the state of food and agriculture 1976

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

SPECIAL CHAPTERS

In addition to the usual review of the recent world food and agriculture situation, each issue of this report from 1957 has included one or more special studies of problems of longer-term interest. Special chapters in earlier issues have covered the following subjects:

1957	Factors influencing the trend of food consumption Postwar changes in some institutional factors affecting agriculture
1958	Food and agricultural developments in Africa south of the Sahara The growth of forest industries and their impact on the world's forests
1959	Agricultural incomes and levels of living in countries at different stages of economic development Some general problems of agricultural development in less developed countries in the light of postwar experience
1960	Programing for agricultural development
1961	Land reform and institutional change Agricultural extension, education and research in Africa, Asia and Latin America
1962	The role of forest industries in the attack on economic underdevelopment The livestock industry in less developed countries
1963	Basic factors affecting the growth of productivity in agriculture Fertilizer use: spearhead of agricultural development
1964	Protein nutrition: needs and prospects Synthetics and their effects on international trade
1966	Agriculture and industrialization Rice in the world food economy
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1969	Agricultural marketing improvement programmes: some lessons from recent experience Modernization of institutions to promote development
1970	Agriculture at the threshold of the Second Development Decade
1971	Water pollution and its effects on living aquatic resources and fisheries
1972	Education and training for development Accelerating agricultural research in the developing countries
1973	Agricultural employment in developing countries
1974	Population, food supply and agricultural development
1975	The Second United Nations Development Decade: mid-term review and appraisal

THE STATE OF FOOD AND AGRICULTURE 1976

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WORLD REVIEW
REGIONAL REVIEW
ENERGY AND AGRICULTURE

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

The statistical material in this publication has been prepared from the information available to FAO up to December 1976.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. In some tables, the designation "developed" and "developing" economies is intended for statistical convenience and does not necessarily express a judgement about the stage reached by a particular country or area in the development process.

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FOREWORD

This issue of The state of food and agriculture *reflects an encouraging improvement in the world food and agricultural situation. The fuller data now available confirm that in 1975 there was a large expansion in production both in the developing countries and in the two major exporting regions of North America and Oceania. The 1976 harvests also appear, generally, to have been good. Prices of fertilizers, as well as of most of the main food products, have fallen from their recent very high levels. Food consumption levels have recovered to some extent, and cereal stocks have begun to be replenished.*

The welcome easing of some of the immediate problems brings both a danger and a new opportunity. The danger lies in a world which may once again lapse into complacency and neglect the many chronic, underlying problems of food and agriculture that must be solved if the basic needs of the millions of poor people in the developing countries are to be met within a reasonable period. At the same time, with less need to concentrate on short-term emergency action, the opportunity springs from the scope offered for a more resolute attack on the persistent, long-standing problems. The recent spurt in the food production of the developing countries, though cause for satisfaction, does not guarantee the sustained expansion required to reduce the enormous backlog of hunger and malnutrition.

Alongside these encouraging production increases, crop losses, in quality and quantity, in developing countries, often totalling up to 40% or more, occur at all stages of the production chain. Poor husbandry, inferior management, unsatisfactory handling, inefficient and faulty distribution, all take their toll. A vital element in any food production strategy must be the preservation of gains made, through the reduction of crop losses to tolerable limits, both at pre- and post-harvest stages.

A faster growth of food and agricultural production in the developing countries is a key element in the greater self-reliance called for in the Declaration and Programme of Action on the Establishment of a New International Economic Order. It is basic to the achievement of world food security. Although there has been a substantial replenishment of world cereal stocks (outside China and the U.S.S.R.), by the close of the 1975/76 seasons, these are not yet large enough to offset the inevitable years of bad harvests. Even more important, little progress has been made toward the establishment of the internationally coordinated system of nationally held stocks envisaged in the International Undertaking on World Food Security. The creation of reserve stocks is an area where a greater gesture of international cooperation is required from the richer countries. The very limited progress in establishing trade relations more favourable to developing countries is too well known to need additional comment here. Food aid in cereals has not yet reached the rather modest target recommended by the World Food Conference.

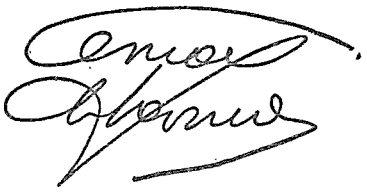
While development assistance for agriculture rose quite sharply in 1975, it is well below what FAO estimates is required to support a sufficiently rapid expansion of food and agricultural production in the developing countries, and there are signs that it may have fallen back again in 1976. It is most welcome that the International

Fund for Agricultural Development (IFAD), called for by the World Food Conference, will begin operations in the near future, but even this important new source of finance can fill only part of the gap.

A newer problem of a longer-term nature is the need for the world economy, including its agricultural sector, to adjust to higher petroleum prices. This important question is taken up in Chapter 3. This benchmark survey of energy in agriculture in the early 1970s reveals that, although agricultural production accounts for only a very small share of the total world use of commercial energy, this amount merits high priority. The high yields in developed countries and the rapid increases sought in developing countries are heavily dependent, with existing technologies, on the expanded use of energy-intensive inputs such as chemical fertilizers, machinery, irrigation and pesticides. However, because of the cost of energy and its effect on the prices of food and agricultural products, its use should be economic and confined to essential purposes.

In the use of energy, as with all other inputs, top priority must be given to the overriding need to increase, much faster than in the past, food and agricultural production in the developing countries. The major increases, however, must come from the small farmers of the developing world. Only in this way will it be possible to reduce the poverty that is the root cause of hunger and malnutrition.

It is with these realities of the world situation in mind that I am continuing to reorient the activities of FAO. It is my aim that the work of the Organization should be of immediate and practical use to its Member Governments. To this end, I am giving highest priority to assisting Member Countries in stimulating investment leading to increased agricultural production and in devising action programmes to reduce crop losses, particularly post-harvest. I am also anxious to foster activities that will reach down to the lowest levels and which will improve the quality of life of the small farmer and other rural poor, not least the rural women.



