the war (except for mutton and lamb, because of a sharp fall in sheep numbers), it has changed little in the last few years and price policies have recently been altered in an attempt to stimulate beef production. The Union of South Africa is the world's fourth largest exporter of wool. Mention should also be made of the valuable karakul and mohair industries of the Union of South Africa and South West Africa.

Fishery Products. Total reported fish production in 1956 was nearly four times as much as in 1938 and almost twice the 1948-52 average (Table III-11). A very large part of this rapid increase has occurred in Angola, the Union of South Africa and South West Africa, which now produce about two thirds of the total eatch of the region.

The sudden expansion in these three areas is explained by firm world demand for certain products, especially fish meal, and the accessibility of dense stocks, mainly pilchard and jack mackerel off the southwest coast. Until 1953 production increased rapidly in all three areas; the expansion has continued in Angola, where there was an increase of over 30 percent in 1956 alone, but in the other two areas produc-

TABLE III-11. AFRICA SOUTH OF THE SAHARA: ESTIMATED TOTAL CATCH 1 OF FISH

COUNTRY	1938	1948-52 Average	1953	1954	1955	1956	1957
			Thou	sand metric	tons		
Angola	$\begin{array}{c} 26 \\ 62 \\ 4 \end{array}$	142 272 85	$   \begin{array}{c c}     220 \\     358 \\     275   \end{array} $	261 354 263	$\begin{bmatrix} 290 \\ 362 \\ 240 \end{bmatrix}$	421 287 268	396
Total	(92)	(499)	(853)	(878)	(892)	(976)	
French Equatorial Africa French West Africa Belgian Congo	· · · · · · · · · · · · · · · · · · ·	 34	100 50 67	100 51 66	100 54 81	100 61 	$\begin{array}{c} \cdot \cdot \cdot \\ 72 \\ \cdot \cdot \cdot \end{array}$
Tanganyika	16 18	26 	50 30 342	50 37 342	52 42 342	55 44 <sup>3</sup> 42	54 
Uganda		16 20 	23 20 19	24 20 18	$\begin{bmatrix} 25 \\ 20 \\ 13 \end{bmatrix}$	34 20 13	20 
Other			76	84	89		• • •
TOTAL	380	870	1 330	1 370	1 410	1 530	• • •

<sup>&</sup>lt;sup>1</sup> Live weight, i. e., whole fresh weight. — <sup>2</sup> Including Walvis Bay area. — <sup>3</sup> Estimated catch of marine fisheries only.

tion has now leveled off and even declined somewhat. While this was to some extent due to the imposition of catch quotas and limitations on craft and processing facilities in the interest of conservation, it now appears that producers in the Union of South Africa are finding it difficult to reach the prescribed annual quota. Fish meal, mainly for export, represents by far the largest usage and, while world markets remain firm, present trends may be expected to continue, with the limits on productive capacity rather than on demand, more especially since relatively low catching costs have placed these industries in a strongly competitive position. Although there is some export to other parts of Africa, including a quite substantial export of dried fish from Augola to the Belgian Congo, the bulk of the export trade (fish meal, canned and other preserved products) is directed to markets outside the region.

In the rest of the region the situation is materially different. These territories collectively absorb virtually all their own fish production (with considerable movement of supplies within the group) and also import substantial quantities from outside. These fisheries are predominantly concerned with the supply of fresh fish for local consumption and of simple forms of cured fish for distribution beyond the immediate vicinity of fishing centers. Inland lakes and river systems provide an important source of fish supplies and a great deal of unrecorded subsistence fishing is practiced, so that trends are difficult to determine. Where records are available, however, they indicate increasing production.

There are many problems to overcome in the provision of marketing and other facilities, equipment, technical training and research, but the general pressure of demand, possibly increased in some cases by the lack of alternative sources of animal protein, and the persistence of current efforts to improve fishing, handling and processing, are expected to support the present trend towards heavier production. In this connection, the development of the dried fish trade is of special importance. The vigor and flexibility of this trade is reflected in the very considerable movement of this simply processed product throughout this group of countries, with increasing imports especially from Angola and Europe. Both the Belgian Congo and Nigeria are now importing over 20,000 tons of dried products annually, representing some

three times that weight of fresh fish. There is also a growing import of canned fish into this group, notably Ghana (11,500 tons in 1955) and the Belgian Congo (6,000 tons in 1955).

Forest Products. In spite of the region's large forested area, recorded removals of roundwood are only about 85 million cubic meters annually (Table III-12). Almost all is broadleaved wood, though the small coniferous removals from artificial forests in Kenya and the Union of South Africa have increased since the war. About nine tenths of the roundwood is used as fuel, though this proportion appears to be slowly falling. Recorded fuelwood removals have remained fairly steady at 70 to 75 million cubic meters throughout the last decade, but much fuelwood production also escapes record.

There has been a rapid expansion in the small output of industrial wood and of processed forest products. The expansion has not been uniform and in 1955 French Equatorial Africa, Ghana and the Union of South Africa accounted for well over half of industrial wood removals. The major increase in sawnwood production has taken place in the Belgian Congo, Ghana and the Union of South Africa. The Union of South Africa accounts for two thirds of the region's plywood production and for almost all of pulp, paper, fibreboard and particle board.

The exploitation of the region's mixed tropical hardwood forests presents many problems. The first phases of commercial exploitation were highly selective and in many of the more accessible areas the classic groups of hardwood species, mahogany, okoumé and limba, have been overexploited and output has had to be restricted. Since the war, however, many new species have won acceptance, especially on Western European markets, but potentialities are still only beginning to be realized. It should be mentioned that the forests also yield a large variety of minor products apart from wood. Wattle bark for tanning, produced on plantations, is a valuable export of Kenya and the Union of South Africa.

In spite of the expansion in production since the war and in spite also of a great increase in exports of broadleaved logs, the region remained up to 1953 a net importer of forest products in terms of roundwood equivalent. Since exports of forest products are mainly of logs, while imports consist largely of more valuable, processed goods, trade is very largely extra-

TABLE III-12. AFRICA SOUTH OF THE SAHARA: FORESTRY PRODUCTION

PRODUCT	1946	1948-52 Average	1953	1954	1955	1956
·			Million cub	oic meters 1		
Removals of Roundwood						
Broadleaved wood Coniferous wood	$\substack{78.6\\0.9}$	77.4 1.1	$\begin{array}{c} 79.8 \\ 1.4 \end{array}$	$\substack{83.1\\1.4}$	83.3 1.5	$\begin{array}{c} 81.5 \\ 1.5 \end{array}$
Total	79.5	78.5	81.2	84.5	84.8	83.0
of which:			a property and the second seco			
Logs	1.0	$4.7 \\ 1.1 \\ 1.2$	$egin{array}{c} 6.3 \ 1.3 \ 1.2 \end{array}$	$egin{array}{c} 6.6 \\ 1.6 \\ 1.5 \end{array}$	$7.0 \\ 1.8 \\ 1.6$	$7.3 \\ 1.8 \\ 1.6$
Total Industrial Wood Fuelwood		$\begin{array}{c} 7.0 \\ 71.5 \end{array}$	$\begin{array}{c} 8.8 \\ 72.4 \end{array}$	$9.7 \\ 74.8$	10.4 74.4	10.7 $72.3$
			Thousand co	ubic meters		
Output of Forest Products		1				
Sawnwood		1,160 70	1,580 170	$\substack{1,650\\190}$	$rac{1,650}{200}$	$1,720 \\ 210$
			Thousand n	netric tons		
Pulp	8 14 —	18 19 11	$\begin{bmatrix} 39 \\ 35 \\ 40 \end{bmatrix}$	50 74 55	64 85 70	85 95 75

<sup>&</sup>lt;sup>1</sup> Solid volume, without bark.

regional and in terms of value imports outweigh exports, which were around 120 million dollars in 1955, as against an import of about 150 million dollars. The principal exporters are, in order, French Equatorial Africa, Ghana, Nigeria, Union of South Africa and the Belgian Congo and the principal importers the Union of South Africa (86 million dollars), the Federation of Rhodesia and Nyasaland (17 million dollars) and the Belgian Congo (8 million dollars.

Exports of broadleaved logs, the main item, rose from 0.53 million cubic meters in 1946 to 2.35 million in 1955. All the leading exporters (French Equatorial Africa, Ghana, Nigeria, French West Africa and the Belgian Congo) raised their shipments considerably in this period. Though there has been an even more spectacular expansion of broadleaved log exports from Asian countries, in 1955 Africa South of the Sahara still accounted for 35 percent of total world exports in this category. Exports of processed broadleaved wood and sleepers have risen less rapidly, except in Ghana, where sawn

hardwood exports have increased thirty-fold in the last ten years and now account for more than half the region's total. Only French Equatorial Africa, the Belgian Congo and Nigeria as yet export plywood or veneers on a significant scale, while there is a sizeable shipment of fibreboard from the Union of South Africa (Table III-13).

Several factors have contributed to the increased European market for West African hardwoods since the war. With the chief supplier of softwoods, the U.S.S.R., unable to resume shipments on the prewar scale, there was a tendency to substitute hardwood wherever practicable and a few of these outlets were retained when later softwood supplies eased, while payment difficulties restricted European purchases of North American hardwoods. The furniture trade, the biggest single consumer of hardwood, has also been buoyant in the postwar period.

Forest products industries are still relatively underdeveloped over most of the region. Pulp and paper production is virtually confined to the Union of South Africa and even that country imports all its newsprint and much of its other

TABLE III-13. AFRICA SOUTH OF THE SAHARA: TRADE IN FOREST PRODUCTS

Item	Unit	1946	1948-52 Average	1953	1954	1955	1956
Exports  Broadleaved logs Broadleaved sawnwood <sup>1</sup> Veneers and plywood Fibreboard	1 000 m <sup>3</sup> 1 000 m <sup>3</sup> 1 000 m <sup>3</sup> 1 000 metric tons	530 150 5	1 170 230 30	1 630 455 60 10	1 860 400 65 15	2 350 450 80 20	2 300 520 95 25
Imports  Coniferous sawnwood Paper and paperboard Fibreboard		140 126	150 191 6	130 82 9	160 217 11	170 235 17	160 230 20

<sup>&</sup>lt;sup>1</sup> Including sleepers.

paper. All countries consume paper, however, and few lack resources of fiber suitable—for paper making. Technically, the problem of exploiting the region's mixed tropical hardwoods is soluble, but local markets are still too small to sustain orthodox mills of economic size. These markets will expand, however, while some metropolitan countries, faced with rising requirements, are beginning to investigate the possibility of supplementing their pulp supplies by developing production in African territories. As regards other forest product industries, further progress depends mainly on improved extraction and processing techniques and on winning markets for less-known species.

#### Producer Prices and Incomes

Various systems of control of producer prices have become very widespread in Africa South of the Sahara since the war. The main types of scheme in force are described later in this chapter, in connection with the marketing organizations that administer most of them, and the present section is confined to a brief review of trends in the prices received by producers.

Table III-14 assembles series of producer prices for some of the major export crops and also for maize, which among local food crops is the most frequently controlled. Published series are mainly of controlled prices and even the average prices shown in the table are all based on some form of guarantee or support, except in the case of coffee in Kenya and of coffee and cacao in the Ivory Coast. In the latter territory, however, stabilization schemes for these crops were begun in 1955.

Maize prices were generally raised steadily in the earlier postwar years, when there was still a shortage of grains on world markets, as an incentive to the expansion of production. These high guaranteed prices, combined with good weather, led in some cases to export surpluses which were difficult to dispose of profitably once the world supply situation had eased, so that after reaching a peak in the years 1951-53 prices were reduced quite sharply in some territories.

The producer prices for the main export crops should be compared with the movements in their average export unit values shown in Table III-3 above. While fluctuations in controlled producer prices have been much smaller than those that have occurred on world markets, these prices have sometimes been changed quite sharply from one year to the next. At one time rather abrupt upward revisions of producer prices were fairly frequent, to adjust to the rise in world prices. Producer prices for groundants, for example, were raised by as much as 70 percent in Nigeria in 1951. When world prices are falling, as in the last few years, some producer prices have had to be substantially reduced, but the use of stabilization funds has caused these reductions to be smaller than the falls in world prices. The effect on producer prices has also tended to be delayed or spread over more than one year.

It would be useful to be able to measure the level of these producer prices in "real" terms in comparison with the prewar period, in order to obtain some idea of the evolution of the purchasing power of agricultural products. Comparable prewar prices are, however, available

TABLE III-14. AFRICA SOUTH OF THE SAHARA: PRODUCER PRICES FOR SOME MAJOR CROPS

COMMODITY AND COUNTRY	Currency and unit	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Maize									,,,		***************************************
Kenya <sup>1</sup>	sh./bag cents/lb.	12.7 $5$ $22.0$	$14.6 \\ 35.0 \\ 5 \\ 22.0$	$17.9 \\ 37.5 \\ 5 \\ 24.0$	$\begin{array}{c} 45.5 \\ 7 \end{array}$	$23.7 \\ 41.5 \\ 14 \\ 30.0$	$23.6 \\ 40.5 \\ 15 \\ 32.0$	$\frac{40.5}{8}$	$22.6 \\ 39.0 \\ 14 \\ 30.0$	40.0 11	$23.8 \\ 38.0 \\ \\ 28.7$
GROUNDNUTS											
Nigeria <sup>5,6</sup>	$f/\log$ ton fes.CFA/kg.	$19.2 \\ 14.5$		$21.2 \\ 24.0$		$\frac{36.0}{18.9}$	$\frac{36.0}{20.0}$		$\frac{36.4}{20.1}$		
Cocoa											
$rac{ ext{Ghana}^{5,8}}{ ext{Ivory Coast}^{2,13}} \dots$ $ ext{Nigeria}^{5,9} \dots$	$\ell/\log$ ton fes. CFA/kg. $\ell/\log$ ton	121.3 $120$	84.0 63 100	130.7 $120$	149.3 170	$130.7 \\ 89 \\ 170$	134.4 88 170	149.3 167 200	$149.3 \\ 93 \\ 200$	149.3 61 150	$134.4\\86\\150$
Coffee											
Kenya $^2$	sh./cwt. fcs. CFA/kg. cents/lb.	161  19	$\frac{350}{35}$	$   \begin{array}{c}     373 \\     73 \\     25   \end{array} $	416 109 40	436 110 50	509 148 70	425 12129 100	471 1290 75	518 <sup>12</sup> 106 76	
Cotton (unginned)											
French Equat. Africa <sup>4</sup> . Uganda <sup>4,11</sup>	m fcs.~CFA/kg. $ m cents/lb.$	$\frac{\dots}{22}$	30	 33	25 45	25 50	25 50	24 51	24 61	24 55	26 57

Note: Unless otherwise specified, prices cover the calendar year or the crop season beginning in the year stated.

in only a few cases. Deflation to "real" terms is also difficult; indices of the general cost of living, for example, rarely extend back as far as the prewar period, while, if they do cover so long a period, they are generally not very accurate. Most indices also refer only to the urban cost of living.

Bearing in mind these difficulties, some tentative comparisons can be made for Kenya, Uganda, and the Union of South Africa. In Kenya the guaranteed price for maize in 1956 was nearly seven times the average price in 1938, as against an approximate trebling of the cost of living index for Nairobi. In Uganda, 1956 producer prices ranged from some 3 times the 1938 level in the case of maize to about 13 times for coffee, while the cost of living index for Kampala was about 2.5 times as great as before the war. The 1956 maize price in the Union of South Africa was about 3.5 times the prewar level, the cost of living having approximately doubled in the same period.

Thus it appears that, in spite of recent declines in producer prices, the purchasing power of the main agricultural products remains considerably greater than before the war. It must be remembered, however, that the immediate prewar years were a period of exceptionally depressed agricultural prices.

Some useful estimates are available of the "terms of trade" of producers of cacao in Ghana and of groundnuts, palm oil, palm kernels, and cacao in Nigeria, based on the producer prices of these crops and an index of the wholesale prices of imported goods. 17 Calculated on this basis the producer's terms of trade appear to have fluctuated very sharply in the postwar period. Generally speaking, the effect of the sharp upward movement of most producer prices around 1951 was offset by a similar rise in the prices of imports. As the latter prices then declined, while producer prices changed little, the terms of trade steadily improved. From about 1956, however, import prices have again begun to rise, coinciding with

<sup>&</sup>lt;sup>1</sup> Guaranteed price. — <sup>2</sup> Average price. — <sup>3</sup> Buganda Province. — <sup>4</sup> Fixed price. — <sup>5</sup> Minimum price. — <sup>6</sup> Shelled, at rall-head, Kano area. — <sup>7</sup>Unshelled. — <sup>8</sup> Grades I and II. — <sup>9</sup> Grade I, naked, ex-scale, port of shipment. — <sup>10</sup> Payable at enring works for African-grown robusta, unhulled (Kiboko) in first half of year. — <sup>11</sup> Payable for good raw cotton, Mengo zone. — <sup>12</sup> December. — <sup>13</sup> Naked, ex-scale, Abidjan.

<sup>&</sup>lt;sup>17</sup> See United Africa Company Limited, Statistical and Economic Review, No. 8, September 1951, pp. 23-26, and subsequent issues.

a reduction in most producer prices, so that the terms of trade have tended to deteriorate.

Producer prices, together with the volume of marketings, determine the level of the gross incomes of agricultural producers. Production changes often have a very sharp effect on gross incomes, especially now that producer prices are generally fixed in advance and do not reflect, even partially, the level of the crop. In Nigeria, for example, total marketings of groundnuts fell from 320,000 tons in 1948/49 to only 130,000 tons in 1950/51 and, with the guaranteed producer price only slightly raised, the gross value of the crop declined by more than half. In Ghana there have been sharp annual fluctuations in the level of the cacao crop and in several years the effect on producers' gross receipts has been accentuated by changes in prices announced before the size of the crop was known.

National income estimates are now prepared for most of the larger territories in Africa South of the Sahara and in most cases they include separate estimates of the income of the agricultural sector, with an imputed value for subsistence production. The large volume of production that is for subsistence only is a major problem in calculating national incomes in most territories, both conceptually and because of the lack of data concerning its level. For most areas national income data still cover only a rather limited number of years and are somewhat out of date, so that it is not yet possible to evaluate general postwar trends in agricultural incomes in the region as a whole. Detailed analysis of agricultural incomes in most individual territories is also not possible, as information is not published on the composition of these incomes and on agricultural and non-agricultural population. The most complete agricultural income data that are regularly published are for the Union of South Africa and for European farmers in Southern Rhodesia.

#### Consumer Prices

While the detailed analysis of consumer prices lies outside the scope of this broad survey, studies of variations in these prices among different parts of a territory and at different seasons are of considerable importance in determining marketing policy. Because of the large volume of output which is not marketed, production changes have a very sharp effect on the size of the marketed surplus and it is there-

fore likely that food prices are subject to large fluctuations in many areas.

Indices of the cost of living and of retail food prices are now published for a number of territories, but most of them are limited to large towns and some to the cost of living of Europeans only. In most territories for which data are available, movements in the index of retail food prices (where African expenditure is included, food is a very large part of the general index) have been very close to those in the general cost of living. In Ghana, Northern Rhodesia, and Uganda, however, food prices have recently increased more rapidly.

Increases in cost of living indices have varied rather widely. Between 1948 and 1956 the increase in the Belgian Congo and Manritius was little more than 20 percent, in Ghana over 30 percent, in the Federation of Rhodesia and Nyasaland and in the Union of South Africa about 40 percent, and in the three British East Africa territories of the order of 50 percent. The largest increases in this period were in Freuch West Africa (nearly 80 percent) and French Equatorial Africa (about 140 percent). The rapid inflation in the French territories is attributed mainly to the large volume of development expenditure and to the introduction of minimum wages and other social provisions. Prices rose so rapidly in the earlier postwar years that special measures, including reductions in freight rates, indirect taxes, and marketing margins became necessary. As a result, consumer prices have been held fairly stable since about 1952, though during 1957 there was a renewed sharp rise.

# FOOD CONSUMPTION AND NUTRITION

Having outlined the main features of the agricultural production of Africa South of the Sahara, it is necessary to examine the extent to which this production provides a satisfactory diet, in quantity and quality, for the population of the region. An account is first given of the main dietary patterns and of the food habits which influence them. The existing data on actual food consumption levels in different areas are then briefly summarized, together with the principal factors determining these levels of consumption. After an account of the extent and the effects of malnutrition in the

region, some of the more important measures being undertaken to improve this position are outlined.

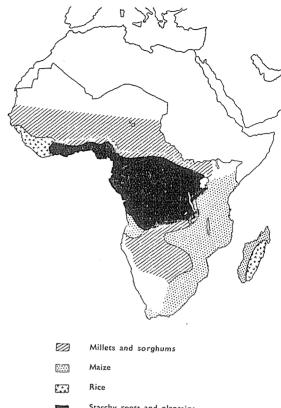
# Dietary Patterns

As in the other economically underdeveloped regions, the diet of the majority of the population of Africa South of the Sahara is limited essentially to the foods that are produced locally. While, as indicated above, food imports have grown rapidly, these are consumed mainly by urban dwellers or a few more prosperous farmers and play a very small part in the nutrition of the great mass of the population. The diversity of diets is further reduced by restrictions imposed by soils and climatic difficulties on the range of crops that can be produced locally.

Dietary patterns, therefore, correspond fairly closely to the conditions of climate and vegetation shown in Figure III-1 above. Figure III-6 broadly distinguishes the principal dietary zones of Africa South of the Sahara according to their staple foods. 18 This map is, of course, highly schematic and does not show the many variations in diet caused by local differences in topography (especially in East Africa), climate, soils, and food habits, but it is an approximate indication of the position for the bulk of the population of the region. In addition, within the main zones shown on the map, there are special population groups, including pastoral tribes, fishermen, and urban dwellers, whose diets will be described separately.

In the sparsely populated drier parts of the region (mainly savannah and seasonal forest), in a broad belt south of the Sahara desert and also around the Kalahari desert, the staple foods are sorghum and millet which are well adapted to the dry climate and provide about 75 percent of the calories. Meals consist essentially of a ball of millet or sorghum meal which is dipped in a sauce or seasoning. Maize, rice, cowpeas, groundnuts, and Bambara groundnuts are subsidiary foods, replaced by cassava and sweet potatoes when the granaries are empty at the end of the short rainy season. Although livestock is numerous in this zone, meat and milk are rare, while fruit and vegetables are not avail-

FIGURE III-6. Africa South of the Sahara: Main Staple Food Zones



Starchy roots and plantains

able throughout the dry season of five to seven

In a large part of the savannah zone of East and Southern Africa, millet has more or less been replaced by maize as the staple food. The two crops are often found together and are also associated with sorghum, rice, peas and beans, while, where the rainfall is better, the starchy roots are also of some importance. The ball of millet, maize (in the form of mealie meal or "posho") or root crops are eaten with a sauce of fermented beans, peppers, baobab and hibiscus leaves, etc. The "hungry season" is shorter than in the drier zone described above and in certain irrigated areas there are two harvests of maize and rice in the year. Meat, milk, eggs, and fish are rare and the consumption of green vegetables, tomatoes, pawpaws, mangoes, citrus fruit, etc., is small.

The tropical rain forest is the zone of the starchy roots and plantains. Although one of these crops is generally dominant, as, for example, cassava in much of the Belgian Congo and of French Equatorial Africa, plantains in most

<sup>&</sup>lt;sup>18</sup>The staple food is defined as the product which, over the year as a whole, is the largest contributor to the total calorie supply. In most areas the staple food accounts for as much as 60 to 80 percent of total calories.

of Uganda and parts of Ghana and the Ivory Coast, and yams in parts of the Ivory Coast and Nigeria, a number of them are always associated and are sometimes of equal importance. They are usually boiled and eaten with a sauce of groundnuts, spinach, hibiscus and eassava leaves, and palm oil. Cassava flour ("fufu") is cooked and eaten as a paste ("luku") or fermented ("chikouangue") with a sauce of palm oil and sometimes dried fish. Because of trypanosomiasis, meat is even rarer than elsewhere and the small supply of animal protein comes mainly from such small game as palm rats and from caterpillars and termites. Fish is hardly found except in the diets of riverain and coastal populations.

Generally speaking, going from the driest areas toward the tropical rain forest, there is a steady decrease in the importance of cereals in the diet and they tend to be replaced by the starchy roots and plantains. In Nigeria, for example, at Zuru in the Northern Region an average intake of cereals of 806 grams per day was found, compared with only 15 grams of starchy roots; at Bida, further south in the same region, cereals intake had fallen to 569 grams per day and that of starchy roots had risen to 204 grams; at Mbaneje, in the forest zone of the Eastern Region, the positious were completely reversed, with a daily intake of only 15 grains of cereals and 1,627 grains of starchy roots and plantains. 19 In most of the forest zone starchy roots and plantains provide a very high proportion of the total intake of calories. At Bongonanon, Ivory Coast, they provided as much as 81 percent of total calories, and cereals another 4 percent. 20

In addition to the three main zones described above, rice is the staple food in certain areas, for example in Casamance (Senegal) and the western part of the forest zone of the Ivory Coast, Gambia, Sierra Leone, Liberia, the Niger valley above Timbuctu (French Sudan), Kivu (Belgian Congo), parts of Tanganyika, and the eastern part of Madagascar. Apart from these areas where it is the staple food, rice is popular almost everywhere, in part because it is relatively easy to prepare.

The diets of the pastoral tribes, Fulani, Masai, etc., cannot be placed in any of the above categories. Their diets were formerly based on livestock products, especially curdled milk mixed with blood. They now tend to consume more cereals, obtained from neighboring agricultural populations in exchange for milk and meat.

In Africa South of the Sahara as a whole, fish is the most important potential source of animal protein. The fishermen tend to have the largest intake of protein in the region, but otherwise they generally eat only a little starchy roots and cereals and their diets are lacking in vegetables and fruits.

Urban diets, influenced by contact with Europeans, have lost most of their traditional character. The consumption of white bread is increasing rapidly and is even spreading from the towns to rural areas. Well supplied daily markets permit the purchase of meat, fish, and milk, products which are comparatively rare in most village markets. In the towns, however, the quantity and quality of diets is determined by purchasing power. The more prosperous officials and traders achieve European tevels of food consumption, but the lower-paid workers, especially those newly arrived from the bush or with large families to support, find themselves worse off than in their villages.

A final special class of diet is that of the employees of mines and other large industries who live in compounds or camps and are fed by their employers. In most territories the composition of their ration is prescribed by law. Generally it is in conformity with their traditional food habits and is nutritionally satisfactory, but sometimes the difficulty of obtaining or preparing some traditional foods causes the use of processed products, such as milled rice or maize meal, and leads to rather monotonous diets. Nevertheless, the diets of these workers are generally superior in both quantity and quality to those which they obtain in their villages.

## Food Habits

Food consumption is governed by many wellestablished rules and customs. Children are generally breast-fed for as long as 18 months or two years unless another pregnancy intervenes. At the age of five or six months they are given additional foods, such as millet or

<sup>&</sup>lt;sup>19</sup> B. M. Nicol, "Nutrition of Nigerian Peasant Farmers," British Journal of Nutrition, Vol. 3, No. 1, Sept. 1949; id. The Clinical and Nutritional Condition of the Population of Mbaneje, near Iludu, Ogoja, 1954.

<sup>&</sup>lt;sup>20</sup> Enquête nutrition-niveau de vie (Subdivision de Bongouanou 1955-1956), Territoire de la Côte-d'Ivoire, Service de statistique, Rapport nº 4, 1955.

maize gruel, mashed bauanas or cassava bread. At weaning, milk is completely replaced by these starchy foods and the diet becomes highly musatisfactory. All animal products tend to be excluded from the diet, either because they are considered inappropriate at this age or because taboos completely forbid their consumption.

In most parts of Africa South of the Sahara, meat is rarely consumed, for even where there is no tsetse fly and cattle are numerous, the cattle owner attaches more importance to their numbers than to their value as a productive or marketable resource. Except for festivals and celebrations, cattle are eaten only when they die of old age or disease. Chickens and eggs are reserved mainly for gifts. Moreover game is now becoming comparatively scarce over most of the region.

Milk is still traded in only very small quantities. In the north of Uganda it is so little prized that certain pastoral tribes live on millet and root crops and give away the milk to their herdsmen. Butter is often used as an ointment or cosmetic and seldom occurs in the diet. In the towns and a few other areas, however, the properties of milk are better appreciated, but here its high price puts it beyond the range of all but the most privileged classes.

Where fish are found locally they are generally greatly appreciated. In addition, with a few important exceptions, including the Bantu of the Union of South Africa, the African is particularly fond of dried, smoked or salted fish, even, and sometimes especially, when its taste and smell are very strong. Unfortunately, it is generally too expensive in relation to the income of the average consumer.

While a great variety of fruits and vegetables are to be found in Africa South of the Sahara, many have been neglected or their cultivation abandoned. In the forest zone, however, food gathering, especially by children, adds to the variety of the diet. There is a great need to encourage the cultivation of a larger variety of fruits and vegetables.

While food taboos are tending gradually to disappear, they remain a powerful obstacle to progress and education in many areas. The most important, from the nutritional point of view, cover the consumption of animal protein by the vulnerable groups of the population. Almost everywhere most animal products are excluded from the diet of pregnant women, nursing mothers, and young children.

# Food Consumption Levels

While a food balance sheet is regularly published only for the Union of South Africa, food consumption surveys have now been carried out in many parts of the region.

Table III-15 summarizes the results of a few of these surveys, taken from both the tropical forest and the savannah zones, including (the last four surveys shown in the table) some of the drier parts of the latter. The results shown are daily averages for the year as a whole. Many other dietary surveys have been carried out or are in progress in different parts of the region, such as Basutoland, Gambia, Madagasear, Ruauda-Urundi, Senegal, Tauganyika, Uganda, the Union of South Africa and Upper Volta, Those shown in the table are chosen mainly for the comparability of their results. While they are all for West Africa, it is believed, on the basis of the broad conclusions of the surveys made in other areas, that they are fairly representative of conditions in the region as a whole. Specific results of some of these other surveys will be cited for comparison.

These results confirm the heavy preponderance of earbohydrates in the diet, carbohydrates providing from 60 to 85 percent of the total calorie intake. Annual average calorie supplies appear to be fairly close to estimated requirements in all cases except for the children surveyed in Eastern Nigeria. It should be pointed out, however, that these calorie requirements are calculated on the basis of the present state (weight, activity, etc.) of the population and that they would probably be greater if a more adequate diet were available from an early age. To some extent this underestimation of true calorie requirements may be offset, especially for the children, by the fact that some of the calorie intake from food gathering may escape record.

Protein requirements are particularly difficult to estimate accurately, as they vary with the quality of the protein consumed, which depends on its source. Nevertheless, it is clear from Table III-15 that in many cases the requirement of protein is far from being satisfied, the deficiency being much greater than the probable discrepancy in calculated requirements. At Attitogon, in French Togoland, protein intake was only about half of estimated requirements, and among the children aged from four

Table III-15. Africa South of the Sahara: Intake of Calories and Nutrients Per Day (Annual Average) Compared with Estinated Requirements, Selected Dietary Surveys

		Calories	ø	Protein	ij	Carbo	Carbohydrates		Fats	Calcium		Vitamin	A	Thiamine		Ribo- flavine	Nia	Niacine	Asc	Ascorbic acid
ARBA	Staple foods	In- take A B	A/B per- cen- tage	take Reqt.	Ani- mal	To- tal	Calor-	salories	To- I tal	In- take Regt.	It. take		Reqt. La	take Reqt.	In- take	Reqt.	In- take	Heqt.	In- take	Regt.
Tropical Forest		Number	`°°	<i>G</i>	Grams	::	Num.	6 %	9. R	Milligrams		I. U.	:		:	Mill	Milligrams	:	:	
Attitogon (French Togoland)	Cassava. maize	1 994 2 008		99 29.2 59.4	6	396 1	584	79	30	801 9	950 6 0	000 4 3	300 1	.3 1.	2 0.5	1.5	8.5	12	54	67.
Bongouanou (Ivory Coast)	Yams	2 166 2 183	99 65	88	26	445 1	082	85	. 50	747 1 0.	054 4 3	3804 3	391 1	.7_1.		9 1.(	.6 13.9	Ξ	341	7.1
Mbaneje (Eastern Nigeria) <sup>1</sup>	Yams	2 393 2 542		94 64.5 65	2.6	450 1	800	75	31	642	11000		: 	- 7:	.2 0.9	_	5 16	12	216	09
Mbaneje (Eastern Nigeria) <sup>2</sup>	Yams	1 950 2 078	9453	3.5 65	2.4	360 1	440	74	- 58	537	13000	. 8		.6 1.	2 0.7	7 1.8	5 16	10	177	09
Mbaneje (Eastern Nigeria) <sup>3</sup>	Yams	1 521 2 064	74 39	65	1.4	300 1	300	: 62	21	373	0	. 000			.9 0.5	5 1.0	6	9	144	30
Mbaneje (Eastern Nigeria) <sup>4</sup>	Yams	906 1 480	61 25	9 9	0.0	183	732	81		253		200		0.8 0.6	6 0.3	3 0.9	55	9	06	30
Savannah Akaba (French Togoland).	Millet, maize,	2 183 2 213	99 45.	6.663	6.3	432 1	728	62	59	566	•	•	•	•	:	•	:	:	:	:
Bida (Northern Nigeria) <sup>1</sup> .	Millet, roots 2	2 639 2 750	96 75	95	ಣ	486 1	944	74	4	489 8	800 5 1	1743 0	000	.2	.6	7 1.6	3 19	17	86	73
Sawude (French Togoland)	Millet	1 797 1 953	92 54	61		:	:	:	•	:	:	•	:	:	:	:	:	:	:	:
Jarawaji (Northern Nigeria) 1	Sorghum	2 977 2 545	117 107		29	587 2	348	. 62	37 1	396 1 00	6 000	926 4 6	600 3	.0	.5 1.1	1.5	5 27	10	10 12.5	09
Jarawaji (Northern Nigerria) 2 · · · · · ·	Sorghum	2 650 I 907	139 92	:	24	497 1	588	09	331	130		200 3 5	500 3	.0 1.	.5 1.1	1.5	521	10	10 16	36
Jarawaji (Northern Nigeriia) 4	Sorghum	1 480 1 480	100 56	:	55	242	898	59 2	23 1 (	060	- G :	960 1 3	300 1	1.6 0.5	5 0.6		0.9 12	9	9	30

SOURCES: J. Pèrissé, Une enquête alimentaire sur les populations du Togo, Institut de recherches du Togo, Loui, 1957. Enquête nutrition niveau de vie (Subdivision de Bongouanou 1955-1956), Territoire de la Côte-d'Ivoire, Rapport n. 4, 1955. B.M.Nicol, The Clinical and Nutritional Condition of the Population of Moneie near Hudu, Condition of the Population of Moneie near Hudu, Sornu, 1954.

'Males. 'Females. 'Children, aged 7-12. 'Children, aged 4-6.

to six at Mbaneje in Eastern Nigeria even less. In the cases shown in the table, the intake of animal protein was generally very low. The highest proportions of animal protein were found in the prosperous caeao-growing area of Bongouanou (about 40 percent of total protein intake), where much food is purchased, and at Jarawaji, Northern Nigeria, where the population combines agricultural, pastoral, and fishing activities and consumes milk and fish daily. It is significant, however, that even in the latter area the bulk of the protein came from vegetable sources. An extreme ease is found among certain tribes in Uganda, where animal protein intake is nil, the fairly high protein intake of 99 grams per day coming entirely from plant sources, mainly peas and beans. 21 With most of the protein coming from vegetable sources, it therefore varies according to the staple food. While it is high where pulses are the staple food, there is also great variation as between cereals and the starchy roots and plantain group, the former yielding more protein, in relation to their carbohydrate content, than the latter.

The fats in the diet are also very largely of vegetable origin (groundnuts, pahn oil, shea butter, according to the region). Consumption is low except in the groundnut-producing areas (up to 44 grams per day at Bida, Nigeria) and in the forest zone where palm oil is found. While the consumption of fats was never more than about 30 grams per day in the forest areas shown in the table, at Evodoula, French Cameroons, it was found to be as high as 54 grams per day. <sup>22</sup> At the other extreme, at Gish, Uganda, where neither of these sources of fats are available in quantity, the consumption of fats was found to be as low as 7 grams per day. <sup>23</sup>

Compared with the theoretical requirements calculated for other regions, calcium intake was found to be sufficient only where milk and fish are consumed (Jarawaji, Northern Nigeria). These requirements, however, depend on other factors, such as the calcium/phosphorus ratio and the vitamin D and phytic acid content of the diet.

As regards vitamins, the table shows a deficiency of vitamin B<sub>2</sub> (riboflavine) in all the areas

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<sup>21</sup> J. Gongora and T. Norris, WHO consultants [Personal communication]. 1957.

<sup>23</sup> J. Gongora and T. Norris, WHO consultants [Personal communication]. 1957.

for which data are available. Vitamin A appears to be sufficient in the forest zone, where palm oil is available, but deficient in the drier areas. Vitamin C (ascorbic acid) also, while generally sufficient in the forest zone, was found to be lacking in an arid area in Northern Nigeria. The vitamin deficiencies, as well as those of calcium and other minerals, are closely associated with the lack of green vegetables and fruit in the diet. The deficiencies found in these dietary surveys are generally confirmed by the results of clinical surveys.

# Factors Influencing Food Consumption

While the subsistence farmer consumes only what he produces or obtains by food-gathering and hunting, at the other extreme, employees in the large towns have to purchase all of their food supplies, except where these are furnished by their employers. Table III-16 shows data from some recent expenditure surveys, which make possible a study of the food expenditures and consumption patterns of the growing intermediate group, consisting of farmers producing cash crops and purchasing some of their food, and their comparison with the position in urban areas.

In the first three eases shown in the table, representing various degrees of urbanization, some 56-59 percent of total expenditures (ineluding subsistence) was devoted to food and drink, while in the three rural centers this proportion was as high as 73-78 percent. The proportion of purchases in the total value of food consumed varied very widely. The highest percentages were, as might be expected, found among the wage-earners in Kumasi and the traders in the Ivory Coast. It is interesting, however, that the farmers in Nigeria purchased a much higher percentage of their total food than those in the Ivory Coast, indicating different degrees of development of a market economy. In Nigeria, cacao farmers in rural settlements purchased 72 percent of their food, compared with only 51 percent for cacao farmers living in market centers; this anomaly is explained by the fact that those in the latter group generally have larger farms.

In terms of calories, the proportion of food purchased was lower in all cases than the corresponding proportion in money terms, indicating that food purchases relate particularly to the more expensive sources of calories, such as animal products. In fact, animal products

<sup>&</sup>lt;sup>22</sup> R. Masseyeff and A. Cambon. *Enquêtes sur l'alimentation au Cameroun*, *I*: *Evodoula*. Institut de recherches du Cameroun, Ministère de la France d'Outre-Mer, Paris, 1955.

TABLE III-16. AFRICA SOUTH OF THE SAHARA: EXPENDITURE ON FOOD AND DRINK IN SELECTED AREAS

ITEM	r	II	III	IV	V	VI
			Perce	ntage		
Food expenditure in relation to total expenditure <sup>1</sup>	57	56	59	73	77	78
Food purchased in relation to total food consumed:						
Money value	100 100	70 60	51 46	72 70	28 10	83 70
Animal products in relation to total food consumed:						
Money value	39 	6	$\frac{\dots}{2}$	 4	38 8	31 6

Sources: Kumasi Survey of Population and Household Budgets, 1955, Acera, 1956; R. Galletti, K. D. S. Baldwin and I. O. Dina, Nigerian Cocoa Farmers [London], 1956, pp. 462 and 489; Enquête nutrition-niveau de vie (Subdivision de Bongouanou 1955-1956), Rapports, nº 3-5, Service de statistique, Côte-d'Ivoire, 1955.

<sup>1</sup> Including subststence valued at local market prices.

I: Wage-carners in Kumasi (Ghana).

II: Cacao farmers in Nigeria, living in towns.

III: Cacao farmers in Nigeria, living in market centers.

IV: Cacao farmers in Nigeria, living in rural settlements.

V: Cacao/coffee farmers in rural centers, Ivory Coast.

V: Cacao/coffee farmers in rural centers, VI: Traders in rural centers, Ivory Coast.

were found to be as much as 30-40 percent of total food expenditures (including subsistence) expressed in money values, though their proportion in the diet was very small.

The large differences in food expenditure as a percentage of total expenditure found between towns and rural areas suggest that the level of income is an important influence on food consumption, but few data are available for an examination of this relationship. Knmasi, for which the data are shown according to income classes, high income elasticities were found for some products. For bread and cereals the income elasticity is estimated to be as high as 1.6, compared with 0.5 for starchy roots, indicating a strong preference for the former in an area where the latter are actually the staple foods. It is also very significant that the income elasticity for meat products was found to be as much as 1.0.

In the towns another important influence on food consumption is the size of the family, an increase more or less amounting to a reduction in per caput income. Available data indicate that an increase in the size of family may cause a sharp reduction in both the quantity and quality of the diet.

A very important influence on food consumption in many rural areas are seasonal variations in the availability of food. Table III-17 com-

pares seasonal variations in total calorie sup plies in relation to estimated requirements in four areas of Northern Nigeria. In Langai, where estimated requirements are approximately covered by the annual average intake of calories, and in Bunga-Ningi, where they are substantially exceeded, seasonal variations are comparatively small. In the other two areas, in contrast, the annual average calorie intake is below estimated requirements as a result of very marked seasonal fluctuations. In the period immediately preceding the harvest the intake in Southwest Borgu fell to less than two thirds of estimated requirements. This problem of the "lungry season" or preharvest shortage is found mainly in the drier areas, where crop production is possible for only a very limited period of the year. It is aggravated by inadequate storage and, in some areas near the larger centers of population, e.g., Tanganza and Southwest Borgu, by the sale of too much of the harvest. Not only is the quantity of the diet reduced at this period, but its quality also falls because of the substitution of root crops, containing less protein, for cereals, while wild fruit and vegetables, sources of vitamius and minerals, are also scarce at this time. In some areas considerable progress has recently been made in overcoming this problem. In Gambia, for example, a survey made in 1945/46 found extreme-

TABLE III-17. NORTHERN REGION OF NIGERIA: SEASONAL VARIATIONS IN CALORIE INTAKE, Compared with Estimated Requirements, 1956/57

	Estimated		Calorie	intake		Intake ii	n relation	to requir	ements
AREA	calorie requirement	Annual average	I	II.	III	Annual average	I	11	111
		Calories per	person :	per day .			Perce	entage	
Bunga-Ningi	2 530	2 920	3 040	3 000	2 890	116	120	119	114
Tanganza	2 570	2 250	2 920	1 840	2 000	88	114	72	78
Langai	2 500	2 550	2 850	2 400	2 300	102	114	96	92
Southwest Borgu	2 550	2 060	2 570	2 000	1 620	81	101	78	63

Source: Annual Report, Nutrition Unit, Federal Medical Department, 1957. Nigeria, 1958.

<sup>1</sup>Males over 12 years. I : Just after harvest. II : Midway between harvests. III : Just before harvests.

ly sharp seasonal variations, but more recent reports indicate that they have now been virtually eliminated. The problem hardly exists in the forest zone, where root crops can be harvested throughout the year and can be stored in the ground, while the diet can always be supplemented by food-gathering.

While every family has its small granaries or storage units, these are generally no defence against the numerous pests and parasites of stored food and it is probable that in some areas as much as one third of the harvest is lost during storage. The improvement of family and village storage is an urgent need in many parts of the region, while in some areas the construction of further bulk storage capacity is also necessary in order to eliminate temporary shortages of food.

#### Nutritional Status

In general, the inhabitants of Africa South of the Sahara have enough to eat, though food shortages occur in certain areas during the "hungry season" preceding the harvest and during long periods of drought. The increase in food production referred to earlier in this chapter has meant a slight but steady rise in per caput consumption during the last ten years. Available information suggests that average daily calorie supplies per caput in central and tropical Africa are now around 2,250, as against an average of some 2,100 in 1949. These are, of course, rough estimates, but the conclusion that an increase has occurred finds some support from the results of recent dietary surveys.

There is, however, abundant evidence of qualitative defects in African diets which adversely affect the health of the population. Up to 85 percent of total calories may be obtained from cereals and starchy roots, which are poor sonrees of many of the nntrients needed by human beings. The most serious deficiency is that of protein. Insufficiency of certain vitamins and minerals, including vitamin A and riboflavin, is also of importance in certain areas.

The relation between mortality in a given age group and malnutrition is invariably complex, because of numerous factors besides nutrition which influence health. The information about the incidence of malnutrition which any available mortality figures can provide cannot therefore be regarded as more than suggestive. Since infants and young children are particularly vulnerable to malnutrition, attention may be drawn to the high mortality in the first five years of life. Precise mortality figures for this age group are available for only a few limited areas and are especially rare for rural populations. Data obtained either through special demographic studies or through enquiries concerned with nutrition indicate that on the average about 30 percent of children born alive die before the age of five. In the lower Senegal valley 24 and at Kiga in Uganda, 25 figures indicating a mortality of about 25 percent and

<sup>25</sup> J. Gongora and T. Norris, WHO consultants [Personal communication]. 1957.

<sup>&</sup>lt;sup>24</sup> Mission socio-économique de la basse vallée du Sénégal. Etude démographique, Service des statistiques, Dakar, 1957.

occasionally less have been reported. Exceptionally high figures were recorded among Ruanda tribes which have emigrated to Uganda (50 percent) <sup>26</sup> and in the diamond-mining areas of Sierra Leone (63 percent). <sup>27</sup> In parts of Tanganyika parents expect one child out of two to die before the age of five is reached. <sup>28</sup>

Infant mortality, that is, mortality under one year of age, reflects the numerous hazards, of which faulty nutrition is only one, which afflict this period of life. Mortality in the age group 1-4 (over one year but under five) may be more closely related to malnutrition, since it is this age group in which the incidence of protein malnutrition (kwashiorkor) is the highest. <sup>29</sup> In Table III-18 some figures are given showing infant mortality in children from 1 to 4 years in certain areas in Africa South of the Sahara, with the corresponding figures for the United Kingdom included for purposes of comparison. It must, however, be repeated that these figures are no more than suggestive.