EDOUARD SAOUMA
DIRECTOR-GENERAL

EXPLANATORY NOTE

The following symbols are used in statistical tables:

— none or negligible

... not available

1971/72 signifies a crop, marketing or fiscal year running from one calendar year to the next; 1971-72 signifies the average for two calendar years.

Figures in statistical tables may not add up because of rounding. Percent changes from one year to another have been calculated from unrounded figures. Unless otherwise indicated, the metric system is used throughout.

Production index numbers [1]

The indices of agricultural production are calculated by applying regional weights, based on 1961-65 farm price relationships, to the production figures, which are adjusted to allow for quantities used for feed and seed. The indices for food products exclude tobacco, coffee, tea, inedible oilseeds, animal and vegetable fibres, and rubber. They are on a calendar year basis and are therefore not comparable with the indices for crop years published in the 1966 and prior issues of this report. Coffee, tea and linseed, which were previously considered food products, are now excluded from this group. Consequently, the indices for food products published in this issue are not completely comparable with those published earlier.

For fishery production, quantities are weighted by the average unit values of fishermen's landings in 1961-65. For forest production, roundwood production is weighted by 1961-65 prices.

Trade index numbers [2]

In calculating trade index numbers of agricultural products for the present issue, both commodity and country coverages include all the commodities and countries shown in the 1975 issue of the FAO *Trade yearbook*.

All indices are calculated independently for the value, volume and unit value of exports and of imports.

Value indices represent the changes in the current values of exports (f.o.b.) and imports (c.i.f.), all expressed in U.S. dollars. If some countries report imports valued at f.o.b., these are adjusted to approximate c.i.f. values. This method of estimation shows an error whenever the trend of insurance and freight diverges from the commodity unit values at export level.

Volume and unit value indices represent the changes in the price-weighted sum of quantities and of the quantity-weighted values of products traded between countries. The weights are respectively the price and quantity averages of 1961-65, which is the base reference period used for all the index number series currently computed by FAO. The Laspeyres formulas were used in the construction of the index numbers.

Regional coverage

The regional grouping used in this publication follows the recently adopted "FAO country classification for statistical purposes." The coverage of the groupings is in most cases self-explanatory. The term "developed countries" is used to cover both the developed market economies and the centrally planned economies of eastern Europe and the U.S.S.R., and "developing countries" to cover both the developing market economies and the Asian centrally planned economies. Israel, Japan and South Africa have been removed from the Near East, Far East and Africa regional groups respectively and are presented under "developed market economies." Western Europe includes Yugoslavia, and the Near East is defined as extending from Cyprus and Turkey in the northwest to Afghanistan in the east, and including from the African continent Egypt, Libya and Sudan.

The trade index numbers of a country group are based on the total trade of each country included in the group irrespective of destination, and in consequence generally do not represent the net trade of the group.

[1] For full details, including a list of weights, see FAO, *Production yearbook 1975*, Rome, 1976.

[2] For full details see FAO, *Trade yearbook 1975*, Rome, 1976.

1. WORLD REVIEW

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RECENT CHANGES IN WORLD LIVESTOCK/FEED PRICE RATIOS

1. WORLD REVIEW

During 1976 there was a distinct improvement in the immediate world food and agricultural situation. With a big expansion in production in 1975 in the developing countries and in North America and Oceania, and generally good to excellent harvests in 1976, food prices tended to ease and there was some recovery both in the food consumption of the developing countries and in world cereal stocks from the low levels of recent years. Nevertheless, only small progress was made toward the longer-term goal of greater world food security. In spite of the steps taken by many developing countries to give agriculture a higher priority in their national development plans, and implementation of various new policies and measures to raise output, the recent production increases must, as so often in the past, be mainly attributed to better weather. The longer-term trend in food production in the developing countries remains disappointingly inadequate in relation to the need to improve nutritional levels. Recent trends in world trade in agricultural products have been unfavourable for the developing countries. Although there have been discussions and negotiations on such matters recently in many international fora, virtually no concrete progress has been made. There has been an encouraging expansion in the amount of international development assistance available for agriculture in the developing countries, but the latest information indicates that commitments by the two major sources of loans may have declined in 1976.

Although at the world level food and agricultural production increased by only about 2% in 1975, there was an encouraging rise of about 4% in the developing countries. In particular, a very good monsoon brought an increase of some 8% in production in the crucial Far East region. However, there was no increase in Africa, where production in 1975 was only about 1% greater than in 1971.

Preliminary estimates for 1976 indicate that world food and agricultural production increased by 2 to 3%, with comparable gains in the developed and developing countries. In general, the developing countries harvested good crops for the second year in succession. In spite of severe drought in much of Europe and dry conditions in parts of the United States and Oceania, world cereal production rose by 6 to 7% above the low levels of 1974 and 1975, with a big recovery in the U.S.S.R. Wheat production increased by 14% and output of coarse grains by 5%, but the rice crop was expected to be only about 1 to 2% below the very high 1975 level. There was a big increase in sugar production and a recovery in cotton production, but coffee output again fell substantially and production of soybeans and several other major oilseeds declined. The European drought caused particularly severe difficulties for livestock producers. World milk production rose rapidly until the middle of 1976, but was subsequently affected by a drop in production in large areas of Europe. Production of beef rose considerably, partly reflecting drought-induced slaughterings in Europe, while output of pigmeat was expected to fall slightly. Mutton and lamb production was affected by the upturn in wool prices, and rose only moderately. A major aspect of the unbalanced world food and agricultural situation in 1976 was the growth of the world surplus of meat and milk products in the face of the continuing need to increase the production of cereals and other basic foodstuffs, particularly in developing countries.

World fishery production has yet to regain the record level reached in 1971. Landings of food fish for direct human consumption have, however, continued to increase. Total fishery production in 1975 (Table 1-1) is estimated to have been slightly below the 1974 level, but there is likely to have been some increase in 1976.

Forestry production, especially in developing countries, was seriously affected by the economic recession in the industrialized countries. World production of industrial roundwood fell in 1975 for the second year in succession, and there were also declines for the other main commodity groups. Recovery in 1976 was limited to only a few products.

Prices of most agricultural products in world markets continued to fall in 1976. The increase in consumer food prices also slowed down in most countries. The fertilizer supply situation eased, and prices of fertilizers declined rapidly from the high levels of 1973 and 1974. Consumption fell in the developed countries in 1975 and stocks were built up. Demand, which was sluggish in early 1976, picked up later in

TABLE 1-1. — INDICES OF WORLD PRODUCTION OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1971 TO 1975

	1971	1972	1973	1974	1975[1]	Change 1974 to 1975[2]
	..... 1961-65 average = 100					Percent
TOTAL PRODUCTION	123	123	129	131	132	+1
Agriculture . . .	123	123	129	131	133	+2
Fisheries[3]	140	148	157	160	159	—1
Forestry	116	117	120	120	114	—5
POPULATION . . .	116	118	121	123	125	+2
PER CAPUT TOTAL PRODUCTION . . .	106	104	107	106	106	—1
Agriculture . . .	106	104	107	106	106	0
Fisheries[3]	121	125	129	130	127	—2
Forestry	100	99	99	98	91	—7

NOTE: For details of the methodology and coverage of these indices, see the explanatory note on page *ix*.

[1] Preliminary. – [2] Percent changes from one year to another have been calculated from unrounded figures. – [3] Excluding China.

the year, and inventories fell to more normal levels. Pesticide supplies, which remained scarce in 1975, improved in 1976, but prices remained high.

Information is only now becoming available on the changes in food consumption and nutrition in the developing countries that occurred during the recent period of shortages and high prices. There were drastic declines in the already very low national average intakes of dietary energy in a number of countries in at least one year in the 1972-74 period. Recovery was usually fairly rapid, but in certain African countries there has been a continued deterioration. The latest available food balance sheets extend only to 1974, but production data for 1975 generally indicate that per caput food production recovered to close to earlier peak levels. However, in Africa per caput food production fell further in 1975.

World stocks of cereals have increased for the first time in three years. Carry-over stocks (excluding China and the U.S.S.R., for which there are still no data) are estimated to have risen by 11% to 119 million tons by the close of the 1975/76 seasons. If present production prospects are realized, wheat stocks could rise by a further 26% in 1976/77, while coarse grain stocks (which fell slightly in 1975/76) could regain or even exceed the 1973/74 level. Hence there is likely to be a qualitative as well as a quantitative improvement in stocks, with the main increase being in the products of greatest importance for direct human consumption.

As a result of lower prices, world export earnings from agricultural, fishery and forest products showed little increase in 1975 after the rapid expansion of previous years. The volume of trade in agricultural products made a good recovery in 1975, and this trend appears to have continued in 1976. But export earnings from these products rose by only about 3% in 1975, while those from fishery products dropped by 2% and those from forest products by 10%.

The 1975 recession further reduced the capability of the 45 most seriously affected developing countries to finance their import requirements. Although they had large crops, there was no decline in their 1975/76 cereal import requirements because they were seeking to replenish pipeline stocks and build up reserves. These requirements are expected to fall somewhat in 1976/77. Their fertilizer consumption fell in 1974/75 (mainly in India), but there appears to have been some recovery in 1975/76. Despite some expansion in their 1975 agricultural export earnings, their agricultural trade balance and its contribution to financing the non-agricultural trade deficit deteriorated still further. Their overall current account trade deficit and external public debt continued to grow alarmingly.

After a large increase in 1974, total official commitments of external assistance to agriculture (OCA) are estimated to have risen in 1975 by as much as 25% in real terms. However, this encouraging overall trend conceals some disquieting features. Assistance to agriculture from Development Assistance Committee (DAC) bilateral sources dropped sharply in 1975, and in the 1975/76 fiscal year there was also a fall in commitments to agriculture by the World Bank, the major source of loans for the agricultural sector. If these trends continue, it is unlikely that the reduced commitments will be offset by the continued increase in OPEC aid to agriculture and by the establishment of the International Fund for Agricultural Development (IFAD).

Notwithstanding the developing countries' good 1975 harvests, their food production increased on average by only 2.5% a year during the first half of the present decade (Table 1-2). This is below the annual rate of population growth in the developing market economies, and far below the 4% per annum target that was specified in the International Development Strategy (IDS) adopted for the Second United Nations Development Decade (DD2) and reaffirmed by the World Food Conference. In Africa, which is increasingly emerging as a special problem area, the average increase in food production was only 0.5% a year in 1971-75, while on a per caput basis it fell by 2.1% a year.

In 1975 the share of the developing countries in

TABLE 1-2. — ANNUAL CHANGES IN WORLD AND REGIONAL FOOD PRODUCTION, 1961-70 AND 1971-75

	Total		Per caput	
	1961-70	1971-75	1961-70	1971-75
	..... *Percent*			
DEVELOPING MARKET ECONOMIES	2.9	2.5	0.3	—0.1
Latin America	3.0	2.7	0.3	—0.1
Far East	2.7	2.8	0.2	0.3
Near East	3.3	3.7	0.7	0.9
Africa	2.9	0.5	0.4	—2.1
ASIAN CENTRALLY PLANNED ECONOMIES	2.8	2.4	1.1	0.7
Total developing countries	2.9	2.5	0.6	0.2
DEVELOPED MARKET ECONOMIES	2.5	1.8	1.4	1.1
Western Europe	2.3	1.9	1.5	1.3
North America	2.4	1.9	1.1	1.1
Oceania	3.4	1.3	1.5	0.7
EASTERN EUROPE AND THE U.S.S.R.	3.2	2.1	2.2	1.1
Total developed countries	2.7	2.0	1.6	1.2
World	2.8	2.2	0.9	0.3