Protein malnutrition tends to manifest itself in most serious form during the period after weaning. It is due primarily to the feeding of young children on diets which are poor in protein of high biological value, at a time of life when requirements for protein are high in relation to body weight because of the demands of rapid growth. Protein malnutrition is often associated with malnutrition due to deficiency of other nutrients besides protein, and malaria, parasitic infestation, and seasonal diarrhea are among the contributory factors. The following figures are illustrative. In Uganda a careful and extensive survey revealed that some 10 percent of 14,424 children under five examined were suffering from malnutrition, the percentage varying from 6.6 to 27.3 in different areas; of the children between one and three years of age, 10.8 percent showed manifestations of kwashiorkor or protein malnutrition.<sup>26</sup> In Tanganyika it was reported that 900 eases of malnu-

TABLE III-18. AFRICA SOUTH OF THE SAHARA: INFANT MORTALITY AND MORTALITY IN THE AGE GROUP 1-4, SELECTED AREAS, WITH CORRESPONDING FIGURES FOR THE UNITED KINGDOM

REGION	Under 1 year (A)	1-4 years <sup>1</sup> (B)	Ratio B/A
	Mortality children	per 1000 born alive	Percentage
Lower Senegal Valley.	199	47	24
French Guinea (urban)	142	184	130
French Guinea (rural).	202	126	64
United Kingdom	26	4	15

SOURCES: Mission socio-économique de la basse vallée du Sénégal, Etude démographique, Service des statistiques, Dakar, 1957; Mission démographique de Guinée, 2° fasciente, Services des statistiques de l'A.-O. F. et de la Guinée, 1956; Central Statistics Office, Annual Abstract of Statistics, 1956, H. M. Stationery Office, London, 1956.

trition were treated in hospitals in 1954, and that many more cases were probably unnoticed. 30 Protein malnutrition may not only lead to serious disease and death in young children; there is evidence that it may also leave sequelae which adversely influence health in later life, even when effective treatment has been given during the acute stage. This and other nutritional deficiencies affect both physical and mental development.

Beriberi, a disease due to lack of thiamine or vitamin B<sub>1</sub>, is rare in Africa South of the Sahara. Scurvy, caused by a deficiency of vitamin C, is also rare, though mild scorbutic symptoms have been observed during seasonal droughts. Pellagra, associated with deficiency of niacine, occurs in certain maize-consuming areas, for example in Basutoland and parts of Tanganyika. Deficiency of vitamin A is fairly widespread, leading to serious lesions of the eye and sometimes to complete blindness. In Ruanda-Urundi, signs of vitamin A deficiency were observed in 39 percent of a group of male children, 31 and in the Khombole area in Senegal mild signs were noted in 18 percent of a group of children examined.32

<sup>&</sup>lt;sup>26</sup> J. Gongora and T. Norris, WHO consultants [Personal communication]. 1957.

<sup>&</sup>lt;sup>27</sup> J. R. Rose, Kwashiorkor in the South-East Province of Sierra Leone, Methodist Mission Hospital, Segbwema, 1956.

Segbwema, 1956.

28 Cecily Williams, Report on the Facilities for the Treatment of Children in Hospital Dispensaries and Clinics and the Training of Staff in Child Care in Tanganyika Territory, Health Department, Tanganyika, 1956.

nyika, 1956.

<sup>29</sup> M. Autret and M. Behar, Sindrome Policarencial Infantil (Kwashiorkor) and its Prevention in Central America. FAO Nutritional Studies No. 13, 1954.

<sup>1</sup> Over 1 year but under 5 years.

<sup>&</sup>lt;sup>30</sup> Annual Report 1954, Department of Health, Tanganyika, 1955.

<sup>&</sup>lt;sup>31</sup> O. A. Roels, O. Debeir and Marian Trout, *Vitamin A Deficiency in Ruanda-Urundi*, Nutrition Laboratory, IRSAC, Bukavu, 1957.

<sup>&</sup>lt;sup>32</sup> A. Raba, Enquête clinique nutritionelle dans la région de Khombole (Sénégal), ORANA, Dakar, 1957.

African diets in general are poor in calcium, when their content in this nutrient is compared with requirements sometimes recommended by nutrition workers for other regions. No evidence of ill health from this cause has, however, been noted. Rickets, associated with deficiency of vitamin D, is rarely seen in Africa South of the Sahara, because of the abundance of sunlight. The special problem of goiter may be briefly mentioned. A high incidence of goiter has been observed in certain areas in French Guinea and Basutoland and in Ubangi-Shari. The introduction of iodized salt to provide iodine for preventive purposes would perhaps be justifiable in such areas, but so far there have been no successful attempts to introduce this measure.

Available information about the nutritional status and deficiency diseases in Africa points to the need to diversify diets by increasing the production of foods of animal origin, legumes and vegetables, particularly green leafy vegetables. The problem is, of course, not only that of increasing and diversifying food production. Ignorance of what constitutes a proper diet must be countered by suitable educational measures, and general improvement of the diet inevitably depends to a great extent on an increase in prosperity and purchasing power.

#### Measures to Combat Malnutrition

In parts of Africa South of the Sahara considerable attention has been given to nutrition for 20 years or more; these include the Union of South Africa, the British East African territories, the Belgian Congo and certain territories in French West Africa. Generally speaking, however, it is only since the war that governments have become aware of the importance of nutrition. A number of conferences have helped to focus attention on the gravity of the problem; among these are the three Inter-African Conferences on Food and Nutrition organized by the Commission for Technical Cooperation in Africa South of the Sahara (CCTA), the first of which was held in Dschang in the French Cameroons in 1949. Special attention was given by these conferences to the lack of personnel trained in nutrition.

FAO and WHO have sought to make good this deficiency by organizing nutrition training courses in co-operation with the governments concerned. To date some training has been provided to about 100 workers, associated with almost all countries and territories in Africa South of the Sahara. In areas including the Belgian Congo, French Togoland, Senegal, the Ivory Coast and Uganda the trainees have reinforced the personnel of existing services; elsewhere, as in French Equatorial Africa, the French Cameroons, Madagascar, and the Portuguese territories, they have helped to create new nutrition services. They have been concerned with surveys of diet and state of nutrition, including investigations of protein malnutrition, often in association with international workers.

With respect to surveys, reference may be made to the information on food habits and the various factors underlying them which has been provided by anthropological studies and nutritional studies in the French Cameroons, French West Africa, and the Union of South Africa, and to the surveys of milk production and consumption carried out in certain territories, often with assistance from FAO and UNICEF.

To develop satisfactory policies and action for the improvement of nutrition, more adequate data on food production and consumption are needed. These include agricultural production statistics which can be used as the basis of food balance sheets. Dietary surveys and enquiries on family expenditure on food are of great value in supplying the information needed for planning food production. A good many investigations of this nature have been undertaken during recent years, but more are needed. With respect to the relation between diet and health and the incidence of malnutrition and deficiency disease, some relevant studies have been made. but here again more are required. It is particularly necessary to obtain more data on the incidence of protein malnutrition in rural areas, to supplement the impressions gained of the seriousness and extent of this condition by doctors in hospitals.

"National nutrition committees" can make a valuable contribution to the solution of nutrition problems, in Africa as elsewhere, both in developing a sound food policy and in implementing specific nutrition programs. Committees of this nature are active in some parts of Africa, for example in the Union of South Africa and Northern Nigeria. The trainces referred to above have helped to strengthen some existing nutrition committees and to establish new ones, as, for example, in Angola, the Cape Verde Islands, French Equatorial Africa and the French Cameroons. Nutrition committees

are now in process of establishment in Ghana and French Togoland.

A Seminar on Nutrition is being arranged jointly by FAO and WHO, in 1959, in the Belgian Congo, at which the progress achieved will be reviewed. The participants will be mainly the nutrition trainees and special attention will be given to the problems and difficulties which they have encountered.

Apart from long-term measures to improve food production some more immediate steps to improve nutrition have been taken. Supplementary feeding programs have been organized with UNICEF assistance in the Belgian Congo. French Equatorial Africa, Kenya, Ruanda-Urundi, Uganda, and other territories, dried skim milk and other foods being distributed through schools and maternal and child health centers. Programs of this nature are now being developed in six territories in French West Africa, in Gambia and in St. Helena. Supplementary feeding helps to prevent malnutrition among limited groups in the population and draws attention to the need for increasing the supply of protein-rich foods. In this connection, reference may be made to the possibility of using in human nutrition certain processed foods, such as the presscakes of groundnut, sesame, and cottonseed, which are at present largely exported for animal feeding, and also fish meal. Research is at present proceeding in the Belgian Congo, Nigeria, Senegal, and Uganda on the processing, acceptability, digestibility, and biological value of groundnut presscake, these investigations being supported by a grant made available by the Rockefeller Foundation and administered through a committee of the American National Research Council. with which FAO and WHO are associated.

All programs to improve nutrition, both of an immediate or long-term nature, should include education in nutrition, the education of mothers in better ways of feeding their children being particularly important. Home economics services, which are now being developed in a number of territories, can contribute substantially to such education.

## TECHNICAL PROGRESS IN AGRICUL-TURAL PRODUCTION

Some of the main physical obstacles and technical problems in agricultural, fisheries, and forestry production have already been briefly referred to in the introduction to this chapter.

Considerable progress has been made in overcoming these problems and has probably been an important factor in the substantial increases that have occurred in the level of production since the war. Many technical problems remain to be solved, however, while research and advisory work is greatly hampered by the shortage of trained technicians. In addition, such work has so far been chiefly concentrated on the main export crops.

This section of the chapter summarizes recent progress in land utilization, soil fertility and the improvement of crop, livestock, fisheries, and forestry production. The organization of research, extension and training facilities is also reviewed.

#### Land Utilization

The utilization of the basic resources of soil and water presents certain special problems in Africa South of the Sahara. As in other tropical regions, water control and the maintenance of an adequate vegetative cover are essential. Owing to climatic factors, soil resources are easily destroyed and the maintenance or increase of fertility depends on management practices very different from those of temperate regions. The preservation or reconstitution of forest cover is frequently essential for continued crop production and especially for the maintenance of the hydraulic regime.

There is evidence that destruction of vegetation and consequent erosion has continued for many hundreds of years over large areas. Traditional methods of land use, under the pressure of modern economic and social influences and especially the growth of population, have greatly accelerated this process.

Shifting Cultivation. While the greatest single factor dominating changes in the vegetation cover has been the use of fire to provide grazing in the more arid areas, shifting cultivation has also had serious effects in both humid tropical forests and in drier bush country. Shifting cultivation requires a long period to restore fertility and is thus satisfactory only when there is no severe pressure of population on land resources. With the extension of settlement and an enforced stabilization of population, the fallow period is not long enough to restore the fertility of the soil.

This problem is being tackled in two ways. In areas of sufficient rainfall attempts are being made to settle the cultivators by the introduction of suitable crop rotations based on alternate husbandry and the ley, as, for example, in Rhodesia, in East Africa and the savannah zones of the Belgian Congo. On the poorer soils, attempts are being made to rationalize bushfallowing, in the Belgian Congo by the "corridor" system, with the encouragement of the Parasollière as the main agent of regeneration, and in Northern Rhodesia by controlling the "chitemene" system.

Settlement Schemes. In some areas of comparatively high fertility, as in parts of the tropical forest of West Africa and around the Great Lakes in East Africa, a tradition of settled agriculture has long been established. Here, however, increasing pressure of population has led to fragmentation of holdings, which have often fallen well below an economic minimum. Various measures for consolidation are being gradually introduced, but this may not always provide for surplus population and parallel settlement or resettlement schemes are necessary, involving the taking in of new land for cultivation.

Extensive land-settlement schemes are being carried out by many governments, ranging from the colonization of reclaimed land, as in Ruanda-Urundi, Mozambique and Tanganyika, to the consolidation of fragmented holdings in Kenya and resettlement within existing tribal areas as in the Federation of Rhodesia and Nyasaland. The gradual evolution of land tenure systems and the development of a prosperous class of farmers demands some form of organized land use planning and settlement. The majority of such schemes are carried out on the basis of aerial survey together with soil and hydrographic reconnaissance. They provide a good opportunity for introducing conservation measures such as contour ridging, terracing, and other erosion control practices. Examples are to be seen along the Nile-Congo watershed, in Ruanda-Urundi and in the Federation of Rhodesia and Nyasaland, but the combination of conservation measures with land planning is being generally applied in such schemes over the whole region. Although much is being done to evolve patterns of land settlement based on sound land-use planning, there is still room for many more pilot schemes aimed at a combination of conservation measures, land planning and the application of improved production techniques.

Water Control. The great hydrological basins, such as the Niger, Congo, and Zambezi, provide considerable reservoirs of untouched fertility. A number of settlement schemes based on flood control and irrigation works have been undertaken or are planned. One of the earliest of these was the Office du Niger in French West Africa, while one of the largest will be the Zambezi Multi-Purpose Scheme in Mozambique. On several of these rivers, hydroelectric schemes are planned or under construction, while the valleys themselves contain large stretches of at present uninhabited, but potentially fertile, land. The development of these basins underlines the urgency of watershed management. In areas of intense tropical rainfall. especially where the climax vegetation has been destroyed or modified by fire, the watershed is particularly vulnerable. While conservation measures are necessary to conserve soil and soil fertility, they are even more necessary to preserve water resources and protect the river basin areas from progressive deterioration.

Efficient watershed management affects also the regime of springs and streams in semiarid regions. The introduction of improved and rotational grazing for the large livestock populations of the tropical savannah belt depends largely on the provision of increased watering points, which in turn depend on the maintenance of ground water recharge. The vegetation cover in semiarid areas, once destroyed, is much more difficult to restore than that of the humid tropics, and the co-ordination of land and water development in these areas must, therefore, proceed on the basis of scientific resource surveys to enable the delicate balance between natural resources and their utilization to be maintained. There is great variation within the region in the amount of data that have been gathered on soil and water resources. Surveys have mainly been undertaken in limited areas and soil, vegetation, or hydrological maps are usually on a scale of not less than 1/200,000.

Irrigation farming is still in its initial stages in Africa South of the Sahara, although over the greater part of the region rainfall is inadequate for sustained erop production. In particular in areas of unimodal rainfall, the long dry season cannot be utilized for any form of erop production, and underemployment, poverty, and malnutrition result. The river systems have scarcely begun to be utilized for erop production and water storage for agriculture is still

largely confined to European settled areas. The development of hydroelectric power for industry will provide large quantities of water for irrigation and considerable areas will thus be opened up for land settlement. Serious human and physical obstacles remain to be overcome, however. Whereas irrigation has been practiced for centuries in the Near East and in Asia, it is practically unknown in Africa south of the Sudan. Following hydrological and soil surveys, pilot projects would provide a nucleus for training in irrigation practices and would also enable the investigation of the reaction of soils to irrigation and of suitable cropping and cultivation patterns.

# Soil Fertility

In spite of extensive research activities, which have accumulated an important body of scientific data, it remains true that, from the point of view of management and the maintenance and increase of fertility, much still remains to be learned regarding suitable practices for tropical and subtropical soils. Soil science was developed in the temperate regions and soil management practices cannot necessarily be transferred from temperate to tropical climates. Research is being actively pursued on these problems, the solution of which is of the greatest importance for the general improvement of yields, as a basis for land settlement schemes and in preventing a further deterioration in soil fertility by exhaustion and erosion.

In almost every territory efforts are being made to improve farm practices by the introduction of suitable rotations with leys and the use of farmyard manure. Progress is, of course, slow and only a small number of farmers have adopted such improved practices in limited areas. Such measures, however, constitute an important part of programs for the development of African agriculture and the establishment of systems of mixed farming adapted to the region.

Here again suitable systems have to be evolved which are acceptable to the African farmer and which will scientifically transform his present cultivation practices. Such a transformation is not only limited by lack of knowledge of suitable soil management techniques and of the plant/soil/water relationship of these elimatic regions, but by other factors as well. For example, no perennial herbage legume has yet been found which can be successfully introduced into rotations in tropical Africa for the im-

provement of soil conditions. It is possible that grass leys receiving heavy dressings of nitrogen and other plant nutrients will have to be used for soil improvement. Much work has been done on the establishment of grass leys, but there is still controversy as to the benefits in reformation of crumb structure claimed by advocates of the grass break.

The building up or even the maintenance of organic matter in cultivated soils always presents difficulties, especially in the tropics and subtropics. For instance, in the southern Transvaal and other areas no distinct residual effect of manure can be shown, nor is the carbon content of the soil increased by repeated dressings. In some areas this is readily explained by the quick consumption by termites of all the cellulose in the manure and in others probably by the rapid decomposition of organic matter that takes place under conditions of high temperature with alternating dry and moist spells. The organic-matter problem, difficult as it may be, still needs some solution through such measures as the use of large quantities of farmyard manure or compost, the incorporation of crop residues into the soil or the use of longer-term grass leys.

The soil-conditioning effects of tree growth are utilized by the African farmer where bush fallowing is practiced and in the paysannats indigènes in the forest zone of the Belgian Congo where shifting cultivation has been rationalized under the "corridor" system. It is known that an adequate period of bush fallow has a beneficial effect on future crop yields, but the reasons for this are not well understood. Experiments in the Belgian Congo have shown that, although they declined later, yields of maize grown without added fertilizer actually increased in the first two or three years after bush fallowing to a level nearly double that reached in the first year after clearing, while yields were about two thirds of those obtained when fertilizers were also added. Similar results have been obtained with cotton. The explanation of this "fertility curve" is obscure, but it involves important problems of soil conditioning and utilization in these areas, the solution of which must provide the scientific basis for replacing bush fallow by other rotations.

Fertilizers are virtually not used outside areas of European settlement, because of the low density of population, the fact that so much production is for subsistence only and the high cost of fertilizers in relation to the price of agricultural products. Although the use of fertilizers is gradually increasing, only in the Union of South Africa, the Federation of Rhodesia and Nyasaland, and in Kenya are any appreciable amounts yet applied.

Supplies of fertilizer are highly localized. Phosphate rock deposits have been developed in the northern Transvaal and aluminiumcalcium phosphate is being mined in Senegal. Calcium phosphate is also mined in Senegal, as well as in French Togoland and in French Equatorial Africa, while other deposits, largely or totally underveloped, occur in French West Africa and Southern Rhodesia. In Kenya and Uganda rock phosphate is processed into soda phosphate and a pilot plant in Uganda produces high-grade apatite containing 41 percent P2O5. At present no deposits of potassium are exploited, although a large layer of potassium salts has recently been discovered near Pointe-Noire in French Equatorial Africa. Only in the Union of South Africa is there any manufacture of nitrogen fertilizers (about 10,000 tons nitrogen), but the development of large-scale hydroelectric projects may be expected to provide for their production in other parts of the region.

Broadly speaking, phosphorus is the basis for improved agricultural production over the whole region, particularly for annual or short-lived crops. When the need for phosphorus is satisfied, nitrogen must be supplied in large quantities, especially for certain crops such as sugar cane, cotton, maize, groundnuts, and bananas. The addition of potassium gives increased yields of a number of crops such as tobacco, maize, wheat, coconut palm, bananas, and cassava, especially on certain soils, and it is possible that with an increased use of phosphorus and nitrogen, more potassium will be needed.

In addition to these major<sup>33</sup> elements, there is evidence that deficiencies of secondary elements (calcium, magnesium, sulphur) and of micronutrient elements (iron, zinc, manganese, copper, boron, and molybdenum) are also lowering crop yields. Research on secondary and micronutrient element deficiencies has been extensively carried out in the Union of South Africa, where it has been shown that zinc de-

ficiency is very widespread for citrus, that applications of manganese, magnesium, zinc, copper, and iron are needed for optimum production of deciduous fruits in many areas and that manganese deficiency is a widespread limitation for maize and other cereals. Work on secondary elements and micronutrients is also being carried out in many other territories on a variety of crops. Zinc deficiencies appear to be the most widespread, having been observed in the Federation of Rhodesia and Nyasaland, the French Cameroons, French Equatorial Africa, French West Africa, Gambia, Gliana, Kenya, Swaziland, Tanganyika, Uganda, and Zanzibar, chiefly with citrus but also with deciduous fruits, oil palm, pineapples, bananas, and groundnuts. Magnesium deficiencies also occur widely and are no doubt responsible for low yields in many places, having been observed in Basutoland with maize, in French Equatorial and French West Africa with oil palm, citrus, bananas, and groundnuts, in Gambia with a variety of crops, in Kenya and the Federation of Rhodesia and Nyasaland with deciduous fruits, in Swaziland with maize and tung, in Tanganyika with tomatoes and in Zanzibar with cacao. Important deficiencies of other secondary and micronutrient elements have also been recorded with a variety of crops.

Another factor which may have wide significance has emerged from comprehensive experiments with coffee conducted at the East African Agriculture and Forestry Research Organization. They have shown that mulches are far more important in raising coffee yields by improving the soil/water regime than the application of plant nutrients. The correction of these nutrient deficiencies did not by itself make for a sustained high level of production.

# Farm Implements and Machinery

Crop production is essentially based on manual labor in most parts of Africa South of the Sahara and crops are planted rather than sown. Associations of different crops frequently occupy the same field plots, thus favoring cultivation practices which are more a form of gardening than field cropping. Cultivation in forest areas under the shadow protection of other vegetation and with natural mulch developed particularly as a woman's task in some areas and the plow and animal draft power have not been used.

This situation is changing, however, and the

<sup>&</sup>lt;sup>33</sup> Elements essential to plant growth have been divided for convenience into major, secondary, and micronutrient or trace. This subdivision refers merely to the relative quantities of the nutrient elements taken up by plants and not to their relative importance, all of them being essential.

introduction of suitable types of farm tools and machinery is essential for the expansion of the cultivated area and an intensification of production. In forest regions, planting, hoeing and inter-cultivating will probably remain the backbone of crop production. Programs of improvement in these areas should concentrate on better hand-operated implements and the introduction of single-animal draft and harness with the appropriate tillage, planting and intercultivating implements.

In many parts of the region power mechanization is rapidly increasing, although it still touches only a small fraction of the African farmers and is mainly confined to export crops. As elsewhere the number of tractors is increasing faster than the supporting services of operation, maintenance and repair and, consequently, many difficulties arise. In other regions experience has shown that large-scale mechanization programs in order to be effective require the simultaneous provision of in-service training and the organizing of maintenance and supply services. In Africa South of the Sahara a number of large-scale schemes for mechanized production have failed in the postwar period. As in all tropical regions, continuing research is needed to adapt to local conditions types of machinery which have often been evolved under temperate climates. Although many such trials have been carried out in the region, there is a wide field for such research, particularly on the effect of mechanized cultivation on soil structure and fertility, and close co-operation is needed between machinery stations and research stations working on soils.

The introduction of farm machinery among peasant farmers of low productivity and without access to credit facilities depends in the first instance on government aid. There are considerable possibilities for the establishment of farm-machinery pools and government hire services, as are already being developed in a number of areas.

# Forestry Production

The paramount importance of adequate forest cover for the conservation of basic soil and water resources has already been emphasized in discussing land utilization. One of the chief reasons for the ruthlessness of forest destruction is that the tropical forest consists largely of species of little or no known commercial value, so that its clearance for crop production is an

economic necessity which can be reduced only by enhancing the economic value of the forest itself. In order to attain this objective, a great deal of attention is being devoted to improvement of the silvicultural, logging and wood utilization aspects of tropical forestry.

Current techniques for improvement in silviculture fall into four main groups: (i) the removal of the old stand by stages and its replacement by a more or less even-aged crop recruited from advance growth or from induced natural regeneration; (ii) the inducement of desirable regeneration by selective fellings; (iii) the enrichment of the stand by the artificial introduction of valuable species, including exotics; and (iv) clearance and plantation, where problems of cost of clearing can be solved in ways that simultaneously mitigate shortage of agricultural land and enhance local food crop production. The increased use of contact arboricides is greatly assisting the work of the forester in this field, but the silviculture of the tropical rain forest is still largely of an experimental nature and has benefited little from the traditional practices of the temperate regions.

Technical progress in logging and in timber utilization has been given particular attention, as a result of the development of export markets for tropical hardoods, and substantial capital has been invested in their development along modern lines. The three fields of research in silviculture, logging, and timber utilization are closely interdependent, but improvement in the utilization of an increasing number of species of local tropical woods must necessarily come first. Progress has been made possible by the development of markets for fibre and particle board and for pulp and paper, which opens up utilization possibilities for a wide range of timber and offers opportunities for the maximum use of the produce of the forest.

Local industrial development based upon tropical woods is, however, still in its infancy. The further development of forest industries is particularly dependent on investment in transport and other basic services, while another stumbling block is the shortage of adequately trained personnel at all levels.

# Crop Production

After a brief account of some of the principal plant pests and diseases in the region, short notes follow on the work that has been done, mainly in plant breeding and improved practices, on some of the more important crops.

Plant Protection. Many plant pests and diseases still take a very heavy toll in the region, especially where extensive areas of cash crops have been established under virtual monoculture. A few examples are quoted below.

Locust infestation covers a larger area than any other insect pest in the region. Although effective protection has been established by international action against the Red and African Migratory Locusts in Central and Southern Africa, the Desert Locust, which inhabits the arid and semiarid zones, causes serious damage by periodic outbreaks on a large scale and extending for vast distances. The control of the Desert Locust depends in the first instauce on international action, in which FAO has taken the initiative. Knowledge of the ecology of the species is, however, incomplete and FAO is initiating a survey to determine the requirement for outbreaks in order to provide the basis for the scientific prevention of plagues, rather than large-scale defensive measures after outbreaks have occurred.

Attacks by weaver birds on grain crops also cause severe losses, especially in East and Central Africa, and no effective control measures have yet been devised.

A recent study<sup>34</sup> assembles some striking estimates of the damage caused by plant diseases in certain areas. In 1947/48 about 46 million cacao trees were estimated to be affected by Swollen Shoot disease in Ghana, where the annual loss from this disease was believed to be about 80,000 tons, while Black Pod was estimated to reduce yields by another 25-40,000 tons. These losses were more than 10 percent of the present world crop. The cutting-out campaign, the only possible control measure against Swollen Shoot, caused further dislocation. In the last few years, however, good progress has been made in West Africa in the control of Black Pod and Capsid by spraying.

It was also estimated that in 1948 at least half the mature clove trees on Zanzibar Island had died from Sudden Death disease during the previous 10-12 years. Diseases and pests of cotton have caused severe losses in Uganda and give rise to serious difficulties in its establishment in some other areas.

With many plant diseases the main line of attack is through the development of disease-

resistant crop varieties. Work in this field will be dealt with in the following notes on individual crops.

Local Food Crops. In spite of the concentration of research and advisory services on export crops, there has been some increase since the war in breeding work on the local food crops which form the greater part of the agricultural production of the region.

Millets and sorghums are of particular importance in large areas of Africa South of the Sahara, as owing to their short growing season and low water requirements they are virtually the only crop that can be grown in the semiarid areas, where food supplies depend on a rapid utilization of available water following the brief annual rains. Work is being done on the production of varieties with even shorter growing seasons, and lower water requirements and comprehensive breeding work has been started in East Africa to produce varieties with good yields combined with good storing qualities. There is scope for the further development of these crops in some areas where maize is at present grown under marginal conditions.

Generally speaking, more research and experimental work has been done on maize and rice than on the other local food crops. Maize yields are generally very low and there is great scope for improvement through the introduction of better varieties, notably hybrids, though work in Kenya has indicated that caution is needed in adopting them. The introduction of hybrid maize in Rhodesia and the Union of South Africa has already had a notable effect on production; in 1953/54 in Southern Rhodesia, for example, the average yield of European crops of hybrid maize was 8.9 bags per acre, compared with 5.2 bags for open-pollinated varieties. Maize Rust (Puccinia polysora) has spread very rapidly since its introduction in 1949 and caused substantial losses, particularly in Dahomey, French Togoland, Ghana, and Nigeria, but many resistant varieties have recently been developed.

Although rice yields in the region are usually low, potential levels, both for mechanized and nonmechanized production, are high, especially on irrigated land in rotation with cash crops such as cotton. The introduction of irrigation in connection with the development of large river basins should provide scope for an extension of irrigated rice production, while rice is also a suitable crop for the low-lying swamp

<sup>&</sup>lt;sup>34</sup> G. Watts Padwick, Losses Caused by Plant Diseases in the Colonies, Phytopathological Papers, No. 1, Commonwealth Mycological Institute, September 1956.

land along the sea coast, of which considerable areas exist in West Africa. In some territories, such as Liberia and Sierra Leone, most of the rice is of the upland variety which contributes to soil erosion and the destruction of forest resources, and efforts are being made to develop swamp rice production.

Rust has caused considerable difficulties in wheat production in some parts of the region. Successful cultivation is mainly confined to highland areas in Kenya and some other territories and to those parts of South Africa where rainfall is adequate (chiefly the winter rainfall area). Research is proceeding in Kenya into Rust-resistant varieties, but because of the continuous mutation of the pathogen no permanently resistant strains have yet been found.

Cassava furnishes heavy yields even on rather poor soils and can be easily propagated by cuttings. Since it can be left in the ground for two or three years and is immune from most pests and diseases, it is particularly important as a famine reserve. Selection work in East Africa has resulted in the development of varieties and strains resistant, and in some cases immune, to Mosaic disease. In the Ivory Coast an excellent collection of some 130 varieties has been formed and a hybridization program started.

Pulses can make an important contribution to protein intake. Some are grown throughout the region and they are also being introduced into crop rotations, but little has been done to improve methods of cultivation or the species or varieties which are grown. In order to improve diets, there is also a great need to develop the production of green-leaf vegetables, legumes and some roots and fruit-vegetables, which are especially rich in certain vitamins. Many of these thrive in tropical regions, but at present they are mainly produced near large consuming centers.

Export Crops. Cotton, groundnuts, and to-bacco are the most important annual crops that are mainly or partly exported. Most of the cotton comes from the tropical belt and is of the American upland type (Cossypium hirsutum). There are great potentialities for expansion in the tropical belt, where large areas have suitable soil and climatic conditions, provided pests and diseases can be economically controlled. A considerable amount of research has been carried out, concentrated on the breeding of high-yielding and disease-resistant varieties, well

adapted to the different producing areas, which vary greatly in ecological conditions. Special attention has also been given to problems of soil fertility and rotations, but the average yields of the smallholders who produce most of the crop continue to be very low in most areas.

Groundants also are almost entirely cultivated by small farmers. They are an important food crop, as well as being exported in large quantities from some territories. Attempts to organize large-scale mechanized production have not proved generally successful. Extensive monoculture of groundants has led to serious erosion problems in Senegal and experimental work in that territory has therefore concentrated on cultivation methods and the development of rotations with millet.

Tobacco is mainly important as a cash crop on European estates in Central Africa, but small quantities are widely grown by African farmers for local consumption. Southern Rhodesia in particular has carried out considerable research and has a special extension service for tobacco growers.

Most of the important cash crops of the region are tree crops, however, produced in the areas of abundant rainfall. Some of these have lent themselves especially to plantation-scale production in certain areas; they also have a stabilizing effect on the holding of the small producer and make an important contribution to erosion control.

Africa is the native home of all commercial species of coffee and offers favorable soil and elimatic conditions for the production of both arabica and robusta types, the latter now accounting for about three quarters of the region's production, while other species, such as Coffea liberica and Coffea dewevrei, var. excelsa, are also grown to a limited extent. Much valuable research has been conducted with regard to breeding, fertilizing, shade, irrigation, insect pests and diseases and also processing, but many problems still remain. Production has recently increased very rapidly and there are great possibilities for further expansion, partienlarly of robusta, as large tracts of virgin land are still available for new plantings and there is also scope for increasing the yields of existing plantations.

In sharp contrast to coffee, the production of caeao in tropical Africa has not increased significantly during the last 20 years in spite of a considerable expansion of the planted area. This is due mainly to Swollen Shoot disease,

particularly in Ghana, to other diseases and insect pests and also to the ageing of many plantations. Excellent research work has been carried out and considerable progress has been made, particularly in the production of improved varieties through the use of new breeding material imported from the Western Hemisphere and in the control of insect pests and diseases. As with coffee, there are substantial possibilities for the expansion of production, as large areas offer favorable soil and climatic conditions. At the same time, considerable efforts are needed to rehabilitate old plantations.

The oil palm is native to extensive areas in tropical West Africa and most of the oil palm products produced in the region are derived from wild stands, to the gradual improvement of which much attention has been devoted. Due to pioneer work in the Belgian Congo and later in the Ivory Coast and Nigeria, valuable planting material obtained through artificial pollination of selected palms (particularly by crossing dura × pisifera), yielding fruit with higher oil content, is now available in increasing quantities.

Considering the large areas of Africa South of the Sahara in which ecological conditions are favorable, rubber has not had the expansion that might be expected. Much research has been done in Liberia by the Firestone Company on control measures for various diseases attacking seedlings (root rot, Helminthosporium, etc.). A special breeding project aims at producing strains resistant to the South American leaf blight (Dothidella ulei), in view of the danger of the introduction of this disease, while some very high-yielding varieties have also been developed.

Good progress in banana cultivation practices, fertilizing, pest and disease control, and in the packing and shipping of the fruit has been made during recent years in some areas. There could be considerable expansion of commercial plantings, particularly in the humid forest zone of West and Central Africa, where very large areas with suitable climate and soil are available.

Citrus fruit can be grown throughout tropical Africa where moisture conditions are favorable, but the major centers of commercial production are at present located in the more marginal areas of the tropics and particularly in the regions of subtropical climate, often near the climatic limits of the species, as in Southern Africa. While tangerines, grapefruit, and pomelos can give rather good results in West and Central

Africa, sweet oranges do not generally reach commercial standards in tropical humid areas, especially as regards color, sugar and acid content.

Many other fruits, such as pineapple, avocado, mango, papaw, guava, etc., can be grown in most parts of the humid forest regions. Most of the existing plantations are still managed in a very primitive way and the introduction of improved varieties and of better cultural techniques could considerably increase production.

#### Livestock

More than half the land surface of the African continent earries a type of natural vegetation of which grass is an essential feature and the dominant component of the climax vegetation. Under present circumstances, livestock production is the only means of utilizing the extensive semiarid areas of the region. Since most of the domestic livestock is maintained under range conditions, the distribution of the main species contributing to the grass cover is a matter of considerable economic importance in determining optimal systems for range management. The FAO map, The Grass Cover of Africa, is intended to be a contribution to this basic subject. Following the classification of the grass cover into 16 major floristic types, it is hoped that the knowledge already available of the management of the types of grass cover occurring in Southern Rhodesia, the Union of South Africa, Kenya, and certain other territories may be extended to all the 16 major types and their many subtypes.

The main factors in grassland management in Africa are, of course, duration of the grazing season, intensity of stocking, controlled and rotational grazing, use of burning in relation to management and, in a few cases, the relation between the rangeland and adjacent limited areas of cropland on which cultivated fodder crops may be grown. The cultivation of sown pastures and fodder crops is practiced only in limited parts of the region where climatic conditions are favorable or irrigation water is available.

Livestock is kept throughout the region, but its range is interrupted by areas of tsetse infestation and by the zones of humid tropical forests, although in these some specially adapted breeds of low productivity have been evolved in parts of West Africa. There is a sharp distinction between the highly developed stock farming in areas of European settlement, especially in the

Union of South Africa, East Africa, and parts of the Belgian Congo, and the animal husbandry of the indigenous population. Europeanowned livestock provides a disproportionately large part of the output of meat and other livestock products, because of its superior productivity and because in many areas the African tends to regard cattle as a store of wealth rather than a productive unit.

The first European farming settlements were largely based on livestock. The great progress made over the past 50 years in European animal husbandry has been made possible largely by veterinary research and animal disease control, established in response to a disastrous outbreak of rinderpest at the turn of the century. The Veterinary Research Institute at Onderstepoort in the Union of South Africa was a pioneer in this field, and afterwards laboratories were established throughout the region. Livestock owners were faced not only with the common diseases of Europe but many others whose cause and treatment were unknown and which resulted in great losses for many years until suitable methods of control were developed. Efficient vaccines now exist for rinderpest, bovine pleuro-pneumonia, anthrax, black quarter, bluetongue, horse sickness, anaplasmosis, enterotoxemia in sheep, Rift Valley fever, rabies, heartwater, Newcastle disease and fowl pox. Widespread vaccination has very largely brought rinderpest under control, though local outbreaks still occur. There are still great disease hazards, however, notably those systemic infections transmitted by arthropod intermediate hosts, although latterly some of the protozoal diseases have proved vulnerable to chemotherapy. Tick-borne diseases are being brought under control by regular dipping or spraying, which is compulsory in some territories. Attention is now being directed more to the wasting diseases such as tuberculosis, to infertility diseases, mastitis and the whole field of parasitic infestations. Among the diseases for which control measures have not yet been evolved may be listed sweating sickness in calves, lumpyskin disease in cattle and virus abortion in sheep.

Apart from the availability of water supplies, however, the greatest single factor affecting livestock is the tsetse fly, which is the vector of the organism causing sleeping sickness in man and "nagana" or trypanosomiasis in cattle. The area of fly infestation runs roughly in a broad belt across the middle of Africa,

depending on certain densities of vegetation, and excludes cattle from approximately half of the region. Over the last 30 years there have been important extensions of infestation, especially in Central Africa. In spite of much research, there is still no generally effective control method; bush clearance, game extermination and aerial spraying all have their advocates. Pro-salt, giving temporary immunity, has been found especially useful for the protection of cattle moving along stock routes that lie across fly belts. The main European livestock areas are marginal to this infestation but contain some areas which must be kept constantly under control to avoid its spread.

European livestock farming has developed on the basis of relatively large units, which in certain areas are now fenced to allow for proper range management. Water supplies have been generally improved and particularly in the last ten years attention has been directed to soil conservation measures. There is a general tendency towards mixed farming, where soil and rainfall conditions are suitable, stimulated in part by research on fodder crop production. Pasture research is also being pursued throughout the region and has assisted improvement of pastures and the carrying capacity of the range, especially in the Union of South Africa.

Much experience in breeding and upgrading has been accumulated, mainly on the basis of individual experiment. Foundation stock of a wide range of livestock has been imported, to establish both pure-bred herds and herds based on indigenous breeds35 upgraded by crossing with sires of imported stock. Areas adapted for the successful raising of exotic breeds are limited to temperate and highland zones and there is now general agreement that for the more severe conditions of open range a policy of selection and breeding improved indigenous stock should be followed. In many areas improved herds, based on native or crossbred stock, well adapted to local conditions, have now been established. Economic production under these rigorous conditions requires further study from the point of view of energetics, Artificial insemination has made however. some progress among Kenya dairy herds, but elsewhere tropical conditions and communications often limit its application.

<sup>&</sup>lt;sup>35</sup> For an account of these breeds, see *Types and Breeds of African Cattle*, FAO Agricultural Study No. 37, Rome, 1957.

European livestock husbandry is mainly directed towards beef production, though the dairy industry is also expanding in some areas, as marketing difficulties are overcome. While sheep and goats are kept by African herdsmen over the whole Sahelian region and in many arid and semiarid areas of East Africa, the most notable development has been in wool production by the European farmers in the Union of South Africa.

Turning to African cattle husbandry, a broad division is found throughout the region between nomadic or seminomadic cattle peoples and cultivators who are also livestock owners. Nomadism in its purest form is seen among the Fulani of West Africa or the Masai of East Africa, who maintain large herds of cattle whose productivity is greatly limited by considerations of prestige and religious observance. Apart from actual nomadism, transhumance is also extensively practiced and large numbers of cattle migrate annually towards Lake Chad, for example, during the dry season. The nomads occupy areas of lower rainfall and, under present limitations of water supply and livestock management, theirs is probably the only method of utilizing these areas until fundamental changes are made which would permit more efficient methods.

Nomad (and transhumance) livestock owners are usually expert graziers and have evolved a system of management well adapted to difficult conditions. The improved control of animal diseases, discussed above, and greater political stability, following European occupation, have, however, permitted large increases in cattle numbers, while feeding, management, and breeding techniques have not kept pace with the improvements in the disease position. While there is probably no severe overstocking in the open savannah and semiarid regions, serious mismanagement is occurring locally in some territories. In Southern Rhodesia, for example, mismanagement has led to such serious erosion that legal measures have been instituted to provide for resettlement and reallocation of grazing grounds.

The improvement of African livestock production depends as much on economic incentives as on the better utilization of natural resources. Improved management practices, such as enclosure, culling and castration, at present run contrary to established methods, while the idea of breeding for sale is still quite foreign to many livestock owners, particularly the

nomads. Education for the nomad presents considerable difficulties and in many ways these societies are still virtually closed to outside influence. Nevertheless, they have inherited valuable stores of skill and experience, together with a genuine feeling for the welfare of their livestock. In order to increase productivity, nomadism and transhumance must be gradually transformed into a form of ranching by the development of water supplies and the establishment of rotational grazing. While the carrying capacity of the range can certainly be increased in this way, the most urgent need, however, is not to increase the total head of stock but to render it considerably more productive.

The integration of livestock with African settled farming is making only slow progress in most parts of the region, but it is essential for improvements in cultural practices and the maintenance of fertility, while increased agricultural production depends in some measure on the adoption of animal-drawn implements. In many areas an initial stimulus has been given by the allocation of animals to selected farmers by the government. While these are generally for draft and eventual slaughtering for beef, small-scale dairy production, based on dualpurpose breeds, is also on the increase. The development of a successful type of mixed farming could have an important effect on the nutrition of peasant farmers. It also provides a point at which the as yet separate economies of the nomad and the cultivator may be joined to their mutual advantage, the latter stocking his holding with cattle purchased from the former or purchasing store cattle from him for a limited fattening period prior to slaughter.

# Fisheries

The rapid increase in fish production since the war has been associated with technical achievements in many different fields of catching and processing. There is a sharp distinction, however, between the industries of Angola, the Union of South Africa, and South West Africa and those of the rest of the region. In the former group, development has been based on the techniques of large-scale production and the factory organization associated with reduction,

<sup>&</sup>lt;sup>36</sup>The processing of fishery products is dealt with here, together with technical progress in production. For agricultural products, improvements in processing are discussed under marketing, as they are closely related to the activities of the various marketing organizations in the region.

canning, and freezing. In the latter, while there has been some conspicuous development of modern fishing methods and processing installations, associated with specialized trade in certain products, the main technical problems are those concerned with the improvement of numerous small individual undertakings in fishing, fish culture and a cottage-industry scale of processing.

In Angola, the Union of South Africa, and South West Africa, the postwar composition of the fishing fleets shows an increasing proportion of larger-powered craft engaged in mediumrange deep-water trawling and seining. In the postwar period some 500 powered craft have been introduced in Angola, while in the Union of South Africa and South West Africa the number of trawlers and seiners of 50-100 feet and over has increased by at least 200. Corresponding improvements in fishing gears and methods have accompanied this expansion.

In the rest of the region improvement rests largely on better fishing methods in coastal and inland fisheries and the extension of operations to exploit resources further offshore. Improved techniques in inland fisheries have been demonstrated with considerable success in the Belgian Congo, Uganda, and some other areas through the promotion of pond culture, the strikingly effective use of nylon gillnets, the mechanization of small craft and the introduction of modern trawlers in lake fisheries. In the marine fisheries, the mechanization of local craft and the introduction of superior craft in coastal waters has already made good progress in Ghana and Senegal, while the use of larger craft, e.g., trawlers, has been successful in French Equatorial Africa, French West Africa, Liberia, and Sierra Leone.

In processing, the most outstanding advances have been in the development of fish meal manufacture and canning. The number of reduction plants and canneries has increased steadily in Angola, the Union of South Africa, and South West Africa, and modernization and refinements of processing continue. The large number of small fish-meal plants in Angola are to be gradually replaced by fewer plants of larger capacity. On a lesser scale, canneries have been established in French Equatorial Africa, French West Africa, and Sierra Leone. Freezing is of very small importance as yet and is confined to specialized products for export and for very limited local markets. It has been developed principally in the Union of South Africa, but

there are a number of small ventures elsewhere with good commercial prospects.

There has been little development so far of local research organization in support of these activities, with the conspicuous exception of the Union of South Africa. In that country the Fishery Industry Research Institute has been particularly active and was one of the first in the world to produce edible fish flour with a high protein content. There has been little technical change in the processing of dried fish products and, in spite of their region-wide importance, there has been little systematic research in this field. Considerable wastage still occurs, due particularly to infestation but also to inefficiencies in preparation, handling, storage, and transport. The whole problem of the treatment of fish products under tropical conditions is one of great complexity involving considerations of taste, appearance, and cost, the substitution of mechanical for natural processes, the diversification of products, standardization and control measures, etc.

Technical progress in fisheries has also been assisted by the growth of educational and research services in closely related fields, such as oceanography, biology, food technology, engineering, naval architecture, navigation, etc.

## The Organization of Agricultural Research

Having outlined some of the main results of agricultural research in the preceding pages, it remains to discuss briefly the organization of research services and, in particular, their postwar growth. There has been a rapid expansion of research facilities in the postwar years, but a wide field still remains to be covered, especially in respect of local food crops, and both facilities and personnel are often inadequate.

There is a tendency to centralize the organization of basic research on problems of wide application in the metropolitan countries and also on an interterritorial basis. The British East African territories, the Federation of Rhodesia and Nyasaland, and Nigeria, for example, have since the war established central bodies responsible for basic agricultural research. Interterritorial institutes working on individual crops or groups of crops are also a common feature in the region. In the British territories the Empire Cotton Growing Corporation, established in 1921, was the earliest of these; it opened a new main research station in Uganda in 1950.

Since the war interterritorial research institutes have been set up in British West Africa for cacao, oil palm, and rice, as well as for fisheries, trypanosomiasis, and social and economic research. In the French territories, the main interterritorial institutes are the Institut de recherches sur les huiles et oléagineux (IRHO), established in 1942, and the Institut de recherches du coton et des textiles exotiques (IRCT), which dates from 1946. In the Portuguese territories the various juntas established for the main export crops conduct research at a number of stations and substations.

In the Belgian Congo and Ruanda-Urundi agricultural research is carried out by the central Institut national pour l'étude agronomique du Congo belge (INEAC), which was set up in 1933. There is a network of Stations d'adaptation locale, each connected with a substation of INEAC and carrying out trials in local conditions, the synthesis of which is performed by the institute. By 1959 there will be 43 such stations concerned with variety trials and multiplication, experiments in fertilizer requirements, mechanization, livestock breeding, etc., directly aimed at their introduction among African farmers.

In most other territories the departments of agriculture also carry out agricultural research, normally more of an applied nature. Generally there is a number of substations in the different agricultural zones which aim at gaining experience with new practices under local conditions, while departments of agriculture also operate some stations concerned with individual crops. Most of these departmental research services have been greatly expanded since the war. A particularly fully developed organization is that in the Union of South Africa, where research has recently been decentralized into six regions and there are also specialized statious, of worldwide reputation, for veterinary, citrus, deciduous fruit, and tobacco research. In Liberia the Department of Agriculture's first research station was opened in 1953, in conjunction with the United States International Co-operation Administration.

In addition, some agricultural research is also carried out at universities with agricultural faculties, including those in the Belgian Congo, the Federation of Rhodesia and Nyasaland, French West Africa, Ghana, Nigeria, Uganda, and the Union of South Africa. Several of these universities and faculties date from the postwar period.

An important postwar influence has been a

trend towards greater regional co-operation in research. This has been mainly under the aegis of the Commission for Technical Co-operation in Africa South of the Sahara (CCTA) and its Scientific Council (CSA), through such bodies as the Inter-African Bureau for Soils and Rural Economy (BIS), the Inter-African Bureau for Epizootic Diseases (IBED), etc., which provide for the exchange of information and the organization of technical meetings. It is probable that international co-operation in the exchange of information and the establishment of priorities for research could usefully be extended still further. Much data of value, gathered in the course of routine duties by local technicians still remains unpublished and thus unavailable to workers in other areas.