world trade in agricultural products declined still further, when the developing market economies accounted for only 27% of the total. There was in fact a substantial fall in their earnings from agricultural exports in 1975, and recent price changes have generally operated against them. Discussions and negotiations on trade and related matters continued during 1976 in fora such as UNCTAD IV and its follow-up meetings, the GATT multilateral trade negotiations and the Conference on International Economic Cooperation, but no concrete measures were agreed upon. The establishment of a new International Wheat Agreement is of particular importance for the achievement of greater stability in world agricultural trade, and for the building up of reserve stocks. However, the discussions in the International Wheat Council so far have registered little progress.

Although food aid in non-cereal products recovered sharply in 1975/76, food aid in cereals did not reach the 10 million-ton minimum target recommended by the World Food Conference and the Seventh Special Session of the United Nations General Assembly. Allocations for 1976/77 again appeared to be falling short of this target. A higher level of food aid would lessen the need for other special measures for certain countries to obtain their food import requirements. Few countries have so far undertaken the forward planning of food aid called for by the World Food Conference.

The sizable increase in cereal stocks in 1975/76 only brought them back to 13% of annual consumption, or about the same proportion as in 1973/74, when the world food and agricultural situation was considered very precarious. They were still some 35 to 45 million tons below the level of 17 to 18% of consumption regarded by FAO as the minimum safe level for world food security. With the opportunity to replenish stocks further in 1976/77, it is imperative that the system of internationally coordinated nationally held stocks, to which the many signatories of the International Undertaking on World Food Security have adhered in principle, become an operational reality as soon as possible. Otherwise, there is the danger that lower prices may cause production plans for 1977/78 and beyond to take insufficient account of the need for further stockbuilding. A number of developing countries have taken specific steps to establish stock policies and are now beginning to move toward the achievement of their targets, but increases in some developed countries' stocks have been largely unplanned. What is in effect the first opportunity to rebuild world stocks to a sufficient level since 1972 could therefore be missed.

Agricultural production

Production in 1975 and 1976

World food and agricultural production increased by 2% in 1975,[1] following a rise of less than 1% in 1974 (Table 1-3). Results were, however, very encouraging in all developing regions except Africa. In the developed countries, where there was a slight reduction in 1974, production rose by only 1% in 1975. FAO's first preliminary estimates of world production for 1976 indicate an increase of 2 to 3% over the 1975 level, with comparable gains in the developed and developing countries.

[1] For details of 1975 regional production, see FAO, World food and agricultural situation - April 1976, *Monthly Bulletin of Agricultural Economics and Statistics*, 25(5): 1-23, and for 1975 production of main commodities, see *The state of food and agriculture 1975*, Rome, FAO, 1976, p. 10-12.

TABLE 1-3. — INDICES OF WORLD AND REGIONAL FOOD AND AGRICULTURAL PRODUCTION, 1971 TO 1975

Production / Region	Total						Per caput					
	1971	1972	1973	1974	1975[1]	Change 1974 to 1975	1971	1972	1973	1974	1975[1]	Change 1974 to 1975
	..... 1961-65 = 100					Per-cent	..... 1961-65 = 100					Per-cent
Food production												
DEVELOPING MARKET ECONOMIES[2]	125	124	129	131	138	+5	102	99	100	99	101	+2
Latin America	125	126	128	136	138	+2	101	99	98	101	100	—1
Far East	125	121	132	129	139	+8	102	97	103	98	103	+5
Near East	128	138	131	143	151	+6	103	109	100	106	109	+3
Africa	122	121	118	124	124	—	100	97	91	93	91	—2
ASIAN CENTRALLY PLANNED ECONOMIES	126	124	130	133	137	+3	110	107	110	110	112	+2
Total developing countries	125	124	129	132	138	+4	104	101	103	103	105	+2
DEVELOPED MARKET ECONOMIES[2]	123	122	125	128	132	+3	114	111	113	115	118	+3
Western Europe	121	119	124	130	127	—2	114	112	116	121	117	—3
North America	124	122	124	125	135	+8	113	111	115	111	117	+7
Oceania	126	127	138	131	139	+6	109	108	116	108	113	+4
EASTERN EUROPE AND THE U.S.S.R.	127	126	148	140	133	—5	118	115	134	127	119	—6
Total developed countries	124	122	132	131	133	+1	115	112	120	118	118	—1
World	125	123	131	132	135	+2	107	104	108	107	107	—
Agricultural production												
DEVELOPING MARKET ECONOMIES[2]	124	124	128	131	136	+4	101	99	99	99	100	+1
Latin America	122	124	126	133	134	+1	99	97	96	99	97	—2
Far East	125	122	132	129	138	+7	102	97	103	98	102	+4
Near East	128	138	131	142	149	+5	103	109	100	106	108	+2
Africa	122	121	118	124	124	—	100	97	91	93	91	—2
ASIAN CENTRALLY PLANNED ECONOMIES	126	125	132	135	138	+2	110	107	111	112	113	+1
Total developing countries	125	124	129	132	137	+4	104	101	103	103	104	+1
DEVELOPED MARKET ECONOMIES[2]	120	119	122	124	128	+3	111	109	110	112	114	+2
Western Europe	120	119	123	129	127	—2	114	112	115	120	117	—2
North America	119	118	120	120	128	+7	108	106	107	106	113	+6
Oceania	123	123	126	119	128	+7	106	105	106	98	104	+5
EASTERN EUROPE AND THE U.S.S.R.	127	125	147	140	134	—5	118	115	134	127	119	—6
Total developed countries	122	121	129	129	130	+1	113	111	117	116	116	—
World	123	122	129	130	133	+2	106	103	107	106	106	—

NOTE: The above indices are based on net production, as amounts used for feed and seed have been deducted from total production figures. However, for eastern Europe and the U.S.S.R. the indices are based on gross production.

[1] Preliminary. — [2] Including countries in other regions not specified.

In 1975 food production in the developing countries increased by 4%, achieving for the first time in DD2 the IDS agricultural production target ratified by the World Food Conference, and bringing the average annual increase in the developing countries during 1971-75 to 2.5% (Table 1-2). This is below the rate of 2.9% achieved in the previous decade, and is only slightly above the 2.3% annual growth of population. In the developing market economies the increase in food production in 1971-75 has not yet caught up with the 2.6% annual population growth, mainly owing to very low increases in Africa. However, the average annual growth of food production in the developing countries since the beginning of the decade now exceeds that in the developed countries by about 25%.

Food production in the developing market economies of the Far East region is now estimated to have risen by 8% in 1975. The summer monsoon was outstandingly good and the preceding winter rains were also sufficient. Part of this increase represented recovery from the drop in production in 1974, but the 5% gain over 1973 is comparable with those achieved in the run of good seasons in 1967-70 when high-yielding varieties began to make their impact. In China food production rose by 2 to 3% in 1975, slightly less than in 1973 and 1974. There was a large increase in the Near East following excellent results in 1974, and the 3.7% rate of production growth in this region in 1971-75 has almost reached the DD2 target. In Latin America there was a moderate rise in 1975 following a large one in 1974.

Food production failed to increase in Africa in 1975, however, and the average annual growth rate in the first half of the decade is now as low as 0.5%. Food production declined in 1975 in 12 of the 48 developing African countries for which FAO published production index numbers. These 12 countries, from all parts of the region but mainly in eastern Africa, had a combined population of 95 million, slightly less than one third of the region's total population.

In the developed region group, North America in 1975 achieved its largest expansion since 1971, and production in Oceania recovered to a level slightly above that of 1973 following the sharp fall in 1974. But bad weather brought a 2% reduction in output in western Europe, and the prolonged and exceptionally severe drought in 1975 in the U.S.S.R. led to a decline of as much as 8% in both food and agricultural production.

In 1976 drought resulted in lower output in both eastern and western Europe and only a marginal gain in Oceania (Table 1-4). However, there was a large recovery in the U.S.S.R. Food production rose by 1 to 2% in North America following the very sharp rise in 1975.

In the developing region group, production was again good in the Near East. There were bumper cereal crops in most countries of the region, particularly Turkey and Iran. The regional index for Africa benefited from large wheat and barley crops in the Maghreb countries, but other African countries apparently made little progress. The was a good performance in Latin America, with excellent wheat crops in the main producing countries (Argentina and Brazil), large rice and soybean crops in Brazil, and improved beef production, particularly in Argentina and Uruguay. Several countries in the Far East are expected to show marginal gains over the good results of 1975, although final results will not be available until the end of the rice harvest. In China food production is expected to increase by 2 to 3%, but will be marginally below the increase achieved in 1975 if better wheat and coarse grain harvests are offset by a somewhat lower rice crop.

Thus the immediate world food situation in late 1976 showed a considerable improvement over that in late 1974, when there were poor harvests in North America, the major grain exporter, and the Far East, the major importer. It also compared well with the situation in 1975, when the shortfall in U.S.S.R. grain production added to the uncertainty of world markets. No major producers suffered difficulties on that scale in 1976, and only a few smaller producers were facing serious food shortages.

The increase of 2 to 3% in production in the developing countries in 1976 is in line with the longer-term trend from 1971. However, despite this unsatisfactory trend, the situation in the developing countries is distinctly better than a year ago, mainly because of improved cereal stock levels following the large output achieved in 1975. In October 1976 only five countries (three of which were facing civil unrest) were reported as suffering from serious food shortages, compared to seven a year earlier and 18 in October 1974.

Production of main commodities [2]

World cereal production increased by 6 to 7% in 1976 following a small rise in 1975 and a drop of almost 3% in 1974. Output recovered by 9 to 10% in the developed countries after two years of declining production, largely because of excellent crops in the U.S.S.R. In the United States production decreased marginally following the record output of 1975. It also fell in western Europe by 3 to 4% and by about 20% in Oceania, where output in recent years has been subject to wide fluctuations. Although the outcome of the Asian rice harvests is not yet certain, it appears that cereal production in the developing countries increased by 2 to 3% in 1976. There may, however, have been a slight drop in the Far East region compared to the exceptionally good harvests in 1975.

Wheat production in 1976 is estimated to have reached a record 405 million tons, 14% larger than last year and 5% above the long-term (1960-75) trend level of 386 million tons. Although larger harvests were expected in all regions except Oceania, much of the increase reflected the rise in production in the U.S.S.R. (where the harvest was estimated at

[2] For a more detailed review of the commodity situation, see *FAO commodity review and outlook, 1975-76*, Rome, 1976.