## Training and Education

Research and other government services for farmers are severely hampered by the lack of trained personnel. Since the war there has been some increase in local training facilities for agricultural technicians at the university level and for auxiliary personnel for the staffing of government services. Some schools and organized courses for the training of primary agricultural producers have also been established.

University colleges with agricultural faculties offering training up to the degree level are listed above. Normally they offer a general course in agriculture without the possibility of specialization. Their annual output of graduates is likely to be very small for some time to come, partly because of the limited numbers graduating from secondary schools but also because of the lack of appreciation for a career in agriculture.

Secondary agricultural schools training auxiliary personnel for junior positions in government services for agriculture now exist in nearly every territory. They generally offer classroom instruction and practical work on a school farm, sometimes completed or preceded by an apprenticeship period at one or more agricultural stations. Only a very limited number of these courses include specialized instruction in extension methods. The duration of training varies from about six months to three years and the general education required for enrolment from six to nine years. The annual enrolment depends on the personnel requirements of the departments of agriculture.

In some territories courses are available at

the university level for future farmers, though these are mainly for Europeans in East and Central Africa. Farm training institutes and agricultural schools have also been set up in many territories to train farmers, often in connection with "Master Farmer" or similar schemes. They generally offer up to two years' training and emphasize practical work. Only a limited number have been successful, because too often the social and land tenure structure prevents the graduates from satisfactorily applying the knowledge they have gained. The percentage of future primary agricultural producers that benefit from this training is also very small. It would seem of considerable importance to investigate the possibilities of introducing systems of vocational teaching in agriculture which are better adapted to the needs and the social pattern of the peasant community, in order to reach a wider range of the rural population. Some elementary and secondary schools also include courses in rural science and many elementary schools have school garden programs.

In Africa South of the Sahara the education of women is an additional special problem, the solution of which is basic to improvements in levels of living. Departments of agriculture should be concerned in this, because of the importance of women as agricultural producers, while nutrition education and home economics should also be included in training programs.

Improved training facilities are also badly needed in forestry for personnel at all levels, from the forest worker, who at present is generally an unskilled, temporary laborer with no incentive for seeking regular employment in forestry, to the professional forest officer with university training. Liberia has recently developed a forestry faculty at university level and in other areas increasing numbers of students are being sent to universities abroad. The demand for a vast force of foresters, rangers, guards, and workers, with essentially practical knowledge of forest protection, regeneration, maintenance, and the use of modern equipment. is to some extent being satisfied by an increase in local training centers.

#### **Extension Services**

The agricultural departments are generally responsible for extension work, which is carried out by their field services, consisting of a network of agricultural stations with agricultural

officers in charge. These officers are assisted by agricultural assistants and overseers, covering the territory more or less densely. The agricultural stations and substations are used for the multiplication of seeds, livestock breeding, and local experimentation, Many of the agricultural assistants are also in charge of nurseries from which the African farmer may obtain improved planting material free of charge or by paying a token price; this activity forms an important part of farm improvement schemes in many territories.

Field services of the agricultural departments in many territories now employ substantial staff, with varying levels of technical training. A considerable proportion of the personnel is, however, often absorbed by duties such as the multiplication and distribution of seed and seedlings, livestock regulatory duties, the collection of statistical data, the implementation of settlement schemes, or the actual establishment and sometimes maintenance during the early years of tree crop plantations. The personnel available for actual agricultural extension work among the African cultivators is therefore limit-The number of farm families served by one local agent performing extension duties varies from 2,500 to 10,000 or more. This degree of coverage is unlikely to have much effect in areas where the high percentage of illiteracy and also the low density of population render mass methods less effective.

In some territories local agricultural officers and their assistants report directly to the local administrative officers instead of to the agricultural department or university, which probably does not have a favorable influence on the effectiveness of extension work. In a few areas, such as the Western Region of Nigeria. an effort is now being made to establish an agricultural extension service with purely educational functions and a density of one field agent to about 1,000 farm families. Extension work is also carried out in a few territories by some of the larger research institutes. Community development services have been established in some areas, though this term may cover projects with widely different terms of reference, not all of them including agricultural projects. Too often there is also a lack of co-ordination between community development services and the extension work of agricultural departments. Community development programs offer particularly effective channels for the spread of home economics into rural areas,

including education in family nutrition, child care and training, health and sanitation, and the general improvement of living conditions.

The training of extension personnel is generally concentrated on agricultural subject matter and only a few institutes offer some instruction in actual extension methods. Attempts to teach the African farmer improved methods are complicated by traditional attitudes, social custom and the nature of tribal organization, which create a resistance to change. It is evident that extension methods are bound to fail if they do not take these factors into account and special training is necessary for this purpose.

The application by the African farmer of the results of research has lagged far behind the progress of the research itself and this gap may well become wider unless greater emphasis is placed on extension work in the future. The field services of agricultural departments have been greatly expanded in the postwar period, but a further strengthening of these services and of their extension activities seems essential if the benefits are to be reaped of the research work which has been carried out.

# THE CHANGING INSTITUTIONAL FRAMEWORK

In putting into practice the technical improvements outlined above many obstacles and deficiencies have to be faced in the institutional framework of agriculture. The following section of this chapter discusses the main postwar progress that has occurred in the adjustment of land tenure systems, in the supply of agricultural credit, in the organization of co-operatives and in marketing, including the many schemes aiming at the reduction of fluctuations in producer prices.

#### Land Tenure

Traditional systems of tribal or lineage ownership of land still persist in some measure in all parts of the region, though in many areas they have been greatly modified as a result of social and economic pressures. The essential feature of these systems is that membership of the tribe or group confers rights of cultivation and the right to the fruits of cultivation, while ownership consists of occupation by the group rather than title to specific boundaries. Such systems depend on a static society and the use of land for subsistence, any surplus production being for the common use in ceremonies and feasts or to support the chief and elders. They are also often obstacles to the introduction of soil conservation measures and other improved practices.

In areas where production for the market has been highly developed there has been strong economic pressure for changes in these systems. Social influences have included the spread of education and increased mobility of the population, the latter creating classes of strangers desiring access to tribal land but with no ties of allegiance to the chief. Where such developments are occurring, customary systems of land tenure are in a transitional stage and are generally tending to evolve towards an individualization of rights.

Changes have usually been in response to these social and economic pressures and much more rarely as a result of deliberate official policy. Governments have generally attempted to assist and systematize such spontaneous changes rather than to initiate them. In the past, attempts by governments to regulate land holding systems have been a frequent cause of friction. In parts of East, Central, and Southern Africa an additional pressure on traditional tenure systems has been caused by European settlement.

Traditional systems of land tenure are a highly specialized and complex subject of study, to which considerable attention has been devoted in many areas. In the present review, there is space only for a brief examination of a few examples of the main types of change that are taking place in these systems. <sup>37</sup>

Southern Rhodesia and the Union of South Africa provide important examples of the Native Reserve system. In Southern Rhodesia some 49 percent of the total land area is alienated, while much of the remainder is administered as an African Reserve under the Native Land Husbandry Act of 1951. This is primarily a resettlement scheme to rehabilitate and protect land from misuse and erosion and improve standards of production, but it also aims at individualizing customary tenures by making provision for the registration of the land rights of individual owners. Control is maintained over

<sup>&</sup>lt;sup>37</sup> For a recent full account of land policies and of modifications in indigenous tenures, see Lord Hailey, *An African Survey*, *Revised 1956*, London, 1957, pp. 685-815.

fragmentation and alienation and the aggregation of uneconomic holdings into larger units is encouraged. No sale is allowed which would reduce the holding below a standard area and purchase may be made only by those who already possess farming rights. No individual may acquire a holding larger than three times the standard area.

In the Union of South Africa about 89 percent of the land is alienated. A sharp division exists between European settlement areas and the Native Reserves, neither party being able to hold land in area delimited for the other. Most of the land in the Native Reserves is still held under customary tenure. The Tomlinson Commission has recently made a thorough investigation of the situation in the Native Reserves and among its many recommendations was a proposal that land should be gradually sold to individual farmers, to whom title deeds would be issued, "subject to the condition that such lands and rights are used to good purpose." 38

Land tenure problems have received considerable emphasis in East Africa, particularly through the investigations of the recent Royal Commission. This Commission also recommended that, with certain safeguards, policy "should aim at the individualization of land ownership and mobility in the transfer of land which, without ignoring existing property rights, will enable access to land for economic use." 39

In Kenya there are clearly demarcated European areas and African Reserves. The evolution of many tribes is towards individual tenure. and traditional systems are already much weakened. Tribal tenure of restricted areas with especially favorable climatic conditions has also led to much fragmentation of holdings with increasing pressure of population. Under the Swynnerton Plan 40 extensive surveys and consolidation of fragmented holdings have been carried out, especially in the Kikuyu area. The aim is to establish economic farming units on a family basis with a registered title of ownership. owners being free to sell land (to other Africans) and to mortgage their holdings. Enclosure of arable and grazing ground is extending to other

tribes from the Kipsigi, a cattle tribe who in the past 30 years have evolved into settled farmers with enclosed fields.

Provision of individual title cannot be made effective without a land survey and the provision of machinery for title registration, as under the Swynnerton Plan. Such measures are particularly necessary in Tanganyika, where many different kinds of tenure exist and their evolution is by no means uniform. As a result of the development of coffee production among the Chagga in the Kilimanjaro district, individual property has developed side by side with the traditional systems and outright sale of land rights is practiced, though normally restricted to fellow tribesmen. There is a virtual absence of written records of African land transactions. Leasing of land is rare, though the lending of land for the production of annual crops occurs in some areas. Unofficial payment in respect of use of land by strangers is sometimes made but a formal landlord/tenant relation is found only on the large estates west of Lake Victoria.

In 1908, government action created the mailo system of land tenure in parts of Uganda, under which large areas were allotted to the King of Buganda and to chiefs in the belief that ancient rights and privileges were being confirmed in permanent form. In fact, these rights were thereby separated from the political functions of the then officeholders, on whom they were thus conferred in perpetuity, creating a landed aristocracy that did not exist before. The tenancy rights of the peasant holders are permanent and inheritable, so long as they are exercised, and the tenant can only be evicted by a court order, while rents are fixed by law in Buganda. Thus the rights of owners and tenants are firmly defined and established, but stresses are arising with the economic changes following the intensive development of eash crops. The progressive peasant is faced with difficulties, since if he wishes to develop his holding he cannot mortgage any part of it to obtain capital and, if he leaves, all his improvements, including his house, revert to the landlord, although his tree crops are subject to compensation. As a result of fixed tenures, few mailo estates are at the free disposal of their owners for improvement or sale. Fixed tenures also raise problems of soil fertility in an area which was formerly cultivated by extensive rotatory agriculture with long periods of bush-fallowing.

In West Africa the spread of tree crop pro-

<sup>&</sup>lt;sup>38</sup> Summary of the Report of the Commission for the Socio-Economic Development of the Bantu Areas within the Union of South Africa, U. G. 61/1955 Pretoria, 1955, p. 195.

<sup>&</sup>lt;sup>39</sup> East Africa Royal Commission 1953 1955 Report, Cmd. 9475, H. M. Stationery Office, London, 1955, p. 428.

p. 428.
 A Plan to Intensify the Development of African Agriculture in Kenya, Nairobi, 1954.

duction has caused changes in tenure systems. In Ghana the customary system, which was directed towards food production, has been profoundly modified or has even disappeared in some areas. There has been a great increase in commercial transactions in land in response to increasing land values of cacao farms and constant litigation occurs over the rights of owners and occupants and, especially, over boundaries and ownership. The remedy is probably in a universal system of registration, accompanied by a cadastral survey.

Similar economic changes have influenced customary tenure in French West Africa, though to a smaller extent. Two classes of rights are recognized: full ownership by immatriculation, which subjects property to French law, and the customary tenure systems. Immatriculation is a legal registration of title and official policy has been to encourage the development of individual ownership. At the same time customary rights in land are fully protected by a decree of 20 May 1955. The trend is towards the legalization of such transformations as occur, but there has been so far a more limited impact on traditional systems than in Ghana. The development of eash crops has provided an incentive towards individualization in French Gninea and the Ivory Coast, while in the groundnut-producing areas of Senegal a class of rentpaying tenants has arisen.

In the Belgian Congo emphasis is laid on improving the efficiency of African agriculture and increasing productivity, rather than on the establishment of individual proprietors, though policy is very flexible and the latter eventuality is not excluded. In the paysannats the social advantages of group land tenure are maintained, it being held that individual ownership would not give any greater security than the right of each member of the tribe to a piece of land according to his needs. This right is inalienable, so long as it is exercised, and the exploitation of such allocations of land is often entirely individual. There is thus a strengthening of the communal element and the traditional system is adapted towards a form of group production, which, however, requires close administrative and technical supervision.

Other forms of group production have also been tried, with varying success, in different parts of the region. An interesting example is provided by the "partnership schemes" sponsored by the Western Region of Nigeria Production Development Board, which supplies finance,

technical advice, and equipment in partnership with either a co-operative or a local community, the members of which make over their land for 50 years. The larger plantation schemes of this board and similar organizations in other territories are of interest from the point of view of land tenure, in that they represent attempts to seenre the economic advantages of plantation-scale production without the alienation of land to private concerns.

The above are some examples of recent developments in the evolution of customary land tenures. While these examples are rather biased towards the British territories, for which information on land tenure is particularly abundant, it appears that the general trend in the region is towards individual holdings to which the owner has a clear legal title. African communities are very largely in a transitional stage between subsistence and commercial agriculture and legal measures are primarily directed towards protecting them during this period of change. Some governments have made considerable efforts to avoid a dangerously rapid disintegration of the tribal land system, in order to prevent large tracts of land from being taken up by a few wealthy individuals as a result of the change-over to private ownership.

The establishment of unrestricted freeholds might have serious consequences if these safeguards are not preserved. In some areas it has led to subdivision and fragmentation of holdings. In particular, the new peasant proprictors are exposed to risks of unwise commercial transactions, in which their indebtedness would be increased or the land pledged on usurious terms. The final result might well be that smallholdings passed into the hands of moneylenders and speculators, creating a new class of landlords without any of the social obligations of tribal ownership, as well as a landless proletariat. Thus the East Africa Royal Commission recommended that indebtedness and loss of land should be avoided by restricting the mortgaging of land and the recovery of debt through the sale of land, together with measures to limit the accumulation of large holdings.

#### Agricultural Credit

The above considerations emphasize the importance of the establishment of sources of credit, to which the small farmer may have access on reasonable terms, as a parallel measure with the individualization of land tennres.

The savings of the average small African farmer are very limited and he generally has little or no surplus to use for the improvement of his farm or for the introduction of better techniques. Furthermore, any savings that he is able to acquire will often be used for a variety of other purposes in preference to agricultural improvement.

Very little detailed information is available, however, on the supply of agricultural credit in Africa South of the Sahara, though institutional credit facilities for European farmers are fairly well documented. Land and Agricultural Banks, generally providing long-term loans on the security of a mortgage, as well as shorterterm credit for specific improvements, have long been established in Kenya, the Federation of Rhodesia and Nyasaland, and the Union of South Africa, for example. In the latter country the Land and Agricultural Bank had loans of 93.6 million pounds outstanding at the end of 1956, of which 68 million pounds were channeled through co-operatives. In the Belgian Congo the Société de crédit au colonat et à l'industrie had loans of more than 1,100 million Belgian francs outstanding in 1956, of which about one quarter was for European farmers and a further large proportion for graduates from farm training schools. European farmers in the region also generally have access to private banks for loan capital.

A major difficulty in the provision of agricultural credit to African farmers is that, except in the few areas where tenures have already been fully individualized, they are unable to offer land as security. On the other hand, it should not be assumed that the individualization of land holding will be the complete solution of the problem. As was emphasized above considerable government initiative is required to ensure that the development of land ownership does not give rise to indiscriminate pledging of land and to the widespread rural indebtedness which characterizes some other underdeveloped areas.

In order to obtain short-term credit to tide them over until their crops are sold, many farmers are obliged to pledge their crops in advance to local dealers, often at very unfavorable rates. Detailed information is not available on the volume or conditions of this type of credit, but it appears to be of considerable importance in areas where cash crops have been developed, as, for instance, in Ghana, where a large volume of seasonal credit is made available to cacao

producers by merchants and licensed buying agents.

Facilities for the provision of institutional credit to African farmers have been established or expanded in a number of territories since the war. While few details are available of their operations, it appears that they generally reach only a limited number of farmers and that the many problems involved in the supply of credit in the region have not yet been satisfactorily solved. A considerable volume of credit has also been made available in some territories through marketing and other co-operative societies. Such sources of credit will be dealt with below in the general discussion of the development of co-operatives, but here it may be mentioned that they appear to be mainly confined to areas where cash crops have already attained a relatively high degree of development.

A form of credit which is quite widespread in Africa South of the Sahara is the provision by governments of credit in kind such as improved seeds, livestock, farm implements, or the construction of dwellings, particularly in connection with land settlement schemes, though this is not always on a repayment basis. Services such as land clearing and plowing are also sometimes provided free of charge or are not paid for until after the harvest has been sold. This credit in kind can be regarded as a rather primitive form of supervised credit.

There would appear to be much scope in Africa South of the Sahara for the experimental introduction of systems of supervised credit, such as have been developed in some Latin American countries since the war, as well as for a further development of co-operative credit. Under a supervised credit scheme the farmer, instead of being a mere borrower, is brought under a broad educational program aiming at improving his farming methods and the standard of living of his family and the provision of credit is thus combined with agricultural extension.

#### Co-operatives

The communal nature of African tribal society would seem favorable ground for the development of co-operatives. In fact, however, this is true in only a qualified way, for while co-operatives have multiplied and prospered in many parts of the region, this is attributable to many other factors besides traditional patterns of communal or tribal organization.

The collapse in world prices in the 1930's stimulated interest in co-operatives as a method of standardizing quality, steadying prices, and improving marketing systems. These first stirrings of interest in co-operatives, though scattered and unconnected, resulted before the war in the passage of special co-operative legislation in Ghana, Kenya, Nigeria, Sierra Leone, Tanganyika, and Zanzibar. In the French territories there was a preference for what were called Sociétés indigènes de prévoyance, to which the governments of the various territories gave much active support and encouragement. In the Belgian Congo a co-operative law, modeled on European lines, was enacted as early as 1921, but it did not apply to African farmers, while in the Portuguese territories the development of co-operatives was not undertaken before the

Under the special export marketing arrangements set up in many territories during and after the war, the co-operatives already in existence were accorded a recognized place, which proved most fortunate for their progress. In the postwar years the strong export demand for most agricultural products has further encouraged their growth and there has been a widespread development of co-operative organizations among African farmers.

Co-operatives, particularly the marketing and credit types, are now most numerous in the British territories and in Ghana. With a membership of 50,000 in Ghana and the Western Region of Nigeria their annual turnover of cacao exceeds 50,000 tons, valued at 15 million dollars or more. In Kenya, Tanganyika, and Uganda, coffee marketed by co-operatives now exceeds 26,000 tons. Its gross annual value is approximately 25 million dollars, while the membership of the co-operatives in whose interests this large volume of business is transacted numbers at least 180,000. In Uganda more than 20,000 tons of cotton are marketed annually by co-operatives with 90,000 members, which organize marketing and operate nine ginneries. More than 12,000 tons of maize, rice, and tobacco were handled by the Tanganyika co-operative marketing societies and unions in 1956.

Postwar developments have shown the importance of linking marketing with credit and in addition to their marketing activities, these, co-operatives usually extend credit facilities. In Ghana and Nigeria cacao farmers receive annual loan facilities of nearly 3 million dollars. In Uganda the credit afforded by marketing

co-operatives is all short-term, amounting to a little over 100,000 dollars in 1954. Most of the British territories have also developed purely credit co-operatives, but returns do not distinguish the proportion of their activities that was for agricultural purposes. Other types of society now to be found in fairly large numbers include consumers, craftsmen, bulk purchasing, and school co-operatives.

This progress has been accompanied by an evolution of the attitude of local administrations, which now actively support the development of co-operatives. During the last decade all the British territories have established or expanded departments or services to promote and guide co-operative activities and to administer the co-operative laws now in force.

In the French territories, policy regarding the establishment of co-operatives has been very different. In most territories Sociétés indigènes de prévoyance, de secours et de prêts mutuels agricoles were first established. These had a compulsory membership and were so much a mechanism of government controlled by officials, that they can scarcely be looked upon as the forerunners of voluntary co-operatives. After the war they were widely criticized and the outcome was the passage of a law in 1947 decreeing their replacement by agricultural co-operatives. In the following year an Inspector of Co-operative Societies was appointed, but the establishment of co-operatives has come about only gradually.

The law of 1947 was replaced in 1955 by legislation designed to be the charter of co-operatives in the French overseas territories. It is now generally appreciated that a good basic law is the primary requisite for sound development of co-operatives. A second and equally important requisite is specialized education, for supervisory officials, for the employees of co-operatives, for the members and for the public at large, in the principles and practice of co-operation. The British authorities have already provided many training facilities and French territories are beginning to follow suit.

It is only in recent years that there has been any systematic approach to the development of co-operatives in the Belgian Congo and Ruanda-Urundi. Before the war there were two or three fairly large African marketing associations, but owing to the opposition of European traders and farmers they did not seek authorization under the law of 1921. The first legal recognition of African co-operatives was provid-

ed in 1949, with the passage of a decree providing that there should be specialized staff to help in the formulation of by-laws prior to registration, supervision in regard to management (principally accounts) and interest-free or low-interest loans from government sources. This law was completely revised and replaced in 1956 by a very comprehensive new decree. In addition the authorities have been given specific responsibility to ensure the sound development of co-operatives and a Co-operative Section was established in 1949.

Three years after the decree of 1949 there were 40 African co-operatives registered thereunder and there has been further steady progress, in line with a program of development which the Co-operative Section announced in 1950. It is intended that the improvement of production under the system of paysannats indigenes should be closely linked with the development of co-operatives. While no plans have been made to open a central or higher school solely devoted to the teaching of co-operation, courses and lectures have been arranged in the senior elementary schools and in training centers run for demonstrators and administrative and agricultural assistants. There is, however, still need for greater training facilities and additional measures are in hand.

In the Portuguese territories the approach to co-operatives is so far only tentative and experiments are in progress to show whether such undertakings can be successfully carried out.

Mention must also be made of the importance of co-operative organizations among European farmers in the region. In the Union of South Africa, for example, each European farmer belongs on the average to two co-operatives. Services provided on a co-operative basis include seasonal credit, the handling of produce, the supply of farm requisites, crop insurance against hail and fire damage, repairs to farm machinery, assistance for soil conservation, the building of storage dams, milk recording, and a fodder bank.

Although there are great variations in the rates of co-operative growth in different parts of Africa South of the Sahara, there is a common realization that co-operation in this region needs the assistance of specially trained personnel. This would appear to be a field in which the international exchange of experience, both within the region and with other parts of the world with comparable conditions, is particularly val-

uable and FAO proposes to hold a Co-operative Training Center in Africa in 1959 in collaboration with ILO and CCTA.

## Marketing Organization and Price Policies

In Africa South of the Sahara, where small farmers supply the bulk of agricultural production and where produce often has to be transported great distances, marketing is a field in which considerable government initiative has been necessary. The provision of marketing facilities is also an essential step in assisting the transition from subsistence farming to production for sale. As discussed above, much has been done through the stimulation of the co-oper-In addition, a large number ative movement. of public or semipublic organizations has been established, especially since the war, for the control of marketing of specific crops. Guaranteed producer prices are now widespread. The quality of export crops has been improved by the introduction of grading systems and better methods of processing, while marketing has also benefited from the considerable postwar improvements in transport facilities.

The marketing of the major export products is now highly organized and relatively efficient in most parts of the region. In some cases the concentration of government assistance on exports has led to a comparative neglect of the marketing of products for domestic consumption and it is probably in this sector that the major effort is needed in the future.

Organized marketing of the main export crops is most fully developed in the British West African territories and in Ghana. The West African Central Cocoa Board was set up in 1939 and replaced in 1942 by the West African Produce Control Board, covering palm oil and groundnuts as well as cacao, and since the dissolution of the latter in 1947, statutory Marketing Boards covering various export products have been constituted in the individual territories. They have buying and selling monopolies, fix producer prices and buying allowances, paying a fixed price throughout the season, and control grading and all aspects of marketing. Firms engaged in the produce trade, including an increasing number of co-operatives and small African enterprises, are licensed by the boards to operate as their buying agents, competing within the maximum buying allowance. Similar boards, with varying powers, control the marketing of some of the principal exports in most of the other British territories. In East and Central Africa the marketing of maize and some other local food products is also sometimes controlled.

There is also considerable government intervention in marketing in the Union of South Africa, dating from the early 1930's. Present powers are based on the Marketing Act of 1937, under which boards have been established for almost all the main products of European farmers, for local consumption as well as export, with the major exception of wool, which is sold by public auction. The boards, on which producers' representatives are in the majority, can impose levies to pay for the administration of the marketing scheme and sometimes for special purposes such as stabilization funds, promotional activities, and research. Some are the sole buyer and seller and some fix producer and other prices, subject to government approval.

In the Belgian territories there are controlled markets for coffee and cotton. Four Offices grade the coffee crop and issue export licenses under a system begun in 1939; export sales are now made by two co-operatives, which include the majority of the producers. For cotton there have long been special funds for price stabilization and other benefits to producers; the system was established in its present form in 1947, with the constitution of the Caisse de réserve cotonnière and the introduction of the principle that the crop remains the property of the producer until it is actually exported, the processing firms to which it is delivered working on his behalf at rates fixed by the government. These firms are grouped into a single sales organization to export the crop.

Government marketing activities in the French territories consist mainly of quality control and price stabilization, which will be described below. In February 1958, however, a single sales organization was set up in Dakar (French West Africa) for the export of the groundant crops of Senegal and Sudan.

For the Portuguese territories there are Juntas de Exportação for most of the important export crops, with headquarters in Lisbon and branches in the producing territories. They control all sales for export, issuing licenses and prescribing grades.

Price Policies. As in other regions, while there were some attempts to stabilize producer prices before the war, the full development of such policies has occurred in the postwar period, of which they have been one of the major features. Most price stabilization schemes in Africa South of the Sahara are based on reserve funds accumulated through special taxes or otherwise withholding from producers part of the proceeds of export sales during periods of high world prices.

Some of the statutory Marketing Boards in British territories were able to build up very large reserves when world prices were high, by fixing producer prices substantially below the level of export receipts. Many of these reserves became so large that, in addition to the sums set aside for the support of producer prices in periods of low world prices, substantial surpluses have also been allocated to research and development. In most territories, producers' receipts have been further reduced by export taxes, usually on a sliding scale, rising very sharply when export prices are high.

The price policies of these boards have been frequently criticized. It is charged, for instance, that prices (notably for caeao in Ghana and Nigeria) have been fixed too low to stimulate adequate increases in production and that, even if a self-balancing stabilization scheme might have been justifiable, the syphoning off of large sums for development has amounted to severely discriminatory taxation of produc-On the other hand it is claimed that disastrous inflation has been prevented in economies dominated by one or only a few export crops and that the essentially windfall nature of the inflated export receipts of the boom years justified their use for development expenditure, while other forms of taxation were difficult to administer. Among the producers themselves, criticism has naturally tended to abate since many of the boards have had to begin price support operations, drawing on their reserves to maintain or only slightly reduce producer

<sup>&</sup>lt;sup>41</sup> The largest stabilization fund is that of the Ghana Cocoa Marketing Board, amounting to 51 million pounds; very substantial sums have also been set aside or spent by this board for development. In Nigeria the policy of the four former boards for individual commodities was to allocate 70 percent of their annual surpluses to stabilization funds. In 1954, when they were converted into regional boards, their combined reserves totaled 75.5 million pounds. The Cotton Price Assistance Fund in Uganda was allowed to rise to 20 million pounds, after which further surpluses were transferred to the African Development Fund. The Coffee Price Assistance Fund in the same territory stood at over 15 million pounds in 1954.

prices in the face of sharp falls on export markets.

The opposite difficulties arising from the overstimulation of production by high prices have also been encountered in some parts of the region, especially with regard to maize, for which high guaranteed prices have been paid in most of the British territories in Central and East Africa and also in the Union of South Africa. Combined with favorable weather, this has led to unexpected surpluses, which, partly because of insufficient storage accommodation, have had to be hurriedly exported, often at a heavy loss in drawings from stabilization funds and government subsidies. In some territories producer prices for maize have now been reduced or guarantees removed.

In the Union of South Africa guaranteed prices, sometimes backed up by stabilization funds drawn from a special levy, are paid mainly for commodities such as maize and livestock products, which are primarily for domestic consumption. Very rapid increases in the production of groundnuts and sunflower seed have been stimulated by means of attractive guaranteed prices. A recent development is the decontrol of farm and retail prices for beef, in an effort to achieve a better balance of supply and demand.

Various forms of price policy are employed in the Freuch territories for different commodities. There are maximum and minimum prices for groundnuts, a guaranteed price for all palm oil imported into France, fixed producer prices for cotton and a guaranteed price for sisal, the latter two prices being maintained from part of the proceeds of a tax on imports of textile manufactures into France. In addition, Cuisses de stabilisation des prix have been set up since 1955 for the major export crops of individual territories, replacing any territorial price stabilization schemes that previously existed. They are financed by export taxes and other levies from which stabilization funds are accumulated. As they were instituted at a time when most world prices were already falling and were therefore immediately called on to support producer prices, they have also received loans from the Fonds national de régularisation des cours des produits d'outre-mer. Some of these loans are now beginning to be paid back following recent improvements in the prices of certain products.

In the Belgian Congo the "potential" price that can be paid to cotton producers is calculat-

ed at the beginning of each season, by estimating the price the crop is likely to realize on world markets and deducting processing and marketing charges and, based on this, a provisional advance to producers is then announced. If, when all the crop has been exported, the price realized is higher than expected, money is paid into the Caisse de réserve cotonnière or distributed to producers as a bonus; in the contrary case, drawings are made from the reserves of the Caisse. This fund amounted to 1,500 million Belgian francs in 1956; as in the British territories, part has been spent on development in the producing areas. The Office des cafés indigènes du Ruanda-Urundi also administers a price stabilization fund.

The Improvement of Quality. Even in the more developed areas the quality of export produce is a question of the utmost importance, as is indicated by the measures taken in the Union of South Africa, where systems of grading and facilities such as those for the precooling of citrus and other fruit are among the best in the world. Strict regulations are also laid down by associations of European producers in other territories. In most parts of Africa South of the Sahara, however, the improvement of quality presents special problems, as in many cases the products of small farmers have to compete on world markets with those of highly organized large-scale enterprises, with modern processing facilities, in other regions.

Improvements in quality begin, of course, at the production stage, with the use of better planting material, disease control, and other measures described earlier in this chapter. Better processing and the organization of grading and control systems, the other two phases of quality improvement, will be briefly discussed here.

Palm oil is a good example of the importance of processing methods, as it requires rapid and efficient extraction to limit the rise in free fatty acid content which chiefly determines its quality, while the oil extraction rates of primitive and modern methods also differ considerably. In Nigeria, where, in contrast to its chief competitors on the world market, the bulk of exports is derived from fruit collected from natural stands, substantial improvements in both the quality and quantity of production have been made through the introduction of mechanical hand-presses and of small power-operated extraction plants known as "pioneer oil mills."

Similar, if less radical, improvements have taken place in the processing of many other commodities, in large part through the activities of co-operatives and of the various marketing organizations described above, which have devoted considerable sums to the investigation and introduction of more efficient methods. Notable progress has been made with the quality of groundnuts through the introduction of a simple hand-decorticating machine.

Some processing that was formerly performed in the importing country now takes place locally, as in French West Africa, where in 1956 44 percent (oil equivalent) of groundnut exports was in the form of oil, compared with a negligible proportion before the war.

Effective systems of inspection and grading enable the payment of premiums for highquality produce. Only in this way can producers be encouraged to take more care in processing or to invest in the necessary equipment. Exports of the major commodities are now subject to official inspection in all territories, though in some cases this is only at the port and fraud still appears to be widespread. In the French territories, produce control services have been set up under the postwar development plans. In recent years premiums for quality have been introduced or sharply increased in many territories and some striking results have been achieved. In Nigeria, for instance, the introduction of improved processing equipment was linked with the establishment in 1950 of a new "Special Grade" of palm oil, for which a substantial premium was paid by the Marketing Board. As a result the proportion of this grade in total purchases rose from 5 percent in 1950 to 53 percent in 1953 and 73 percent in 1957.

Other Marketing Developments. Most of the developments discussed above are concerned with export products. In many territories rather little is known about the internal movement of food supplies, though surveys are now in progress in a few areas. While it is probably true that in most of the region less attention has been paid to the marketing of products for domestic consumption, it is also a fact that export marketing is better documented and more is being done than is generally known in such spheres as the construction of urban retail and wholesale markets and the improvement of conditions under which food is sold. Many co-operatives handle the marketing of local food products, while there are now good

municipal markets in most of the larger towns.

Even this brief sketch of marketing developments cannot be concluded without some reference to the provision of transport facilities, which is generally the main factor in opening up new areas for the production of cash crops and is an essential part of the transition from a subsistence to a market economy. Products often have to be transported very long distances from the producing area to the port or urban center and transport charges constitute a particularly high proportion of the cost of both imports and exports in many territories. Northern Rhodesia is a striking example of the influence of transport; agricultural production is mainly concentrated in the vicinity of the single railway line and only products of high unit value, such as tobacco, can profitably be exported, because of the long haul to the sea. Transport deficiencies are also the cause of many shorter-term marketing problems, such as the excessive accumulation in the earlier postwar years of the well-known "pyramids" of stored groundnuts at the railhead in Northern Nigeria.

The great increase in the volume of trade in the postwar period has severely taxed transport facilities. At the same time, very substantial improvements have been made in these facilities. Transport has received the major share of investment under the postwar development plans, while it is significant that a large part of the development expenditure undertaken by the agricultural marketing organizations has been for roads in producing areas. There has been a very great increase in the number of bicycles and small vehicles used in the movement of local food supplies; often the purchase of a truck is one of the first relatively large investments made by the more prosperous farmers. A further interesting development is the use of air transport for meat in French Equatorial Africa.

In many parts of the region the existing transport network is based primarily on the requirements for moving export products and, with rising local demand, will need to be more adapted to the complex needs of the movement of food supplies for internal consumption. In this connection it is of interest that a recent investigation in the Northern Region of Nigeria concluded that the postwar building of feeder roads had led to a sharp increase in the movement of foodstuffs and greatly reduced the danger of

localized shortages; it had also resulted in higher prices being offered to producers in the more remote areas, making it worthwhile for them to produce surpluses for sale.<sup>42</sup>

# AGRICULTURAL DEVELOPMENT PLANS

Earlier parts of this chapter have demonstrated the large part that governments have played in agricultural development in the postwar period. This section is mainly concerned with the financial aspects of agricultural development and with the ways in which government development plans and projects have been organized. Long-term capital development plans have been an important postwar influence in almost all parts of Africa South of the Sahara, as in the underdeveloped regions generally, and the main characteristics of such plans will first be discussed. While these overall plans are usually the principal channel for public investment in agricultural, fisheries, and forestry development, other public and semipublic investment outside the development plans is also important in some areas. This type of investment and also the rather limited data on private agricultural investment will then be reviewed. After an account of recent trends and prospects for the supply of development capital, some aspects of the agricultural, fisheries, and forestry policies executed through the programs of public and semipublic investment will be briefly examined.

#### Over-all Plans of Economic Development

Since the war agriculture, fisheries, and forestry have benefited, both directly and also as a result of improvements in transport and other basic services, from a marked expansion in public expenditure in the general field of economic and social development. Some governments had accumulated reserves that they had been unable to spend during the war and, because of the generally higher world prices for agricultural and other raw material exports during the postwar period, most have also been able to set aside larger sums from current revenue for development expenditure. Loans and grants from the metropolitan countries for the development of their dependent territories have substantially increased, reflecting the wider recognition of the need to assist in raising levels of living in less developed areas and in providing a sound economic and social foundation for accelerated political evolution. Especially in the earlier postwar years, it was also believed that African agriculture could make a very significant contribution to overcoming the world food shortage and also the currency problems of the metropolitan countries, given sufficient capital and technical aid. In most of the region agriculture can mobilize relatively little private capital while, although it was envisaged that private sources would eventually provide much of the finance needed in other sectors, it was recognized that substantial public investment in transport, power and similar basic services was an essential prerequisite.

Once governments had accepted this broader role in capital development, and in particular following the widespread experience of planning during the war, it was natural that their investment came to be planned for longer than the normal annual budgetary period. Thus longterm capital development plans were prepared soon after the war in the individual Belgian and British territories, in the French and Portuguese territories within the framework of general plans including the metropolitan country as well, and in Liberia. In the Union of South Africa the large public investment in various sectors has not been brought together into an overall plan, though a Natural Resources Development Council was established for the planning and promotion of the development of natural resources.

As compared with those in other regions, the main feature of these development plans, apart from the part played by the metropolitan governments in financing them, has been the very substantial proportion of total funds devoted to the basic services, particularly transport, needed to lay the foundations of future agricultural and industrial progress and also to social projects, chiefly hospitals, schools, and housing. In some underdeveloped areas elsewhere there is very strong competition for development funds between agriculture and industry and, in a number of cases, concentration on rapid industrialization has caused a comparative neglect of agriculture. In Africa, in contrast, agriculture has usually received the largest share of funds after infrastructure and social projects. Recently, in revising plans and preparing new ones, a somewhat increased proportion has generally been allocated to the

<sup>&</sup>lt;sup>42</sup> Movement of Local Foodstuffs, Northern Region, Nigeria, Ministry of Agriculture, Kaduna, 1958, p. 29.

productive sector, including agriculture, while still maintaining the main emphasis on basic services. This trend has occurred not only as some of the most urgent gaps in the *intrastructure* gradually came to be filled but also partly because of the need to increase productivity so as to provide revenue to meet the debt and other recurrent charges on completed projects of basic and social services.

The Organization of Development Planning. Most of the initial development plans were for ten years, but it was found that so long a planning period necessitated frequent modifications as a result of changing circumstances and unforeseen difficulties. Costs rose more rapidly than had been expected, recurrent charges on development projects also increased and were sometimes found to be more than a territory would be able to meet out of future revenue. These revenues, often derived largely from export taxes, themselves changed sharply with fluctuations in the world prices of primary commodities and it was not possible to predict for such a long period how much could be made available for development expenditure. Changes in programs and delays in their implementation were also caused, particularly at the beginning of the period under review, by the shortage of technicians and capital equipment and by inadequate investigation and preparation of projects. In most cases, therefore, with the principal exception of the Belgian territories, the original ten-year plans were soon modified to cover a shorter period, generally of four to six years.

Not all of the development plans relate only to capital expenditure proper, a few including the additional recurrent charges arising from new projects or even covering all forms of government expenditure. Some of the earlier plans were little more than collections of projects designed to spend a certain amount of money. As experience has been gained and more adequate surveys carried out, they have increasingly shown a more or less integrated approach to the economy as a whole. In Nigeria, for example, the latest Federal and Regional plans closely follow the recommendations of the mission from the International Bank for Reconstruction and Development which conducted a detailed economic survey of the territory. While plans have to be based on what can be done within the limits of the financial and other resources expected to be available, most are now formulated in the light of some such broad assessment of needs, though statistical data are generally inadequate for them to be based on detailed estimates of consumption requirements. The plans for the Belgian and the French territories and also the Swynnerton Plan for African agriculture in Kenya established actual targets and forecasts for the main agricultural commodities.

Ad hoc bodies, such as the Agricultural Productivity Committee in Uganda, have sometimes been established to prepare individual plans or parts of them, but usually there is now a continuing central body to co-ordinate both their formulation and execution. Most often this is in one of the existing ministries, aided by an interministerial committee, though the French territories have separate planning ministries. The planning organization of the dependent territories is generally supplemented in the metropolitan country, where plans are reviewed for the allocation of financial assistance. In addition, as will be discussed later, in many of the British territories specialized semipublic boards for agricultural and industrial development also play a part in planning, though their activities are usually outside the development plan proper.

Development Plan Finance. There are striking variations in the pattern of development plan finance in the different parts of the region (Table III-19). In the Belgian Congo the plan is financed mainly from loans guaranteed by the Belgian Government,43 and the contribution of budget surpluses has so far been relatively small. The financing of the plan for Ruanda-Urundi is through an interest-free loan from the metropolitan government, to be repaid over 25 years. In addition, about 1,700 million francs are to be spent on health services, education and rural development in the two territories by the Fonds du bien-être indigène, which is financed by an initial grant from Belgium and the proceeds of the colonial lottery. The original plan for the Belgian Congo devoted as much as 50 percent of total expenditure to transport, about 30 percent to social services and 5.4 percent to agriculture, fisheries, and forestry, with another I percent for storage and preservation of products; in the latest revision the share of

<sup>&</sup>lt;sup>43</sup> Raised primarily in Belgium, but also in Switzerland, in the territory itself and from the International Bank and the United States International Co-operation Administration.

TABLE III-19. SOURCES OF FINANCE OF CURRENT DEVELOPMENT PLANS

COUNTRY OR GROUP	Planuing period	Currency unit	Total planned expen- diture	Metro- politan grants	Loans from metro- politan govern- ment	Other loans	Local resources <sup>1</sup>
				Percentage of total planned expenditure			
Belgian Congo	1949–58	Thousand million B. fcs.	<sup>2</sup> 49.5	3			
Ruanda-Urundi	1949–58	Thousand million B. fcs.	<sup>2</sup> 5.1	6	94		_
British territories	1955-60 °	Million €	450	9		36	55
Federation of Rhodesia and Nyasaland 4	1957–61	Million ∉	84			49	51
Southern Rhodesia	1957–61	Million €	37				
Ghana	1951~57	Million ∉	120	2		25	73
French territories <sup>5</sup>	6	Thousand million Fr. fes.	6401	65	734	Marriama	1
Liberia	1951–59	Million U.S.\$	73				,
Portuguese territories	1953–58	Million contos	<sup>8</sup> 5.8	3	51	******	46

SOURCES: La situation économique du Congo belge et du Ruanda-Urundi en 1956, Ministère des colonies, Brussels, 1957; The Colonial Territories 1956-1957, Cmnd. 195, H. M. Stationery Office, London, 1957; High Commission Territories, Economic Development and Social Services, Cmnd. 9580, London, H. M. Stationery Office, 1955; The Federation of Rhodesia and Nyasaland Newsletter, Federal Information Department, London; Bulletin hebdomadaire de statistique, No. 511, INSEE, Paris, 22 February 1953; Bulletin mensuel de statistique d'Outre-Mer, Paris, July-October 1957; Wayne Chaffield Taylor, The Firestone Operations in Liberia, National Planning Association, Washington, D. C., 1956; Situation économique des colonies portugaises, Notes et études documentaires No. 1964, Paris, 1954.

agriculture, fisheries, and forestry is raised slightly and in the new plan now in preparation there is to be a further increase. In the smaller and more densely populated territory of Ruanda-Urundi, transport receives about 24 percent and agriculture, fisheries, and forestry about 7 percent of total expenditure.

In the British territories, grants for development have been provided by the United Kingdom government under a series of Colonial Development and Welfare Acts and, apart from provision for research and other central and joint schemes, are allocated to individual terri-While this assistance is only a fraction of the total development plan expenditure in some of the richer territories, which are able to use substantial local resources (reserves and current revenue) and loan funds, it is almost the only source of finance for the plans of some of the smaller ones. Loan capital for the development plans is mostly raised in London, where colonial loans have the status of trustee stock, though there is a growing tendency for some loans to be wholly or partially issued locally, and recently part of the territories' sterling balances has sometimes been invested in this way. In some territories loans from the reserves of the statutory Marketing Boards have been of considerable importance, while there have also been loans, mainly for the transport sector, from United States government sources and from the International Bank. The Federation of Rhodesia and Nyasaland has obtained loans from mining interests and private banks and also hopes to raise a loan on the United States market in 1958. On the expenditure side, the emphasis varies greatly among the different British territories. In some territories a very large proportion of funds is allocated to agriculture, as much as 26 percent in Kenya and 19 percent in Tanganyka under the current plans. In general, transport (though less predominantly than elsewhere), and social services, particularly education, are the major categories. There has been the same tendency for a gradual increase in the share of agriculture.

<sup>&</sup>lt;sup>1</sup> Reserves and current revenue. — <sup>2</sup> Includes expenditure from Fonds du bien-être indigène. — <sup>3</sup> Basutoland, Bechuanaland and Swaziland 1945-60, Kenya 1954-57, Northern Rhodesia 1954-59, Nyasaland 1957-61, and Sierra Leone 1956-59. Excludes expenditure on central and joint schemes (e. g., programs of East Africa High Commission). — <sup>4</sup> Federal government plan only; excludes Kariba Scheme. — <sup>5</sup> Including Reunion; excluding the "general" section of the plan. which is financed entirely by France. — <sup>6</sup> Total credits granted to individual territories under first and second plans up to 30 June 1957 (Reunion, 31 December 1956). — <sup>7</sup> Loans from the Caisse centrale de la France d'Outre-Mer, which is financed by metropolitan grants and loans. — <sup>8</sup> Includes metropolitan contribution to capital of Banco de Fomento de Ultramar.

In the French territories there is greater uniformity in the financing of the plans of the individual territories, which are included in an overall plan for the French Union as a whole. Metropolitan grants, allocated annually, are channeled through the Fonds d'investissement pour le développement économique et social (FIDES). They finance all of the general section of the plan, a section which is for the benefit of the metropolitan country as well as the territories themselves,44 and a very large part of the territorial sections. The proportion of the finance of the territorial sections for which the territories themselves are responsible has been successively reduced, while in practice their contributions to FIDES have not come from local resources but almost entirely through low-interest loans from the Caisse centrale de la France d'Outre-Mer. This body is itself financed by metropolitan grants and loans, so that actually metropolitan assistance in one form or another has covered nearly the whole development plan expenditure.

The increasing emphasis on agricultural production has been particularly marked in the successive plans for the French territories. Under the territorial sections of the first plan, about 50 percent of investment went to transport, 20 percent to social projects, and 12 percent to agriculture and water control. Up to the end of 1956, 43 percent of authorized expenditure in the second plan was for transport, 8 percent for social projects and as much as 34 percent for agriculture and water control. A third four-year plan is now in preparation and that recently proposed for the Ivory Coast devotes about 33 percent to agriculture, fisheries, and forestry, or more than the 30 percent each for transport and social services. The financing of the Ivory Coast's plan is likely to show some new features, as it is proposed to find half the funds from current revenue, while loan funds may also be raised to provide for the very large investment envisaged.

The loan finance for Liberia's development plan is from the United States Export-Import Bank and there is also considerable assistance from the United States International Co-operation Administration. Current revenue is the main source of funds, however, about 20 percent being set aside for development each year. The original program devoted 27 percent of expenditure to health projects, 22 percent to basic education, 14 percent to road transport (with a further 20 percent for other engineering and construction projects) and 13 percent to agricultural development.

Loans from the Portuguese government cover the entire development plan expenditure in the Cape Verde Islands and Portuguese Guinea, approximately 65 percent in Mozambique, 60 percent in São Tomé and Principe and 40 percent in Angola. Apart from 160,000 contos granted by Portugal towards the capital of the Banco de Fomento de Ultramar for Angola and Mozambique, the remainder comes from local resources. Transport is the major item of expenditure, receiving 35 percent of the total for the Portuguese territories as a whole, but the share of agriculture, at 31 percent, is very little less.

# Other Public and Semipublic Investment in Agricultural Development

Although there is no formal development plan in the Union of South Africa,<sup>45</sup> public investment has been very substantial, especially in transport and power. Loans for these sectors have been obtained from the International Bank for Reconstruction and Development, while public loan issues have also attracted much foreign private capital. Agriculture is financed predominantly from private savings, but here also there has been considerable public expenditure, mainly for research, extension, education, conservation works and irrigation. The government-financed Fisheries Development Corporation has made some direct investment as well as advancing loan capital.

Elsewhere, public and semipublic investment in agriculture, fisheries, and forestry outside the overall development plans is probably of most importance in the British territories. Very large projects are sometimes budgeted separately from the development plan, an example affecting agriculture being the Kariba Scheme in the Federation of Rhodesia and Nyasaland. The Colonial Development Corporation

<sup>44</sup> Total expenditure under the general section of the first and second plans is about 90,000 million frances

<sup>&</sup>lt;sup>45</sup> A development plan for the African Areas was recently proposed by the Tomlinson Commission. Of a total expenditure of 104 million pounds over a ten-year period, about 36 percent was to be for agricultural development, including soil reclamation and afforestation. While endorsing the general aims of this plan, the government was, however, unwilling to budget for so long a period.

was established in 1948 to undertake, either directly, in partnership with or through loans to private enterprise or territorial governments, projects of agricultural or industrial production which would eventually be commercially remunerative. Long-term Treasury loans are advanced for individual projects up to a maximum outstanding at any one time of 100 million pounds.46 Of a total of 50.5 million pounds approved for 42 continuing projects in Africa South of the Sahara by the end of 1956, 12 million pounds was for 12 agricultural, fisheries, or forestry projects (10 of them managed directly or through subsidiary companies) and another 2.7 million pounds for 5 projects for the processing of agricultural products. 47 Somewhat similar functions are carried out in individual territories by such bodies as the Camerooms Development Corporation, the Ghana Agricultural Development Corporation, the Regional Production Development Boards in Nigeria, the Tanganyika Agricultural Corporation, and the Uganda Development Corporation. Their financing is mainly from loans and grants from the government and sometimes also from the reserves of the statutory Marketing Boards. In addition to loans and grants to these bodies and to governments, the Marketing Boards have themselves directly financed agricultural development projects and research in some territories.

Similarly, in the Belgian territories the marketing organizations for coffee and cotton have made substantial investments in roads and other development projects for the benefit of producers. In the French territories also, the Caisses de stabilisation des prix are empowered to invest in this way. A number of semipublic bodies (sociétés d'économie mixte) are partly financed by loans from the Caisse centrale de la France d'Outre-Mer, referred to above. Those concerned with the production and export of agricultural commodities include the Compagnie générale des oléagineux tropicaux and the Compagnie trançaise pour le développement des fibres. In the Portuguese territories, the semipublic juntas for the marketing of the main agricultural exports also provide funds for research and production and marketing improvements.

## Private Agricultural Investment

Private investment in agriculture is relatively limited in Africa South of the Sahara, except in the areas where there are substantial numbers of European farmers or large plantations operated by expatriate firms. The need to augment the small African farmer's capacity to invest in improved methods is one of the major problems of the financing of agricultural development. Government attempts to overcome it through the supply of credit were described earlier in this chapter. In some areas. especially the British territories in West Africa, much of what might have been saved by private individuals from enhanced export proceeds for their crops has been transferred, through export taxes and the policies of the Marketing Boards, into public and semipublic saving.

While estimates of the private capital invested in African farming are limited to a few studies of small areas, even for European enterprises the available data are complete only for the Union of South Africa, where, however, the great majority of European farmers in Africa South of the Sahara are concentrated. Net annual capital formation in European farming in the Union of South Africa is now at a rate, in real terms, substantially higher than before the war, though there has recently been some decline from earlier high levels. Most of the increased investment has come from larger net incomes in agriculture, including price supports for some commodities. Government loans through credit institutions and under the Soil Conservation Act have also increased and more capital originating in other industries is now being invested in agriculture. In recent years the share of the agricultural industry in total gross capital formation has averaged above 13 percent.

Little is known about the quantity of capital invested in the large plantations that are a feature of some parts of the region. In the Belgian Congo the total investment in European plantations is estimated at 8,700 million francs in 1953.48 The total investment of United States private capital in Liberia (apparently excluding the very substantial investment in tanker fleets) was estimated to be more than 50 million dollars in 1956 and other foreign

<sup>&</sup>lt;sup>46</sup> Recently raised to 150 million pounds, of which up to 130 million may be borrowed from the Treasury.

ury.
<sup>47</sup> Colonial Development Corporation, Report and Accounts for 1956, H. M. Stationery Office, London, 1957.

<sup>&</sup>lt;sup>48</sup> "Essai d'estimation du capital investi au Congo belge," Bulletin de la Banque centrale du Congo belge et du Ruanda-Urundi, August 1955, p. 296.

investment about 7-10 million dollars; <sup>49</sup> most of this was in Firestone and a few smaller plantations of rubber and other tree crops.

# Trends in the Supply of Capital for Agricultural Development

While some details are available of annual public expenditure on agriculture alone, it is more useful to examine trends in overall development expenditure, since agriculture's share of the total reflects not only the available supply of capital but also the changes in emphasis that have occurred between the different sectors of the economy.

United Kingdom grants were substantially increased under the Colonial Development and Welfare Acts of 1950 and 1955. Credits granted annually to the individual French territories from FIDES rose sharply in 1952 but they have since returned approximately to the level of earlier years; <sup>50</sup> the reduction in 1953 was attributed to the transition between the first and second plans, but the high level of 1952 has not so far been regained.

It appears that the supply of loan capital, which is especially important in the Belgian Congo and in many of the British territories, may now be dwindling. In the postwar period, the first colonial loans were permitted on the London market in 1948 and the total rose very rapidly up to 1950. A decline was to be expected once pent-up demand had been satisfied, but since 1953 there have been further falls in the total raised annually,<sup>51</sup> probably because of high interest rates and a tighter money supply. As has already been mentioned, the Federation of Rhodesia and Nyasaland has found it necessary to seek a loan on the United States market. Partly, however, the decline in loans raised in London may have been offset by the recent increase in loans issued in the territories themselves.

The part of development finance most liable to fluctuation is that provided from the territories' own current revenues. This has been, together with reserves accumulated from the revenue of previous years, the main source in

<sup>40</sup>Wayne Chatfield Taylor, *The Firestone Operations in Liberia*, National Planning Association, Washington, D. C., 1956, p. 16.

50 Bulletin mensuel de statistique d'outre-mer, Paris, 1947-57.

<sup>51</sup> The Colonial Territories, H.M. Stationery Office, London, 1947-48 to 1956-57. many British territories and in Angola and Liberia. With the high export prices of the Korean boom years, government revenues were generally buoyant and it was possible to revise many of the development plans upwards, though in some cases this did little more than meet increased costs. In the last few years, on the other hand, prices of a number of important African exports have been falling and changes in revenue expectations have more often caused downward revisions in the development plans, as in the Federation of Rhodesia and Nyasaland for example, following the recent sharp decline in the price of copper.

Thus there are signs of the emergence of a shortage of capital such as could not be said to have existed in the earlier part of the postwar period, when it was generally possible to obtain funds for the execution of all projects for which equipment and personnel were available and which were considered feasible in the light of the expected burden which debt repayments and other recurrent charges would place on future revenues. At that time the shortage of equipment and technicians were the chief limiting factors in most territories and large sums of money were sometimes wasted on inadequately prepared projects. The present relative shortage of capital is also accentuated by the fact that many more projects are now ready for execution. This situation indicates the need for closer attention to priorities in development planning, which may already have been partly reflected in the tendency noted above to increase the share of development funds allocated to the directly productive sector.

The future prospects for capital supplies for agricultural and general development in Africa South of the Sahara are difficult to assess. Most territories will continue for some time to have lower revenues than during the boom period, so that not only will there be less capital from this source for new projects but also less money will be available to meet the debt and other recurrent charges on projects already completed. It is probable that the consequent increased demand for loan capital will be only partly offset by the greater availability of such funds locally. The International Bank has so far played little part in financing agricultural development in the region, its loans having gone mainly to the more developed territories, almost entirely for transport and power. As for private capital, there has recently been a tendency for some European enterprises producing rubber, tea, etc., to seek to transfer part of their interests from the Far East to Africa. The Union of South Africa, however, hitherto the major importer of foreign private capital in the region, has recently experienced a small net outflow of funds. Western Germany remains the main potential source of capital, public and private, that has so far been relatively untapped. The Western German Government is a major contributor to the investment of 580 million dollars over the next five years planned by the European Economic Community in the overseas territories of member countries (maiuly in the French territories), but it is not yet known how much of this will be available for agriculture.

# Agricultural Development Policies and Projects

Government activities in numerous fields, such as agricultural research, education, extension, soil conservation, irrigation, price stabilization, and the organization of marketing and other agricultural institutions, have already been described in earlier parts of this chapter. Except for price stabilization, which is largely a postwar development, these have been the principal government activities in connection with agriculture both in the prewar period and in more recent years. Some of the main policy aims pursued through these activities include the promotion of particular cash crops, increased production of food for domestic consumption, the introduction of mixed farming and the diversification of production. In some cases almost all available resources, from research, education and extension to the supply of credit, have had to be concentrated on the combating of a single problem of particular urgency, such as soil erosion in some parts of Central Africa or Swollen Shoot disease of cacao in Ghana.

A full review of agricultural policies in Africa South of the Sahara is not possible here. It would probably reveal mainly the considerable increase in the scale and scope of government intervention since the war. Two specific aspects of postwar policies are, however, of special interest. One is the evolution of agricultural price policies, which, because of its close link with the marketing organizations in the region, was treated in an earlier section of this chapter. The other, which remains to be discussed, concerns the general approach to relatively large-scale projects of agricultural production.

Large-Scale Projects of Agricultural Production. Before the war most government-sponsored projects for agricultural production were chiefly experimental in purpose and almost the only large-scale enterprises were the privately-owned plantations. The scheme for the irrigation of the inland Niger delta in French Sudan, which was begun in this period, remains, however, the largest irrigation project in operation in Africa South of the Sahara. Following some schemes initiated earlier, the Office du Niger was set up in 1932, with the eventual aim of irrigating nearly one million hectares to settle a population of some 300,000. Progress has been much slower than expected and by 1955/56 3,236 families were established on an irrigated area of 44,500 hectares. About 45,000 tons of rice (paddy) and some cotton were produced at varying levels of mechanization, yields and incomes being considerably higher than in the rest of the territory. Financing has, since 1952/53, been entirely by France, through the "general" section of the development plan.52

In the early postwar years the belief was somewhat widespread that Africa had enormous agricultural potentialities, which needed only the wholesale application of capital, and especially machinery, for their rapid development. It was in this atmosphere that the East African Groundnut Scheme was conceived in 1946 with the aim of overcoming the shortage of fats and oils caused by the reduction in exports from the Far East. It was hoped to produce, under mechanization, a crop of some 600,000 tons of groundnuts by 1951, but actual results never exceeded a few thousand tons after an expenditure of around 35 million pounds. From 1955, the land cleared by the Overseas Food Corporation has been in the hands of a new organization, the Tanganyika Agricultural Corporation, which is conducting an African Tenant Farmers' Scheme and several promising experimental projects for the mechanized production of various crops.

This costly failure has already had a salutary influence on the conception and execution of many subsequent projects. Generally it has caused considerable modification of the belief that European or American agricultural methods could easily be applied to African conditions. The need to proceed through the succes-

<sup>&</sup>lt;sup>52</sup> Office du Niger, Notes et études documentaires, No. 2240, Paris, 12 December 1956; Compte rendu succinct de la campagne agricole 1955-1956, Archives de l'Office du Niger, No. 18, 1956.

sive stages of investigation, experiment and pilot project before beginning full-scale development is now usually recognized, even if not always strictly followed in practice.

Another important postwar influence was the establishment in 1947 of the Cameroons Development Corporation to operate 100,000 hectaresof plantations, taken over by the government from their former German owners. Similar organizations engaged in direct production now play a significant part in a number of the British territories. Their activities cover a wide range, but a major function, especially of the Regional Production Development Boards in Nigeria, is plantation-scale production, for which the alienation of land to private concerns would be unacceptable. Some of these schemes are carried out in conjunction with private partners. In a number of territories such semipublic bodies also operate food production schemes near the large centers of population.

The projects of the Colonial Development Corporation are broadly similar to those undertaken by the territorial organizations just described. Schemes managed directly or through subsidiary companies now include cattle ranches in Bechnanaland, tobacco and tung estates in Nyasaland, irrigation and forestry schemes in Swaziland and wattle estates in Tanganyika. A number of its earlier projects, most notably that for poultry production in Gambia, had to be abandoned after heavy losses, but a policy of retrenchment and caution has resulted in a net operating profit in each year from 1955. One of the early failures, the Niger Agricultural Project at Mokwa, Northern Region of Nigeria, for the mechanized production of groundnuts and subsistence crops by peasant settlers on hitherto empty land, is of particular interest in that its history has recently been analyzed in great detail. Again the chief mistake was found to be the lack of experiment and pilot operations before beginning full-scale develop- $\mathrm{ment.}^{53}$ 

In the French territories, projects directly managed by public or semipublic bodies are less common, but the Compagnie générale des oléagineux tropicaux has a scheme for the mechanized production of groundnuts in the Casamance area of Senegal. It was aimed to produce some 70,000 tons by 1955, but initial results were disappointing and from 1952 mechanization

has been confined to the preparation of the soil, other operations being performed by peasant settlers. The same organization also operates a project for completely mechanized production of groundnuts at Niari in the Middle Congo, which has succeeded rather better. A further large scheme is that carried out at Richard Toll in Senegal by the Mission d'aménagement du Sénégal to investigate the possibilities of mechanized rice production under irrigation.

The above are some of the chief large-scale projects of agricultural production that have been attempted in Africa South of the Sahara since the war. They are intended only as examples and, in particular, some irrigation projects at present in an early stage of implementation as part of wider hydroelectric schemes have been omitted. The large number of projects and the rather high proportion of failures point to the value of detailed analyses of these projects in order to enable the lessons of previous schemes to be fully utilized in new ones. As yet available information is generally insufficient, but a notable exception is the valuable study referred to above, which illustrates the great complexity of the factors involved in the planning and execution of agricultural development projects.

The Improvement of Indigenous Agricultural Systems. In part because of the disappointing results of so many of these large-scale schemes, the focus is shifting more and more to the possibilities of improvement within existing indigenous systems of agriculture. This less spectacular aim has always received a major share of funds for research, extension, etc., in most territories, but it is now coming more to the forefront as the main direction in which progress can be achieved. It is increasingly recognized that in many areas African agricultural systems are well adapted to the environment, although at a low level of productivity, and that it is more suitable to make improvements within these systems than to attempt to replace them completely by different techniques.

The principal example of this approach is the system of paysannats indigènes employed in the Belgian Congo and, to a smaller extent, in Ruanda-Urundi, some technical features of which have already been described in other parts of this chapter. The introduction of cash crops and the production of sufficient food supplies had previously been stimulated by a system

<sup>&</sup>lt;sup>53</sup> K. D. S. Baldwin, The Niger Agricultural Project, Oxford, 1957.

of obligatory cultivation. The paysannat policy was begun experimentally before the war and is now being intensively applied under the development plans. By the beginning of 1955, paysannats based on annual crops covered 5.2 million hectares in the Belgian Congo and Ruanda-Urundi, and those based on perennial crops a further 130,000 hectares.<sup>54</sup> The policy is very flexible and individual paysannats are closely adapted to local conditions, of which very detailed surveys are first made. The basic aim is to settle farmers on the best soils under skilled supervision and to replace shifting cultivation by rotational systems. Under the second ten-year plan now in preparation, agricultural systems will be intensified by mechanization and the replacement of the long bush fallow by a short productive fallow and the use of fertilizers. It is also intended eventually for the members of each paysannat to be members of a co-operative as well. A high degree of mechanization is already proving successful in a number of pilot centers; economic as well as technical results appear promising, while even with many operations performed centrally there is still scope for individual initiative and better work to obtain yields and returns well above average.

A type of paysannat is also being developed in French Equatorial Africa. Plans on similar lines for the stabilization of African farmers have recently been started in Angola and Mozambique.

In French West Africa good progress is being achieved in some areas through the Sociétés mutuelles de production rurale (SMPR), a type of co-operative which has recently replaced some of the former Sociétés indigènes de prévoyance. The detailed agricultural objectives of the SMPR vary in different areas, but generally the aim is to establish improved versions of the traditional type of farm (fermes traditionnelles améliorées). Farms of about 3 hectares made available from communal land are allotted to individuals, to whom the SMPR makes a gift of the necessary equipment, etc. After three years' supervision by a monitor of the agricultural department, which provides selected seeds, etc., and approves a plan of production which must be followed, if the farmer is satisfactory, he becomes the owner of the equipment and supervision ceases.

Other formulas include the consolidation of holdings and farm planning carried out in Kenya under the Plan to Intensify the Development of African Agriculture (Swynnerton Plan), the promotion of rotations and mixed farming through the Master Farmers Schemes in Nyasaland and Southern Rhodesia, etc., etc. In addition to such specific systems, in all territories a large part of research and extension work is, of course, directed towards this general aim of the improvement of traditional systems of agriculture.

Fishery Policies. In fisheries also, policies and plans relate to a variety of objectives, reflecting widely different levels of commercial development and different opportunities and requirements for intensifying the exploitation of marine and inland resources. In Augola, the Union of South Africa, and South West Africa, fishery programs relate to highly commercialized industries which have been developed by private enterprise and capital. Policies here are concerned with supervisory and regulatory functions, with biological and technological research and with the provision and maintenance of common services, e.g., harbors, markets, water supply, etc.

In much of the rest of the region the fisheries are considered mainly in terms of their contribution to national food supplies, on nutritional grounds, and from the standpoint of the economic and social welfare of the fishing communities. These policies obviously call for more comprehensive programs involving financial aid and direct assistance in the application of improved fishing and marketing methods.

Limited financial means are reflected in the smallness of the fishery services generally, when compared with the breadth of their administrative responsibilities, in the lack of trained specialists in certain fields, especially in economic and institutional matters, and in the provision of desirable equipment and facilities, the latter also being restricted by foreign exchange problems.

There are, however, a few governments which occupy an intermediate position, inasmuch as they are concerned both with the development of traditional fisheries on general social and economic grounds and also with the specialized operations of certain private commercial enterprises which have successfully introduced

<sup>&</sup>lt;sup>54</sup> P. Staner, "Les paysannats indigènes du Congo belge et du Ruanda-Urundi," Bulletin agricole du Congo belge, XLVI, No. 3, Brussels, 1955, pp. 467-558

modern equipment, installations, and methods, greatly in advance of traditional practices, e.g., in the Belgian Congo, French West Africa, and French Equatorial Africa.

With regard to the administration of fishery programs in Africa South of the Sahara, some problems of co-ordination appear in the matter of price, tariff and other controls on fish products, which sometimes operate to the disadvantage of fishermen, both in domestic and export markets. These and other difficulties associated with the marketing and consumption of fish products reflect policies which, in general, are influenced by the apparent potential for increased production rather than an evaluation of fishing costs in relation to prevailing demand and prices in accessible markets. This is understandable in the early stages of fishery programs, but the very success of these policies already manifest in some African fisheries may call for corresponding adjustments in the structure of the fish trade and, therefore, in the planning and implementation of fishery programs.

Common interests in certain natural resources and markets may also call for more extensive intergovernmental consultation with a view to promoting co-ordination of research and regulation and to increasing the flow and consumption of fish products regionally.

Forestry Policies. Integration of a forest policy into a general land use development plan is of fundamental importance in the region, since much of the forest area is threatened by thoughtless destruction or ruthless exploitation under climatic and soil conditions which often make reforestation extremely difficult.

The general policy has been to carry out surveys of the existing timber resources and, with an eye on future industrial development and marketing possibilities, to delimit and reserve a minimum forest domain deemed sufficient to ensure the productive and protective functions expected of it. Consideration is given in the location of such reserves to the forest's essential role in soil protection, in the maintenance of water supplies, and in preserving as equable a local climate as possible.

The areas of forest cover outside these reserves have been opened to exploitation under as much control as the slender resources of Forest Service staff permit. In some countries (notably in Ghana, where the policy was to open land to cacao cultivation by a prior "salvage" of all valuable timber species available) the

rate of clearing by farmers for the planting of cacao and other tree crops has exceeded that of those interested in the forest resources, with the result that much of the export value which could have been drawn from forest areas outside the reserves has been lost. What is more serious still is that inroads are being made in some cases even into the zones reserved as the minimum area considered necessary to satisfy the country. An urgent need therefore exists for educating public opinion in the essential role of forests in the long-term social, physical, and economic welfare of an area, and for stepping up the training of a sufficient staff of forest personnel at all levels to safeguard and manage the forest estate that remains.

In a number of cases it has been recognized that exploitation should not be limited to areas outside the reserves as long as these last. Continued research is essential into methods for increasing the economic value of the tropical forest and this can best be carried out within the reserves which are destined to form a permanent forest estate. As far as their accessibility permits, therefore, they have not been left untouched and unproductive, but have been placed under management designed to enable them to produce their maximum yield when the timber resources of the country are largely reduced to the reserved area only.

#### MAIN PROBLEMS

A large number of problems and obstacles to agricultural development and nutritional improvement have emerged in the course of this chapter. Some of these are peculiar to the region or to some part of it, but more of them are common in some degree to all the less developed parts of the world. The region is too diverse and this study too preliminary to attempt to allocate priority to particular problems for further study and action or to propose solutions for them. It does seem useful, however, to close the chapter with a summary of the various problems that have been referred to at different points in the discussion.

The steady postwar growth in production and trade in agricultural, fisheries, and forestry products is impressive, but satisfaction with this general situation must be tempered in three principal respects. Firstly, the actual level of production to which such a high rate of increase has applied is still extremely low in relation to the population and the available

land, while the growth of population is itself enforcing the development of more permanent and productive systems of agriculture. Secondly, food consumption is inadequate, particularly from the point of view of its nutritional quality. Thirdly, the export revenues of many territories are highly vulnerable to fluctuations in world prices. Most of the main food and agricultural problems, economic, institutional, nutritional, social, and technical, fall under these three heads.

## Low Productivity

Improved productivity is, of course, the key to increased incomes and to economic and social development in general. Most territories in the region are likely to remain mainly dependent for a long time on their domestic agriculture not only for feeding their own populations but for obtaining the revenues needed for further development. Improvements in the agricultural sector are therefore crucial.

The present level of agricultural production per head of the total population appears to be lower than in any other main region except the Far East, where, in sharp contrast to most parts of Africa South of the Sahara, there is very heavy population pressure. While comparable yield data are scarce, it seems that, generally speaking, yields of most crops and also of livestock are very low in comparison with the rest of the world and even with other underdeveloped areas. In some parts of the region European farmers obtain yields well above those in indigenous agriculture, but even these are often lower than those prevailing in other regions.

Almost everywhere in Africa South of the Sahara agricultural progress depends on studying and overcoming various adverse factors, including difficulty in preventing erosion and maintaining fertility, uncertain rainfall and the abundance of diseases and pests, particularly the tsetse fly. In many areas the productivity of labor is reduced by unfavorable climate, diseases, and malnutrition. It seems hardly likely that any sudden revolution in the overall level of productivity could occur, except perhaps through the substantial changes that might result from the successful control of the tsetse fly, which at present excludes the more productive breeds of livestock from very wide areas and limits the use of animal traction in agriculture, though as a factor in human disease its importance has recently been sharply reduced.

Nevertheless, very considerable progress could be achieved and much has already been done in the breeding of improved plants and animals, in the control of pests and diseases, and in land utilization. But for these results of research and for the application of improved techniques to have a full and lasting effect on yields, many further economic, social, and technical obstacles remain to be overcome.

In most areas the most urgent technical problems are probably the need for systems of land and water utilization that are better adapted to the building-up and maintenance of soil fertility and can conserve water resources and apply them to the most fertile land. Although the population of most of the region is sparse by normal standards, in many areas it is already too great for the maintenance of fertility under existing extensive methods and the development of suitable systems of permanently settled agriculture is imperative. A very large part of the forest cover of Africa South of the Sahara has already been destroyed through the systems of shifting cultivation prevalent over wide areas of the region and through the opening up of land for tree-crop production. Burning to provide pasture has also been an important factor. The forest resources that have been destroyed have usually been completely wasted, or used for fuel. Far more serious, however, is the effect of this destruction on the water regime and on the fertility and stability of the soil. It has been suggested that if soil and water resources, the two basic elements for the agricultural development of Africa South of the Sahara, are to be maintained in a productive condition, about 30 percent of the land surface must be kept under forest cover in the tropical and subtropical zone and as much as 45 percent in the equatorial belt within this zone. In many areas these critical minima are being approached and sometimes they have already been passed.

The need for soil conservation dominates the agricultural situation in some parts of East and South Africa, where erosion is particularly serious. Almost everywhere, however, there is evidence that yields are tending to decline as, with the growth of population, the shifting cultivation cycle is reduced below the minimum period needed for regeneration. Changes in indigenous systems of land utilization are being introduced in all territories, often through settlement schemes, but mostly they are still ex-

perimental and it is too early for an assessment of their success. One lesson has however, already emerged fairly clearly. Postwar experience strongly suggests that the wholesale application of ' modern " methods is not appropriate and that progress must be attempted much more slowly by building on and improving the existing indigenous methods. Systems of permanent agriculture developed in other tropical areas may also be found suitable in certain parts of the region. In particular, much progress can probably be looked for through the gradual development of appropriate systems of mixed farming, the introduction of suitable rotations, and the provision of better hand and animal-drawn implements.

Forestry and fisheries production also have their own technical problems. The present low productivity of the forests is an important cause of their ruthless destruction, and an enhancement of their economic value would therefore have very far-reaching beneficial effects. In the economic exploitation of the region's timber resources the main obstacles are the inaccessibility of many of the forest areas and the mixed nature of the tropical forest, which contains many species whose commercial value is not known. Outlets for the latter are, however, increasingly being found in the manufacture of fibreboard and particle board, pulp and paper, products which can bear heavy transport costs more readily than can bulky timber.

Outside the relatively highly developed sea fisheries of the southern part of the region, fishing and processing techniques generally remain primitive. Tropical conditions cause many marketing problems and accentuate the effects of inefficient preparation, handling, storage, and transport.

Increased productivity in agriculture, fisheries, and forestry does not depend solely on technical factors, however. Ignorance and the general lack of training facilities are still formidable obstacles. Improvements in the methods of the individual small farmer are also severely hampered by the lack of savings and the inadequacy of the supply of rural credit. Social factors hampering increased productivity include tribal systems of land tenure and the custom, in many areas, to regard livestock as a store of wealth or sign of prestige, so that numbers count instead of quality or productivity.

Where production is mainly for subsistence, the concept of increased productivity has very little meaning and it is very difficult for government policies for improvement to penetrate except in areas where the production of cash crops is already established. Little is yet known with certainty about the response of the African farmer to price incentives, while it is also surprising, in view of the widespread prevalence of the problem in the less developed regions, how little systematic study has been made of the best methods of easing the transition from subsistence to a market economy. Certainly, however, in Africa South of the Sahara, the provision of marketing facilities and, especially, transport are among the key factors in this transition.

While in many other parts of the world the provision of industrial and other alternative employment for surplus agricultural population is a prerequisite for the raising of agricultural productivity, in most of Africa South of the Sahara this does not appear to be so and agriculture and industry often compete for labor. Except for the provision of enlarged urban markets for foodstuffs, industrialization has not so far had wholly beneficial effects on agricultural production in the region. Much of the industrial labor supply is based on temporary migrant workers who return to their villages after a short period of work in mining or other industry, where they may frequently accumulate neither capital nor skill and in the meantime leave their villages with inadequate labor for agricultural production.

#### Nutritional Problems

The available data indicate that the increase in food and agricultural production has more than kept up with the growth of population in the postwar period. Dietary surveys also suggest that the intake of calories generally more or less corresponds to calculated needs. These needs are based, however, on the present state of the population, which has usually been malnourished from birth and before. Thus, if better diets were available from an early age it is very probable that the calorie needs of the adult population would be increased on account of greater weight, degree of activity and other factors

In some areas even calorie needs as calculated at present are not satisfied during the period of shortage or "hungry season" that precedes the harvest. While the magnitude of this shortage appears to have been reduced in many areas, recent surveys suggest that it is still a widespread problem. In particular, much further progress appears to be needed in the provision of family and village storage facilities and also in the development of earlier maturing varieties of crops, especially of millets and sorghums.

From the nutritional point of view, however, it is the pattern of food production and consumption, rather than its low level, which most urgently needs changing. Even where calorie needs appear to be satisfied, almost all available information on diets indicates that their nutritional quality is unsatisfactory. A deficiency of protein, especially animal protein, and of certain vitamins and minerals appears to be very widespread. These deficiencies, above all protein deficiency, are the cause of much morbidity and mortality in the region. They contribute especially to the very high rate of infant mortality between the ages of one and four and must also eause reduced activity and productivity in the adult worker.

Most research and most efforts to improve production and marketing have so far been directed mainly to the export crops. Even where work has been done on the local food crops, it has been chiefly concerned with the starchy staples, improvements in the production of which were initially required to prevent actual famine, and which now occupy too great a place in the diet. Livestock has received much attention, but this is a long-term question and more emphasis could probably be given to shorter-term possibilities of improvement in dietary quality through increased production of such foods as fish, pulses, green vegetables, and fruits.

While the diversification of food production is urgently needed, the problem is not one of production alone. In many areas nutritional ignorance and taboos forbidding the consumption of certain foods, especially of the all important animal products by the most vulnerable groups of the population, have still to be overcome, even though the influence of these factors is decreasing as a result of contacts with the outside world. In most of the areas where eattle are abundant it is proving very difficult to introduce the idea that the animals should provide a regular source of food and a marketable surplus. Nutritional education and home economics work will clearly play a large part in dietary improvements in Africa South of the Sahara. In this connection, there is also much scope for reductions in the time spent in food preparation, e.g., pounding cereals and roots by primitive methods.

Urban diets present particular problems, though here at least educational and home economics programs can be conducted more easily and cheaply than in sparsely populated rural areas. In the towns improvements in income are of overriding importance.

#### Export Problems

While commodities for export represent much the smaller part of the agricultural production of Africa South of the Sahara, they are the main source of money incomes, foreign exchange, and government revenues in most areas. In many territories the sums that can be set aside for development expenditure depend mainly on agricultural export earnings. The main export problems concern both the level and the pattern of production.

The sharp fluctuations in world prices to which the main agricultural exports of the region have been subject in the postwar period illustrate the great vulnerability of these incomes and revenues. In many territories postwar schemes for the control of producer prices have given greater stability to the incomes of the many small producers in the region. Total export revenues and thus the government revenues deriving from export taxes have, however, fluctuated considerably. Short of international agreements for the stabilization of world prices, such as have often been contemplated but rarely put into practice in the postwar period, these fluctuations seem bound to continue. To some extent their effects, especially on the funds available for development, can be mitigated by setting aside reserves in years of high prices for use when revenues are lower.

Fluctuations in total export earnings could also probably be reduced if these earnings were derived from a wider range of commodities than is at present the ease in most territories. It has already been emphasized, however, that the diversification of production is both a difficult and a rather long-term process and that it is probably unwise, in the ease of exports, to expect too much from it. In particular, the choice of a new or at present minor crop for encouragement involves very careful judgement of future export possibilities, often, especially in the ease of tree crops, a long while

in advance of the time when the crop will be in substantial production.

In the last few years, as the main postwar shortages have been overcome, world markets for the chief exports of Africa South of the Sahara have tended to become much more highly competitive. Thus the level of productivity of these crops, which determines their cost of production and thus their competitive ability is an increasingly important factor. In spite of the great volume of research devoted to export crops, the generally low yields referred to earlier apply to these crops also and much further work appears to be necessary on the breeding of improved varieties, the control of diseases, the use of fertilizers, and the improvement of cultural methods. While the organization of export marketing is now fairly highly developed, it seems essential that efforts to improve quality, which also determines the competitive position of a product, should not be relaxed.

Judging by the rates of increase achieved recently for some of the major exports, these could be very substantially and rapidly increased, given sufficient encouragement in world markets. Demand in the industrialized countries for the main exports of tropical areas such as Africa South of the Sahara appears likely to continue to increase steadily, in line with the growth of economic activity and of incomes in those countries, and the main factor which could cause a break in this expansion would be the development of successful synthetic substitutes. This problem is probably more acute for industrial raw materials than for food products, but recent experience with cacao is particularly significant, indicating that if prices rise too steeply manufacturers tend immediately to begin or intensify the search for a substitute.

With only a few rather specialized exceptions, most territories in the region produce the great bulk of their own food supplies. This is itself a stabilizing influence on their economies and tends to protect them from the most extreme effects of fluctuations in export earnings. It emphasizes once again the need for governments not to neglect to encourage the production of adequate domestic food supplies, particularly in view of the increasing rate of population growth.

The present low level of intraregional trade may offer some scope for a strengthening of the export position of some territories. While transport difficulties and the composition of the

export and import trade militate against any substantial increase, except in the long term, in the volume of trade movements within the region some increase is certainly possible if export opportunities in neighboring territories, especially those where urbanization is rapid, are given more consideration in production planning. Already in the postwar period there has been a substantial increase in exports of cattle to neighboring territories; here the varying physical conditions within the region, especially the presence of the tsetse fly, have enforced a degree of specialization. It also appears likely that increased fish production would find substantial outlets in intraregional trade if marketing and transport problems can be overcome. Similarly, the economics of maize production in eastern and southern Africa would seem worthy of study, for recently a number of unexpected export surpluses have had to be sent at a loss to distant markets outside the region, only to be followed by the need to import in the following season, while in some territories much of the maize is grown on land marginal for its production, with consequent low yields. It may well be that an investigation of this and some other products might reveal a strong case for some degree of intraregional specialization in production and for some co-ordination of production, trade, and storage policies.

# The Organization of Measures for Improvement

It is hoped that, although extremely tentative, the above summary of some of the principal problems that seem to emerge from an examination of the food and agricultural situation of Africa South of the Sahara may help to suggest some lines for future study and action, either in specific areas or at the regional level. Emphasis of these problems at the close of this study should not, however, be allowed to detract from the great strides that have already been made in combating them. In general they are the very problems to which governments have given most attention in the period under review.

The first and most basic stage of government assistance is in the organization of research. It is clear that there has been a substantial postwar increase in research facilities, while a major development during this period has been the growth of international co-ordination and exchange in the research field, especially under

teh aegis of the Commission for Technical Cooperation in Africa South of the Sahara (CCTA) and its Scientific Council (CSA). In view of the growing shortage of trained technicians, increased co-operation of this nature could probably have most beneficial effects and the burden of the necessary research could be to some extent shared. This would probably provide more opportunity for research into some of the fields that have so far been less explored, such as basic soil, water, and general resource surveys, the study of the factors that have shaped the evolution of existing indigenous systems of agriculture and their value in devising improved systems, and more research on the local food crops whose production is so influential in determining human welfare in the region.

The improvements that are made possible by research must, however, be translated into practice and in Africa South of the Sahara this seems to be the more difficult part of the problem. Even more than elsewhere, it appears that the actual application of improved methods lags behind the achievements of research. It would appear to be essential for extension work to be regarded as a more specialized branch of activity than at present, taking more account of the many social and other nontechnical obstacles to improvement.

Much has also been done in assisting adjustments in land tenure systems, in the organization of marketing facilities, and in encouraging the growth of co-operatives. The question of changes in tribal systems of land holding is a particularly complex one and would seem a fruitful field for the international exchange of experience. Marketing organization has tended to concentrate on export crops and there is still much scope for improvement in respect of local food supplies, especially as internal movements of food products will increase with

growing populations and greater urbanization. Among the many fields where co-operative organization has been found advantageous, the provision of credit to small farmers is one which could be developed much further, while the experimental introduction of systems of supervised credit might also prove valuable.

Much of the postwar improvement in the food and agricultural situation has resulted, either directly or indirectly, from the plans and programs of economic and social development that have been executed in almost all territories. Such public investment is bound to remain one of the main lines of progress for a long time to come, especially in the provision of such all-important basic facilities as transport, which has so far been one of the main purposes of these programs.

It may be that the region is entering a period when capital supplies, especially from loans and from current revenue resources, for the execution of these plans are likely to be tighter. This emphasizes the need, not only for increased international attention to the mobilization of capital for underdeveloped regions but also for closer examination of priorities in development planning. There is an urgent need for improvement in the provision of the basic data required for realistic planning, such as demographic, agricultural, and food consumption statistics, resource surveys and reliable assessments of future world demand for exports. Above all, clear-cut agricultural policies, fully integrated into overall policies for economic development, are required. In Africa South of the Sahara such policies should particularly take account of the overriding nutritional needs of the population and of the need to have a comprehensive land-use policy which does not allow the wasteful destruction of irreplaceable forest and soil resources.

# Chapter IV - THE GROWTH OF FOREST INDUSTRIES AND THEIR IMPACT ON THE WORLD'S FORESTS

#### INTRODUCTION

Tabloid educators have familiarized most people with the fact that the timber from 50 hectares of forest is consumed by a single Sunday edition of a New York newspaper.1 A fearsome picture is thus created in people's mind of modern pulp and paper industries - juggernauts relentlessly rolling back the forest boundaries and destroying man's forest heritage. Though this picture may contain a particle of truth, it is on the whole false and inaccurate. Man made war on the forests long before the advent of modern forest industries. Woodworking industries in the modern sense date back less than a century with the introduction of the steam engine into the saw-mill. Even today it is not the giant modern forest industries which are making the most serious inroads in the forest; indeed, in many parts of the world large-scale industrial exploiters of the forest are today setting a shining example of forest care and conservation.

Man's "pre-industrial" impacts on the forest began soon after the emergence of man; they have proceeded through historical times, changing their nature with man's ceaseless development.

Of course, the earth's forest cover varied considerably in prehistoric times. The forest vegetation and forest boundaries fluctuated with secular changes in climate and under the influence of such material agencies as storm, drift sand, snow, insect pests, fungus diseases and fire caused by lightning and volcanic eruptions. The margins of many woodlands must also have been affected by long-continued grazing of large herds of wild animals. It is believed that in prehistoric times forests covered most of the world save the ice-capped polar

regions, barren mountains, the Sahara, Kalahari, Gobi deserts and open areas such as the Russian steppes and the American prairies. That is to say, before the influence of man about half of the land area of the world — almost 60 million square kilometers — was covered with primeval forest; but whereas in prehistoric times the forest area fluctuated, shrinking in the glacial periods and recovering when the climate became warmer, in historic times, under man's influence, the forest area has almost continously diminished.

The areas deforested, as may be seen from the maps, correspond closely to the areas of population concentration, for while dense virgin forest is essential to primitive human life it is hostile to civilization. As man multiplied, as his social organization and culture changed, the forest boundary receded before him. A glance at the successive phases of this historical process will help to place the impact of modern forest industries in better perspective.

#### The Food-Gatherer and Hunter

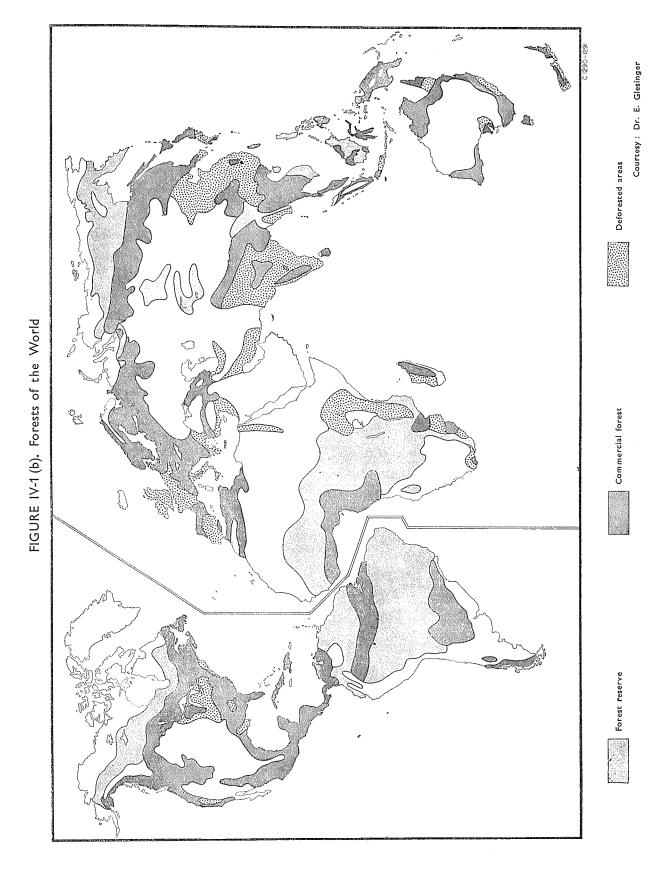
Through the greater part of his history man has obtained his food from the forest — game and seeds, fruit, berries, roots, etc. Still today wild fruit, seeds, and game are the staple of many peoples in remote areas.

Both for early man and for contemporary primitive tribes, however, the forest was and is more than a reservoir of food. The skins of sable, fox, and bear provided clothing. The forest gave shelter from wind, rain, and sun, and protection from enemies. Wood as a material was used for a variety of purposes, including construction, but its main use was as fuel—to give warmth and light, and to cook by. And still today, taking the world as a whole, more wood is consumed as fuel than for all other purposes taken together.

 $<sup>^{\</sup>rm 1}$  Assuming Canadian coniferous forest, clear-felled. On a sustained-yield basis about 5,000 hectares would be required.

From The Oxford Atlas. By permission of The Clarendon Press, Oxford.

1 dot = 100,000 persons



For primitive man the forest was the basis of his existence; he had no apparent cause to destroy it. Yet recent research has shown<sup>2</sup> that the practice of reducing the forest area by fire and by tree-girdling must have been wide-spread long before shifting agriculture came into being. This may have been to facilitate hunting or the digging of roots, or the object may have been to kill and dry wood for fuel. Sometimes these inroads may have been self-healing, even facilitating the development of tree vegetation. But often they must have resulted in pushing forward permanently the boundaries of steppes, prairies, and savannahs.

#### The Farm Versus the Forest

A revolution in the human economy was effected when man started to control his own food supply, through cultivation and stock-breeding. Both imply forethought, and the capacity to create and utilize surpluses; both thus permitted a rise in population. Agriculture does not imply permanent settlement, any more than hunting implies nomadism, and early agriculture, in all parts of the world, was probably shifting, giving way to settled agriculture only as land became scarce and techniques improved.

Much of the world's crop and pasture land has been acquired without infringing on the forested areas, for example in the North American prairies, the South American pampas and the Russian steppes, and this process will continue in some parts of the world. But most of the land under agriculture today has been won by clearing the forest. It has been estimated that about one third of the original forest in the United States has been cleared. in Western and Central Europe, and also in India, about 80 percent, and an even higher proportion in England and China. It is more than likely that the forest has yielded more ground to agriculture than to any other demand. Farmers and herdsmen continue to win most of their new land from the forest, and this process will undoubtedly continue, though with slackening speed in many regions.

In the temperate zones of the Northern Hemisphere the boundaries between farm and forest are at present almost stationary. In Western Europe and the United States the forest has even regained some ground through reforestation and afforestation. Forest clearance continues in parts of Canada and Eurasia, but this may be balanced by afforestation in other areas of the same regions. However, there is a steady pressure for more land for food in both Europe and North America, while more ground is needed for urban and industrial expansion. It is the need to meet this demand while yet preserving beneficent forest influences and safeguarding future timber supplies that is focusing attention increasingly on land use policies and increased productivity in agriculture.

In the temperate zones of South America, Africa, and Australasia the forest area, never large as compared with the Northern Hemisphere, seems to be stabilizing, even increasing through the planting of exotic species.

Throughout the tropics, however, the forest continues to lose ground to agriculture, and it seems doubtful whether this trend will be checked in the coming decades. The use of fire to clear forest for crops and pasture prevails in many tropical and subtropical countries. A third of Southeast Asian agriculture is said to be under shifting cultivation. In Africa some authorities assert that the original tropical forest area has already been reduced by two thirds and that, unless determined efforts are made to change the farming system, the whole of the tropical virgin forest may disappear within our lifetime.

The problem of shifting aboriginal farming is no simple one, however. Clearly a prodigal waste of timber is involved. If erosion follows clearance, if cropping is carried on too long, if the land is overgrazed, regeneration is hindered, the land becomes unproductive waste land recoverable only at high cost. On the other hand, most tropical soils are poor in nutrients, and many authorities believe that they can only be continuously cultivated by using the forest as an essential part of the cycle to restore fertility to the soil.

Finally, there are many arid zones in the world — some formerly forested — where the reestablishment of vegetation and some forest cover is a necessary precondition for a development of agricultural activity and indeed for any economic progress at all.

It may well be that in certain areas of the world the further alienation of forested land for agriculture is necessary, inevitable, even desirable. But it is of cardinal importance that

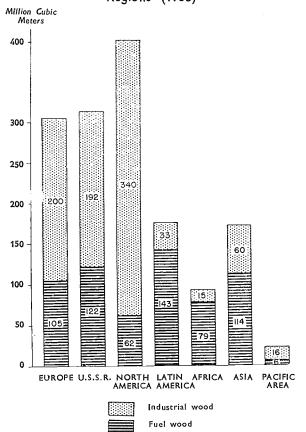
<sup>&</sup>lt;sup>2</sup> Erhard Rostlund, The Outlook for the World's Forests and their Chief Products. New York, 1956.

this process be planned and controlled in the framework of integrated land use policies if the interests of future generations are not to be sacrificed.