TABLE 1-4. — ANNUAL CHANGES IN WORLD AND REGIONAL FOOD AND AGRICULTURAL PRODUCTION, 1961 TO 1976

Production / Region	1961 to 1975 (annual average)	1971 to 1975 (annual average)	1972 to 1973	1973 to 1974	1974 to 1975	1975 to 1976 [1]
	..... *Percent*					
Food production						
DEVELOPING MARKET ECONOMIES [2]	+2.7	+2.6	+ 3.3	+2.3	+4.8	+3 to + 4
Latin America	+2.8	+2.7	+ 1.5	+6.0	+1.9	+4 to + 5
Far East	+2.7	+2.8	+ 9.0	—2.2	+7.9	+1 to + 2
Near East	+3.3	+3.8	— 5.1	+8.7	+6.0	+4 to + 5
Africa	+2.1	+0.5	— 3.0	+5.1	+0.3	+5 to + 6
ASIAN CENTRALLY PLANNED ECONOMIES	+2.7	+2.5	+ 4.7	+2.4	+2.8	+2 to + 3
Total developing countries	+2.7	+2.5	+ 3.7	+2.3	+4.2	+2 to + 3
DEVELOPED MARKET ECONOMIES [2]	+2.3	+2.0	+ 2.8	+2.3	+3.5	0 to + 1
Western Europe	+2.2	+1.9	+ 4.2	+4.7	—2.2	—2 to — 1
North America	+2.3	+2.0	+ 1.9	+0.5	+8.6	+1 to + 2
Oceania	+2.8	+2.3	+ 9.2	—5.4	+6.6	0 to + 1
EASTERN EUROPE AND THE U.S.S.R.	+2.9	+2.2	+18.7	—5.1	—4.9	+9 to +10
Total developed countries	+2.5	+2.1	+ 7.6	—0.1	+0.9	+2 to + 3
World	+2.6	+2.3	+ 5.9	+0.9	+2.3	+2 to + 3
Agricultural production						
DEVELOPING MARKET ECONOMIES [2]	+2.6	+2.4	+ 3.2	+2.2	+3.9	+3 to + 4
Latin America	+2.6	+2.6	+ 1.4	+6.1	+0.8	+3 to + 4
Far East	+2.7	+2.7	+ 8.8	—2.2	+6.7	+1 to + 2
Near East	+3.3	+3.3	— 5.3	+8.4	+4.8	+4 to + 5
Africa	+2.1	+0.5	— 2.9	+4.9	+0.1	+5 to + 6
ASIAN CENTRALLY PLANNED ECONOMIES	+2.8	+2.6	+ 5.2	+2.4	+2.7	+1 to + 2
Total developing countries	+2.7	+2.5	+ 3.8	+2.3	+3.5	+2 to + 3
DEVELOPED MARKET ECONOMIES [2]	+2.1	+1.8	+ 2.3	+2.0	+3.0	0 to + 1
Western Europe	+2.1	+1.9	+ 4.2	+4.6	—2.2	—2 to — 1
North America	+1.9	+1.8	+ 1.5	+0.3	+6.9	+2 to + 3
Oceania	+2.2	+0.5	+ 2.7	—5.4	+7.3	—1 to 0
EASTERN EUROPE AND THE U.S.S.R.	+2.9	+2.2	+17.4	—4.4	—4.7	+8 to + 9
Total developed countries	+2.3	+1.9	+ 6.8	—0.1	+0.6	+2 to + 3
World	+2.5	+2.2	+ 5.5	+0.9	+1.9	+2 to + 3

NOTE: Data for total agricultural production and for food production are based on net production, with deductions for seed and feed.
[1] Preliminary. — [2] Including countries in other regions not specified.

94 million tons compared to 66 million tons in 1975). Weather conditions were reasonably favourable in the U.S.S.R., the Indian subcontinent, northern Africa and the Near East — all areas that are vulnerable to periodic crop failures. Good or bumper crops were forecast in the U.S.S.R., the United States, Canada, Argentina, Brazil, Mexico, Algeria, South Africa, Turkey, Iran, India, Pakistan and China. The developing countries had another very successful year in wheat production, with an esti-

mated output of 135 million tons (14 million tons or 11% more than in 1975).

The substantial improvement in world wheat production is expected to be reflected in higher consumption levels and increased stocks. Demand for wheat as animal feed is expected to increase considerably in 1976/77, especially in the EEC, the United States and the U.S.S.R. In North America wheat is selling at the smallest premium to maize since the early 1970s (Table 1-5), and feed usage is expected to be more than double the 2 million tons of 1975/76. More wheat will be fed on farms and incorporated in manufactured feeds. World trade in wheat during 1976/77 (July/June) is estimated at 59 million tons, about 10% below the record level of 1975/76. The decrease primarily reflects a sharp fall in the import requirements of the U.S.S.R. (from 10 million tons to 6 million tons) and in those of India, where excellent 1975 harvests resulted in a sizable rebuilding of wheat stocks, which together with the good crop of 1976 is likely to reduce import requirements to 3.5 million tons. Even allowing for increased consumption, carry-over stocks at the end of the 1976/77 seasons (excluding the U.S.S.R. and China) could increase by approximately 14 million tons to 72 million tons. This would bring wheat stocks to their highest level in five years. Wheat prices in international markets declined in late 1976/77 to the levels of late 1972/73, and in real terms to even lower levels.

World production of coarse grains in 1976 is estimated to have been 696 million tons, 36 million tons larger (+5%) than in 1975 and back at the long-term trend level. A substantially larger harvest in the U.S.S.R. more than offset lower production in eastern and western Europe and Oceania, while output in other regions is estimated to have been at, or only slightly above, the levels of 1975, with the exception of Africa, where there was a significant increase in the Maghreb countries. The developing countries as a whole are estimated to have continued their expansion of coarse grain output, increasing production by 3% in 1976.

Demand for livestock feed was forecast to increase in North America, but only moderately because of livestock/feed price ratios. In western Europe feedstuff requirements were larger than in 1975, but no increase in consumption of coarse grains was anticipated because of the tighter supply situation and the fact that more wheat was being fed. In eastern Europe some reduction of feed consumption was expected, depending on the level of trade in grains within the region, and on imports from outside.

TABLE 1-5. — RECENT CHANGES IN EXPORT PRICES OF SELECTED AGRICULTURAL COMMODITIES

Year / Month	Wheat (U.S. No. 2 Hard Winter, Ordinary, f.o.b. Gulf)	Rice (Thai white rice 5%, f.o.b. Bangkok)	Maize (Yellow No. 2, f.o.b. Gulf)	Soybeans (U.S., c.i.f. Rotterdam)	Sugar (ISA composite price, world market, f.o.b. and stowed Caribbean ports)	Coffee (ICO composite price New York, ex-warehouse)
	U.S. dollars/metric ton				*U.S. cents/pound*	
1972: January	60	131	51	125	7.90	44.80
June	60	136	53	138	6.33	47.76
1973: January	108	179	79	214	9.40	57.03
June	106	205	102	470	9.38	62.78
1974: January	214	538	122	261	15.16	66.22
June	154	596	117	228	23.51	71.49
1975: January	169	399	132	256	38.31	64.96
June	126	346	118	207	13.65	63.00
1976: January	143	280	111	176	14.02	94.97
June	147	242	122	230	12.99	149.24
July	143	243	121	250	13.21	142.34
August	129	243	116	240	10.02	150.87
September	122	266	115	252	8.13	154.19
October	113	270	106	236	8.03	162.62
Average: 1972	70	151	56	140	7.27	50.34
1973	139	[1] 368	98	290	9.45	62.16
1974	181	542	132	277	29.66	67.95
1975	150	364	119	206	20.37	71.73

[1] Thai rice, as well as rice from most other regions, was not quoted regularly on the world market from the second week of March to November 1973; this average is estimated on the basis of the few quotations that were available and is only indicative of the change that took place in prices.

World exports of coarse grains in 1976/77 are estimated at about 70 million tons, 3% below the high level of 1975/76. Overall availabilities of coarse grains are estimated to be generally sufficient to cover anticipated import demand, but the situation is tightly balanced. World coarse grain stocks at the end of the 1976/77 seasons are not expected to increase substantially above the previous year's extremely low level of 43 million tons, equivalent to only 9% of annual world consumption (excluding the U.S.S.R. and China). Some rebuilding of stocks is, however, likely to take place in the U.S.S.R. Coarse grain prices have continued to fall despite the tighter supply situation, but this is probably due to the lower profitability of grain feeding by livestock producers, particularly in the United States.

Total rice production is estimated to have been about 226 million tons (milled), in line with the long-term trend but 1 to 2% below the excellent 1975 harvest. In Asia, where the major part of the world crop is harvested in the closing months of the year, a harvest somewhat lower than the 1975 bumper crop was expected in India, owing to erratic monsoon rains. China officially reported that another good harvest was anticipated. Japan's 1976 rice crop was officially estimated at 15.3 million tons (paddy), down from 17.1 million tons in 1975 owing to bad weather. Crops in Pakistan, Malaysia and the Socialist Republic of Viet Nam are likely to have been larger than in 1975, and the Philippines and Thailand again anticipated good harvests. Production in the United States was lower, but in Brazil an excellent crop was harvested in the first half of the year. Export prices of Thai rice again levelled out after the 11% increase recorded in the first half of September, and at mid-October were 25% lower than a year earlier. Large purchases by Indonesia, Sri Lanka and some Near Eastern countries in August and September contributed to the price rise. With most of their 1976 business transacted, both exporters and importers appeared to be waiting to assess the outcome of the paddy harvests before concluding 1977 contracts on a substantial scale.

Total production of oil-bearing crops (measured in oil equivalent) is estimated to have declined by 1 to 2% in 1976 following a sharp rise in 1975. World production of soybeans was about 9% below that of 1975. The United States soybean crop was officially estimated at 34 million tons, 18% below the 1975 crop. However, output in Brazil increased once again, exceeding 11 million tons. Palm oil output was expected to increase, although Malaysia experienced some lack of rains. Expansion of copra production was also foreseen; the increase in the Philippines, the largest producer, could be as much as 15%. Poor harvesting conditions were reported to be limiting the size of the U.S.S.R. sunflower crop, which was not expected to exceed 6 million tons and could well be substantially lower. World groundnut production is estimated to have reached a record level for the second year in succession, with another excellent crop in India and an improved performance in Nigeria. Cottonseed production was probably higher than the small 1975 crop, but world output of castor beans, linseed and rapeseed was expected to be lower.

World meat production is estimated to have expanded by 2 to 3% in 1976, with increases of 4% in beef and veal, 3% in mutton and lamb, and as much as 6% in poultry meat output. Pigmeat production probably fell by 1 to 2%. There were substantial increases in beef production in Canada as well as in the United States, where the downswing in the cattle inventory during the current cattle cycle may have been the largest since the mid-1920s. After several years of financial losses, cattlemen in the United States are steadily reducing breeding stock inventories. Production of beef and veal and mutton and lamb has been at record levels in Australia, with drought conditions in southern regions leading to heavier marketing of cattle. Following the steady buildup of herds in New Zealand, there was a large expansion in beef production in 1976, but output of mutton and lamb remained near earlier levels. These results contrasted sharply with the lower output of meat (particularly pigmeat) in eastern Europe and the U.S.S.R. In Latin America, however, the increase in beef production was above average.

The report of the Sixth Session of the FAO Intergovernmental Group on Meat, held in Rome from 4 to 8 October 1976, indicated that the oversupply of meat (particularly beef) on the world market continued in 1976 despite a slight improvement in import demand. Exportable supplies of beef in the main exporting countries are expected to remain high well into 1977, even though cattle inventory cycles will have passed their peak. Increases in meat demand in the main traditional importing countries are likely to be relatively small in the short run (at current prices) as the economic recovery now under way is likely to proceed at a moderate pace. In the EEC beef stocks were expected to be large enough by the end of 1976 to limit import demand, so the market will remain weak for exporters. The large exportable supplies from the main producing countries are likely to continue to face restricted access to import markets, at least during the first half of 1977, and world market prices will continue to be low. In spite of the slow increase in overall meat demand, import demand could improve con-

siderably in the second half of 1977 or early 1978 when the effect of the cyclical rundown of cattle herds, reinforced by drought-induced slaughterings, will be reflected in reduced beef production in western Europe. This could coincide with a tightening of exportable supplies and thus lead to some upward pressure on international market prices.