## The Need for Fuel

From earliest times the main use of wood as a material was as domestic fuel. The advent of the early civilizations, about five millennia ago, led to an enormous expansion in fuel-wood needs. Urbanization and relatively complex forms of social organization had been made possible by a variety of innovations; the harnessing of wind, water and animal power; the invention of the plow and the wheel; the discovery of brick and pottery making and of metal working. Settled and more productive agriculture, increasing division of labor, growing contacts - including trade - between communities, led to a rapid rise in population which multiplied domestic fuel needs. New crafts demanding sustained high temperatures brought a rising demand for fuel wood and

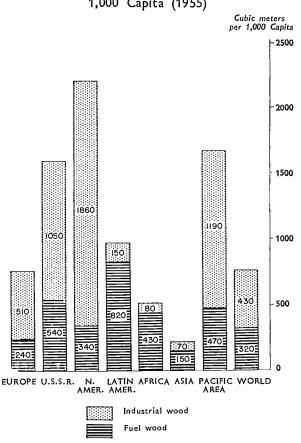
FIGURE IV-2 (a). Wood Consumption by Regions (1955)



charcoal. Much of the deforestation in historical times, for example in the Mediterranean Basin, in the Indian subcontinent, and in China, has probably resulted from the incessant depredations of the forest for fuel. It should be remembered that right down to the eighteenth century, fuel wood and charcoal were, for all practical purposes, the only energy-giving combustibles to supplement wind, water, and muscle power. In many parts of the world they remain so today.

In Europe the incursions on the forest area accelerated in the fifteenth century with the invention of iron smelting and steel. The rising demand for implements of peace and war drove back the forests from the iron areas. The new industry created tools which made it easier to deplete the forests. The rapid progress of other arts — glass, pottery, brick, etc. — added to the demand for wood. For the first time forests were protected by law. Iron production in Europe moved from the denuded South and West to Sweden and the Urals where wood was plentiful.

FIGURE IV-2 (b). Wood Consumption per 1,000 Capita (1955)



The application or development of other forms of energy — coal, oil, and electricity — came in time to save the remnants of Europe's forests. These have substituted wood and charcoal in most industrial processes as well as for domestic purposes in many areas. In Europe and North America wood has become a rural fuel, when it is used at all.

But though the use of wood as fuel is declining in Europe and North America, absolutely and per caput, in Asia, Africa, Central and South America fuel is still the most important use of wood. Moreover, there is every reason to believe that recorded figures of fuel-wood removals seriously understate total fuel-wood consumption. Thus it is reasonably certain that well over half the wood used in the world today is used as fuel.

Because the forests have been razed, millions in Asia rely on cow dung and grass for fuel today. But the majority of the peoples of Asia, Africa, and Latin America still rely on wood for fuel, and must continue to do so until new sources of energy have been developed in those areas and until increased purchasing power has brought these new forms within their reach. The problem therefore is to ensure that fuelwood cutting shall not be destructive, to improve fuel-wood utilization practices, and in some areas to create fuel-wood plantations. By these means it may be possible to avert the dire consequences that attend reckless devastation of the forests.

## Wood for Industry

The brief account in the foregoing paragraphs of the pressure of agriculture on the forest and of the need for fuel might suggest that the demands on the forest for wood for constructional and other industrial purposes have been relatively insignificant. But at various times and in particular areas these demands have constituted the greatest drain on the forest, and this is the case in all developed regions of the world today.

Wood is the traditional building material. Though other materials have ousted it or diminished its importance in wood-deficit countries and in conurbations, wherever wood is plentiful it is still the dominant material. And even where wood is scarce, provided it is obtainable at all, it continues to play an important role. Wherever man has settled, he has needed

wood for construction, and this has frequently led to heavy overcutting of the best timber in the surrounding areas.

Shipbuilding, too, has been a heavy wood consumer in past times, though its importance has diminished since the advent of steel ships. The fleets of the Greek and Phoenician mariners, and later of the Romans, contributed largely to deforestation in the Mediterranean Basin. The mountains of Greece were nearly stripped of trees by the fifth century B.C., and thereafter ship timber was sought ever farther afield in the Altai mountains, in Italy, and in other lands of the Western Mediterranean. When, after the Dark Ages, other maritime powers arose, the need for ship timber depleted the forests of the Pyrenees, Britain, the Low Countries, and Germany. This may have been an important factor also on the coasts of the Indian peninsula and perhaps on the borders of the Pacific.

Wooden props for mining must have been used in very ancient times, and the demand for mine timber contributed to deforestation in Southwest Asia, in the Sierra Nevada and Sierra Morena in Spain, in the Erz Mountains in Germany, and many other mining regions. Indeed it was deforestation resulting from the need for mine timber that led to the promulgation of some of the earliest forest regulations — in Germany, Austria, and Mexico.

The rapid expansion of coal mining in the last two centuries has accelerated the demand for pitprops, and many coal regions have come to depend on imported props. But today mine timber is losing its importance as an outlet for wood, in relative, and probably also in absolute, terms. This is partly due to the advent of new sources of power, and partly due to the increasing use of steel and concrete in place of wood in mines.

## Avoidable Calamities

Enough has perhaps been said to show that the most serious encroachments on the forest occurred long before the advent of modern forest industries. In the sections which follow an attempt will be made to sketch the history of the principal forest industries and to examine their impact on the world's forests. But first it is necessary to mention some other ways in which the forests have been diminished or depleted — through man's carelessness or ignorance.

Fires are an important cause of forest damage. Controlled burning has its place in silvicultural practice. Clearance through burning, as has already been indicated, is an essential feature of shifting cultivation. Accidental fires, however, are a constant headache to the forester. It is estimated that around 7 million cubic meters of timber are burned annually in the United States, in spite of an annual expenditure of some 63 million dollars on fire prevention and control. But there have been times — during colonization periods, for example — when even accidental fires were regarded as a blessing.

Pest plagues of various kinds represent an important drain on the forest. Indeed, there are still many forests in the world where natural losses of all kinds — fires, insects, and diseases - balance gross increment, the amount of new wood put on yearly, so that there is no net growth. But nature is not always alone to blame. Inadequate precautions against the introduction of pests and diseases on planting stock can be dangerous. For example, at the beginning of this century the chestnut blight fungus was carried from Asia to the United States on nursery plants, with the result that the American chestnut (Castanea dentata) has been practically wiped out. Similarly, the introduction of the European white pine blister rust into the United States at about the same time has threatened the whole existence of the eastern white pine (Pinus strobus) on which the sawmilling industry in the United States was founded.

The Douglas fir, on the other hand, native to the Western United States, was introduced into Europe in the eighteenth century. It gave excellent results and was widely planted. Thirty years ago, however, the Rhabdocline fungus was carried from the United States to Europe, where its virulence increased, though not all forms of the tree were molested. More recently, a severe disease, Adelopus needle cast, has attacked all forms, and the planting of Douglas fir has now been given up is some areas of Europe, while in other areas it is planted only in mixtures.

Other examples could be quoted, but these perhaps suffice to point out the danger of unplanned efforts, without an adequate research basis, to raise forest productivity. But the lessons of these and similar experiences have been learned, and ever greater success attends man's efforts to combat natural calamities in the forest and to avoid disasters of his own making.

## The Rise of Forest Consciousness

The history of man's relationship to the forest makes sorry reading — a tale of wanton misuse and reckless exploitation through most of recorded history. Regions of barren desert, areas subject to recurrent flooding, bear witness to man's past failure to recognize the protective role of the forest, while areas of wood scarcity where forests formerly grew emphasize the high price which has to be paid for past disregard of the needs of future generations.

From time to time lone voices were heard calling attention to the danger, and here and there sustained efforts were made to maintain or re-establish the tree cover, though few of these endured. In China, for example, under the Chu dynasty - three millennia ago - a "Mountain and Forest Service" was established and forest administration and management reached a high degree of efficiency. 4 In India, during the Brahmani and Buddist periods, religious considerations helped to preserve the forests. 5 In Western and Central Europe, from the Middle Ages on, protective measures were taken from time to time, either to safeguard timber supplies for particular industries, or to preserve hunting grounds for the nobility. But in modern times, effective forest policies combined with scientific silvicultural management began to emerge only a century ago — and this in Europe, where growing wood scarcity in many countries compelled action. Even then the main emphasis was on timber as a crop, on the need to utilize the forest interest while maintaining the forest capital intact. Recognition of the non-crop functions of the forest, of its influence on flood control, erosion, water supply, came much later. Today hardly any country lacks a forest service, though in many countries the means, both in material and man-

<sup>&</sup>lt;sup>3</sup> Timber Resources for America's Future (U.S. Department of Agriculture, Forest Resource Report No. 14). pp. 189 and 198. Apart from the timber actually burned, growth loss is estimated at over 40 million cubic meters.

<sup>&</sup>lt;sup>4</sup> D.Y, Lin, "China" in A World Geography of Forest Resources. edited by Stephen Haden-Guest [and others], Ronald, New York, 1956 (American Geographical Society, Special Publication No. 33), pp. 529-550.

<sup>5</sup> M.D. Chaturvedi, "India" in A World Geogra-

phy of Forest Resources, op. cit., pp. 455-482.

power, available to the service, and the statutory powers it enjoys, are still far from adequate for it to discharge its functions effectively.

If for many decades foresters were conservative, this was a natural consequence of the circumstances in which forestry as a profession grew up. Professional foresters became concerned to check abuse of the forest; they prided themselves on taking the long view, safeguarding the interests of future generations. Sometimes they were at odds with those who looked to the forest as a source of necessary raw material, and the foresters and the forest industries frequently found themselves in opposition. In recent decades an encouraging change has come about. On the one hand, foresters have seen more clearly the importance of meeting present needs while safeguarding future needs, and the great strides they have made in silvicultural practice have multiplied the tools available to do this. On the other hand, forest industries themselves are increasingly taking the longer view, and in many cases have become the foresters' best allies in promoting sound forestry practice. In the pages which follow, this favorable evolution will be traced in more detail.

# THE GROWTH OF THE FOREST INDUSTRIES

#### Introduction

Much of the so-called industrial wood taken annually from the world's forests does not enter into factories at all. In 1955, for example, world industrial wood output as reported to FAO amounted to some 900 million cubic meters. Of this, around 80 percent underwent processing in the major forest industries 6; the remainder entered into final use substantially in round-wood form — as mining timber, poles, posts, for direct use on farms, etc. — having undergone only rudimentary fashioning, either in the forest or by the final consumer. Included among the 80 percent which did undergo transformation in the forest industries were considerable amounts which were processed on

relatively primitive — almost "pre-industrial" — lines, such as hewn or handsawn sleepers and hardwood bolts.

It is customary to draw a distinction between the primary and secondary forest industries, the former operating on roundwood as raw material, and generating products either for final use or destined for further processing in the secondary forest industries, while the latter further process the semiprocessed goods delivered by the primary forest industries. This dichotomy is not an ideal one, but it has its conveniences. It is not ideal because the structure of the forest industries is somewhat more complex than it might suggest: wood processing is not only one-stage or two-stage, there are a number of "tertiary" forest industries; the line between primary and secondary industries is not always easy to draw. Strictly speaking, pulp manufacture should be regarded as a primary industry and paper and paperboard manufacture a secondary one. But in practice a considerable proportion of paper manufacture is integrated with pulp production, so that in this article pulp and paper manufacture are considered together as one of the major primary industries.

It is the primary forest industries, operating on roundwood, which have a direct impact on the forest; the extent and nature of that impact is determined in the first instance by the activity of the secondary forest industries and in the last analysis, of course, by the size and pattern of the demand for forest products for final consumption. In the following pages attention is concentrated on the primary forest industries, and in particular on the four main groups: the sawmilling industry; the pulp and paper industry; plywood and veneer manufacture; and the board industries - fibreboard and particle board. The order cited corresponds to the order in which these groups have developed in the course of time; it also corresponds to the present-day order of importance as measured either by roundwood consumed, gross value of output, or direct employment afforded.

Some estimated comparative figures for the world's primary forest industries in 1955 are given in Table IV-1.

While no great accuracy can be claimed for these estimates, it is believed that they reflect reliably the orders of magnitude involved. They show that sawmilling is still the most important primary forest industry, employing two thirds of the labor force, accounting for

<sup>&</sup>lt;sup>6</sup> More accurately, forest products' industries, since in literal terms a forest industry is one carried out in the forest, e.g., charcoal burning. Throughout this article, however, the term forest industries is used as a convenient shorthand for forest product industries as herein defined.

TABLE IV-1. WORLD'S PRIMARY FOREST INDUSTRIES COMPARED (1955)

FOREST INDUSTRIES	Roundwood equivalent of output <sup>1</sup>		Gross value of output		Investment <sup>2</sup>		Labor force	
	Mill. m³ (r)	%	Mill. dollars	%	Mill. dollars	%	Millions	%
Sawmilling 3	510	68	13 000	49	7 500	22	3.0	66
Pulp and paper 4	190	27	11 600	44	25 000	73	1.2	26
Plywood	29	4	1 200	5	1 300	4	0.3	7
Board products	11	1	425	2	450	1	0.04	1
TOTAL	740	100	26 225	100	34 250	100	4.6	100

<sup>&</sup>lt;sup>1</sup>Duplication arising from the use of wood residues is disregarded. — <sup>2</sup>Estimated cost of establishing in 1955 the capacity existing in 1955. — <sup>3</sup>Includes all sleeper production. — <sup>4</sup>Includes production of dissolving pulp for all purposes, including textiles.

more than two thirds of the roundwood equivalent of output, and furnishing half the gross output by value. In terms of capital invested, however, it ranks well behind the pulp and paper industry, though the latter employs little more than a third as many personnel. Compared with these two giants, the plywood and board industries play a minor role.

These contrasts stand out even more clearly if we compare some of the ratios involved (see Table IV-2).

TABLE IV-2. SELECTED RATIOS: WORLD'S PRIMARY FOREST INDUSTRIES (1955)

FOREST INDUSTRIES	Gross value of output per unit of raw material	Invest- ment per person em- ployed	Invest- ment per unit of raw material	Employ- ment per unit of raw material
	Dollars per m³(r)	Thou- sand dollars	Dollars per m³	$Number\ per\ 1,000\ m^3\ (r)$
Sawmilling	25	2.5	15	5.9
Pulp and paper .	61	20.8	132	6.3
Plywood	41	4.3	45	10.4
Board products .	39	11.2	41	3.6

Any comments on these figures must necessarily be very broad generalizations, since within each of the four industrial groups there are very wide variations in size, operating efficiency, type of product and investment per unit of capacity. There are thousands of small sawmills producing a few hundred cubic meters of sawn goods annually, with rudimentary equipment; at the other extreme, there are

many highly mechanized sawmills with an anuual capacity of over 50,000 cubic meters. There are paper mills in different parts of the world where the procedures differ little from those by which the Chinese made paper two millennia ago; on the other hand, there are giant, fully automatized plants, with annual capacities in the order of 200-300,000 tons, where it is possible to walk the plant for hours and encounter but a handful of skilled machine-tenders.

Yet, with all these qualifications, it is evident that the pulp and paper industry is much more capital-intensive than its sister primary forest industries, and yields a higher gross value per unit of raw material. The type of wood raw material used by each industry differs. On the whole, the sawmills and plywood mills require more valuable species and larger dimensions; the pulp mills and board plants operate on smaller-dimensioned woods, do not make use of high-value woods, and to an increasing extent are utilizing wood residues from other forest industries and even residues from forest operations. Thus, in terms of value added to the raw material employed, the pulp and paper industry has a lead over other industries even more pronounced than is shown in Table IV-2, while board products come second, before plywood and sawmilling.

The four industry groups listed in the foregoing tables do not exhaust the primary forest industries. Omitted are such important industries as charcoal, wood-wool manufacture, and wood distillation. And quite apart from wood-transforming industries, there are important forest-based industries concerned with the extraction and refining of tanning materials, resins, lacs, oils, and the like. In round

figures, it may be estimated that the primary wood-transforming industries employ around 5 million, while the secondary forest industries — furniture, container, box, match, and other woodworking industries, together with the paper-converting industries — employ about the same number. These figures exclude, of course, those who work in the forests themselves — on felling and extraction. Their numbers vary with the season, but on average it is probable that employment in the forest is roughly of the order of 5 to 6 million. Finally, an estimated 1 to 1½ million are engaged directly in forestry.

The importance of the four industry groups discussed in this article varies from region to region, as may be seen from Table IV-3.

Table IV-3. Regional Distribution of Primary Forest Industries in 1955 (Measured by wood consumption in million m<sup>3</sup> roundwood equivalent)

Region	Saw- mill- ing	Pulp and pa- per-1	Ply- wood	Board pro- ducts <sup>1</sup>	Total	m³ per caput
North America . Europe U.S.S.R Pacific Subtotal	$ \begin{array}{ c c c } \hline 210 \\ 95 \\ 120 \\ 10 \\ \hline \hline 435 \\ \end{array} $	115 53 10 1 179	16 6 3 —	5.5 5.0 0.2 0.3	159	2.09 0.39 0.66 0.75
Asia Latin America Africa	45 25 5 ——75	10 1 —	$\begin{array}{c} 2\\1\\1\\-\\4\end{array}$	$0.2 \\ 0.1 \\ 0.2 \\ \hline 0.5$	57 27 6 ——90	$0.04 \\ 0.13 \\ 0.03 \\ \hline 0.05$
World	510	190	29	11	740	0.27

SOURCE: FAO, Yexrbook of Fore t Produc's Statistics, 1957.

1Includes roundwood equivalent of wood residues.

The four developed regions — North America, the U.S.S.R., Europe, and the Pacific — which contain 30 percent of the world population, account for 85 percent of the sawmilling and plywood industries and 95 percent of the other two major forest industries — pulp and paper and board — as measured by industrial wood consumption.

The final column is not, of course, an index of consumption of forest products, since it does not take into account trade in processed goods; it is rather an indication of industrialization. Even so, it is not complete, since it concerns

only forest industries based on wood. A significant proportion of the manufacture of both paper and board is based on non-wood materials — agricultural residues, annual plants, etc. — and these are slightly more important in the developing regions. Nevertheless, this column does afford an indication of the extent to which the several regions turn their forest crop to industrial account. The striking thing is that per caput industrial consumption of wood in the advanced regions is 16 times that in the less developed regions.

In the world as a whole, just over two thirds of the industrial wood is consumed by sawmills, rather more than a quarter by pulp and paper mills, while plywood and board plants together account for little more than 5 percent. The pattern varies from region to region, however. The pulp sector is most important in North America and Europe (each 35 percent of the total) and least important in Latin America and Africa (each 6 percent). It is evident that in general the more advanced the region, in terms of industrialization and living standards, the greater importance does the pulp sector of the forest industries assume.

# The Sawmilling Industry

The sawmilling industry had its genesis in the application of a saw blade for cutting a log into boards. At first the blade was hand-driven, and was sometimes fixed into a frame to avoid bending. Two men were needed to operate it, one on a platform above the log, and one in a pit dug beneath it. By this "pit sawing" method, considerable amounts of sawnwood were produced. The method is still in use today; in various parts of the world important quantities of tropical hardwoods are pit sawn, and some of this pit sawn hardwood even reaches the export market.

Water power and wind power replaced manpower in operating the one-blade frame saw
at an early stage. The water wheel was adapted to power the saw in Germany as early as
the beginning of the fourteenth century. For
several centuries the frame-saw type of sawmill,
powered by water wheels or by Dutch windmills, dominated the sawmilling industry; indeed, no fundamental change occurred until
the steam engine began to find practical application in the first half of the nineteenth
century.

The water mills were mostly small affairs. of limited capacity and requiring little investment. In North America their best output is said to have been little more than one cubic meter of sawnwood per day. Being dependent on water flow, their location was restricted; in cold regions they could operate only part of the year. The advent of the steam engine, by making possible much higher capacities and liberating the sawmill from its previous locational bonds, revolutionized sawn-timber production. The beginning of the large-scale sawmill industry may thus be said to date from around the middle of the nineteenth century. With the introduction of steam power, and later with the application of the internal combustion engine and electric power, sawmilling rapidly developed technically.

The original frame saw — frequently with several blades added in parallel (the gang saw) — has retained its importance in stationary high-capacity sawmills operating on medium or small-sized roundwood.

Early in the nineteenth century another type of saw blade made its appearance, first in America and later spreading to Europe and other parts of the world: the circular saw; this was followed by a third type, the band saw, which began to find general application toward the end of the nineteenth century.

In large modern sawmills various combinations of these different types of saw are frequently met with; the first cutting usually determines whether the combination is known as a frame saw, circular saw, or band-saw mill.

Each type of saw has its own special characteristics, and hence its own main field of application. In softwood regions the frame saw is becoming more and more common in stationary mills; wherever resources of large-sized virgin timber are giving way to second growth and plantation timber, as in the United States, it finds increasing application. Where small local markets are concerned, and in circumstances where it is more economic to take a portable mill to the forest, transporting sawnwood instead of roundwood, circular saws are gaining on frame saws. The exploitation of hardwood resources, and especially of tropical hardwoods, gives wider application for band saws.

The long-term evolution of the United States sawmilling industry, has been uneven. With the advent of steam power in the 1850's, sawnwood production rose rapidly, reaching its peak at the beginning of this century. There-

after, sawmill output fluctuated considerably, consumption being sensitive to cyclical changes in economic, particularly building, activity. Since the last war, output has been relatively stable, though at a level lower than that achieved in the peak year 1907.

Clearly, sawnwood production has not, in the last four decades, kept pace either with the rise in industrial output or with the increase in population. Even when account is taken of the increase in net imports into the United States, it is evident that sawnwood consumption per caput has declined considerably. There are several reasons for this. Accessible resources of large-sized virgin timber have been worked out, while productivity both in logging and in sawmilling has risen only slowly; this has meant that sawnwood prices have risen relative to the prices of other structural materials. In many end-uses cement, bricks, stone, steel, and more latterly plywood, boards, aluminium, and plastics have taken the place of sawnwood.

This substitution has not always been due to price. Urbanization and the trend to multifamily dwellings has favored other materials. Even where sawnwood has been retained, economies (e.g., smaller dimensions) have been realized in its use.

Consumption of sawnwood in a number of other end-uses has been similarly affected, sometimes by the same factors, sometimes by special factors. With the slowdown in railway expansion, for example, the demand for sawn sleepers now comes predominantly from replacement needs, negligible quantities being required for new track. At the same time preservative treatments lengthen sleeper life. Thus wooden sleeper consumption in the United States fell by two thirds within the last three decades.

The development of sawmilling output in Europe since the beginning of this century holds certain similarities. Here, too, there were wide fluctuations between the wars, and though the general trend has been upwards, both before and after the second world war, the rise has not kept pace with either industrial output or population. If anything, the trend toward substitution has been even more marked, especially in the postwar years. It has been estimated, for example, 7 that sawnwood consumed per dwelling unit fell from 9.1 to 7.6 cubic

<sup>&</sup>lt;sup>7</sup> Trends in the Utilization of Wood and its Products in Housing (UN/FAO, Geneva, 1957), p. 7,

TABLE IV-4. SAWNWOOD PRODUCTION TRENDS BY REGIONS

Region	1913	1923-27	1937-38	1946	1948	1950	1952	1954	1956
					Million m³	(8)			
Europe	45.9 11.9 112.8	$\begin{array}{c c} 52.4 \\ 12.6 \\ 103.0 \\ \dots \end{array}$	56.7 33.9 72.7	$ \begin{array}{c c} 49.4 \\ 19.6 \\ 94.0 \\ 2.9 \end{array} $	52.5 32.7 103.7 3.6	$ \begin{array}{r} 56.4 \\ 49.5 \\ 107.1 \\ 4.0 \end{array} $	53.9 60.5 106.1 4.5	59.9 69.0 103.9 4.8	$\begin{array}{c} 61.4 \\ 75.2 \\ 108.4 \\ 4.7 \end{array}$
Subtotal	170.6	168.0	163.3	165.9	192.4	217.0	225.0	237.6	249.7
Latin America Africa				7.5 1.0 11.6	7.3 1.1 15.7	8.0 1.2 19.4	$8.9 \\ 1.6 \\ 23.6$	$9.2 \\ 1.8 \\ 25.4$	8.8 1.9 32.9
Subtotal				20.1	24.1	28.6	34.1	36.4	43.6
World		190.0		186.0	216.5	245.6	259.1	274.0	293.3

SOURCES: FAO, European Timber Statistics 1913-1950, pub. 1953. FAO, World Forest Products Statistics 1946-1955, pub. 1958. FAO, Yearbook of Forest Products Statistics, 1957. Streyffert, Världens barroleogstillgangar, 1931.

meters between 1950 and 1955. Since, however, new residential construction rose during this period from 1.35 to 2.18 million dwelling units, total sawnwood consumed in new housing rose from 12.2 to 16.7 million cubic meters.

Current trends suggest that both in Europe and the United States sawnwood consumption per caput will fall steadily in the coming years, with aggregate consumption remaining steady in the United States and rising slightly in Europe. In all other regions of the world, sawmilling output continues to rise, the major part of the considerable increase since the Second World War having occurred in the U.S.S.R. While a slowdown in the rate of expansion in the U.S.S.R. is foreseeable, production may be expected to continue to rise in other regions. Thus, the upward trend in world sawnwood production will probably continue in the coming years, although it is likely to remain below the increase in industrial output and population.

Sawmilling capacity is heavily concentrated in Europe, North America, and the U.S.S.R., the three regions which encompass the great coniferous belt of the Northern Hemisphere, containing 88 percent by area and 91 percent by growing stock of all the world's coniferous forests in use. Table IV-4 shows that these regions account for 85 percent of current sawnwood production.

In recent years there have some marked changes in the regional pattern of sawnwood production.

TABLE IV-5. REGIONAL DISTRIBUTION OF SAWNWOOD PRODUCTION. 1948 AND 1956

ITEM	1948	1956
		$n m^3 \dots$
Sawnwood production .	216.4	293.3
Regional share		ent
Europe	$\begin{bmatrix} 24.3 \\ 15.1 \\ 47.9 \\ 1.6 \end{bmatrix}$	21.0 $25.6$ $37.0$ $1.6$
Latin America Africa Asia	$\begin{bmatrix} 3.4 \\ 0.5 \\ 7.2 \end{bmatrix}$	$\begin{array}{c} 3.0 \\ 0.6 \\ 11.2 \end{array}$

Apart from the striking advance of the U.S.S.R., it will be observed that the shares of Africa and Asia have improved, while the Pacific Area has more or less maintained its position. The shares of Europe, North and Latin America have accordingly contracted.

Communications largely govern the location of industrial sawmills. Mills operating on imported roundwood are generally situated in or around the main ports, or within easy reach of them by road, rail, or water. Mills manufacturing for export are also normally concentrated near ports offering adequate shipping facilities, but of course they must also have easy and cheap access to their raw material supplies, which normally means adjacency to floatable waterways. It is this last factor

which has determined the location of export sawmilling, with the creation of ports and the development of new communities as corollaries. Portable sawmills, of course, operate in the forests, but here too adequate communications to the consuming centers must be available unless a strictly local market is to be served.

Coniferous species account for four fifths of all sawnwood produced. Conifers grown in cool temperate or subarctic climates grow in more or less pure stands, with straight stems clear of nodes and branches. The wood is strong in relation to its weight, and can be readily sawn and planed. Most broadleaved species are more durable and decorative, but they seldom occur in pure stands and vary much more in form and diameter. Extraction and processing costs are thus higher. Hence, for constructional purposes, coniferous timber is preferred in most end-uses wherever it is available. Though there are notable exceptions (e.g., eucalyptuses and poplars) most broadleaved species grow slower than conifers, reaching sawlog diameter less quickly. The larger the diameter the less the processing cost per unit, since the smaller the proportion of edges and slabs. In areas where sawnwood requirements have pressed heavily on the forest resources available there has been a distinct tendency to reduce the minimum diameter of log sawn. Thus in Germany, for example, logs down to 10 centimeters diameter are sawn today, as compared with 20 to 30 centimeters 20 years ago.

In the world as a whole it is estimated that on average a cubic meter of roundwood yields 0.6 cubic meter of sawnwood. The actual yield in particular circumstances may vary from below 0.4 to 0.8, depending on species, diameter, and sawnill efficiency.

A sawmill requires a considerable area of forest to assure its supplies. It is estimated, for example, that in Scandinavia about 14 hectares of coniferous forest are necessary to supply enough roundwood of sawlog size to produce annually 1 standard (4.67 cubic meters) of sawn softwood. In other words, a mediumclass Scandinavian sawmill, with an annual output of 20,000 standards, needs approximately 300,000 hectares of forest to assure its supplies. It will probably draw its supplies from a much larger area, since the forest areas feeding the sawmills overlap considerably. In forests where the growing stock and yield is higher, a smaller drainage area will suffice. Thus in the Douglas fir stands of the United States West Coast or in favored Central European fir stands the same output may be obtained from 30 to 60,000 hectares.

Mills of this size, or greater, account for the bulk of sawnwood output in Northern Europe and for nearly all the export production. But most mills are much smaller. The 2,500 sawnills recorded in the industrial statistics of the three northern countries — Finland, Norway, and Sweden — in 1954 had an average annual output of only 1,200 standards, or about 6,000 cubic meters. In addition, there are many thousands of even smaller mills which are recorded only in periodic special surveys, as well as domestic saws which escape record.

A recent detailed survey of the lumber industry in New York State 8 revealed the following distribution (1952/53).

$\begin{array}{cc} Annual \ production & Numb \\ \text{(m³ sawn)} \end{array}$	er of mills
Less than 118	817
118 and less than 475	334
475 and less than 1 180	189
1 180 and less than 2 360	99
Over 2 360	118

The 118 mills in the last class, though only 7 percent of the total, produced 58 percent of the total output.

This distribution is not only typical of the long-established sawmilling industries. A similar pattern is evident, for example, in the following figures for Brazil:

Annual capacity Num (Thousand m <sup>3</sup> sawn)	mber of mills
Less than 1	2 159
l and less than 5	. 2 923
5 and less than 10	. 244
10 and less than 20	. 144
20 and less than 50	. 13
50 and over	. 1

The small sawmills undoubtedly serve a purpose, providing the cheapest means of meeting a local demand for sawnwood where long-distance transport of logs or sawnwood is impracticable or too costly. They can exploit areas beyond the physical or economic reach of larger undertakings. At the same time, they present a major problem in that they are largely beyond control, often beyond record, and not particularly receptive to propaganda aimed at ensuring that their incursions on the

<sup>\*</sup>Primary Wood Use in New York, State University College of Forestry, Syracuse, 1957.

forest do not diminish the forest's long-term productivity since such exhortations usually call for a sacrifice of immediate profit prospects. It is among the scores of thousands of small-scale sawmills operating in the world today that there is the greatest need for education and extension services.

It was mentioned earlier that a large proportion, around 40 percent on average, of the raw material entering the world's sawmills emerges from the process in the form of slabs, edgings, sawdust, and shavings. A few decades ago most of this wood material was wasted - indeed, its disposal presented a problem and often added to sawmill costs. Today most of this material, and even the bark, can be utilized certainly in areas where forest industries are concentrated. Provided the material can be economically collected, i.e., provided the sawmill is large enough or sufficient sawmill capacity is concentrated in a given locality, the slabs and edgings can be chipped for pulp or board manufacture and even the shavings and sawdust can be turned to industrial account. The possibility of utilizing sawmill residues has considerably modified the economics of sawmilling in the developed areas of the world, and has in many instances encouraged the integration of forest industries.

## The Pulp and Paper Industry

The first technical revolution in papermaking occurred 1850 years ago when Tsai Lun, a high Chinese court official concerned with supplies for the Imperial Court, invented a paper made from hemp fiber, rags, and old fishing nets. Before that the Chinese — the world's first papermakers — had utilized the waste from silkworm cocoons, and the product was expensive and highly prized. The Chinese people have made and used paper ever since, and still have the world's biggest hand-made paper industry, based on rags, straw, and bamboo.

It took a thousand years for the invention of paper to spread westward, through the Near East to the Mediterranean, and via Spain to Western Europe, reaching Russia and the American colonies around the year 1700. As the demand for paper grew, available supplies of rags and other materials were increasingly taxed until the middle of the nineteenth century, when the raw material basis was immeasurably expanded by the invention and successful application of processes permitting the mechan-

ical and chemical pulping of wood. Wood soon became the principal raw material for paper and board manufacture, and today 96 percent of all pulp for papermaking is made from wood about one third by mechanical operations and two thirds by chemical or combined processes. The object of the pulping operation — a more or less complete separation of the fibers in the raw material - can be achieved in two fundamentally different ways: either by overcoming the binding forces between the cellulose fibers by mechanical action, or by chemically dissolving the substances acting as binders. In recent years a number of processes have been developed which combine the chemical and mechanical pulping operations with the object of increasing the yield by the chemical processes and of broadening the raw material field for the production of mechanical pulp. Their importance is steadily increasing, and will continue to increase. The many processes available today are very different in their technical characteristics and papermaking possibilities, and above all, in the variety of the raw material they can operate upon. In fact, the proliferation of processes is a measure of the technical effort devoted to expanding the industry's raw material base and to raising the yield from its raw material. Moreover, these efforts must be sustained if the world's future requirements of pulp are to be met; this much is evident from a brief consideration of pulp and paper production trends over the last decades.

In 1956 world wood pulp production was six times as high as in 1913; between 1947 and 1956 it approximately doubled. It is still heavily

Table IV-6. Woodpulp Production Trends, by Regions

REGION	1913	1925-27	1937	1947	1956
		Millio	n metri	c tons.	
North America Europe	$\frac{3.4}{4.6}$	$\begin{array}{c c} 6.6 \\ 6.3 \end{array}$	$10.5 \\ 11.4$	$\begin{array}{ c c }\hline 17.4\\ 6.9\end{array}$	$\frac{29.8}{13.4}$
of which: Three northern					
countries U.S.S.R	0.21	0.22	$(6.8) \\ 1.0$	$(4.9) \\ 0.75$	
Asia Latin America			$0.90 \\ 0.03$	0.33	2.7
Africa		_		$0.01 \\ 0.16$	$0.12 \\ 0.47$
WORLD	8.3	13.1	23.9	25.7	49.7

concentrated in North America and Europe but a trend toward decentralization in the last decade is evident.

The rapid rise in pulp requirements since the last war has surpassed all expectations. For example, the Preparatory Conference on World Pulp Problems, convened by FAO in Montreal in 1949, after reviewing the world's prospective needs for pulp products, estimated that by 1955 pulp needs would rise by 37 percent over 1948, an annual rate of increase of  $4\frac{1}{2}$  percent; in fact, production and consumption over this period increased at an annual average rate of 7 percent.

Similarly, the FAO/UN Survey "World Pulp and Paper Resources and Prospects" underestimated both production and consumption. The forecasts contained in this report indicated an increase in wood pulp consumption from an average of 37.1 million tons in 1950-52 to 50.5 million in 1960-62, corresponding to an annual growth of 3.1 percent. In 1956 (midpoint of the survey decade); world wood pulp consumption reached 49.5 million tons, which is close to the ten-year estimate. Thus consumption actually increased at an annual rate of 6.6 percent, more than double the rate forecast.

Many other forecasts, pertaining to particular regions and prepared by official and private agencies, have been made; all have been similarly outstripped by realizations. These consistent underestimations have arisen less from any shortcomings in methodology than from the difficulty of appraising accurately the rate of economic growth in a rapidly changing world. The consumption of pulp and its products is closely linked with the progress of the economy generally. Comparative figures of per caput paper and board consumption and of per caput national income, for example, show very high correlations, both as between countries and for given countries in the course of time. It seems reasonable to assume that, given sustained economic growth, pulp requirements will continue to grow at a minimum rate somewhere between 4 and 6 percent. 9

Even the minimum figure — 4 percent — would imply a world pulp need of some 100 million tons by 1975. Thus the present pulpwood removals of about 210 million cubic meters would have to be raised to over 400 million cubic

meters, of which the main part would be needed in Europe and North America. This will compel a more intensive use of broadleaved woods and a more efficient utilization of forest and industrial waste, as well as a determined effort to raise fellings of traditional pulpwood. At the same time, it will intensify the problems of the less advanced regions — Asia, Africa, and Latin America — which today depend on the advanced regions for a major part of their pulp products and for a goodly proportion of the pulp to feed their domestic production of paper and board. Moreover, it is precisely in these regions that demand is growing most rapidly. Obviously there must be some doubt whether Europe and North America will be able to continue to supply other regions of the world with their growing needs, even were those regions able to spend increasing amounts of foreign exchange on imports of pulp and paper. It is clear that the rapidly increasing importance of the pulp sector of the forest industries will not only influence forest policy and timber utilization in the centers where the industry is today established; it will also furnish a stimulus to, and at the same time create the economic preconditions for, the opening up of forests in the less advanced regions of the world. For the most part these contain species other than those which have been traditionally used in the areas where pulp manufacture has so far been concentrated. It has already been shown, however, that technical progress has made it possible to use almost any fibrous material for pulp-making, and farther technical progress can be confidently expected in the years to come. The main problems to be encountered are thus economic rather than technical; they are perhaps best summed up by the following quotation: 10

"There is every reason to expect that, given properly executed technical and economic plans, these large unexploited resources can make a vital contribution to living in what are at present underdeveloped countries. There must be a period of trial, a period of groping, patient capital, but if the means available are wisely used, there can arise a pulp and paper industry [in these regions] that will be of world importance."

It is natural that the wood pulp industry first developed, and is still largely concentrated,

<sup>&</sup>lt;sup>9</sup> In the period 1920·37 pulp production in North America and Europe increased at an annual average rate of 4.5 and 7.6 percent, respectively.

<sup>&</sup>lt;sup>10</sup> Raw Materials for More Paper, FAO Forestry and Forest Products Study No. 6, Rome, April 1953.

in regions where ample supplies of the species suitable for the early pulping processes are found. But a number of other factors contributed to this concentration. Capital requirements are heavy, and - for most processes the economies of size are considerable. Thus the need for an assured and substantial market (in early days only available in the industrialized countries) within easy reach is paramount. The need for capital, for adequate power supplies and for considerable quantities of cheap chemicals all favored the concentration of the pulp industry in the early days of this century. If decentralization is now taking place, it is primarily because nations in the less advanced regions of the world are faced with rising paper needs for educational, cultural, and industrial purposes so that markets are gradually developing capable of supporting an economic-sized mill. At the same time, the early steps in industrialization bring into existence other essential factors such as power and chemicals.

Even in the older producing regions the last decade has seen certain important shifts in the distribution of the pulp industry. In the United States, for example, there has been a very rapid development of the industry in the South based on resources of Southern pine. The South has now more than half the total United States capacity, and the proportion is expected to increase. It is noteworthy, too, that already in 1952 14 percent of the industry's pulpwood supplies consisted of broadleaved species, and this ratio is expected to increase to 25 percent by 1975. In Europe there has been an increase in pulp production on the continent, much of it based on broadleaved species; however, capacity has expanded equally rapidly in the three northern countries where new forest inventories have revealed timber reserves greater than previous estimates indicated. In the U.S.S.R., too, the current Five-Year Plan provides for a more rapid increase in pulp production in the Far-Eastern territories than elsewhere, but this is believed to correspond to general plans for economic decentralization rather than to any basic shift in the raw material base of the industry.

The considerable economies of size in pulp and paper production have already been mentioned. In the leading exporting countries, for example, the economic size for an integrated newsprint mill is now normally reckoned to be of the order of 150,000 tons annually. However, very many smaller mills are operating, and

successfully. This is simply because the influence of locational factors (material, power, chemicals, market proximity) is so strong that it can frequently offset the economies of size in production costs. In Northern Europe to-day there are some 200 pulp mills, with an average annual production of around 40,000 tons; in North America 1,300 with an average annual production of 20,000 tons.

A newsprint mill of the capacity quoted earlier - 150,000 tons - requires annually around 450,000 cubic meters of pulpwood. To assure its supplies on a sustained yield basis (assuming half the annual crop can be used as pulpwood) it requires a forest area, under Northern European conditions, of approximately 350,000 hectares. Where growth is more vigorous, and especially where forest management is directed to pulpwood production, a smaller catchment area will suffice. These figures show that the forest operations concerned in the provisioning of even a modest-sized mill, say 20-30,000 tons annually, are formidable. They become even more complex if the pulping operation is based on material drawn from heterogeneous broadleaved forests.

Pulp and paper manufacture is big business. A medium-sized integrated mill to manufacture annually 30,000 tons of fine paper may require a capital of around 20 million dollars. Security of raw material supplies is essential when such sums are concerned. Profit margins are not sufficient to allow of recourse to timber mining methods, implying high profits and quick recovery of capital. This is the principal reason why the pulp industry has become an important factor in forest conservation.

# The Plywood and Veneer Industry

The art of veneer-making is very old. In ancient Egypt, thin slices of veneer were cut from selected hardwood logs and placed by skilled craftsmen as cover leaves on high-quality furniture. This essentially artistic use of veneer remained the only use until the middle of the nineteenth century. A hundred years ago, however, the rotary veneer lathe was invented and it was also found that veneers could be glued together to form panels of high strength and wide dimensions. With these discoveries the modern veneer and plywood industry was born, and it has since, especially during the past 30 years, experienced a truly spectacular rise.

Compared with solid sawnwood, plywood has many advantages. It makes a valuable facing material not only for furniture but also as wall panels and as a construction material with any width of surface. A decided advantage is that plywood inherently remains flat under service conditions thus avoiding one of the greatest problems in sawnwood structures which often react adversely to changes in atmospheric conditions. In addition, plywood does not split easily and can be pressed into curves more easily than sawnwood. The two following main groups of plywood are produced commercially: hardwood plywood for use in sheets for decorative purposes, panels, doors, table tops, and the like; and softwood plywood used mainly for construction purposes. In both cases, plywood competes with sawnwood and more recently has been subject to competition from board products.

The high quality raw material requirements of the veneer and plywood industry mean that only a small part of the timber in the woods can be used for this purpose, and large-diameter logs have tended to become increasingly scarce. In Europe, for instance, it is unlikely that the output of veneer logs exceeds one fifteenth of the sawlog output, and it may even be considerably lower. In the old-growth Douglas fir forests on the west coast of America, however, as much as 50 percent of the stand is capable of being used for this purpose.

As a result of their higher quality and their relative scarcity, veneer logs are expensive, which has kept the price of plywood at a high level and limited its competitive power. Therefore, the industry continues to make great efforts to reduce production costs by lowering the qual-

ity requirements for veneer logs. Machines have been developed with higher productivity capable of using smaller logs, and automatic machines to cut out defects from the sheets and to insert patches, and machines for edgegluing and end-gluing sheets together have been developed. Also, various kinds of combined boards made partly of veneer and partly of sawnwood (blockboards) or even metal or plastic have been introduced. Due to the introduction of laminated veneer products, the industry has been able to compete even with metals in certain markets.

Output of plywood before the First World War is estimated at about 300,000 cubic meters per year. By 1938 it had risen to 3 million cubic meters. In 1946 it had returned to this figure again, and has almost quadrupled in the last decade, with no interruption in the steady upward trend.

Though by 1946 world output had returned to the prewar level, this was only because the considerable expansion in the United States, Canada, and other regions compensated for the setbacks experienced in Europe, the U.S.S.R., and Japan. Though production in all these regions has since expanded far beyond the prewar level, North America retains its place as the leading producer, accounting for well over half the world total.

The bulk of North American production is of softwood plywood, based on Douglas fir; it is a utility plywood capable of economic application for a wide variety of constructional purposes. European and Soviet production is ninetenths hardwood plywood, mainly birch, rather more expensive, but of better appearance. The recent expansion of the Japanese industry

TABLE IV-7. REGIONAL DISTRIBUTION OF V	World Plywood Production
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	1938		1946		1955		1956		19571	
REGION	1000 m <sup>3</sup>	%								
Europe	1 090	36	510	17	1 950	19	1 910	17	2 100	18
U.S.S.R	885	29	252	8	1 049	10	1 122	10	1 200	10
North America	820	27	1 990	66	6 245	59	6 575	59	6 650	58
Japan	207	7	67	2	683	6	852	8	950	8
Others	38	1	196	7	623	6	661	6	690	6
TOTAL	3 040	100	3 015	100	10 550	100	11 120	100	11 590	100

<sup>&</sup>lt;sup>1</sup>Estimated.

and the new industry developing in the Philippines are based on Philippine lauan logs. Originally the Japanese industry was concentrated on Hokkaido, using domestic raw material. With the rising demand for plywood both for reconstruction and for export, and the diminution in availability of domestic veneer-sized logs, the industry has come to be based 80 percent on imported lauan and the center has shifted to Honshu where it has the advantage of the shipping facilities at Tokyo, Osaka, and Nagoya.

The most important factor in the location of plywood mills is the availability of large-diameter logs of good form, whether indigenous or imported. Like the Japanese industry, much of the industry in Western Europe is based on imported tropical hardwoods. These mills have been fed by selective extraction in the forests of Asia, Africa, and Central America, and this type of exploitation has often been prejudicial to the forests of these regions. Frequently the species desired are very scattered, and their extraction has required long hauls and much manual labor, involving such high costs delivered port that only precious woods could pay the cost of extraction. The cream has thus been skimmed from the forest, with damage to the remaining growing stock and with much waste left in the forest as inevitable corollaries. In certain tropical countries, e.g., Nigeria, important domestic plywood industries have arisen, but these have been mainly directed to export, local consumption remaining low or negligible. Indeed, the type of plywood produced has been too expensive and not well adapted to the local market.

But a further development of plywood manufacture in the tropics, with exploitation on more rational lines, is by no means out of the question. Many of these forests contain a wide range of species of little present commercial value, with many trees of good size and form. These, converted into plywood and subjected to the various inexpensive treatments now available, could provide a cheap and durable building material capable of satisfying local requirements. Indeed, there are many areas where plywood manufacture presents a more promising line of development than the production of either fibreboard or particle board.

The postwar expansion of the plywood industry has been largely bound up with the improvement of glues and the development of surface treatments which has made it possible to use

the product on an increasing scale for exterior purposes and for such special purposes as concrete formwork. Continuous technical improvement will be necessary if plywood is to withstand successfully the growing competition of board products, as the diminishing supply of large-diameter logs, at any rate in the temperate regions, means that the industry's raw material costs are likely to increase.

### The Board Industries

Fibreboard

Fibreboard has been defined as "a sheet material manufactured from fibres of wood or other ligno-cellulosic material with a primary bond deriving from the arrangement of the fibres and their inherent adhesive properties." Fibreboard is a pulp product and its manufacture involves the application of one or other of several specially developed methods of pulping, mainly mechanical. Though fibreboard production is often pursued in association with other forest industries, the process and the product are specialized, and it is regarded as a separate industry.

There are two main groups of fibreboard: noncompressed and compressed, commonly marketed as insulation board and hardboard, respectively.

Noncompressed fibreboards are usually dried without pressure; they are thus light in weight, porous and low in bending strength. They have their main application as in-between or facing sheet for insulation or as surfacing material where strength is not essential.

Large-scale commercial production of insulation board started in the United States in 1914 and developed rapidly in the early twenties. In 1938, the world's total production of this product amounted to 700,000 tons of which the United States contributed about 550,000, three Scandinavian countries 120,000, the remainder being produced by Canada, the United Kingdom, Australia, and the U.S.S.R. Utilization of treated insulation board as exterior sheathing in residential building was a leading application of fibreboard at that time. In most parts of Europe the war hampered development, but the industry continued to expand in Sweden and to a lesser extent in Finland and Norway. Between 1938 and 1948 capacity in Northern European countries more than doubled. In the course of the following years production of insulation board expanded

all over the world and reached in 1956 1.6 million tons of which the United States share had, however, dropped to about two thirds while the European share had risen to more than 20 percent.

The production of compressed fibreboard can be traced back to as early as 1898, when a plant to manufacture "hardboard" was established in the United Kingdom. The first major hardboard plant, however, did not come into production until 1926 — in the United States.

Hardboards are rigid, durable, and find their main field of application in construction work. The process of manufacture starts exactly as that of insulation board, i.e., the raw material is first chipped and then pulped. According to the type of board that is to be manufactured, certain chemicals may be added to the pulp, e.g., to increase water resistance, bending strength, or resistance to insects or fungi. After the sheet is formed, however, it is dried between heated steel plates under pressure.

Production of compressed board expanded in the nineteen-thirties, Europe and North America being the most important producers in 1938, each accounting for 40 percent of the world output. Production continued to grow in the following years, especially in Northern and Continental Europe. By 1954 world output of compressed board had surpassed that of noncompressed board. In 1955 Scandinavia and North America accounted for nearly 30 percent each of world production, and other European countries for a further 25 percent.

The rapid growth in both branches of the industry during the postwar decade is shown by the following figures:

Table IV-8. Growth in World Fibreboard Production, 1938 to 1956

	3	Z ie z	ΛR		Compressed	Non- compressed	Total
					Thou	usand metric	tons
1938					125	700	825
1946					510	810	1 320
1948					715	1 145	1 860
1950					965	1 085	2 050
1952					1 085	1 150	2 235
1954					1 460	1 400	2 860
1956					1 780	1 590	3 370

The pattern of world production of fibreboard and the evolution of that pattern have been very similar to that for pulp production: the same heavy concentration of production in Europe and North America; the same dependence in other regions on external sources of supply. There has, however, been a certain decentralization in the decade, as may be seen from the following table:

Table IV-9. Regional Distribution of Fibreboard Production, 1938, 1948 and 1955

Region	1938	1948	1955
		. Percent .	
North America of which United	77	69	53
States Europe of which Scandina-	$(73) \\ 21$	(62) 28	(46) 38
via Africa	(14)	(19)	$(20)$ $\frac{2}{2}$
U.S.S.R		1	$\frac{2}{1}$
Latin America Pacific Area	2	2	$\frac{1}{3}$

Plant capacity varies, averaging 50,000 tons per year in North America, and around 15,000 tons per year in other regions. There is considerable dispersion around these averages, however. Most of the mills built recently in Northern Europe have been large-capacity mills.

The trend toward larger capacities rests on the economies of size and increasing competition, particularly in the export market. A fibreboard mill requires considerable investment, though less than for a pulp and paper mill of comparable output, and capital charges form an important part of total production costs, a share which diminishes as mill size increases. The raw material requirements are somewhat less exacting, though in Northern Europe the fibreboard mills compete with the pulp mills for the available raw material, both roundwood and industrial residues. One half of Swedish fibreboard production, for example, is based on sawmill residues. The fibreboard process can make use of a large variety of species, and of both forest waste and industrial residues. Thus in many parts of the world the industry can obtain its raw material cheaper than can the pulp and paper industry.

Technical progress in the fibreboard industry has made possible a reduction in the real price of its products over the last 20 years, that is to say, during a period when the real price of sawnwood and plywood has been rising. It is this price advantage, coupled with an everincreasing range of applications as use practice accumulates, that has led to rapidly rising consumption of fibreboard. This rise, and the still existing disparity in consumption levels, is reflected in the following figures:

TABLE IV-10. ESTIMATED FIBREBOARD CONSUMP-TION IN SELECTED COUNTRIES, 1948 55

COUNTRY	1948	1952/53	1954/55
	Kil	ograms per	head
Sweden	21.8	19.5	20.0
Norway	9.1	17.7	19.9
Finland	6.4	12.8	17.1
Canada	6.9	10.6	10.9
Australia	7.8	7.7	8.6
United States	3.2	8.1	9.3
Israel	2.9	3.8	6.2
Netherlands	2.4	4.0	5.8
Denmark		1.0	7.9
United Kingdom	1.6	1.9	3.9
Belgium	2.3	3.3	3.3
Austria	1.4	2.4	3.3
France	0.8	1.5	1.9
Germany, Western	0.5	1.5	0.9
Italy	0.6	0.8	0.9
Japan	0.1	0.1	0.2

Those disparities point to the great opportunities for expanding fibreboard consumption, though it would be unrealistic to imagine that the high consumption levels prevailing in Northern Europe can ever become universal.

The real significance of the fibreboard industry for the forests lies in its raw material requirements. It can make use of material unsuited for sawmilling and plywood manufacture. In this it resembles the pulp industry, though under normal circumstances a fibreboard plant can operate economically on a smaller scale than can a pulp and paper unit, thus requiring a smaller annual flow of raw material. Hence the fibreboard industry, in association with the older forest industries, presents a total pattern of wood requirements which favors the integral utilization of the forest crop, and thereby facilitates rational and economic exploitation of the forest. This is the basic reason why, when new areas of forest are being opened up for exploitation, there is today a greater disposition than ever to think in terms of a complex of forest industries rather than of a single venture. On the one hand, integration offers the possibility of a variety of economies in the production of the several forest products; on the other, the problem of sound forest exploitation and management is simplified.

### Particle Board

Particle board is a sheet material manufactured from small pieces of wood or other lignocellulosic material (e.g., chips, flakes, splinters, strands, shavings, etc.) agglomerated by the use of an organic binder, together with one or more of the following agents: heat, pressure, moisture, a catalyst, etc. The particle board industry is the youngest of the existing forest industries, but its growth in the last decade has been phenomenal. The first plant to produce particle board commercially was built in Germany in 1941; it operated on spruce chips using a phenolic resin as binder and had a daily output of 10 tons. Soon many species besides spruce were found suitable, including birch, beech, alder, and pine. The first three-layer particle board, with coarse wood particles forming the middle layer and thin flat particles for the stronger outer layers, was marketed in Switzerland in 1945. In 1947, the first plant based on flax was put into operation in Belgium; of the roughly 200 board plants today in existence, about 15 utilize flax straw. The greater part of the raw material for particle board manufacture still consists of waste or residues from other forest product manufactures, such as slabs, edgings, cut-offs, planer shavings, etc.

Particle boards are extensively used as core stock for veneer and other overlaid furniture and as panel material, for flooring and for facing concrete forms.

The tremendous growth rate of this new industry is evident in the production figures of Table IV-11.

Europe accounts today for over two thirds of all particle board produced, a pre-eminence it enjoys in no other forest product. Current expansion plans suggest that Europe will continue to dominate the pattern of world production. Practically the whole of European production is concentrated in the countries of continental Western Europe, Western Germany being the world's largest producer. Thus, the world pattern of this industry is, and seems likely to remain in the near future, quite unlike that of any other forest product, the main concentration being in the timber deficit coun-

TABLE IV-11. ESTIMATED WORLD OUTPUT OF PARTICLE BOARD, 1950-56

Region	1950	1951	1952	1953	1954	1955	1956	Expected capacity end-1958
				Thousand	cubic meters	3		
Europe	10	40	80	120	270	450	775	2 092
North America	10	15	30	80	120	180	240	750
Pacific Area		_	_			_	2	25
Union of South Africa		_		5	15	25	50	75
Far East			_	2	5	8	12	45
Near East		**********	Annualisa	**************************************	_	***************************************	6	25
Latin America					1	5	16	65
U.S.S.R	_		Second Se			*********		80
World	20	55	110	207	411	668	1 101	3 157

tries of Western Europe. Similarly, in Asia and Africa the production of particle board is concentrated in Japan and the Union of South Africa respectively, i.e., in the industrial wood deficit, but economically advanced, countries.

The main factors in the rapid growth of the particle board industry have been the need to find a substitute for solid wood where that has become scarce or relatively expensive, and the will of operators to turn to profitable account residues from their forest product operations.

Consumption figures suggest that particle board to some extent compensates for differences in fibreboard consumption levels. In fact, in many applications fibreboard and particle board can be used alternatively at the present time. Hitherto, particle board has competed mainly with plywood and blockboard and, to a lesser extent, with solid timber. The longer-term future of the particle board industry will largely depend on its price trend relation to the alternative materials and the success achieved in the search for new applications. While the industry must inevitably encounter certain growing pains in the course of the next few years, its long-term future seems assured.

The capital requirements for establishing a particle board plant are not very heavy and, since capital charges do not figure so strongly in the pattern of production costs, relatively small plants can be economically viable. This industry is more versatile than any other forest product industry as regards its wood raw material requirements. Providing a market exists for its products, or can be developed, a

particle board plant in association with other forest product industries can lead to production economies throughout the combination. This in turn reacts on the economics of operations in the forest. Herein lies the principal attraction of the particle board industry.

#### Conclusions

The preceding sections have shown how the major forest industries have grown up in turn, the pulp, plywood, and fibreboard industries being successively added to the older sawmilling industry, and the latest addition - particle board - emerging only in the last decade. Generally speaking, the more recent the development of the industry, the more rapid has been its growth rate, as shown by the figures in Table IV-12. An exception to this general rule is the plywood industry, the average growth rate of which has expeeded 10 percent through the last three decades. It has been already noted that this expansion is likely to slow down in the future, partly as the result of diminishing supplies of suitable logs, partly as a result of fiercer competition from board products.

While Table IV-12 exhibits clearly the contrasts between the several forest industries, it does not allow of any really valid comparison between the long- and short-term growth rates for each industry, since the longer-term period encompasses both the war years and the postwar decade. However, it is evident that there has been a vigorous growth in all the forest

TABLE IV-12. AVERAGE ANNUAL GROWTH RATES
OF THE MAJOR FOREST INDUSTRIES

Industry	Period	Medium or long term	Short term
		Perc	ent
Sawmilling	 1925–56 1948–56	1	3.8
Pulp	1926–56 1948–56	1	5.5
Plywood	. 1926–56 1948–56		12.7
Fibreboard	. 1938–56 1948–56		8.1
Particle board	. 1952–56		61

industries since 1948, the year in which these industries had in general recovered to the prewar level. These developments are plainly related to the somewhat faster rate of general economic growth which the world has experienced since the last war. It seems safe to assume that as soon as the present recession is overcome the problems which several of the forest industries are currently encountering will largely disappear, and the resumption of economic expansion will bring with it continued growth in all the forest industries, though growth rates may well fall somewhat below those recorded in the last decade. Their demands on the forest will thus steadily increase. Though industrial wood supplies can be stretched by better utilization of industrial roundwood and the further diversion of fuelwood to industrial uses, these means alone cannot furnish all the additional industrial raw material that will be required in increasing amounts. A forest policy based on sustained yield, on keeping the forest capital intact, is not sufficient. Forest policy must plan for an expanding yield, for the building up of forest capital. Considerable areas of forest not hitherto exploited will require to be brought into use; new forest resources will need to be created; a dynamic approach will be required in the management of existing forests.

The disparities in the growth rates of the several forest industries also imply a change in the pattern of wood requirements. The pulp and board sectors are expanding much more rapidly than is sawmilling, and this trend will certainly continue. Thus an ever-increasing proportion of industrial wood will be required

in species and dimensions suited to these sectors. Hence, while efforts will continue on the part of industry to enlarge the raw material basis, thus utilizing more rationally the timber available in the forests, complementary efforts are required from those concerned with forest management to ensure that the crop of the future will be adapted to the changing pattern of industrial needs.

To some extent the several forest industries are competitive with each other. Of recent years, however, there has been a growing recognition of identity of interest, of the fact that each product has its special qualities and its particular role to play in meeting the needs of an expanding world economy. This is to some extent reflected in — indeed it is one of the causes of — the current trend toward integration of the forest industries. It is also manifest in the growing number of applications in which two or more forest products are combined.

Finally, it has been noted that the raw material requirements of the various forest industries differ, and that they are to a large extent complementary. This has opened the way to a more rational utilization of the forest crop, and has had a favorable impact on the economics of forestry.

# THE IMPACT OF THE FOREST INDUSTRIES

The forest industries of the world are heavily concentrated in the coniferous regions of the Northern Hemisphere. For most forest products, coniferous wood is the most suitable raw material, lending itself readily to mechanical and chemical transformation. Moreover, the coniferous stands are less heterogeneous as regards species, density, tree size and form, and are hence more suitable for large-scale logging. The nature of the forests, however, is not the sole factor which has led to this concentration. It is in these very regions that industrialization has proceded most rapidly in the last two centuries, bringing with it both a rapidly rising demand for forest products and the tools for large-scale exploitation of the forest. Until these conditions were satisfied, vast areas of coniferous forest even in these regions remained virgin and intact. There is a marked positive correlation between purchasing power and consumption of industrial wood - especially con-

TABLE IV-13. THE WORLD'S FOREST RESOURCES AND THEIR USE

	F	Forest area			ovals1	Removals <sup>1</sup>		Consumption per 1 000 capita <sup>2</sup>	
REGION	All forests	Forests in use	Conif- erous forests in use	Total	Industrial wood	Total	Industrial wood	Sawn- wood	Paper and paper- board
	Hecte	ares per	caput	Cubic me	ters/hectare	Cubic me	eters/caput	Cubic meters	Tons
Europe	0.3	0.3	0.2	2.5	1.6	0.7	0.5	160	37
U.S.S.R	3.8	1.8	1.5	1.0	0.6	1.6	1.0	380	26
North America	4.1	1.4	1.1	1.9	1.6	2.2	1.9	580	176
Pacific Area	6.7	1.3	0.1	1.3	0.9	1.4	1.0	400	68
Latin America	5.2	0.5	0.06	2.5	0.4	1.0	0.2	54	8.8
Africa	3.9	0.5	0.01	1.0	0.1	0.5	0.05	20	2.6
Asia	0.4	0.2	0.03	1.0	0.3	0.2	0.05	30	3.8
World	1.6	0.5	0.3	1.2	0.7	0.6	0.3	150	29
World totals								•	
Million hectares	3 840	1 140	603		-		_	_	_
Million cubic meters			_	1 598	886		_		_

sumption of paper products, as may be inferred from Table IV-13. While adequate supplies of coniferous timber cannot be regarded as a condition of progress, there is no doubt that they have facilitated progress in these areas of the world.

The figures of total forest area per caput given in Table IV-13 show that, in relation to population, the world's forests are not very evenly distributed between the regions. The differences are less marked, however, if account is taken only of forest areas already under exploitation. While Europe still ranks low, the U.S.S.R., North America, and the Pacific Area stand at the top of the scale; Africa and Latin America, with the major part of their forest resources still untapped, assume a more modest ranking. The advantages of the advanced regions stand out most clearly, however, if attention is concentrated on the area of coniferous forest under exploitation. Europe, on this criterion, stands at around the world average; the U.S.S.R. and North America stand well above, while Africa, Asia, and Latin America trail far behind.

But forest area is an inadequate measure of forest wealth. It is the climatic factors governing growth and the intensity of management

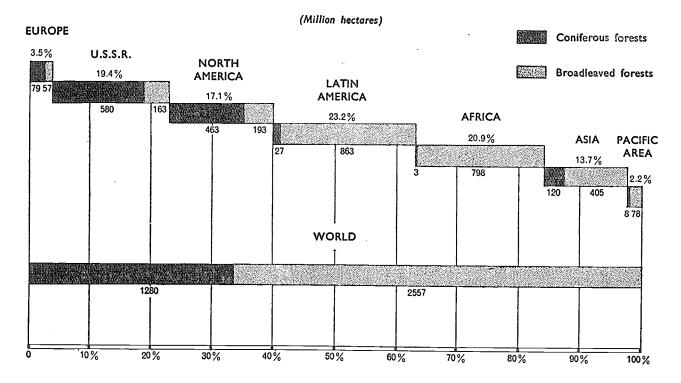
that determine what volume of wood a given area can furnish, while the pattern of demand, utilization practice, and technical development influence the proportion of that volume which is used industrially. Thus North America and Europe show the highest removals of industrial wood per hectare in the world. Still more striking is the sharp contrast between North America, Europe, the U.S.S.R., and the Pacific Area on the one hand, and Africa, Asia, and Latin America on the other, in terms of industrial wood removals per caput. This parallels very closely the contrast shown in the last two columns for per caput consumption of sawnwood, and paper and board, respectively.

The relatively high figures for industrial wood removals per hectare in Europe, North America, the U.S.S.R., and the Pacific Area suggest that it is in these regions that the forest industries impose the greatest strain on the available forest resources. While this is true, generally speaking, it is necessary to examine a little more closely the capacity of the forests to meet industrial needs, and the conditions under which industrial exploitation takes place.

It is customary to lay stress on the need for achieving a balance between the annual increment (growth) less natural losses on the one

Sources: FAO, World Forest Resources, 1955. FAO, Yearbook of Forest Products Statistics, 1957. <sup>1</sup>Removals 1955 in forest area in use. — <sup>2</sup>Consumption figures 1954-56 average, wherever possible. Reporting countries only.

FIGURE IV-3. Forest Area of the World



hand, and total removals on the other, the underlying idea being that the growing stock or forest capital should be maintained intact. Thus removals should be limited to net increment (the forest income, so to speak), ensuring that the forest will be able to provide a sustained yield in perpetuity. This principle of sustained yield has come to play a major role in the formulation of national forest policies; it received international recognition when, on 7 December 1951, the Conference of FAO adopted the formal declaration defining the principles of forest policy, where it is said that "production should be organized in quantity and quality, with a view to obtaining at least a sustained yield as soon as practicable."

Where the professional forester is in a position to influence the course of removals, this is the long-term principle which governs the advice he tenders or the controls he exercises. The application of this principle, however, is no easy matter. If the forests over which he presides have an ideal composition in regard to species and age class, his task is relatively simple. But this is the exception rather than the rule. He will press forward silvicultural measures to raise net growth by reducing natural losses and increasing gross increment. The meas-

ures he takes to raise growth will depend on the age and species composition of the forest with which he is concerned. In a virgin forest, for example, a large proportion of the trees will have reached maturity, so that gross increment is low, since most of the trees will have passed the age at which their annual accretion of wood starts to diminish. At the same time, destruction by suppression, insects, diseases, and old age is relatively high. Net growth may thus be nil or negligible. When the forest comes under exploitation, the mature and over-mature trees will be felled first. Removals will exceed net growth, while net growth will progressively rise both by reducing natural losses and facilitating the growth of the remaining trees and natural regeneration.

In a young plantation forest, on the other hand, growth will be rapid, though much of this growth will be valueless since it occurs on young trees of small diameter, not yet suitable for utilization. In such a forest the cuts will be kept constantly below net growth until maturity is reached, and only intermediate cuts, such as improvement cuts or thinnings, will be countenanced up to the time of final harvest.

In a forest of normal age-distribution, the cut will on average be regulated to net growth unless

it is desired to change the composition of the forest, e.g., to replace a broadleaved forest by conifers or by faster-growing broadleaved species.

There are other complications. It has already been mentioned that tree growth varies with the age of the tree. The age at which maximum growth takes place, and the level of that growth, vary from species to species. It is evident that the yield of the forest will be greatest if the final cut takes place at the age when average growth is greatest.

But maximum volume yield is not the only criterion to be taken into account in determining the age at which trees should be felled. The price obtainable per unit volume varies with the age of the tree, older (larger diameter) wood generally commanding a higher unit price.

This brief, and far from complete, account of the factors which have to be taken into account in determining cutting policies from the standpoint of the forester is perhaps sufficient to illustrate not only the complexity of the forester's task, but also the invalidity of attempting to compare removals and net growth. Were all forests "going concerns," with normal age distribution, such a comparison might lead to useful conclusions. But the vast majority of the world's forests now being exploited are not of this type. More usually they are virgin forests, young plantations, or natural forests in which cutting, either uncontrolled or planned, has already taken place. Even where net growth rates have been calculated, these rates give no real indication of the long-term capacity of the forests.

Some useful comparisons can perhaps be drawn by recourse to another concept: that of potential productivity. In a recent publication S.S. Paterson<sup>11</sup> showed that the yields obtained from high-class stands of timber in different parts of the world, all managed under optimum conditions, fitted very accurately a "potential productivity" formula based essentially on temperature, precipitation, and insolation. He went on to calculate, on the basis of available data concerning these three factors, potential productivity in different regions of the world, in other words the timber growth that could potentially be realized if optimum management conditions were ever established.

In recent months the Paterson formula has

been discussed in scientific circles, but though the actual formula has been criticized, the utility of this approach has received wide recognition. At the same time, Paterson himself has accepted the need for certain amendments to the original formula. The calculations of potential productivity for the several regions may eventually require revision, but they nevertheless provide interesting, and probably valid, comparisons. Taking potential productivity per hectare in Europe as 100, the other regions of the world rank as follows:

U.S.S.R					50
North America					90
Pacific Area					240
Latin America.					240
Africa					240
Asia					190

The greater potential per hectare in the forests in use in the last four regions contrasts sharply with that in the predominantly coniferous regions of the Northern Hemisphere.

We have already seen (Table IV-13) that actual removals per hectare vary considerably from region to region. In round figures, again taking Europe as 100, the regions compare as follows:

Region	T	otal	r	emovals	Removals of industrial wood
Europe				100	100
U.S.S.R				40	35
North America .				75	100
Pacific Area				50	55
Latin America				100	25
Africa				40	5
Asia				40	20

Thus Europe, with a potential lower than any region save North America and the U.S.S.R., is actually obtaining more roundwood per hectare than any other region but Latin America and more industrial roundwood than any other region but North America. Europe, in other words, comes closest to realizing its forest potential even though, as will be seen later, it falls far short in most countries. This, of course, is simply a corollary of the intensity of management in European forests. The comparison does, however, shed light on the lag between actual removals and potential in the less advanced regions, and this becomes even more apparent if actual removals are

<sup>11</sup> S.S. Paterson, The Forest Area of the World and Its Potential Productivity (Royal University of Göteborg, 1956).

related to potential productivity. Once again the comparison is with Europe, though it will be understood that in taking Europe as 100 there is no implication that potential productivity is fully realized in that region:

Region		hectare i	removals per n relation to productivity
		$Total \ removals$	Industrial removals
Europe		100	100
U.S.S.R		80	70
North America .		85	110
Pacific Area		1 20	25
Latin America .		40	10
Africa		15	2
Asia		20	10

This table makes it clear that the impact of the forest industries on the forest is most intense in Europe, North America and the U.S.S.R. It is with these regions, therefore, that the following pages of this section will be mainly concerned. This impact has had, and continues to have, a different significance for the industrialist, the professional forester, the forest owner, and the community as a whole. Their interests and their reactions are discussed in turn below.

# The Industrialist as Timber Miner

Timber is a crop, no less than wheat or potatoes. Though it is normally harvested annually, it is not an annual crop. A tree may take 30 to 300 years to reach maturity, though certain species, under suitable conditions, can attain merchantable size in 6 or 7 years. On the other hand, a virgin stand of old-growth timber, as has already been pointed out, will require exploitation at a rate many times the annual growth — at any rate in the initial stages of exploitation.

The forest industries in the past have all too often exploited old-growth timber in a manner suggestive of mineral exploitation. Hundreds of examples could be cited, but perhaps the classic example is furnished by the sawmill boom that swept over the North American continent in the last century. Like the colonists on their arrival in the New World, the pioneers in their westward trek over the United States were confronted with apparently inexhaustible reserves of timber which presented an

obstacle to agriculture and to community development. Requirements of constructional timber for towns and settlements rose rapidly, and a profitable business in exporting sawn and squared wood developed alongside. In rapid succession the heavily stocked pine resources of the East Coast fell to the axe. Unrestricted fellings, with no thought for the consequences for the forest and the community, were the rule. The largest sawmill towns in the world grew up in the Northeast, only to move westward toward the Great Lakes as the original resources were exhausted and the population migrated. With each move technological progress made it possible to speed up the rate of exploitation. In the wake of the westward movement lay a trail of ghost towns, with scores of abandoned sawmills, surrounded by areas of commercially valueless forest or fully cleared areas incapable of natural regeneration.

From the Lakes, the weight of the United States sawmill production moved to the pine districts of the South, and finally, in this century, to the gigantic Douglas fir stands on the Pacific Coast. By now, however, exploitation was becoming less uncontrolled and was more often accompanied or followed by regenerative measures. Today the West Coast produces half of the United States sawnwood, while similar stands in British Columbia provide 60 percent of Canadian sawnwood output.

Typical of the effects of this ruthless depiction is the case of Minnesota, where between the 1860's and the end of the century sawnwood production multiplied twelvefold but fell back to less than the original level in the course of the next 40 years.

The story of forest exploitation by essentially timber mining methods in the United States is gloomy enough. But there is ample evidence of analagous destruction in other regions. The forests of Northern Europe have experienced similar, though less destructive, sawmill booms, though fortunately less saw timber was taken out, and enough left to ensure regeneration. In Russia, too, the sawmilis have exhausted or seriously run down the timber resources in the more heavily populated areas of central and south Russia, and in recent years the industry has steadily shifted north and east. The geographical shift parallels that experienced in the United States, but, coming many decades after, forest consciousness has been built up and the shift is taking place in a planned and controlled fashion.

Nor are examples in other regions lacking, even though the sawmill industry is far less developed. Over-exploitation of teak in Thailand, and of Parana pine in Brazil — at any rate in certain areas — are cases in point.

It is easy to blame the sawmiller for his ruthless quest for profit, heedless of the consequences of his activity for the forest, for the community, and for the needs of posterity. But it must be understood that in the early days of industrial development the art and science of forestry was in its infancy. The functioning of the forest as a source of timber crops was but little understood, and the protective role of the forest scarcely recognized at all. Sawmilling was virtually the only forest industry, and interest concentrated on saw timber. The mature tree felled for sawing may have taken a hundred years or more to reach maturity; this is not a span which comes into the reckoning of the business man. Moreover, it must be remembered that investment in sawmilling is not particularly heavy. Given favorable prices, it can be recovered in one or two years. This facilitates the abandonment of the mill once its catchment area has been cleared and the establishment of new mills closer to the receding resources. With the portable sawmill this process is accelerated.

# Industry Seeks a Sustained Crop

Gradually the industrialist has come to realize the need for a sustained forest crop. This increasing realization, which has accelerated in the last decade, is due to a variety of factors. In the sawmill industry itself there has been a trend toward larger units of operation, and a parallel trend toward a higher capital/iabor ratio. With higher capital investment, there is a natural tendency to seek longer-term employment of capital equipment. The advance of forest science has been accompanied by a more widespread, and more alert, forest consciousness. Most important of all, perhaps, has been the emergence of the wood-based pulp and paper industry.

The pulp industry, operating on small-dimensioned timber, has been able to follow in the tracks of the sawmill industry, using the smaller timber, and even the feiled residues left in the forest. It has been able to use as raw material the second-growth forests which have grown up even in badly treated coniferous forest areas.

Trees reach pulpwood size in a fraction of the time necessary to grow saw timber. Indeed, certain species in suitable locations can be felled for pulping in six to ten years. It has thus been easy to realize that a continuous supply of pulpwood from a given forest area can be readily organized given adequate attention to growing and harvesting practices. The time span involved is one capable of ready comprehension by the individual operator, and can be planned for.

Moreover, a pulp mill involves very heavy investment. There can be no question of abandoning this capital with impunity. It is physically possible to transfer a pulp mill, but this is a very costly business, and possible sites are limited by the need to assure adequate supplies of water, power and other important production factors. All these facts combine to provide the pulp and paper industry with a much greater incentive to establish a long-term raw material policy than is the case for sawmilling.

Even so, the pulp paper industry, too, has passed through the mining stage, though these phases have been shorter, and less violent in their effects, than for sawmilling. Generally speaking, however - for the reasons cited pulp and paper industrialists have been more readily disposed to accept the foresters' longheld view that the forest should function not as a mine but as a crop, and to plan their actions accordingly. Moreover, this disposition has increasingly communicated itself to the sawmill and plywood industries. This is partly because in recent decades there has been a pronounced move toward the integration of these forest industries, physically and technically as well as from the standpoint of ownership, and partly because a recognition of the complementarity of the demands for raw material which these industries make on the forest facilitates the economical production of a crop which can meet their needs in quantity and quality.

Thus, in the course of recent decades, the forest industries have — in many parts of the world — developed from destructive agents of the forest to more conservationist and creative elements, both in the forests from which they draw their resources and in national forestry as a whole. This fact receives recognition, for example, in *Timber Resources for America's Future* (p. 305):

"Although industry holdings comprise only 13 per cent of the commercial forests, they include some of the most accessible, productive and well-managed forests...

Forest industry may be of even larger significance through demonstration, education and assistance to other private forest land owners who supply most of the raw material for wood-using plants. The forest industries also are in a position to influence the cutting practices of the independent logging operators who cut timber on farm and other private forest ownerships for delivery to wood manufacturing plants."

This is typical of the testimonial which forest industries are earning in several parts of the world today. However, it should be clearly understood that if the industrialist is changing his spots, this is partly because the diminishing areas of old-growth timber now available have compelled him, in self-protection, to take a longer view; this evolution has certainly been helped by the development of forestry science and, last but not least, by the steady formation of an informed public opinion and alert forest consciousness. A few decades ago the farsighted forest industrialist was a rarity. He is still by no means the general rule, but he is more commonly met with each year that passes.

# The Forester's Battle for Recognition

The preceding paragraphs may conjure up in the reader's mind a haloyon picture of the industrialist and the forester living and working in harmony toward a common goal. This is a false picture. Conflicts still arise, and if they are less bitter than in the past this is because there is on both sides a better understanding of, and an increased respect for, the other's point of view. It is not the industrialist alone whose outlook has changed under the impact of events and extended frontiers of knowledge.

Forestry may be defined as the scientific management of forests for the continuous production of goods and services. As the practice of forestry develops, the forests come to be looked upon less as a natural resource (differing from some others in that it is renewable) and more as a crop, dependent in a large measure on man's knowledge and skill. However, forestry is not concerned exclusively with growing timber as a crop; forests contribute in many other ways to the well-being of mankind, and

proper forestry practices assure the maintenance and enlargement of these benefits too.

Man is not a conservationist by nature. Throughout history, so long as the existing forest has appeared adequate to meet current and immediately foreseeable demand, it has been exploited for immediate revenue with little account taken of its future productivity. Only when it became apparent that current practices were endangering the future supply of goods and services, were labor and capital directed to forest conservation.

As indicated at the beginning of this chapter, efforts to conserve the forests are not new. Some are recorded over 3,000 years ago. From time to time efforts have also been made to create new forest resources. But it was only with the advent of modern forest science still scarcely a century old — that these efforts began to take a permanent and enduring shape. It was natural that modern forest science developed first in Central and Western Europe, where the disciplines of a variety of sciences could be mobilized to solve the dilemma of rising timber needs and vanishing forests. It was perhaps fortunate that in the early days of forestry, methods of estimating the extent of forest resources and their potentialities were far less precise than they are today. This meant that in many cases - though by no means in all - foresters overestimated the dangers of the forests being depleted. Thus sometimes the public conscience was aroused in time to save the forests from disaster, and in recent years inventories carried out by modern methods have revealed greater resources than had been suspected. 12

The forester has fought an uphili battle for recognition. He learned early to plan for a long period ahead, and became accustomed to the idea that, save in special cases, he himself would not see the final result of his work. Since his mission was to safeguard the needs of posterity against a host of insistent current demands — for land, fuel, timber, food, etc. — he has been in many respects a lonely man, a man set apart from the community. His lawenforcement functions, where he has been able to pursue his aims with the full backing of

<sup>12</sup> This is true of a number of countries which have a long forestry tradition. It should be observed however, that inventories in less developed areas have, in general, revealed forest resources less abundant than had hitherto been believed.

the law, have not added to his popularity, nor have they endeared him to those with claims on the forest, whether legitimate or illegitimate. It is small wonder that his work has brought him in the past into constant conflict with forest industries. He has been accused and the modern forester would concede not altogether without justice - of elevating the forest to an end in itself. It has been said that he has overlooked the economic functions of the forest, the part that the timber crop should play in the national economy. It has been said that many of the best-managed stands to which the forester points with pride are in fact overstocked and tie up a considerable amount of national capital while yielding little or no interest. It has been said also that forestry pays too little attention to the requirements of industry, both as regards quantity and quality, and that the methods of harvesting advocated pay greater attention to biological than to economic factors.

In all these charges there has been — and perhaps still is in many cases — an element of truth. Yet there is much that can be said in extenuation. So long as forest mensuration was subject to considerable error margins, so long as the range of silvicultural measures in the forester's armory was limited, so long as the public conscience was not awake, so long as the forester stood virtually alone against those who would make war on the forest, the forester had ample justification for strict conservatism.

In recent decades, however, the situation has gradually changed. This is partly due to the more general understanding of the role and function of the forest — for which the forester himself can claim much of the credit; it is partly due to the progress made in forest biology and technology, which has both multiplied the tools at the forester's disposal and given him increased confidence in their application; and finally, it is also due in part to the growing maturity of the youngest branch of forest science forest economics — and the steady integration of this branch with the other branches of forest science. Now that the rival interests in the forest are increasingly disposed to take a long-term view of the forest, the forester himself can safely pay more attention to the shorterterm needs of the forest. He is today, as never before, adapting his measures to ensure that the needs of the users, whether in the shape of timber crop, amenities, or other non-crop values, are met.

# The Forest Owner

It must not be supposed that the forester's writ is universal. Though in the course of the last half-century he has gained in competence, stature, and influence, his power to shape events is limited by a number of factors. Perhaps the most important of those is forest ownership.

Of the world's accessible forests, no less than 80 percent is publicly owned.

The two regions of the world with the most diverse and highly developed forest industries — Europe and North America — are also the two regions where the percentage of accessible forest privately owned is greatest (see Table IV-14).

Table IV-14. Ownership of Accessible Forests

Region	Total acces- sible forest area	Public- ly owned (State and com- munal)	Owned by institu- tions	Private forests	Private forests as per- eent- age of acces- sible forests
		Million	hectares		Percent
Europe	132	59	2	71	54
U.S.Š.R	720	720	_		0
North America	333	171		162	49
Latin America	323	192	1	130	40
Africa	252	244		8	3
Asia	280	252	, 1	27	10
Pacific Area	16	12		4	24
World	2 056	1 650	4	402	19

The mere fact of public ownership in no sense constitutes a guarantee that the forests are adequately serviced and that the professional forester has the means, in personnel, expertness, funds, and authority, to moderate the impact of forest industries. Indeed, the contrary is usually the case. The high percentage of forest publicly owned in many of the countries in the less developed regions of the world reflects the will of those countries to ensure that these natural resources be acknowledged as a national asset. For the most part, however, the forest services are weak, thinly spread, and badly equipped; they are all too seldom capable of assembling the basic data essential for the formulation of a forest policy, let alone ensuring that such a policy is implemented. Where industrial exploitation is taking place, it is mainly being carried out by industrialists or logging contractors holding concessions from

the public authorities, often on a long-term lease. The problems of extraction are frequently formidable, and the public authorities, anxious to derive revenue from idle, unexploited assets, are usually in no position to stipulate logging methods and to insist on regeneration measures.

The situation in the public forests of Europe and North America is better, but it was not always so. Progress, however defined, brings with it an incessant increase in public expenditure. It has been all too easy for governments, central and local, to turn to the public forest domain as a source of easy revenue, especially when forest industries and logging contractors, check in hand, have emphasized the extent of idle, unproductive forest assets and have indicated their readiness to take their checks elsewhere. The long-term concession of large areas of public forest to industry for unrestricted fellings was a characteristic of the "mining era" of forest exploitation. It is still the dominant method of timber sale in Canada, where 83 percent of the accessible forest is publicly owned. However, in the course of the last half-century, and particularly in the last two decades, proper management has become a common condition of lease, and devastation of the forest a much rarer consequence of exploitation.

Quite apart from the concession of leases on public forest land to industry, there has been in many regions a strong tendency to sell public forests to private owners. In Europe, throughout the nineteenth century the area of public forest steadily diminished as tract after tract was disposed of for agricultural or building purposes. Often the timber was heavily cut or even completely cleared before the land was released. In the United States it has been part of government policy to transfer certain lands to private ownership as rapidly as possible. Thus of the 585 million hectares to which the Federal Government acquired title in the course of the growth of the United States, by 1953 no less than 71 percent — or 420 million hectares — had passed into private ownership through public and private land sales, sales and grants to individuals, states, and corporations. Much of this land was forested, and one effect has been the proliferation of forest tracts too small for efficient management. Thus in 1953, 34 percent of all United States commercial forest land was held by farmers, and a further 27 percent by other private, non-forest industry, owners. These figures may be compared with the 13 percent owned by forest industries. Of the privately-owned forest roughly one third (i.e., about one fourth of all commercial forest land) was held in lots of less than 100 acres. The average holding of the close on 4 million owners in this size group was 37 acres. A further 30 percent of the commercial forest area was held in lots of from 100 to 5,000 acres by 630,000 forest owners.

Small forest holdings by private forest owners are characteristic of many other countries too. In Western Germany, 42 percent of the private forest area consists of holdings of less than 10 hectares. In Austria, Finland, and Ireland holdings of less than 100 hectares account for two thirds or more of the private forest area. The situation is very similar in most European countries, always excepting those which have adopted a socialist form of economy.

It is the small private forest owner who presents the professional forester with his greatest problem. In the publicly-owned forests of Europe and North America management practices today are on the whole good. Their domains are not usually of the best, since they often contain the least accessible and poorest sites; in many cases they have acquired devastated land for afforestation and reforestation purposes. Much of the effort of state forest services has to be devoted to rehabilitation measures and the building up of timber reserves.

But the small farm forest, even though it may be favorably situated and relatively well stocked, is not usually well managed. The very size of the holding precludes scientific management, even if the farmer or small private owner has the will, the expertness, and the means to manage his woodlot scientifically. Normally, he looks on his woodlot partly as a subsidiary source of income, partly as a stock or raw material for his domestic use, and partly as a capital reserve. When bills accumulate, when capital is needed for agricultural installation, equipment, land improvements, etc., there is a great temptation to make inroads into the forest capital. On a small holding the concept of sustained yield is hard to grasp, while the sense of private property makes the needs of future generations weigh lightly against urgent current needs. Though relatively small investments normally suffice to ensure regeneration or stand improvement, these investments are apt to rank far behind agricultural investment in priority, since the latter show quicker, more visible, returns. The temptation for the farmer-forester is especially great when expanding timber industries, in quest of additional raw material supplies, send stumpage prices soaring; the sale of standing timber seems an easy way of earning money.

Education, extension work and the promotion of co-operatives all help to improve the management of small woodlots, and these activities are perhaps among the more important carried out by forest services. It is a slow and thankless task, since in few cases has public opinion evolved to the point where it is willing to endow the forest service with the anthority to impose sanctions. The carrot - in the shape of subsidies, low-interest loans, free or cheap nursery stock, free technical advice, etc. - may not be more effective than the stick of licensing fellings, exacting penalties for bad practices, and the like; but at the present time it is more prevalent. Because so large a part of the national forest assets rests in the small, privately-owned forest, this is a sphere which must receive increasing attention.

For many years private associations and public forest services were alone in their efforts to promote better practice in private woodlands. But since the war the forest industries have also taken a hand. This most encouraging development, very marked in the United States, springs from the recognition by the forest industries of the fact that these woodlands will constitute, for many generations yet, the main source of industrial raw material. A far-sighted procurement policy must therefore ensure that forests in this category, too, be managed along enlightened lines. Demonstration, education, and assistance provided to private owners by the forest industries is likely to increase.

# The Forest and the Community

The community's interest in the forest needs no underlining. The timber crop is a matter of concern to the community as well as to the industrialist. But it is the community whose interests are most vitally affected by the non-crop functions of the forest. If the recreational values of the forest are destroyed or impaired, it is the community that suffers. If the loss of tree cover leads to soil erosion, uncontrolled flooding, avalanches, lowered water tables, it is the community that eventually pays the penalty.

It has been noted earlier that no less than 80

percent of the world's accessible forest is publicly owned - by nations, states, provinces, and local communities. This is due only in part to a conviction that a resource provided by nature should be owned and operated in the interests of all rather than confer benefits on the few; in the main it has its roots in fendal tenure systems, royal reservations, and the like. But the disposition to confirm, or make over to, public ownership of forests in States which have newly acquired independence or in States where the political and social order has changed rests also on a growing recognition of the intimate way in which the forests are bound up with agriculture and the life of the people. In the course of the last decade, statutes and decrees in a number of countries have proclaimed public ownership of many forests whose title was uncertain.

In Europe and North America the long-term trend has been in the other direction; as earlier noted, public forests today account for half or less of the accessible forest in these regions. Every forester in these regions will concede that much remains to be done, even in the public domain, to ensure that these forests are managed in a manner entirely consonant with the short- and long-term interests of the community. This is not only a matter of the resources in men and money available to the forest services. It is also a matter of scientific knowledge and techniques; more and more effort is being devoted to research and experiment, both silvicultural and in the field of utilization, and the economic aspects of timber growing, timber extraction and timber marketing have never received so much attention as they are doing today. It is a matter, too, for closer co-operation between forestry, agriculture, economic ministries, and planning authorities, to ensure that the various land needs of the community are harmonized in an integrated land-use policy, and here considerable progress has been made in recent years.

The major problem in these two regions, however, remains the private forests. Some of the difficulties have already been referred to, but it should be observed that already — particularly in Europe — the community has gone a long way toward ensuring, whether by education and persuasion or by enforcement, that the present and future needs of the community are not overlooked. The reasons are not far to seek. Europe has very little forest in relation to population — a mere 0.3 hectare per

head. It is highly developed economically, and has a high per caput requirement of forest products. The natural growth capacity of the soil and climate is low — lower than that in any other major region save the U.S.S.R. Yet, over a relatively long period, the forests have produced more wood per hectare than any other region. Ontput per hectare has steadily increased, and there is every reason to suppose that this increase will continue.

This could only have been achieved by the widespread application of sound forest policies and high standards of silviculture, and clearly, in view of what has been said above, these must have been applied to private as well as public forests. It is therefore worth examining in a little more detail how this has come about.

Forest regulations, implying a recognition of community interest, date back many centuries in Europe, long before forest science had evolved to the point where really scientific forest policies could be devised and applied. Before the French Revolution there existed in many conntries an astonishing volume of meticulous rules on forest practice and wood use, including silvicultural methods. It is true that for the most part these laws, rules, and orders went nuobserved, and had very little impact on the woods themselves. What is important to note is that parliaments and absolute monarchs recognized the community's interest in the forest. Enforcement was difficult, partly because forest science was not sufficiently advanced, partly because public understanding of the issues involved had not reached the point where a climate favorable to enforcement was created. The impact of the French Revolution and the era of laissez-faire weakened the effect of such regulations as existed, and the industrial revolution, with its accompanying rise in the demand for timber, slackened the remaining restrictions and ashered in a period of destructive forest exploitation. But though many small forests were cleared or seriously overcut, the demands of the new times were frequently resisted. Commercial pressures often failed to overcome innate conservative instincts. On both public and private lands substantial planting programs were undertaken.

In isolated areas restrictions on fellings and cutting practices remained in force, but for the most part they wilted away under economic pressures. However, in the course of the nineteenth century the community interest gradually reasserted itself, and private forest owners were

increasingly coaxed, cajoled, or compelled to improve their practice; at the same time forest science, gaining in precision as well as confidence, was better able to indicate what needed to be done and how it should de done.

The most common practice in guiding private forestry in Europe is to safeguard the forest area by insistence on regeneration; bad entting practices may be liable to penalties; in a few instances, as in Great Britain and some cantons of Switzerland, fellings of all or of certain categories of timber require specific official authorization. In some cases the law is directed to the owner of cutting rights; mostly it is directed to the forest owner. In some countries the forest authority reserves the right to impose management plans in cases where poor practices persist.

Taxes and levies on the sales of timber or forest property are sometimes imposed as a means of building up a fund to finance forestry training, forest research, afforestation, and reforestation, provision of seeds and plants, forest roads, etc. Loans, subsidies, tax exemptions, as well as technical advice and materials, all play their part in encouraging improvements in private forestry.

In the United States the community interest asserted itself somewhat later, and the "cut out and move on" methods of industry were allowed to persist until late in the nineteenth century. In 1891 the President was authorized to withdraw "any part of the public land wholly or in part covered with timber or undergrowth " as forest reserves, and the new trend in United States public opinion about the basic function of the forest dates from around this time. In 1911 the Federal Government was allowed to purchase private lands for protection purposes, and in 1924 also for timber production. The area of commercial forest now publicly owned gives the Forest Service a vast field for proper management and great opportunities for providing an example for private forest owners.

Enforcement procedures play a minor role, in the United States. The main weapon is education, and this has been carried out on a very broad scale. Once public opinion is convinced, action is facilitated. Yet the task is immense, as it must be with so large a proportion of commercial forest land in the hands of millions of small owners. Thus, in spite of the extension services built up by universities and Federal and state forest services, supplemented in a few instances by co-operative movements

among forest owners, the latest available figures show that 59 percent of the cut on farm woodlands was only of low or medium productivity, as compared with 23 percent on industrial and 20 percent on public woodlands.

In the past the forest meant different things to the industrialist, the forest owner, the forester, and the community. Their respective interests often clashed. Today, under the influence of economic pressures, growing knowledge, wider understanding and a strengthening sense of community, some of these conflicts have disappeared, while others have become blunted or have shown themselves capable of adjustment. The professional forester long considered himself the only true custodian of the community interest. Today he is a wiser and happier man: wiser, in the sense that he realizes that his training does not of itself enable or entitle him to judge the validity of all claims on the forest; happier in the sense that the other interests in the forest are beginning to share with him the burden of responsibility in making the best use of this renewable resource.

# The Integration of Interests

The century-old history of modern forest industries has left heavy sears in the forests of those lands where they have assumed importance. The inroads of the forest industries were preceded by other influences destructive of the forests — agriculture, and the need for timber for fuel, mines, railways. All these influences have operated during the last century alongside the growing forest industries. Thus, even were adequate statistics of forest area, standing stock, and yield available over the period during which the forest industries have developed, it would be impossible to isolate and quantify the impact of the latter. It is only possible to show in very general terms the nature of that impact by reference to scattered examples for which data exist or can be estimated and by reference to what is known about the state of the forests today.

The foregoing pages have stressed — some might say overstressed — the new spirit that is abroad today, and the reasons why one may hope that lessons have been learned from the errors of the past, and that the impact of the forest industries on the forests in the future is likely to be more beneficent than destructive. But the emphasis is a deliberate one, and is accorded not so much because a progressive

and enlightened attitude is fully typical of forest industries today as because this represents a new and significant element in the total forestry picture which is destined to play an ever more important role. This is perhaps a bold assertion, but it is based on the fact that new attitudes discussed in these pages do not spring from altruism or from any mysterious conversion but from steadily accumulating economic pressures and a growing recognition of long-term economic interest. These pressures are manifest in a variety of ways, and the moves toward integration — in its widest sense — are equally varied.

The acceleration in economic growth rates is bringing in its train rapidly rising needs for industrial wood. These rising demands come up against limitations in the amount of industrial timber available or in the amount which can be economically extracted. The law of increasing costs focuses the attention of all on the value of timber as a raw material and on the need to ensure its rational use. Full employment policies have helped to improve the rewards of labor and this, too, has had its influence on the price of timber, since roundwood delivered to the mill has a high labor content.

The response of the forest industries has been to undertake a variety of actions designed to secure their raw material supplies and to make the best use of the supplies available. Technical progress has in some cases enabled them to broaden their raw material basis, making use of species, qualities, and dimensions hitherto disregarded. The pulp industries, for example, utilize increasing volumes of temperate hardwoods and resinous pines; they can accept material which hitherto would have been classed as forest waste, useable only as fuel. Industrial residues in sawmills and plywood mills are collected and pulped in considerable volumes, and in some countries the price per unit volume of slabs and edgings is approaching that of raw pulpwood. With a growing shortage of quality veneer logs, the plywood mills accept smaller dimensions, peel to a smal-Ier core, and by means of patching machines produce marketable plywood from material that hitherto would have been rejected. The new particle board industry operates on forest and industrial waste, as well as on a wide variety of roundwood species. The fact that the several forest industries can be largely complementary in their raw material requirements has led to integration, ensuring the optimum economic utilization of the forest crop as a whole, including residues. To ensure raw material supplies, the industries have acquired forests themselves, sought long-term concessions, and encouraged better practice among private forest owners.

On the other side, public forest authorities as well as private forest owners acting in association have, to ensure the best markets for their crops, established forest industries themselves or acquired interests in existing forest industries. Both sides promote and support research and experiment over a wide field: wood properties, silvicultural methods, logging techniques, utilization practice, and industrial techniques.

Alongside the integration of forest industries and the knitting together of forest and forest industry interests, a certain improvement has come about in the lot of the forest worker, with better accommodation, community developments, added facilities for training, more stable conditions of employment.

# Meeting Future Needs

Two questions naturally arise. Are the world's forests capable of meeting the growing demands which future economic growth will impose upon them? Can the forest industries be relied upon to play their part without jeopardizing the forest resources?

An indication of the extent to which industrial wood needs have grown in the course of the last four decades is afforded by the figures in Table IV-15.

The combined industrial wood requirements of Europe and North America rose from 351 to 551 million cubic meters, or by 57 percent, between 1913 and 1956. The rise has been particularly spectacular in the postwar decade, and even more pronounced in other regions. Thus between 1946 and 1956 world industrial wood needs rose from 589 to 917 million cubic meters. It is evident that, given sustained economic growth, a total world requirement of industrial wood of the order of 2,000 million cubic meters by the end of the present century is well within the bounds of possibility.

There can be no doubt of the capacity of the world's forests to furnish these requirements. Even if we leave out of reckoning the 2,000 million odd hectares of forest presently classified as inaccessible and the 680 million hectares of accessible forests not yet under exploitation, there is ample evidence to show that the 1,100 million hectares of forests already in use are potentially capable of satisfying this demand. It is of some interest to compare for selected countries the actual gross increment in forests already under exploitation with the productivity that the climate and soil is potentially capable of yielding given optimum conditions.

Thus, even in Europe, where forests have long been under proper management and the most intensive silviculture is practiced, the margin for improved yield is considerable. It follows that the margin in other regions is considerably higher.

It must not be supposed, however, that the gap between the actual and the potential can

TABLE IV-15. RECORDED ROUNDWOOD REMOVALS, TOTAL AND INDUSTRIAL WOOD, 1913-56

REGION		Total re	movals		Of which, industrial wood			
TUEGION	1913	1938	1946	1956	1913	1938	1946	1956
				. Million cu	ible meters			
Europe	261 273	303 261	299 353	303 416	116 235	170 210	154 281	195 356
Total	534	564	652	719	351	380	435	551
U.S.S.R		•••	186 176	328 179	• • •	• • •	80 22	220 29
Africa		•••	$\begin{array}{c} 99 \\ 202 \\ 14 \end{array}$	102 227 28	• • •	• • •	5 39 8	10 86 21
Total		•••	1 329	1 583			589	917

TABLE IV-16. GROSS INCREMENT IN FORESTS IN USE COMPARED WITH POTENTIAL PRODUCTIVITY IN PRODUCTIVE FORESTS, IN SELECTED COUNTRIES

COUNTRY OR REGION	Gross increment	Potential produc- tivity	Gross increment as percentage of potential produc- tivity¹
		s with bark	Percent
Europe	2.5	4.6	54
Austria	3.3 3.7 6.9	5.4 5.2	61 71 nearly 100
Finland. France. Italy Norway Poland Spain Sweden. United Kingdom Yugoslavia	2.0 3.0 2.7 2.5 2.2 0.4 2.8 3.2 2.3	3.3 5.9 6.1 4.6 5.0 3.4 3.7 7.5 5.8	61 51 44 54 44 12 76 43 40

Sources: Inerement: FAO, World Forest Resources, 1955.
Productivity: S.S. Paterson, The Forest Area of
the World and its Potential Productivity, 1955.

'The increment and productivity figures are not fully comparable because they do not always relate to the same area.

be diminished with ease, still less that it can ever be closed. Intensive forestry requires heavy investment, both in labor and materials, and an adequate supply of professional skills. The cost of the additional inputs has to be balanced against the market value of the supplementary yields they will generate. In other words, the problem of raising output from existing forests is essentially a problem of forest economics. Herein lies the explanation for the increasing attention given to this branch of forest science and for the intimate relationship which is growing up between the silviculturist, the wood utilization technologist, and the forest economist.

Remains the question of whether the forest industries can raise their capacity to match rising demand without leading to local overtaxing of the forest resources. Of this, too, there can be no doubt — at any rate in the long term and considering the world as a whole. The last decade has seen the most vigorous expansion of the forest industries in history. Rapidly as demand has risen, both the invest-

ment capital and the necessary specialized equipment have been forthcoming to ensure that capacity has not lagged far behind consumption. The process has not been entirely smooth. When the upward curve in demand has wavered, as it did in 1952 and as it is doing in some regions today, temporary excess capacity has arisen. But in the future, as in the past, this is likely to be swiftly absorbed. A more disquieting feature of the expansion is that it is not taking place sufficiently rapidly in those regions where, in relative terms, demand is rising most rapidly. Thus many countries in Asia, Africa, and Latin America are still "underconsumers" of forest products (in relation to their national incomes) because they still lack either sufficient indigenous capacity or the means of importing all the forest products they could absorb. Lack of capital is obviously one reason for this relative lag. But another, and perhaps equally important reason, is that the introduction of modern forest industries in countries which are still underdeveloped industrially, where the raw material differs in many respects from that traditionally used in the established centers, and where the conditions of extraction are entirely new, poses a variety of economic problems, and notably questions of forest economics, whose solution cannot be hastened without running the risk of creating unviable concerns. There will always remain the danger that developing countries with ample timber resources may, in order to attract industries and valorize their forest assets, be tempted to offer concessions on terms which are not consonant with good stewardship of the forests. The "cut out and move on" methods of exploitation may thus be reproduced in other regions of the world. But though this is still a danger, it is perhaps a less serious danger than it would have been a short decade ago. On the one hand, the investments necessary to establish modern forest industries compel entrepreneurs to envisage longer periods of stable operation, with secure material supplies. On the other, the rise in forest consciousness and in understanding of the multiple role of the forest, both by governments and by the man in the street, is not confined to the world's developed regions.

# ANNEX TABLES

Annex Table 1-A. Estimated World Production of Major Commodities

COMMODITY	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
			Million	metric tons		
Wheat	$95.0 \\ 28.5 \\ 37.5 \\ 94.1 \\ 70.2$	113.5 $36.0$ $42.5$ $119.6$ $74.8$	118.7 $44.8$ $42.3$ $123.1$ $82.2$	$egin{array}{c} 123.4 \\ 46.4 \\ 45.7 \\ 129.8 \\ 87.6 \\ \end{array}$	$\begin{array}{c} 123.3 \\ 52.5 \\ 43.8 \\ 136.1 \\ 92.1 \end{array}$	122.4 $49.7$ $40.8$ $137.6$ $88.2$
Sugar (centrifugal)	20.0	26.4	31.4	32.0	33.5	35.6
Citrus fruit	$11.1 \\ 11.0 \\ 8.1$	$15.1 \\ 12.6 \\ 11.2$	$17.7 \\ 13.8 \\ 12.2$	$18.1 \\ 12.8 \\ 12.3$	$17.9 \\ 14.6 \\ 12.7$	$17.3 \\ 9.0 \\ 12.7$
Vegetable oils and oilseeds (oil equivalent)	$\frac{9.2}{3.01}$	$11.6 \\ 4.20$	$\substack{13.2\\4.58}$	$13.4\\4.94$	$14.7 \\ 5.26$	$14.9 \\ 5.14$
Coffee	$2.41 \\ 0.74 \\ 0.47 \\ 18.0 \\ 1.96$	$egin{array}{c} 2.25 \\ 0.76 \\ 0.57 \\ 17.6 \\ 2.46 \\ \end{array}$	$egin{array}{c} 2.48 \\ 0.82 \\ 0.67 \\ 21.1 \\ 2.81 \\ \hline \end{array}$	$2.86 \\ 0.83 \\ 0.70 \\ 21.3 \\ 2.88$	2.60 $0.91$ $0.70$ $20.6$ $2.93$	$egin{array}{c} 2.98 \\ 0.76 \\ 0.71 \\ 16.1 \\ 2.76 \\ \end{array}$
Cotton (lint)	5.31 $1.95$ $1.51$ $0.96$	5.75 $2.03$ $1.58$ $1.74$	6.47 $1.68$ $1.76$ $1.85$	6.80 $2.32$ $1.81$ $1.95$	$\begin{array}{c} 6.50 \\ 2.30 \\ 1.90 \\ 1.91 \end{array}$	6.03 $2.23$ $1.91$ $1.93$
Milk (total)	$193.6 \\ 26.9 \\ 5.82$	$204.8 \\ 30.5 \\ 7.49$	$226.5 \\ 35.7 \\ 8.69$	$229.1 \\ 37.4 \\ 8.83$	$\begin{array}{c} 233.8 \\ 39.0 \\ 8.99 \end{array}$	$241.8 \\ 39.2 \\ 9.10$
			1948/49 -	1952 53 = 100	)	
Index of all farm products	85	100	111	115	118	117
Forest Products			Million cu	ıbic meters		
Roundwood	•••	$^{3}1 \ 469 \\ ^{3}266.4 \\ ^{3}8.6$	$\begin{array}{c} 1 \ 550 \\ 274.0 \\ 9.3 \end{array}$	$\begin{array}{c c} 1 & 598 \\ & 285.5 \\ & 11.0 \end{array}$	$\begin{array}{ c c c c }\hline 1 & 600 \\ & 290.0 \\ & 11.4 \\ \hline \end{array}$	$\begin{array}{c c} 1 & 570 \\  & 280.0 \\  & 11.5 \end{array}$
			Million	metric tons .		
Wood pulp	•••	<sup>3</sup> 39.1 <sup>3</sup> 9.8 <sup>3</sup> 38.5	$42.4 \\ 10.4 \\ 40.8$	$\begin{bmatrix} 46.6 \\ 11.2 \\ 46.4 \end{bmatrix}$	$\begin{vmatrix} 49.7 \\ 12.0 \\ 47.7 \end{vmatrix}$	$\begin{bmatrix} 50.2 \\ 12.3 \\ 48.9 \end{bmatrix}$

 $<sup>^1</sup>$ Excluding U.S.S.R., Eastern Europe, and China. —  $^2$ Beef and veal, mutton and lamb, pork. —  $^3$ 1953.

ANNEX TABLE 1-B. WORLD TRADE<sup>1</sup> IN MAJOR COMMODITIES

COMMODITY	1934-38	1948-52	1954	1955	1956	1957
			Million m	etric tons		
Imports						
Wheat and wheat flour	0.86	25.23 $3.58$ $1.33$ $4.79$ $4.32$	22.59 5.47 1.48 4.91 4.68	23.75 $4.79$ $0.94$ $5.15$ $4.60$	28.12 $7.07$ $1.22$ $6.05$ $5.51$	28.50 $6.51$ $1.42$ $6.69$ $5.45$
Sugar (raw equivalent)	9.38	10.76	12.09	12.75	13.16	14.05
Citrus fruit <sup>2</sup>	$egin{array}{c} 1.72 \\ 0.67 \\ 2.43 \end{array}$	$1.80 \\ 0.50 \\ 2.34$	$2.50 \\ 0.61 \\ 3.00$	$2.64 \\ 0.73 \\ 3.03$	$\begin{array}{c} 2.23 \\ 0.80 \\ 3.03 \end{array}$	$2.55 \\ 1.04 \\ 3.27$
Vegetable oils and oilseeds (oil equivalent)         Coffee	$egin{array}{c} 0.40 \ 1.82 \ 0.49 \ \end{array}$	$egin{array}{c} 3.67 \\ 1.90 \\ 0.66 \\ 0.42 \\ 1.61 \\ 0.49 \\ \end{array}$	4.49 1.82 0.69 0.50 2.37 0.55	$egin{array}{l} 4.66 \ 2.04 \ 0.67 \ 0.49 \ 2.77 \ 0.59 \end{array}$	5.02 $2.24$ $0.71$ $0.48$ $2.55$ $0.58$	5.17 2.24 0.69 0.53 2.94 0.58
Cotton (lint)	$\begin{array}{c} 2.77 \\ 0.73 \\ 1.07 \\ 0.98 \end{array}$	$egin{array}{c} 2.14 \\ 0.77 \\ 1.07 \\ 1.58 \\ \end{array}$	2.52 0.84 0.98 1.66	2.30 $0.92$ $1.07$ $1.82$	2.59 $0.89$ $1.15$ $1.71$	2.83 $0.82$ $1.20$ $1.74$
Meat (fresh, chilled, frozen) <sup>4</sup> Eggs (in the shell)	$\begin{array}{c} 1.16 \\ 0.33 \end{array}$	$\begin{array}{c} 0.90 \\ 0.27 \end{array}$	$\begin{bmatrix} 0.87 \\ 0.36 \end{bmatrix}$	$\begin{array}{c} 1.01 \\ 0.38 \end{array}$	$\begin{bmatrix} 1.21 \\ 0.39 \end{bmatrix}$	$\substack{1.33\\0.42}$
Exports			Million cub	ic meters		
Roundwood		$\begin{bmatrix} 518.4 \\ 528.7 \\ 50.5 \end{bmatrix}$	$\begin{bmatrix} 21.3 \\ 39.1 \\ 0.8 \end{bmatrix}$	$\begin{bmatrix} 27.0 \\ 35.7 \\ 1.0 \end{bmatrix}$	$\begin{bmatrix} 26.9 \\ 32.3 \\ 1.0 \end{bmatrix}$	$26.5 \\ 32.3 \\ 1.2$
			Million me	tric tons		
Wood pulp	• • • • • • • • • • • • • • • • • • • •	<sup>5</sup> 6.0 <sup>5</sup> 5.9 <sup>5</sup> 2.2	$\begin{bmatrix} 6.9 \\ 6.2 \\ 2.8 \end{bmatrix}$	$\begin{bmatrix} 7.6 \\ 6.6 \\ 3.1 \end{bmatrix}$	$\begin{bmatrix} 7.8 \\ 7.0 \\ 3.3 \end{bmatrix}$	$7.6 \\ 6.9 \\ 3.5$

<sup>&</sup>lt;sup>1</sup>Including imports into the rest of the world from the U.S.S.R., Eastern Europe, and China, but excluding imports into these countries. — <sup>2</sup>Oranges and lemons only. — <sup>3</sup>Excluding imports into Malaya and Singapore for re-export. — <sup>4</sup>Beef and veal, mutton and lamb, pig meat. — <sup>5</sup>1953. — <sup>6</sup>Excluding U.S. trade with its territories.

Annex Table 2-A. Western Europe: Production of Selected Commodities

COMMODITY	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
			Million 1	netric tons		
Wheat.          Rye.          Barley.          Oats          Maize.	7.49	30.32   6.65   10.93   14.84   7.15	$egin{array}{c} 35.70 \\ 7.65 \\ 13.72 \\ 14.58 \\ 8.55 \\ \end{array}$	37.80 $6.70$ $14.74$ $14.78$ $9.71$	$egin{array}{c} 32.04 \ 7.14 \ 19.04 \ 16.00 \ 10.11 \ \end{array}$	38.20 $7.22$ $17.58$ $13.38$ $11.99$
Sugar (centrifugal)	4.02	5.13	6.55	6.87	6.49	7.10
Potatoes	1.99	76.16 $2.10$ $8.73$	$     \begin{array}{c c}       81.04 \\       2.63 \\       9.50     \end{array}   $	73.26 $2.51$ $8.71$	$84.63 \\ 1.85 \\ 10.28$	$78.68 \\ 2.49 \\ 4.26$
Olive oil	0.81 1.04	$\begin{array}{c} 0.86 \\ 0.99 \end{array}$	$\begin{bmatrix} 0.86 \\ 1.14 \end{bmatrix}$	$\begin{bmatrix}0.69\\1.18\end{bmatrix}$	$\begin{bmatrix}0.91\\1.24\end{bmatrix}$	$\frac{0.99}{1.29}$
Wine	14.13 0.19	$\begin{bmatrix} 13.09 \\ 0.25 \end{bmatrix}$	$\begin{array}{c} 15.33 \\ 0.29 \end{array}$	$\begin{array}{c} 16.08 \\ 0.34 \end{array}$	$15.59 \\ 0.30$	$11.40 \\ 0.33$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	8.56	$egin{array}{c} 77.00 \ 7.51 \ 2.10 \ \end{array}$	$89.42 \\ 10.24 \\ 2.65$	$88.56 \ 10.52 \ 2.70$	$90.62 \\ 10.73 \\ 2.76$	96.38 $11.19$ $2.81$
	•••••		1948/49-198	52/53 = 100		
Index of all farm products	93	100	115	116	116	117
Forest Products <sup>2</sup>			Million m	etric tons	• • • • • • • • • • • • • • • • •	
Sawn softwood (mill. standards) Sawn hardwood (mill. m³) Plywood (mill. m³) Fibreboard (hard and insulating). Wood pulp (chemical) Wood pulp (mechanical) Newsprint	$   \begin{array}{c}     10.24 \\     9.07 \\     1.09 \\     0.17 \\     6.67 \\     3.95 \\     2.80 \\   \end{array} $	$egin{array}{c} 9.87 \\ 9.08 \\ 1.27 \\ 0.67 \\ 5.94 \\ 3.45 \\ 2.33 \\ \end{array}$	$10.72 \\ 9.82 \\ 2.02 \\ 1.05 \\ 7.62 \\ 4.38 \\ 2.86$	11.13 10.60 2.13 1.19 8.33 4.65 3.12	10.95 10.50 1.91 1.31 8.63 4.94 3.42	10.47 10.70 2.10 1.41 8.98 5.14 3.50
Other paper and board		8.85	12.11	13.18	13.57	14.55

 $<sup>^{1}</sup>$ Beef and veal, pig meat, mutton and lamb. —  $^{2}$ Includes Eastern Europe. Figures refer to calendar year and prewar figures to 1938.

Annex Table 2-B. Western Europe: Exports and Imports of Selected Commodities

			*			
Commodity	1934-38	1948-52	1954	1955	1956	1957
			Million me	etric tons		
GROSS EXPORTS			1	1	1	
Wheat and wheat flour	1.47	0.76	2.30	3.39	2.30	2.41
Sugar (raw equivalent)		1.35	1.65	1.81	1.54	1.45
Citrus fruit	1.18	0.91	1.26	1.41	0.85	0.85
Apples	0.19	0.31	0.41	0.66	0.53	0.72
Wine	0.50	0.46	0.78	0.78	1.00	0.81
Bacon, ham and salted pork	0.26	0.14	0.27	0.29	0.28	0.29
Eggs (in the shell)		0.17	0.26	0.27	0.28	0.30
Wool (actual weight)	0.23	0.11	0.09	0.10	0.11	0.11
			Million cu	bic meters		
Coniferous $logs^1 \dots \dots \dots$	2.39	1.71	0.88	0.92	0.70	0.72
Broadleaved $\log s^1$	0.50	0.45	0.67	0.94	0.66	0.65
Pulpwood 1	3.03	3.53	4.11	5.74	5.22	5.02
Pitprops <sup>1</sup>	3.16	3.00	2.44	3.00	3.03	3.12
Sawn softwood ·	13.86	12.66	14.88	15.39	14.52	14.82
		• • • • • • • • • • • • • •	Million n	netric tons		
Wood pulp $^{1}$	4.55	3.51	4.39	4.70	4.97	4.82
Newsprint 1	0.92	0.87	1.02	1.12	1.29	1.27
Other paper and board 1	1.20	1.51	2.24	2.46	2.47	2.68
Gross Imports						
Wheat and wheat flour	11.95	14.42	12.88	13.21	15.78	13.90
Barley	2.41	2.53	3.96	3.57	5.06	4.77
Maize	8.46	4.03	4.25	4.51	5.01	4.80
Rice (milled equivalent)	1.31	0.37	0.42	0.59	0.59	0.48
Sugar (raw equivalent)	3.46	4.23	3.78	4.06	4.40	5.37
Vegetable oils and oilseeds (oil	0.00	2 22	n 00	0.12	0.45	0.10
equivalent)	3.00	2.53	3.02	3.11	$\frac{3.41}{1.72}$	3.49
Coffee	$1.28 \\ 0.69$	$\begin{array}{c} 1.33 \\ 0.48 \end{array}$	$\begin{array}{c} 1.92 \\ 0.61 \end{array}$	2.05	1.72	1.95
Cocoa	0.36	$0.48 \\ 0.33$	0.61 $0.40$	$0.67 \\ 0.39$	$\begin{array}{c} 0.75 \\ 0.39 \end{array}$	$0.75 \\ 0.40$
Tea	0.36	$0.33 \\ 0.23$	$0.40 \\ 0.28$	$0.39 \\ 0.26$	$\begin{bmatrix} 0.39 \\ 0.27 \end{bmatrix}$	$0.40 \\ 0.31$
Wine		1.39	$\frac{0.28}{2.00}$	2.39	2.10	$\frac{0.31}{2.50}$
$\operatorname{Tobacco}$	0.37	0.34	0.39	0.41	0.40	0.41
Cotton (lint)	1.75	1.40	1.57	1.42	1.51	1.72
Rubber (natural)	0.36	0.59	0.72	0.81	0.78	0.80
Meat (fresh, chilled, frozen)?	1.13	0.82	0.77	0.92	1.12	1.17
Canned meat	0.08	0.18	0.20	0.20	0.19	0.14
Bacon, ham and salted pork	0.39	0.22	0.31	0.32	0.33	0.34
Butter	0.58	0.39	0.32	0.39	0.44	0.45
Cheese	0.23	0.27	0.28	0.28	0.30	0.30
Eggs (in the shell)	0.31	0.21	0.28	0.31	0.32	0.34

<sup>&</sup>lt;sup>1</sup>Includes Eastern Europe. — <sup>2</sup>Beef and veal, pig meat, mutton and lamb.

Annex Table 3-A. Production of Main Agricultural Products in Eastern Europe, U.S.S.R., and Mainland China

COMMODITY	Prewar	1950-53	1954	1955	1956	1957
Eastern Europe <sup>1</sup>	• • • • • • • • • • • •	Million	metric tons (un	less otherwise	specified)	
Wheat and rye.  All cereals <sup>2</sup> Potatoes.  Sugar beet.  Milk.  Eggs <sup>3</sup> .		22.5 $38.0$ $56.0$ $21.5$ $20.5$ $10.0$	$   \begin{array}{c}     19.4 \\     37.3 \\     64.1 \\     23.5 \\     22.2 \\     10.5   \end{array} $	23.0 44.2 51.6 24.0 23.4 11.3	$\begin{array}{c} 21.4 \\ 38.5 \\ 66.2 \\ 19.7 \\ 23.6 \\ 12.7 \end{array}$	24.7 46.6 
U.S.S.R.						
All cereals <sup>4</sup> Sugar beets          Milk.          Meat          Eggs <sup>3</sup> Cotton (raw)          Flax (fiber)          Wool	580.0 17.5 533.6 54.7 512.2 2.2 0.64 50.16	81.0 22.5 35.9 5.2 13.8 3.8 0.17 0.21	82.0 19.8 38.2 6.3 17.2 4.2 0.18 0.23	$103.0 \\ 31.0 \\ 43.1 \\ 6.4 \\ 18.5 \\ 4.0 \\ 0.31 \\ 0.26$	$123.0 \\ 32.5 \\ 49.1 \\ 6.6 \\ 19.5 \\ 4.5 \\ 0.43 \\ 0.26$	100.0 39.3 54.7  21.4 4.4 0.36
Mainland China						
Paddy	650.5 622.6 697.9 60.7 69.9	63.8 $17.0$ $127.9$ $1.1$ $8.9$	70.8 23.3 143.4 1.1 9.1	$78.0 \\ 22.9 \\ 155.8 \\ 1.5 \\ 9.1$	$82.5 \\ 24.8 \\ 160.7 \\ 1.4 \\ 10.2$	6160.0 61.3

Source: Based generally on the official statistics of the countries concerned.

ANNEX TABLE 3-B. EXPANSION OF THE CULTIVATED AREA IN THE U.S.S.R.

	Siberia and Kazakhstan¹		Т	otal U.S.S.F	Percentage increase 1953 to 1956			
Спор	1953	1956	1953	1956	1957	Siberia and Kazakhstan	Total U.S.S.R.	
	Million hectares							
Total crop area	30.0	56.6	157.2	194.7	193.2	89	24	
Total grain		42.9	106.7	128.3	126.4	92	20	
Wheat		(32.1)	(48.3)	(62.0)	(69.5)	138	28	
Maize (for grain)		(0.1)	(3.5)	(9.3)	(6.1)		166	
Potatoes and vegetables		1.4	10.3	11.6	11.9	17	13	
Industrial crops		1.5	11.5	13.1	12.4	7	14	
Forage crops		10.8	28.7	41.7	42.5	112	45	

Source: Based generally on U.S.S.R. official statistics. <sup>1</sup>Main areas where new lands were brought under cultivation.

<sup>&</sup>lt;sup>1</sup>Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, and Romania. — <sup>2</sup>Wheat, rye, barley, oats, and maize. — <sup>3</sup>Thousand million eggs. — <sup>4</sup>FAO estimate. ECE estimates for the U.S.S.R. are slightly higher. — <sup>6</sup>1940. — <sup>6</sup>FAO estimate.

Annex Table 3-C. Estimated Utilization of Some Agricultural Products in the U.S.S.R.

Commodity	Year	Total production	Qu	Production		
			Total	State collections	Other quantities marketed <sup>1</sup>	remaining on farms <sup>2</sup>
				etric tons		
Grain	$1940 \\ 1953 \\ 1956 \\ 1957$	80.0 80.0 123.0 100.0	$   \begin{array}{r}     38.3 \\     35.8 \\     61.2 \\     \dots   \end{array} $	$\begin{array}{c} 31.1 \\ 54.1 \\ 36.7 \end{array}$	4.6 7.1	42.0 44.0 62.0
Potatoes	1940 1953 1956	3(96.5)	$12.9 \\ 12.1 \\ 15.7$	$8.5 \\ 5.4 \\ 9.2$	4.4 6.7 6.5	•••
Vegetables	$1940 \\ 1953 \\ 1956$	3(14.3)	$egin{array}{c} 6.1 \ 5.1 \ 6.9 \end{array}$	$3.0 \\ 2.5 \\ 3.8$	$3.1 \\ 2.6 \\ 3.1$	• • •
Meat (live weight)	1940 1953 1956 1957	$ \begin{array}{c c} 7.5 \\ 9.4 \\ 10.7 \\ \dots \end{array} $	$egin{array}{c} 4.2 \ 5.4 \ 6.2 \end{array}$	2.0 3.4 4.2 4.8	$\begin{bmatrix} 2.2 \\ 2.0 \\ 2.0 \end{bmatrix}$	3.3 4.0 4.5
Milk	1940 1953 1956 1957	33.6 36.5 49.1 54.7	10.8 13.7 20.4	$ \begin{array}{c c} 6.5 \\ 10.6 \\ 17.3 \\ 20.5 \end{array} $	4.3 3.1 3.1	22.8 22.8 28.7
				Thousand	million eggs	
Eggs	1940 1953 1956 1957	$ \begin{array}{c} 12.2 \\ 16.1 \\ 19.5 \\ 21.4 \end{array} $		$\begin{bmatrix} 2.7 \\ 2.6 \\ 3.3 \\ \cdots \end{bmatrix}$	1	9.5 3.5 6.2

Source: Based generally on U.S.S.R. official statistics.

¹Principally free market but including also some sales to consumers' co-operatives. — ²Including quantities used for live-stock feeding, seed, etc., and also sales on the rural free markets. — ²Probably biological yield.

ANNEX TABLE 4-A. NORTH AMERICA: PRODUCTION OF SELECTED COMMODITIES

COMMODITY	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58		
	Million metric tons							
Wheat	65.60	44.46 $52.30$ $82.36$ $1.25$	$35.18 \ 25.19 \ 78.24 \ 1.89$	$\begin{array}{ c c c }\hline 38.89 \\ 28.11 \\ 82.84 \\ 1.65 \\ \hline\end{array}$	$egin{array}{c} 42.93 \ 24.97 \ 88.47 \ 1.45 \ \end{array}$	35.86 $24.92$ $87.19$ $1.27$		
Potatoes	$\substack{11.94\\3.62}$	$\substack{12.83\\6.41}$	$\substack{11.41\\7.32}$	12.14 7.47	$12.97 \\ 7.56$	$\substack{12.67\\6.51}$		
Vegetable oils and oilseeds (oil equivalent)	$\substack{1.19\\1.30}$	$\frac{2.66}{2.37}$	$\frac{2.86}{2.57}$	$\begin{array}{c c} 3.20 \\ 2.78 \end{array}$	$\frac{3.66}{2.93}$	$\frac{3.38}{2.80}$		
Tobacco	$\substack{0.62\\2.76}$	$\substack{1.02\\3.09}$	$\substack{1.10\\2.97}$	$\frac{1.04}{3.19}$	$\substack{1.06 \\ 2.89}$	$\frac{0.84}{2.38}$		
Milk (total)	8.08	$   \begin{array}{r}     59.59 \\     10.85 \\     3.78   \end{array} $	$63.20 \\ 12.45 \\ 3.95$	63.78 $13.21$ $3.94$	$64.93 \\ 13.81 \\ 4.02$	$66.07 \\ 13.45 \\ 4.03$		
			1948/49-195	2/53 = 100				
Index of all farm products	73	100	104	109	114	109		
			Million m	etric tons				
FOREST PRODUCTS								
Sawn softwood (mill. standards) Sawn softwood (mill. m³)	11.86 12.08 0.82 0.64 5.20 3.44 3.38 10.05	18.36 18.55 3.49 1.21 13.70 7.23 5.74 20.50	18.43 17.80 4.99 1.53 17.02 8.32 6.51 23.09	19.79 19.37 6.24 1.65 19.16 8.87 6.92 26.85	19.28 $18.20$ $6.58$ $1.73$ $20.64$ $9.17$ $7.33$ $27.11$	17.43 14.78 6.00 1.60 20.08 8.92 7.36 26.37		

ANNEX TABLE 4-B. NORTH AMERICA: EXPORTS AND IMPORTS OF SELECTED COMMODITIES

	,							
COMMODITY	1934-38	1948-52	1954	1955	1956	1957		
	Million metric tons							
GROSS EXPORTS								
Wheat and wheat flour	$0.50 \\ 0.80 \\ 0.21$	18.63 $1.44$ $2.31$ $0.71$ $0.23$	$egin{array}{c} 13.36 \\ 2.15 \\ 1.96 \\ 0.73 \\ 0.33 \\ \end{array}$	13.74 $2.96$ $2.77$ $0.70$ $0.30$	22.07 $3.56$ $3.02$ $1.00$ $0.41$	20.33 $2.55$ $4.52$ $0.92$ $0.33$		
Vegetable oils and oilseeds (oil equivalent)	0.20	$0.40 \\ 0.22 \\ 1.04$	$0.86 \\ 0.22 \\ 0.94$	$\begin{array}{c} 0.83 \\ 0.27 \\ 0.56 \end{array}$	$egin{array}{c} 1.13 \ 0.25 \ 1.03 \end{array}$	$1.28 \\ 0.24 \\ 1.57$		
			Million c	ubic meters				
Coniferous logs		$egin{array}{c} 0.33 \\ 0.23 \\ 5.68 \\ 8.41 \end{array}$	$egin{array}{c} 0.60 \\ 0.25 \\ 4.64 \\ 11.15 \\ \end{array}$	$egin{array}{c} 0.71 \ 0.22 \ 4.87 \ 12.59 \ \end{array}$	$\begin{bmatrix} 0.72 \\ 0.26 \\ 5.20 \\ 10.80 \end{bmatrix}$	$0.54 \\ 0.24 \\ 4.85 \\ 10.40$		
			Million n	netric tons	ic tons			
Wood pulp		$\frac{1.83}{4.50}$	$\begin{bmatrix} 2.37 \\ 5.14 \end{bmatrix}$	$\begin{bmatrix} 2.72 \\ 5.42 \end{bmatrix}$	$\begin{bmatrix} 2.63 \\ 5.55 \end{bmatrix}$	$\substack{2.65\\5.53}$		
GROSS IMPORTS								
Sugar (raw equivalent) 1	$egin{array}{c} 3.20 \ 0.11 \ 1.35 \ \end{array}$	$3.87 \\ 0.19 \\ 1.48$	$egin{array}{c} 4.03 \\ 0.22 \\ 1.62 \\ \end{array}$	$egin{array}{c} 4.19 \\ 0.21 \\ 1.59 \\ \end{array}$	$egin{array}{c} 4.44 \ 0.21 \ 1.56 \ \end{array}$	$egin{array}{c} 4.41 \ 0.22 \ 1.61 \end{array}$		
regivalent)	$\begin{bmatrix} 0.81 \\ 0.26 \\ 0.06 \\ 0.07 \end{bmatrix}$	0.55 1.27 0.29 0.06 0.08 0.19 0.29 0.81	$\begin{array}{c} 0.52 \\ 1.07 \\ 0.25 \\ 0.07 \\ 0.06 \\ 0.17 \\ 0.15 \\ 0.65 \end{array}$	0.53 1.23 0.24 0.07 0.05 0.18 0.17 0.70	$\begin{array}{c} 0.53 \\ 1.32 \\ 0.27 \\ 0.07 \\ 0.09 \\ 0.16 \\ 0.16 \\ 0.64 \end{array}$	0.52 1.30 0.25 0.07 0.06 0.16 0.15 0.60		

<sup>&</sup>lt;sup>1</sup>Excluding imports from United States territories. — <sup>2</sup>Oranges and lemons only.

ANNEX TABLE 5-A. LATIN AMERICA: PRODUCTION OF SELECTED COMMODITIES

COMMODITY	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
			Million m	etric tons		
Wheat	18.00	7.96 $15.12$ $3.07$	$11.75 \\ 17.34 \\ 3.79$	$\begin{array}{r} 9.58 \\ 19.04 \\ 3.63 \end{array}$	$\begin{array}{ c c c }\hline 11.48 & \\ 18.38 & \\ 4.06 & \\ \end{array}$	$9.87 \\ 19.54 \\ 3.98$
Sugar (centrifugal)	6.89	12.33	12.80	12.84	14.26	14.98
Citrus fruit	$3.28 \\ 4.20$	3.80 7.60	$\substack{4.07\\8.60}$	4.23 8.70	4.49 9.00	$\substack{4.30\\9.10}$
Coffee	0.24	$1.89 \\ 0.25 \\ 0.31$	$1.96 \\ 0.32 \\ 0.37$	$2.25 \\ 0.29 \\ 0.39$	$egin{array}{c} 1.97 \\ 0.31 \\ 0.39 \\ \end{array}$	$2.35 \\ 0.30 \\ 0.40$
Cotton (lint)	0.59	0.86	1.12	1.27	1.15	1.18
Milk (total)	$\begin{array}{c} 12.22 \\ 5.03 \\ 0.48 \end{array}$	$14.68 \\ 6.10 \\ 0.58$	$17.19 \\ 6.21 \\ 0.75$	18.15 6.55 0.78	19.01 7.19 0.80	$19.62 \\ 7.07 \\ 0.82$
			1948/49 - 19	052 53 = 100 .	• • • • • • • • • • • • • • • • • • • •	
Index of all farm products	82	100	112	116	120	122
Forest Products <sup>2</sup>			Million 1	netric tons		
Sawnwood (million m³) Wood pulp		$8.10 \\ 0.22 \\ 0.69$	$9.12 \\ 0.31 \\ 0.89$	$\begin{array}{c c} 9.26 \\ 0.32 \\ 1.08 \end{array}$	8.85 0.33 1.15	$8.60 \\ 0.34 \\ 1.20$

<sup>&</sup>lt;sup>1</sup>Beef and veal, pig meat, mutton and lamb. — <sup>2</sup>Figures refer to calendar year.

Annex Table 5-B. Latin America: Exports and Imports of Selected Commodities

COMMODITY	1934-38	1948-52	1954	1955	1956	1957		
### ### ##############################	Million metric tons							
GROSS EXPORTS						1		
Wheat and wheat flour  Maize.  Rice (milled equivalent).  Sugar (raw equivalent) <sup>1</sup> .  Bananas.  Linseed and linseed oil (oil equivalent).  Coffee.  Cocoa.  Cotton (lint).  Wool (actual weight).  Meat (fresh, chilled, frozen) <sup>2</sup> .	$\begin{array}{c} 6.61 \\ 0.10 \\ 3.17 \\ 2.04 \\ \\ 0.55 \\ 1.40 \\ 0.21 \\ 0.34 \\ 0.19 \\ 0.59 \\ \end{array}$	2.00 1.20 0.25 6.23 1.91 0.19 1.61 0.18 0.39 0.19	$egin{array}{c} 3.38 \\ 2.27 \\ 0.16 \\ 5.60 \\ 2.32 \\ \hline 0.29 \\ 1.35 \\ 0.22 \\ 0.72 \\ 0.16 \\ 0.27 \\ \hline \end{array}$	4.23 0.58 0.14 6.87 2.36 0.18 1.57 0.22 0.68 0.17 0.31	3.02 1.14 0.13 6.96 2.30 0.08 1.70 0.23 0.75 0.19	2.99 0.87 0.13 7.54 2.70 0.15 1.58 0.20 0.51 0.16		
Canned meat	.   0.12   0.12   0.10   0.10   0.09   0.12							
Broadleaved logs		$\begin{bmatrix}0.40\\1.25\end{bmatrix}$	$\begin{array}{c} 0.34 \\ 1.19 \end{array}$		$\begin{array}{c} 0.48 \\ 1.08 \end{array}$	$\begin{vmatrix} 0.45 \\ 1.70 \end{vmatrix}$		
Gross Imports	}	,	]			J		
Wheat and wheat flour Rice (milled equivalent) Sugar (raw equivalent)	$egin{array}{c} 1.74 \\ 0.49 \\ 0.24 \\ 0.18 \\ \end{array}$	$egin{array}{c} 2.91 \\ 0.50 \\ 0.36 \\ 0.23 \\ \end{array}$	$egin{array}{c} 3.49 \\ 0.43 \\ 0.38 \\ 0.19 \\ \end{array}$	$egin{array}{c} 3.73 \\ 0.32 \\ 0.39 \\ 0.18 \\ \end{array}$	3.37 $0.35$ $0.38$ $0.18$	$egin{array}{c} 3.08 \\ 0.41 \\ 0.41 \\ 0.22 \\ \end{array}$		

<sup>&</sup>lt;sup>1</sup>Excluding trade between the United States and its territories. — <sup>2</sup>Beef and veal, mutton and lamb, pig meat.

Annex Table 6-A. Far East (Excluding Mainland China): Production of Selected Commodities

Commodity	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
			Million 1	netric tons		
Wheat	14.94	$11.32 \\ 13.34 \\ 66.58$	$13.51 \\ 18.21 \\ 72.03$	$13.83 \\ 15.37 \\ 77.83$	$\begin{array}{ c c c }\hline 13.69 \\ 15.66 \\ 82.07 \\\hline \end{array}$	$14.43 \\ 15.50 \\ 78.00$
Sugar (centrifugal)		$\frac{3.15}{4.03}$	$\substack{4.68\\4.46}$	5.07 4.87	$\substack{5.23\\5.22}$	$\begin{array}{c} 5.58 \\ 5.30 \end{array}$
Starchy roots		$26.26 \\ 7.09$	$\frac{31.81}{8.23}$	33.77 9.16	33.00 9.05	$\begin{array}{c} 33.29 \\ 9.60 \end{array}$
Vegetable oils and oilseeds (oil equivalent)	3.96	3.99	4.96	4.83	5.11	5.11
Tea.          Tobacco.          Cotton (lint).          Jute.          Rubber (natural).	$\begin{bmatrix} 0.79 \\ 1.22 \\ 1.94 \end{bmatrix}$	0.55 0.61 0.88 1.99 1.65	0.63 $0.74$ $1.30$ $1.65$ $1.74$	$\begin{array}{c} 0.66 \\ 0.78 \\ 1.20 \\ 2.28 \\ 1.82 \end{array}$	0.65 0.86 1.26 2.26 1.77	$egin{array}{c} 0.66 \\ 0.86 \\ 1.28 \\ 2.18 \\ 1.78 \\ \end{array}$
Meat <sup>1</sup>		$1.78 \\ 25.24$	$\substack{1.99\\26.71}$	$\begin{bmatrix} 2.13 \\ 26.72 \end{bmatrix}$	$2.26 \\ 26.35$	$\substack{2.26\\26.76}$
			1948/49 - 19	052/53 = 100 .		
Index of all farm products	97	100	113	116	119	119
			Million	metric tons		
Forest Products 2			I		1	
Sawn softwood (million m³)		16.86 0.25 0.78 0.16 0.90	21.00 0.67 1.65 0.45 1.77	24.57 0.83 1.93 0.48 2.09	28.47 1.03 2.22 0.55 2.41	30.80 $1.15$ $2.50$ $0.60$ $2.85$

<sup>&</sup>lt;sup>1</sup>Beef and yeal, pig meat, mutton and lamb. — <sup>2</sup>Figures refer to calendar year.

Annex Table 6-B. Far East (Excluding Mainland China): Exports and Imports of Selected Commodities

COMMODITY	1934-38	1948-52	1954	1955	1956	1957
			Million 1	netric tons		
Gross Exports				1	1 1	
Rice (milled equivalent)	8.95	3.05	3.08	3.54	3.49	3.97
Sugar (raw equivalent) Vegetable oils and oilseeds (oil	3.28	1.02	1.85	1.91	2.07	2.27
equivalent)	1.78	1.36	1.33	1.57	1.57	1.52
Tea	0.36	0.39	0.47	0.40	0.47	0.44
Cotton (lint)	0.68	0.27	0.19	0.28	0.25	0.18
Jute	0.78	0.84	0.89	0.98	0.87	0.80
Rubber (natural)	1.14	2.01	2.02	2.14	2.07	2.10
			Million cı	ıbic meters		
Broadleaved logs		0.76	2.20	2.50	2.98	2.65
Sawn hardwood		0.56	0.89	1.08	1.11	1.05
Plywood		0.02	0.17	0.24	0.30	0.35
Gross Imports		• • • • • • • • • • • • • • • • • • • •	Million m	etric tons		
Wheat and wheat flour	1.03	4.95	4.15	4.31	5.66	7.64
Rice (milled equivalent)	6.13	3.12	3.40	3.10	3.95	3.87
Barley	0.05	0.69	0.82	0.61	1.21	1.16
Maize		0.20	0.24	0.44	0.48	0.62
Sugar (raw equivalent)	1.67	1.15	2.62	2.30	2.06	1.93
equivalent)	0.45	0.32	0.47	0.55	0.53	0.59
Cotton (lint)	0.91	0.52	0.74	0.67	0.86	0.88
Jute	0.04	0.27	0.25	0.29	0.23	0.14

Annex Table 7-A. Near East: Production of Selected Commodities

COMMODITY	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
	• • • • • • • • • • • • • • • • • • • •		Million m	etric tons		• • • • • • • • • • • • • • • • • • • •
Wheat	$9.66 \\ 4.75 \\ 1.09$	$\begin{array}{c c} 11.13 \\ 5.28 \\ 1.33 \end{array}$	$\begin{array}{c c} 13.74 \\ 6.51 \\ 1.50 \end{array}$	$ \begin{array}{ c c c } \hline 14.27 \\ 6.02 \\ 1.35 \end{array} $	$\begin{array}{c c} 15.40 \\ 6.81 \\ 1.65 \end{array}$	$ \begin{array}{c c} 17.92 \\ 7.90 \\ 1.81 \end{array} $
Total cereals 1	20.84	23.93	28.75	29.39	31.43	35.19
Sugar (centrifugal)	0.22	0.42	0.60	0.72	0.75	0.81
Pulses	1.16	1.32	1.36	1.36	1,33	1.41
Citrus fruit	$0.79 \\ 0.87 \\ 0.10$	$0.86 \\ 0.85 \\ 0.13$	1.10 1.08 0.17	$1.26 \\ 1.11 \\ 0.20$	$1.20 \\ 1.03 \\ 0.20$	$1.16 \\ 0.97 \\ 0.19$
Vegetable oils and oilseeds (oil equivalent)	0.35	0.46	0.58	0.56	0.68	0.58
Tobacco	$\substack{0.09\\0.56}$	$0.13 \\ 0.66$	$\begin{array}{c} 0.16 \\ 0.74 \end{array}$	$0.17 \\ 0.76$	$0.17 \\ 0.82$	0.16 0.81
Milk (total)	11.30	12.15	12.27	13.39	13.66	13.93
Meat 2	0.99	1.28	1.44	1.52	1.55	1.61
			. 1948/49 - 195	2/53 = 100		
Index of all farm products	83	100	119	122	127	131

<sup>&</sup>lt;sup>1</sup>Wheat, barley, oats, maize, millet, sorghum, and rice. — <sup>2</sup>Beef and veal, pig meat. mutton and lamb,

Annex Table 7-B. Near East: Exports and Imports of Selected Commodities

Commodity	1934-38	1948-52	1954	1955	1956	1957
			Million n	ietric tons		• • • • • • • • • • • • • • • • • • • •
Gross Exports						
Wheat and wheat flour		$egin{array}{c} 0.29 \ 0.46 \ 0.27 \end{array}$	$egin{array}{c} 1.28 \ 1.03 \ 0.13 \ \end{array}$	$0.34 \\ 0.46 \\ 0.25$	$0.42 \\ 0.77 \\ 0.28$	$0.44 \\ 0.54 \\ 0.35$
Total cereals $^1$	0.94	1.16	2.68	1.16	1.55	1.48
Citrus fruit <sup>2</sup>	0.04	$0.20 \\ 0.07 \\ 0.47$	$0.37 \\ 0.07 \\ 0.51$	$0.32 \\ 0.06 \\ 0.56$	$\begin{array}{c} 0.37 \\ 0.06 \\ 0.49 \end{array}$	$\begin{array}{c} 0.37 \\ 0.09 \\ 0.52 \end{array}$
Gross Imports					-	
Wheat and wheat flour	0.30	1.42	0.85	1.23	1.77	2.39
Total cereals <sup>1</sup>	0.51	1.77	1.10	1.74	2.27	2.94
Sugar (raw equivalent)	0.34	0.53	0.73	0.77	0.85	0.83

<sup>&</sup>lt;sup>1</sup>Including rye, oats, maize, millet and sorghum. — <sup>2</sup>Oranges and lemons only.

Annex Table 8-A. Africa: Production of Selected Commodities

Соммориту	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
			Million	metric tons		
Wheat.       .         Barley.       .         Maize.       .         Millet and sorghum.       .         Rice (milled equivalent).       .	7.88	2.97 $2.56$ $6.86$ $8.93$ $1.74$	4.11 $3.14$ $8.42$ $9.50$ $1.91$	3.64 $2.33$ $8.51$ $9.21$ $2.01$	4.01 3.03 9.14 9.18 1.95	$egin{array}{c} 3.43 \\ 1.56 \\ 8.69 \\ 9.25 \\ 2.16 \\ \end{array}$
Sugar (centrifugal)	0.95	1.36	1.71	1.91	1.95	2.02
Starchy roots	$\frac{35.38}{0.56}$	$\begin{array}{c} 45.14 \\ 0.87 \end{array}$	$\begin{array}{c} 51.13 \\ 1.25 \end{array}$	$52.02 \\ 1.19$	$\begin{array}{c} 52.10 \\ 0.95 \end{array}$	$\substack{52.14\\0.93}$
Citrus fruit	$\substack{0.38\\0.25}$	$\begin{array}{c} 0.76 \\ 0.25 \end{array}$	$\substack{0.98\\0.37}$	$\substack{1.07\\0.35}$	$\begin{array}{c} 1.07 \\ 0.36 \end{array}$	$\substack{1.17\\0.36}$
Groundnuts (oil equivalent) Vegetable oils and oilseeds (oil equivalent)	0.56 $1.69$	0.71 2.15	0.81 $2.46$	0.93 2.47	0.94 2.69	1.11 $2.69$
Coffee	$0.12 \\ 0.49 \\ 2.14$	$0.25 \\ 0.50 \\ 1.72$	$0.36 \\ 0.49 \\ 2.51$	$0.43 \\ 0.53 \\ 2.07$	$0.45 \\ 0.59 \\ 2.49$	$0.45 \\ 0.45 \\ 2.10$
Cotton (lint)	$\substack{0.14\\0.15}$	$\substack{0.22\\0.23}$	$\substack{0.26\\0.29}$	$\substack{0.26\\0.30}$	$\begin{array}{c} 0.27 \\ 0.31 \end{array}$	$\substack{0.27\\0.32}$
$egin{array}{lll}  ext{Milk} & ( ext{total}) & . & . & . & . & . & . & . & . & . & $	$\frac{5.21}{1.17}$	$\begin{array}{c} 5.68 \\ 1.41 \end{array}$	7.18 1.57	$\substack{7.27\\1.55}$	$\begin{array}{c} 7.38 \\ 1.60 \end{array}$	$7.49 \\ 1.64$
	• • • • • • • • • • • • •		1948/49 - 1	952/53 = 100		
Index of all farm products	78	100	119	119	123	120
			Million	cubic meters .		
FOREST PRODUCTS <sup>2</sup>			ļ		1	
Sawnwood		1.31	1.79	1.80	1.86	1.90

<sup>&</sup>lt;sup>1</sup>Beef and veal, pig meat, mutton and lamb. — <sup>2</sup>Figures refer to calendar year.

ANNEX TABLE 8-B. AFRICA: EXPORTS AND IMPORTS OF SELECTED COMMODITIES

Commodity	1934-38	1948-52	1954	1955	1956	1957
			Million m	etric tons		
GROSS EXPORTS						
Wheat and wheat flour	0.51	0.19	0.38	0.46	0.26	0.15
Barley	0.21	0.55	0.64	0.46	0.49	0.12
Maize	0.67	0.35	0.77	1.02	1.31	1.40
Sugar (raw equivalent)	0.68	0.70	1.02	1.06	1.09	1.16
Oranges	0.15	0.39	0.53	0.66	0.56	0.72
Bananas	0.12	0.20	0.30	0.31	0.31	0.33
Groundnuts and groundnut oil (oil						
equivalent)	0.33	0.33	0.51	0.46	0.57	0.54
Palm kernels and oil (oil equivalent)						
and palm oil	0.55	0.66	0.76	0.74	0.75	0.71
Coffee	0.11	0.26	0.31	0.40	0.47	0.47
Cocoa	0.46	0.48	0.47	0.48	0.52	0.57
Wine	1.41	1.12	1.59	1.90	1.53	1.85
Tobacco	0.03	0.06	0.08	0.08	0.10	0.08
Cotton (lint)		0.19	0.24	0.24	0.26	0.24
Sisal	0.16	0.22	0.27	0.29	0.30	0.31
		· · · · · · · · · · · · · · · ·	Million co	ubic meters		
Broadleaved logs		1.18	1.87	2.36	2.32	2.40
			Million 1	netric tons		
Gross Imports				1		
TITL	0.00	0.54	0.76	0.70	0.05	0.87
Wheat and wheat flour	0.26	0.74	0.76	0.78	$\begin{bmatrix} 0.95 \\ 0.32 \end{bmatrix}$	0.87 $0.42$
Rice (milled equivalent)		0.18	0.23	0.33		$0.42 \\ 0.99$
Sugar (raw equivalent)	0.39	0.52	0.81	0.91	0.91	0.99

ANNEX TABLE 9-A. OCEANIA: PRODUCTION OF SELECTED COMMODITIES

Commodity	1934-38	1948-52	1954/55	1955/56	1956/57	1957/58
			Million 1	netric tons		
Wheat	$0.94 \\ 0.59 \\ 10.18$	5.30 $1.04$ $0.69$ $10.43$ $1.58$	$\begin{array}{c c} 4.70 \\ 1.48 \\ 0.79 \\ 10.52 \\ 1.79 \end{array}$	5.39 $1.34$ $0.85$ $11.28$ $1.88$	3.73 $1.39$ $0.93$ $11.81$ $1.85$	$\begin{array}{ c c c }\hline 2.66 \\ 1.53 \\ 0.92 \\ 11.54 \\ 1.96 \\ \hline \end{array}$
Index of all farm products	88	100	1948/49 - 1 108	952 53 = 100	114	111
Forest Products <sup>2</sup>			Million o	ubic meters		
Sawnwood	• • • •	4.19	4.76	4.83	4.69	4.65

<sup>&</sup>lt;sup>1</sup>Beef and veal, pig meat, mutton and lamb. — <sup>2</sup>Figures refer to calendar year.

Annex Table 9-B. Oceania: Exports and Imports of Selected Commodities

COMMODITY	1934-38	1948-52	1954	1955	1956	1957
	• • • • • • • • • • • • • • • • • • • •		Million m	netric tons		
Gross Exports	1				1	
Wheat and wheat flour	0.56	3.13 0.26 0.19 0.47 0.13	1.99 0.63 0.03 0.80 0.16	2.55 $0.36$ $0.11$ $0.81$ $0.17$ $0.25$	3.58 0.63 0.20 0.88 0.17	2.65 0.64 0.10 1.31 0.17
Mutton and lamb	$\substack{0.27\\0.24}$	0.30 0.21 0.12 0.66	0.17 0.34 0.18 0.11 0.62	$0.23 \\ 0.33 \\ 0.24 \\ 0.11 \\ 0.71$	$0.24 \\ 0.31 \\ 0.25 \\ 0.11 \\ 0.72$	0.28 0.30 0.21 0.10 0.81
Gross Imports  Wheat and wheat flour  Sugar (raw equivalent)  Rubber (natural)	$0.06 \\ 0.09 \\ 0.01$	$\begin{array}{c} 0.21 \\ 0.11 \\ 0.04 \end{array}$	$0.26 \\ 0.13 \\ 0.05$	$\begin{array}{c} 0.28 \\ 0.13 \\ 0.06 \end{array}$	0.31 0.11 0.05	$\begin{array}{c} 0.33 \\ 0.12 \\ 0.05 \end{array}$

Annex Table 10. United States Commodity Credit Corporation : Quantity and Value of Investment<sup>1</sup>

COMMODITY		Q	uantity	(30 Apr	ril)				Value (3	0 April)		
Commoniti	1953	1954	1955	1956	1957	1958	1953	1954	1955	1956	1957	1958
TXT			housand						Million	dollars		
Wheat Rice Rice Rice Barley Oats Maize Grain sorghum Butter Cheese Dried milk Linseed Linseed oil Cottonseed oil Cotton linters Cotton, upland Wool Tobacco Other commodities.	250 13 373 29 58 35 84 96 86 288 178 482 49	58 622 589	763 2 044 1 052 22 255 2 927 149 176 101 201 37 170 318 1 817 70	29 073 1 322 1 987 1 222 29 192 2 887 34 130 81 141 26 5 141 2 839 54 402	2 040 16 87 65 351 — 20 2 056 24	732 2 698 732 37 211 8 295 45 74 70 59 — 973	1 095 5 14 835 1 86 31 32 14 55 116 36 339 70 225 182	2 1555 6 34 32 1 296 60 245 146 109 56 13 185 58 1 268 81 270 175	2 633 98 107 58 1 437 167 212 156 38 25 14 64 67 1 439 103 406 237	2 791 232 92 600 1 926 128 44 111 30 5 9 2 2 31 2 268 82 535 287	$ \begin{array}{c} 2 \ 411 \\ 107 \\ 87 \\ 32 \\ 2 \ 289 \\ 105 \\ 21 \\ 73 \\ 24 \\ 42 \\ \\ 5 \\ 1 \ 580 \\ 36 \\ 609 \\ 396 \\ \end{array} $	2 409 104 114 32 2 414 393 60 62 26 67 ——————————————————————————————
TOTAL	<u> </u>		1	<u> </u>		1	3 136	6 189	7 261	8 633	7 816	7 251
										cent		
Change from prev	vious ye	ar					+ 95	+ 97	+ 17	+ 19	_9	+ 7

Source: Report of Financial Conditions and Operations, United States Department of Agriculture, Commodity Credit Corporation, April 1954, 1955, 1956, 1957, and 1958.

'Stocks pledged for outstanding loans and stocks in price support inventory.

Annex Table 11. CCC Shipments under Titles I and II of P.L. 480 (Euxclding Poinsettia Program) by Regions of Destination and Commodities (from Inception of Program through 31 December 1957)

Regions	Wheat and wheat flour	Coarse grains	Rice	Fruit and vege- tables	Dairy products	Meat	Fats and oils	Cotton	Tobacco	Total
	<u> </u>			2	Thous and	metric to	ons		• • • • • • • •	
Western Europe Title I Title II Total Europe	$ \begin{array}{r} 3 & 173.3 \\  & 459.0 \\ \hline  & 3 & 632.3 \end{array} $	$ \begin{array}{ c c c c c c } \hline 607.3 \\ 135.0 \\ \hline 742.3 \end{array} $		$ \begin{array}{r} 37.3 \\ 6.0 \\ \hline 43.3 \end{array} $	44.2	28.8 ———————————————————————————————————	1.9	$ \begin{array}{r} 229.2 \\ 6.2 \\ \hline 235.4 \end{array} $	39.9	4 628.3
Eastern Europe - Title II	32.2	42.3		2.2			1.0			85.6
Africa - Title II	74.2	12.0			0.7		1.17			74.9
	73.2			***************************************						,1.0
Near East Title I	1 677.1 176.1	512.6	0.1	1.9	8.5		62.4	2.8		2 292.2 184.7
Total Near East	1 853.2	512.6	10.3	1.9	15.8	17.7	62.4	2.8	0.2	$\frac{2\ 476.9}{}$
Far East Title I Title II Total Far East	$\begin{array}{ c c c c c c }\hline 4 & 330.7 \\ & 287.0 \\ \hline & 4 & 617.7 \\ \hline \end{array}$	0.6	$ \begin{array}{r} 1 & 018.1 \\  & 92.7 \\ \hline 1 & 110.8 \end{array} $	0.5	18.8	6.8	$ \begin{array}{ c c c c } \hline 11.7 \\ 9.2 \\ \hline 20.9 \end{array} $	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		$\begin{array}{r} 6 \ 149.8 \\ 412.4 \\ \hline 6 \ 562.2 \end{array}$
	# 017.7	914.2	1 110.0	0.9	19.9 . 2	0.0	20.9	230.0	20.0	0 902.2
Latin America Title I Title II.	1 546.2 117.3	90.4	20.7	6.9	$0.5 \\ 3.3$	1	$ \begin{array}{c c}  & 164.3 \\  & 2.7 \end{array} $	2.6		$\begin{array}{c} 1 & 749.5 \\ & 243.9 \end{array}$
Total Latin America .	$\frac{1 \ 663.5}{}$	107.5	20.7	6.9	3.8		167.0	23.5	0.5	1 993.4
World Title I	10 727.3 1 145.8	268.3	115.8	39.7 15.1	35.7 81.8	53.3	14.8	479.3 12.9		1.654.5
Total World	11 873.1	1 918.9	1 144.1	54.8	117.5	53.3	754.2	492.2	66.2	16 474.3
					Thousan	nd dollars	S <sup>1</sup>			
Western Europe Title I	377 943 54 852	14 018	171	4 628 1 155	39 963	********	179 362 888	5 523		927 764 116 570
Total Europe	432 795		171	5 783	44 316	18 655	180 250	235 039	61 271	1 044 334
Eastern Europe - Title II	4 219	4 344	467	437	4 950		556			14 973
Africa - Title II	9 588		******		434					10 022
Near East Title I	195 614 22 325		2 838 41	352 —	7 409			2 711	396	292 919 29 775
Total Near East	217 939	45 861	2 879	352	15 916	14 819	21 821	2 711	396	322 694
Far East Title I	447 491 31 754		$234 778 \\ 22 233$	342	10 480 9 258	8 253	4 108	220 938 4 474		1 007 959 71 888
Total Far East	479 245	40 854	257 011	342	19 738	8 253	7 735	225 412	41 257	I 079 847
Latin America Title I	178 008 14 354	1 660 8 839	4 830	1 377	532 1 454	PARTICULAR A	61 747 1 317	21 498 2 528		264 198 34 669
Total Latin America .	192 362	10 499	4 830	1 377	<u>I 986</u>		63 064	24 026	753	298 897
World Title I	1 199 056 137 092	27 262	27 742	5 322 2 969			6 869	12 525		$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Total World	1 336 148			8 291						

Source: U. S. Department of Agriculture, Commodity Credit Corporation, Report of Title I Operations (P. L. 480), No. 57; and Report of Title II Operations (P. L. 480), No. 37.

1 Value represents estimated cost to CCC.

Annex Table 12. Average World Import Unit Values in U.S. Dollars, Major Commodities

Соммориту		Ave	rage					195	6			19	57	
COMMODITY	1947- 49	1950- 51	1952- 53	1954- 55	1956	1957	I	II	III	IV	I	II	III	IV
					t	7. S. doi	llars per	· metric	ton					
Wheat	107 146 89 89 171	88 112 76 76 139	92 121 85 90 184	78 112 65 73 155	78 $102$ $69$ $74$ $135$	$76 \\ 104 \\ 64 \\ 69 \\ 130$	78 104 67 69 138	77 96 70 76 131	77 101 69 77 135	79 106 70 75 136	81 106 71 77 139	78 106 65 72 130	73 102 59 66 125	70 101 58 63 129
Sugar (raw and refined)	125	134	129	121	121	143	120	123	120	122	133	151	154	130
Apples	$\begin{array}{c} 146 \\ 98 \\ 165 \\ 282 \end{array}$	$\begin{array}{c} 125 \\ 100 \\ 129 \\ 256 \end{array}$	$\begin{array}{c} 131 \\ 98 \\ 128 \\ 257 \end{array}$	$\begin{array}{c} 148 \\ 98 \\ 131 \\ 252 \end{array}$	153 105 163 306	170 103 178 315	136 103 132 278	189 105 194 291	169 104 161 310	105 109 198 325	129 104 171 301	168 105 170 313	214 105 180 324	197 100 192 316
Copra	232 $161$ $142$ $203$	230 $170$ $123$ $213$	191 172 127 248	184 149 120 225	$165 \\ 143 \\ 111 \\ 233$	$166 \\ 142 \\ 108 \\ 243$	163 142 104 221	168 $143$ $114$ $242$	168 146 127 239	$\begin{array}{c} 163 \\ 142 \\ 107 \\ 221 \end{array}$	170 173 112 249	$168 \\ 142 \\ 113 \\ 253$	$171 \\ 140 \\ 110 \\ 241$	$\begin{array}{c} 157 \\ 139 \\ 101 \\ 220 \end{array}$
Olive oil	1 189 359 281 400 439 471	666 377 274 383 371 477	623 298 244 325 347 449	566 286 214 286 320 393	834 255 245 266 338 418	$\begin{array}{c} 675 \\ 268 \\ 251 \\ 271 \\ 346 \\ 444 \end{array}$	810 $251$ $232$ $266$ $306$ $381$	876 $261$ $240$ $264$ $362$ $415$	888 251 253 280 353 442	765 259 256 257 332 437	683 266 254 279 359 465	701 268 256 279 354 463	671 262 246 258 334 444	635 269 244 269 328 395
Beef and veal <sup>2</sup> Mutton and lamb <sup>2</sup> . Bacon	350 357 747 725 979 803	423 $320$ $645$ $593$ $841$ $624$	439 377 718 643 954 720	481 487 650 640 978 633	424 504 732 723 925 624	453 558 680 636 791 587	446 510 651 733 1 034 632	443 470 736 685 854 540	446 515 761 712 904 647	378 529 776 760 881 663	415 589 756 692 760 506	463 545 669 637 778 496	454 553 703 618 884 639	475 524 595 595 777 697
Oilcake	105	77	86	87	85	79	88	82	84	86	86	79	75	73
Coffee	613 622 1 143 263	1 152 709 1 055 168	1 268 743 1 026 167	1 424 1 119 1 486 143	1 235 634 1 350 158	1 226 621 1 365 179	1 199 693 1 241 143	154	607 1 314 164	255 603 1 561 169	569 1 557 164	547 1 218 171	642 1 167 181	197
tured)	1 252 244 558	1 228 175 374	1 307 183 345	1 380 137 212	1 393 160 323	1 481 137 270	1 391 154 293	1 312 166 348	1 439 165 323	1 411 156 313	$\begin{array}{c} 1 & 404 \\ & 163 \\ & 323 \end{array}$	1 462 147 287	$\begin{array}{c} 1 & 552 \\ 119 \\ 245 \end{array}$	$\begin{array}{c} 1 \ 487 \\ 123 \\ 246 \end{array}$
Cotton (lint) Jute	832 *326 1 005 458	1 073 298 2 109 915	943 236	866 209 1 580 623	$783 \\ 204 \\ 1 451 \\ 741$	737 251 1 689 681	790 197 1 363 872	802 214 1 402 732	788 207 1 445 656	755 203 1 629 678	736 240 1 666	748 262 1 775	735 257	$727 \\ 253$
Food and food	1001	oel	100				: 1952-8				 اون	۰۰۰۰۰ اوم	 len	
Food and feed Beverages and tobacco Raw materials All agricultural prod-	106 75 79	96 99 123	100 100 100	90 116 93	90 101 91	92 102 92	89 99 93	91 99 91	91 102 88	$92 \\ 104 \\ 91$	93 103 93	93 100 94	93 103 91	87 103 89
uets	91	104	100	97	93	94	92	92	93	94	95	95	95	91

 $<sup>^1</sup>$ Average export unit values. —  $^2$ Fresh, chilled and frozen. —  $^3$ 1947 and 1948 excluding trade between India and Pakistan.

Annex Table 13. Average Returns Received by Farmers for Selected Commodities  $1953/54\!\!-\!1956/57$ 

Country	1953/54	1954/55	1955/56	1956/57	1953/54	1954/55	1955/56	1956/5
	1		<i>U</i> . s	. dollars pe	r 100 kilogr	ams		
		WE	EAT			R	YE	
Austria	19.23	19.62	19.62	19.62	9.23	8.85	8.85	8.8
Belgium	9.39	9.35	8.92	9.36	5.24	5.88	5.44	6.4
Denmark	26.68	<sup>2</sup> 6.42	26.81	$^{2}6.72$	25.12	<sup>2</sup> 6.30	<sup>2</sup> 6.15	25.8
Finland	13.43	13.66	14.53	16.27	13.29	13.66	14.33	16.7
France	9.26	9.27	9.19	10.83	8.07	7.29	6.99	7.8
ermany, Western	9.95	9.69	9.86	9.60	9.48	8.98	9.29	9.0
Greece	8.47	8.47	9.00	10.27	5.67	6.17	6.60	6.9
reland	277 60	311 50	311 60	$^{3}11.52$	40.75	47 01	10 76	40
taly	<sup>3</sup> 11.50 <sup>5</sup> 6.74	$^{311.59}_{56.74}$	<sup>3</sup> 11.62 <sup>5</sup> 6.63	$^{5}6.82$	$     \begin{array}{r}       48.75 \\       5.45     \end{array} $	$\begin{array}{c} 47.01 \\ 6.38 \end{array}$	$\frac{48.76}{6.57}$	49.3 6.3
Vetherlands	11.29	11.87	12.55	11.83	11.24	10.87	11.81	10.8
$\operatorname{Poland}$	11.20	\$5.45	66.30	68.39		63.38	63.80	65.0
Portugal	710.57	710.61	710.23	710.26	88.59	88.49	*8.31	88.4
pain	9.33	9.31	9.81	9.98	6.57	6.57	6.62	6.6
weden	109.47	108.49	107.99	108.24	8.93	7.14	7.27	7.5
witzerland	15.03	14.96	14.88	14.91	12.84	12.77	12.72	12.
urkey	1010.71	1010.71	1010.71	1010.71				
Inited Kingdom	8.53	8.86	8.45	8.32	6.84	6.97	6.42	6.4
Ingoslavia		<sup>11</sup> 7.46	119.13	119.88				
Canada		4.67	$\frac{4.67}{7.00}$	4.04		3.66	3.66	4.0
Jnited States		7.79	7.28	7.39		4.80	4.13	4.6
fapan	1	$9.55 \\ 5.22$	$9.62 \\ 5.29$	9.26	• • • •	• • •	• • •	• •
		.).22	0.20	• • • •		[	!	• •
		BAF	LEY			OA	TS	
Austria					6.73	7.31	7.50	7.1
Belgium	5.74	6.52	6.32	6.52	5.48	6.16	5.92	6.0
Denmark	<sup>2</sup> 5.97	<sup>2</sup> 6.86	<sup>2</sup> 6.64	<sup>2</sup> 6.33	<sup>12</sup> 5.84	127.04	126.54	126.0
'inland	10.02	9.56	11.44	12.74	7.98	9.39	11.42	11.6
rance	8.28	7.27		7.13				5.6
ermany, Western	9.64	9.90	10.05	9.93	7.74	7.40	8.12	7.7
reece	6.25	6.90	7.50	8.20	6.22	6.60	6.73	7.8
1,000							5.96	5.
$_{\mathrm{eland.}}$	7.70	6.38	6.92	6.86	6.72	6.47		
m reland.  .  .  .  .  .  .  .  .  .	8.29	6.46	9.03	9.22	7.22	6.19	9.03	
reland	8.29 6.01	$\substack{6.46 \\ 6.59}$	$\frac{9.03}{6.47}$	$\substack{9.22\\6.44}$	$7.22 \\ 5.59$	$\begin{array}{c} 6.19 \\ 6.76 \end{array}$	$\frac{9.03}{6.11}$	6.3
reland	8.29 6.01 9.61	$6.46 \\ 6.59 \\ 9.13$	$9.03 \\ 6.47 \\ 9.81$	$9.22 \\ 6.44 \\ 9.07$	$7.22 \\ 5.59 \\ 8.19$	$egin{array}{c} 6.19 \ 6.76 \ 7.90 \end{array}$	$9.03 \\ 6.11 \\ 8.59$	$\frac{6.3}{7.8}$
eland. ely. etherlands. orway oland.	8.29 6.01 9.61	$6.46 \\ 6.59 \\ 9.13 \\ 3.28$	$9.03 \\ 6.47 \\ 9.81 \\ 3.50$	$9.22 \\ 6.44 \\ 9.07 \\ 4.30$	$7.22 \\ 5.59 \\ 8.19 \\ \dots$	$egin{array}{c} 6.19 \ 6.76 \ 7.90 \ 4.24 \ \end{array}$	$9.03 \\ 6.11 \\ 8.59 \\ 4.32$	6.5 7.8 4.7
eland. ely. etherlands. orway oland. ortugal	8.29 6.01 9.61  7.13	6.46 $6.59$ $9.13$ $3.28$ $6.89$	9.03 $6.47$ $9.81$ $3.50$ $7.34$	9.22 $6.44$ $9.07$ $4.30$ $8.38$	7.22 $5.59$ $8.19$ $$ $6.40$	$egin{array}{c} 6.19 \\ 6.76 \\ 7.90 \\ 4.24 \\ 6.36 \\ \end{array}$	$9.03 \\ 6.11 \\ 8.59 \\ 4.32 \\ 7.10$	6.4 7.3 4.7 8.0
eland. aly. etherlands. orway oland. ortugal	8.29 6.01 9.61  7.13 8.29	6.46 $6.59$ $9.13$ $3.28$ $6.89$ $5.43$	9.03 $6.47$ $9.81$ $3.50$ $7.34$ $7.29$	9.22 $6.44$ $9.07$ $4.30$ $8.38$ $9.93$	7.22 $5.59$ $8.19$ $$ $6.40$ $7.74$	$egin{array}{c} 6.19 \\ 6.76 \\ 7.90 \\ 4.24 \\ 6.36 \\ 5.07 \end{array}$	9.03 $6.11$ $8.59$ $4.32$ $7.10$ $6.81$	6.3 7.8 4.7 8.0 9.2
eland. ely. etherlands. forway oland. ortugal pain weden.	8.29 6.01 9.61  7.13 8.29 5.64	6.46 6.59 9.13 3.28 6.89 5.43 7.10	9.03 6.47 9.81 3.50 7.34 7.29 6.77	9.22 6.44 9.07 4.30 8.38 9.93 6.28	7.22 $5.59$ $8.19$ $$ $6.40$	$egin{array}{c} 6.19 \\ 6.76 \\ 7.90 \\ 4.24 \\ 6.36 \\ \end{array}$	$9.03 \\ 6.11 \\ 8.59 \\ 4.32 \\ 7.10$	6.2 7.8 4.7 8.0 9.2
reland. taly. etherlands. forway oland. ortugal pain weden. witzerland.	8.29 6.01 9.61  7.13 8.29 5.64 912.32	6.46 6.59 9.13 3.28 6.89 5.43 7.10 912.60	$9.03$ $6.47$ $9.81$ $3.50$ $7.34$ $7.29$ $6.77$ $$^{9}12.46$	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37	7.22 5.59 8.19  6.40 7.74 4.99	$\begin{array}{c} 6.19 \\ 6.76 \\ 7.90 \\ 4.24 \\ 6.36 \\ 5.07 \\ 6.64 \end{array}$	$egin{array}{c} 9.03 \\ 6.11 \\ 8.59 \\ 4.32 \\ 7.10 \\ 6.81 \\ 6.96 \\ \end{array}$	6.2 7.8 4.7 8.0 9.2
eland. Ealy. Eetherlands. Orway oland. Ortugal pain weden. witzerland. urkey. Inited Kingdom	8.29 6.01 9.61  7.13 8.29 5.64	6.46 6.59 9.13 3.28 6.89 5.43 7.10	9.03 6.47 9.81 3.50 7.34 7.29 6.77 912.46	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37	7.22 5.59 8.19  6.40 7.74 4.99	$\begin{array}{c} 6.19 \\ 6.76 \\ 7.90 \\ 4.24 \\ 6.36 \\ 5.07 \\ 6.64 \end{array}$	$egin{array}{c} 9.03 \\ 6.11 \\ 8.59 \\ 4.32 \\ 7.10 \\ 6.81 \\ 6.96 \\ \end{array}$	6.1 7.8 4.7 8.6 9.2
eland. ealy. etherlands. forway. orway. oland. ortugal pain weden. witzerland. urkey. nited Kingdom ugoslavia.	8.29 6.01 9.61  7.13 8.29 5.64 °12.32  7.68	6.46 6.59 9.13 3.28 6.89 5.43 7.10 912.60	9.03 6.47 9.81 3.50 7.34 7.29 6.77 912.46	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37	7.22 5.59 8.19  6.40 7.74 4.99 —	6.19 6.76 7.90 4.24 6.36 5.07 6.64	$egin{array}{c} 9.03 \\ 6.11 \\ 8.59 \\ 4.32 \\ 7.10 \\ 6.81 \\ 6.96 \\ \end{array}$	6.8 7.8 4.7 8.0 9.2
eland. ealy. fetherlands. forway. oland. ortugal pain weden. witzerland. urkey. nited Kingdom ugoslavia.	8.29 6.01 9.61  7.13 8.29 5.64 912.32	6.46 6.59 9.13 3.28 6.89 5.43 7.10 912.60 	9.03 $6.47$ $9.81$ $3.50$ $7.34$ $7.29$ $6.77$ $912.46$	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37	7.22 5.59 8.19  6.40 7.74 4.99	6.19 6.76 7.90 4.24 6.36 5.07 6.64 —	9.03 6.11 8.59 4.32 7.10 6.81 6.96	6.8 7.8 4.7 8.0 9.2 6.9
reland. taly. fetherlands. forway. oland. ortugal pain weden. witzerland. furkey. fuited Kingdom tagoslavia.	8.29 6.01 9.61  7.13 8.29 5.64 °12.32  7.68	6.46 6.59 9.13 3.28 6.89 5.43 7.10 °12.60  7.97 ¹106.24 4.18 5.01	9.03 6.47 9.81 3.50 7.34 7.29 6.77 912.46  7.27 108.01 4.04 4.21	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37 7.77	7.22 5.59 8.19  6.40 7.74 4.99	6.19 6.76 7.90 4.24 6.36 5.07 6.64 — 6.55	9.03 6.11 8.59 4.32 7.10 6.81 6.96 — 6.17	6.8 4.7 8.6 9.2 6.9
reland. tally tally Tetherlands. Torway Toland Tortugal pain weden witzerland Turkey Turkey Tugoslavia anada. Tnited States.	8.29 6.01 9.61  7.13 8.29 5.64 *12.32  7.68	6.46 6.59 9.13 3.28 6.89 5.43 7.10 °12.60  7.97 ¹06.24 4.18 5.01 Jc 7.11	9.03 6.47 9.81 3.50 7.34 7.29 6.77 912.46  7.27 108.01 4.04 4.21 e 7.25	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37  7.77 108.32 3.40 4.51 6.7.18	7.22 5.59 8.19  6.40 7.74 4.99 — 6.06 	6.19 6.76 7.90 4.24 6.36 5.07 6.64 — 6.55 155.46 4.47 4.91	9.03 6.11 8.59 4.32 7.10 6.81 6.96 — 6.17 157.83 4.41 4.10	6.5 7.8 4.7 8.6 9.2  6.9 158.6 3.8 4.8
reland	8.29 6.01 9.61  7.13 8.29 5.64 912.32  7.68	6.46 6.59 9.13 3.28 6.89 5.43 7.10 °12.60  7.97 ¹106.24 4.18 5.01	9.03 6.47 9.81 3.50 7.34 7.29 6.77 912.46  7.27 108.01 4.04 4.21	9.22 6.44 9.07 4.30 8.38 9.93 6.28 912.37  7.77 108.32 3.40 4.51	7.22 5.59 8.19  6.40 7.74 4.99 —	6.19 6.76 7.90 4.24 6.36 5.07 6.64 — 6.55 155.46 4.47	9.03 6.11 8.59 4.32 7.10 6.81 6.96 — 6.17	8.1 6.5 7.8 4.7 8.6 9.2  6.9 158.6 3.8 4.8

For notes, see end of table.

Annex Table 13. Average Returns Received by Farmers for Selected Commodities 1953/54-1956/57 (continued)

COUNTRY	1953/54	1954/55	1955/56	1956/57	1953/54	1954/55	1955/56	1956/5	
		U. S. dollars per 100 kilograms							
			BEETS				TOES		
ustria	1.48	1.39	1.31	1.42				1	
$elgium \ldots \ldots \ldots$	1.33	1.35	1.39	1.41				:	
enmark	131.04	130.97	<sup>13</sup> 1.15	<sup>13</sup> 1.41	2.49	2.50	3.61	2.	
inland	2.67	2.68	3.17	3.65	3.02	4.76	5.99	3.	
rance	1.45	1.30	1.42	1.20			2.52	3.	
ermany, Westərn	1.70	1.50	1.57	1.50	2.62	2.62	3.40	2.	
reece					3.75	4.43	5.13	5.	
eland					3.39	4.59	4.84	2.	
aly	1.25	1.32	1.26	1.39	4.37	3.35	3.44	4.	
etherlands. $\dots$ $\dots$ $\dots$									
orway						3.13	4.21	2.	
oland		2.00	2.00	2.11		1.71	2.33	$\frac{2}{2}$ .	
ortugal					4.35	4.17	4.03	3.	
pain	1.60	1.57	1.55	1.55	2.76	2.26	3,31	3.	
weden	1.64	1.51	1.37	1.66	$\frac{1}{3.01}$	3.88	4.59	2.	
witzerland	1.82	1.80	1.87	1.82	4.97	4.85	4.85	4.	
urkey			1.01			2.10.7	1.00		
nited Kingdom	41.68	41.65	41.77	$^{4}1.74$	3.33	3.38	4.90	3.	
ugoslavia		151.17	151.50	151.67		153.01	154.91	154	
anada			1.34	1.48			3.93	4.	
nited States		1.29	1.33	161.39		4.74	3.90	4.0	
apan						$\frac{2.35}{2.35}$	$\frac{3.30}{2.11}$	2.4	
ustralia			• • • •			$\frac{5.33}{6.33}$			
		••••	٠ ا	•••		0.99	1. 11.21		
		WHOLE	миж			Pigs (live weight)			
ustria					47.46	51.27	50.15	50.4	
elgium	6.24	5.92	5.92	6.10	46.42	53.20	$\frac{30.15}{43.10}$	41.5	
enmark	5.92	6.15	6.19	5.91	1760.29	$^{17}60.15$	1765.16	1765	
	8.59	8.84	11.04	11.81	1784.87	1784.92	1794.44	17102.	
rance	0.55	0.04	11.04	11.01		09.94		-102.	
ermany, Western	<sup>21</sup> 6.14	<sup>21</sup> 6.57	217.02	$^{21}7.52$	59.05	52.86	54.29	50	
reece					39.56	41.33	$\frac{34.29}{41.66}$	56.42.	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	• • • •		• • • •	• • •	49.36	$\frac{41.33}{45.95}$	$\frac{41.00}{47.77}$	47.	
aly.	7.68	7.00	6.91	6.91	54.85	63.71	59.14	1	
etherlands. $\dots$	5.65	6.10	6.33	$\begin{array}{c} 0.91 \\ 7.47 \end{array}$	48.17	03.71 $46.59$	43.95	56.	
	1							46.	
orway	7.28	$\frac{7.90}{7.75}$	8.66	9.70	49.42	$\frac{49.56}{47.19}$	44.10	45.5	
oland	5 95	7.75	8.08	9.08	<sup>23</sup> 38.26	47.12	51.08	66.	
ortugal	5.25	5.18	5.04	$\frac{5.29}{7.02}$		<sup>23</sup> 42.08	$^{23}46.71$	2353.9	
	6.95	$\frac{6.71}{7.07}$	7.02	$\frac{7.93}{9.17}$	38.76	40.67	46.17	53.	
$\frac{1}{2}$	7.06	7.07	8.14	8.17	$^{17}62.24$	1766.88	1775.77	1778.	
witzerland	8.33	8.26	8.43	8.82	71.19	77.02	74.69	72.	
arkey	1	0.00			0,5 45				
nited Kingdom	9.78	9.63	9.68	9.34	65.42	57.10	57.74	60.	
ugoslavia		$^{255.97}$	257.43	<sup>25</sup> 7.89	• • •	20			
anada		6.50	6.39	6.53		66.80	53.48	54.	
		8.50	8.58	8.84		47.62	33.07	31.	
nited States					1	40 00 1	11 20	1 10	
nited States						48.00	44.53	42.	
nited States	1	5.42 $3.20$	$egin{array}{c} \dots \ 5.54 \ 3.20 \end{array}$			$\frac{48.00}{33.20}$	$\frac{44.53}{42.30}$	42.	

Annex Table 13. Average Returns Received by Farmers for Selected Commodities 1953/54-1956/57 (concluded)

COUNTRY	1953/54	1954/55	1955/56	1956/57	1953/54	1954/55	1955/56	1956/57		
	BEEF C	ATTLE (live	weight exc	l. calves)		EG	GS			
Austria. Belgium Denmark. Finland France. Germany, Western Greece Ireland. Italy. Netherlands. Norway Poland. Portugal Spain Sweden. Switzerland. Turkey. United Kingdom Yugoslavia. Canada. United States. Innan	33.42 41.30 30.64 1876.00  34.76 24.46  38.44 40.27 39.20  2255 1773.45 45.51  32.07	35.46 39.70 30.70 1872.66 37.38 28.20 41.92 39.48 41.58 20.46 2349.63 24.36 1769.78 46.68 35.36 35.36 41.60	35.42 41.98 32.29 1874.13 32.24 40.79 34.30  43.08 42.11 37.38 22.79 2351.89 29.00 1778.67 47.85  35.27	37.50 43.64 34.03 1885.05 37.94 40.48 34.90  47.12 46.59 38.78 28.29 2357.80 34.81 1778.09 47.85  37.20  35.67 32.85 38.40	81.36 55.85 1975.58 2076.82 75.83 48.86  82.68 57.38 57.27  2431.93 74.17 55.86 98.26 2250.21 83.52	78.48 54.85 1977.61 2082.94 78.00 53.76 77.73 58.17 58.25 2248.97 2433.56 78.74 56.25 98.49 2254.99 81.87 2577.32 57.86 53.68 47.52	72.00 59.24 1982.22 2081.42 84.36 58.76  83.45 63.43 63.35 2250.10 2433.98 82.43 62.05 103.63  83.36 2582.00 61.00 57.05 49.28	73.08 51.84 1987.83 2077.14 77.62 60.63  83.51 53.69 58.10 2254.20 2434.68 91.36 59.92 101.53  85.05 2592.00 61.31 56.76 52.80		
Japan		18.46	17.72	38.40	• • • •	70.40 82.13	$74.80 \\ 82.13$	32.80		

Note: For an explanation of what is comprised in the figures, see section "Prices and the Farmer," page 42 c - Common barley. n - Naked barley.

1 Equals fixed prices. — "Market price derived from wholesale quotations minus estimated wholesale margin and the f.o.b. price for exports less trade margin. — "Average of government and free market prices for soft and durum wheat. — "Average free market prices. — "Basic fixed price paid to producers. — "Quota price. — "Average price at which purchases were effected by the National Federation of Wheat Producers; cost of transportation, etc., to be paid by farmers have been deducted. — "Based on monthly averages verified in each of the 18 districts of continental Portugal. — "Including a premium of 200 Swiss francs per hectare, which the government paid to producers since 1951. — "Prixed price. — "ICalcudar years. Prices are not strictly primary producer prices. — "IAverage of wholesale quotations less trade margin. — "IThe final price is fixed after the end of the crop year, the basic price being increased to compensate for increases in wages, and premium is paid for postponed delivery. — "IA arketing expenses included. — "ICalcudar year. — "IA average of 11 months. — "ICalcudar years. — "IA average prices paid by egg-collecting co-operative stores. 1954/55 and 1955/56 include a subsidy of 465 and 605 markkaa, respectively. — "Eggs from Picardy/Normandy at the Paris Central Market (Halles centrales). — "IP rices paid by dairies. — ""Converted at 50-55 grams per egg. — "Net weight. — "Estimates based on retail prices. — "Scalendar year.

Annex Table 14. Total Catch (Live Weight) of Fish, Crustaceans, Mollusks, etc., in Selected Countries

COUNTRY	1938	1948-52	1954	1955	1956	1957			
	Thousand metric tons								
Major Producers		1		1	1	1			
Canada (including Newfoundland)	836.8	1 010.6	1 025.8	963.7	1 091.9	991.7			
China: Mainland	1(1 500.0)	2863.4	2 294.0	2518.0	2640.0				
<u>India</u>		3770.6	828.5	839.0	1 012.3				
Japan	3 562.0	3 329.1	4 544.6	4 912.8	4 762.6	5 399.0			
Norway	1 152.5	1 584.5	2 068.2	1 813.4	2 201.3	1 738.9			
United Kingdom	. 1 198.1	1 108.8	1.070.2	$1\ 100.4$	1.050.4	1 014.7			
United States (including Alaska)	2253.1	2451.7	2 706.4	2.738.9	2 935.9				
$_{ m U.S.S.R}$	1 523.0	1 761.0	2 258.0	2498.0	2 617.0				
MEDIUM PRODUCERS									
Angola	26.2	142.0	261.2	290.4	420.5	395.5			
Brazil	103.3	156.7	172.0						
3urma					100.0	100.0			
Chile	32.2	88.4	143.5	214.3	188.3				
China : Taiwan	89.5	94.8	152.2	180.3	193.2	208.0			
Denmark	97.1	270.3	359.4	425.3	463.0	533.3			
$^{ m f}$ aeroe Islands	63.0	93.9	89.4	105.6	116.3				
France (including Algeria)	530.3	482.5	500.2	522.7	537.9	514.5			
French Equatorial Africa					100.0				
Germany, Western	776.5	560.5	678.0	776.9	770.8	753.8			
lceland	327.2	415.7	455.4	480.3	517.3	502.7			
ndonesia	472.0	<sup>2</sup> 436.5	628.5	621.5	636.9				
taly	181.2	183.1	217.6	218.0	218.6				
$Corea,  North.  \ldots  \ldots  \ldots  \ldots  \ldots$	925.2	$^{4}275.0$	235.0	312.0	5(383.0)				
Korea, South	832.0	271.8	247.2	259.3	340.9				
Ialaya, Federation of		145.7	137.3	136.8					
$egin{array}{llllllllllllllllllllllllllllllllllll$	43.7	108.9	105.5	96.3	110.2				
Vetherlands	256.2	284.7	339.2	319.5	298.1				
Pakistan		6241.0	259.7	270.9	277.0	282.8			
Peru		74.0	146.1	183.3	267.3	350.0			
$^{ m Philippines.}$	80.9	255.1	364.6	385.2	416.0				
Poland			106.4	113.0	127.4				
Portugal	247.2	310.1	438.7	424.7	472.2	464.6			
pain	408.5	581.6	639.2	747.4	736.0	752.4			
weden	129.2	189.9	201.1	219.5	197.4				
'hailand	161.0	174.3	229.8	213.0	217.9				
'urkey	76.0	6105.1	119.4	111.5	139.5	116.7			
Inion of South Africa7		357.9	617.1	602.0	555.2				
Viet-Nam	180.0			130.0					

Annex Table 14. Total Catch (Live Weight) of Fish, Crustaceans, Mollusks, etc., in Selected Countries (concluded)

Country	1938	1948-52	1954	1955	1956	1957			
	Thousand metric tons								
ELECTED SMALLER PRODUCERS									
${ m Aden}$		344.8	51.9	34.8	21.8				
Argentina	55.3	70.1	78.1	78.9	75.1	81.4			
Australia		38.2	53.7	52.2	49.9	55.3			
Belgian Congo		34.2	65.7	80.6					
Belgium	42.8	65.0	72.6	80.0	69.1	62.9			
Sameroons (French Admin.)	18.0	822.0	37.2	42.0	43.5	53.6			
Seylon	1	33.1	$\frac{37.2}{29.7}$	31.3	40.3	38.5			
Colombia		15.8	16.0	18.0	21.2	30.			
Suba	10.0	99.4	11.5	12.8	15.6	•••			
	38.1	49.0	$\frac{11.3}{56.7}$	63.4	70.3	• • • • • • • • • • • • • • • • • • • •			
gypt			25.2	18.1	1				
'inland	44.4	60.2	$\frac{25.2}{65.5}$	63.3	60.2	64.			
					20.0	20.0			
hana	25.0	41.3	52.5	60.0	65.0	75.0			
freece		$\frac{41.5}{22.8}$	$\frac{32.5}{24.9}$	25.8	27.4	31.4			
Freenland	7.0	7.2	9.3	7.0	7.5	4.9			
Iawaii		37.8	$\begin{array}{c} 9.3 \\ 46.7 \end{array}$	45.9					
Hong-Kong	1 700	19.4	21.5	23.6	30.5	• •			
reland			9.2	10.7	10.3	• •			
srael	1.7	5.3		10.7	$\frac{10.3}{12.7}$	••			
Cenya	1 :::		17.6		$\frac{12.7}{2.2}$	• •			
Iauritius		2.0	2.1	2.2		••			
	17.1	68.8		20.0	• • •	• •			
lew Zealand		35.8	36.9	39.2	• • • •	• •			
ingapore	1.5	3.6	6.3	6.2	9.3	7.9			
t. Pierre and Miquelon	1.9	82.2	6.8	6.8					
anganyika		25.9	50.0	52.4	55.0	• •			
Cunisia	9.6	12.7		2	94.9	• •			
$_{ m ganda}$		16.2	24.4	25.0	34.3	6.9			
Truguay		3.6	4.0	4.9	5.4				
Tenezuela		76.7	51.8	69.6	61.3	89.			
Zugoslavia	16.8	24.7	23.0	22.6	28.4	• •			

<sup>&</sup>lt;sup>1</sup>1936 data. — <sup>2</sup>Average 1949-52. — <sup>3</sup>Average 1950-52. — <sup>4</sup>1949 data. — <sup>6</sup>Plan target for 1956. — <sup>6</sup>Average 1951-52. <sup>7</sup>Including South West Africa. — <sup>8</sup>1948 data. — <sup>6</sup>Average 1948-51.

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