World milk production is estimated to have risen by 2% in 1976 to a new record level, with gains of about 4% in North America, 2 to 3% in western Europe and 1% in Oceania. No change in production was expected in eastern Europe and the U.S.S.R. World stocks of butter and skim milk powder ceased to grow in the last half of 1976. They are expected to decline somewhat in the coming months, but are nevertheless likely to remain large in 1977. The recent decline in stocks reflects the effects of the drought on milk production in large parts of western and eastern Europe, where output was not only reduced during the grazing season, but will also be affected by short supplies of hay, silage and other fodder in the coming winter. Moreover, in Europe the relationship between prices of milk and commercial feeds is likely to be less favourable than in 1975/76. In Australia drought has affected dairy farming even more than in Europe, and in Canada policy measures have curbed milk output. With the major exceptions of the United States and New Zealand, the developed countries anticipate a reduced output during the first six months of 1977. But, assuming normal weather conditions, European output should recover in 1977.

Production of sugar in 1976 is estimated to have reached a record level following the large crop of 1975, with substantial increases in Australia, Brazil, Spain, Thailand and the U.S.S.R. Smaller crops were expected in Cuba, France and India. In the United States and other major producers output was estimated to be close to 1975 levels. Sugar prices were very low, with the 1975/76 crop well in excess of current demand, and as production of both cane and beet sugar is expected to increase further, prices are likely to remain low. Stocks were expected to reach a total of 20 million tons, nearly one quarter of estimated 1976 production.

Coffee production in 1976 is estimated to have declined by as much as 20%; estimates of the Brazilian crop range from only 330 000 tons to 570 000 tons. The world coffee market became extremely tight after the severe frost of 1975 in Brazil. Export availabilities in 1976 were expected to be 9 to 12 million bags below current demand. International prices doubled during the twelve-month period ending October 1976.

Production of cocoa is estimated to have been about 10% lower in 1976, reflecting falls of a similar scale in Africa, where the Nigerian crop was probably the smallest in 15 years, and in Latin America. By October 1976 cocoa prices had reached record levels, as the expected considerable shortfall in production coincided with a surprisingly strong recovery in consumption. The International Cocoa Organization was not able to accumulate stocks, and national cocoa stocks were also at very low levels. Some increase was expected in 1976 tea production; the rise in Indian output more than offset the reduction in Sri Lanka.

Production of cotton is estimated to have increased by 4%, below earlier expectations, although better harvests were expected in the United States and the U.S.S.R. A significant increase in output of raw jute was foreseen. Rubber production may have increased by 7% or more. World output of wool is likely to have fallen by 1%.

Cereal stocks and world food security

For the first time in three years, cereal stocks (excluding the U.S.S.R. and China, for which no information is available) are estimated to have increased in 1975/76 and to have shown a qualitative improvement, as wheat increased its share of the total. Stocks are estimated to have reached 119 million tons by the end of the 1975/76 seasons, an increase of 12 million tons from the previous year (Table 1-6). Closing wheat stocks are estimated to have risen by 9 million tons to reach a total of 58 million tons (of which 37 million tons were held by the major exporters), with the United States accounting for most of the increase. Coarse grain stocks are likely to have remained unchanged at 45 million tons. Rice stocks rose by 3 million tons to 16 million tons. Despite these improvements, however, stock levels in 1975/76 remained far from adequate to ensure world food security. They were equivalent to only 13% of annual consumption and were some 35 to 45 million tons below the minimum security requirement of 17 to 18% of annual consumption recommended by FAO.

On the basis of forecasts of production and consumption at mid-November 1976, world wheat and coarse grain stocks are expected to increase by 22 million tons (21%) to 125 million tons by the end

TABLE 1-6. — ESTIMATED TOTAL CARRY-OVER STOCKS OF CEREALS,[1] 1971/72 TO 1976/77

	Closing stocks					
	1971/72	1972/73	1973/74	1974/75	1975/76[2]	1976/77[3]
	Million metric tons					
WHEAT	69	47	42	49	58	73
Main exporting countries	52	33	29	32	37	52
Main importing countries	10	7	7	9	15	21
Others	7	7	6	8	6	
RICE	21	13	14	13	16	15
Selected exporting countries	6	4	4	4	5	
Selected importing countries	8	5	6	6	11	
Others	7	4	4	3		
COARSE GRAINS	75	60	51	45	45	52
Main exporting countries	56	40	29	24	25	32
Main importing countries	11	11	13	13	12	20
Others	8	9	9	8	8	
Total cereal stocks	165	120	107	107	119	140
	Percent					
Share of total consumption	19	14	13	12	13	15

NOTE: This table has been revised and the series adjusted to take account of the change in the crop year by the United States (now June/May). Stock data are based on an aggregate of national carry-over levels at the end of national crop years and should not be construed as representing world stock levels at a fixed point of time.

[1] Excluding China and the U.S.S.R. – [2] Preliminary. – [3] Forecast.

of the 1976/77 seasons. This increase would be primarily due to higher wheat inventories, mostly in North America. Coarse grain stocks are expected to rise by some 7 million tons despite larger European import demand and smaller-than-anticipated North American production. A preliminary forecast of the level of 1976/77 rice carry-over stocks indicates a decline of 1 million tons to 15 million tons, which is still 1 to 2 million tons higher than in 1972/73-1974/75.

In the U.S.S.R. record grain crops in 1976 are expected to allow for a buildup in stocks following the drawdown in 1975. Thus at the world level the rise in stocks at the end of 1976/77 is likely to be even greater than shown in Table 1-6. Although the bulk of the wheat stocks will probably be held by exporting countries, the share of total stocks held by importing countries is forecast to be higher in 1977 than in the last relatively good year of 1972.

The First Session of the Committee on World Food Security, held in Rome in April 1976, was attended by representatives of 86 governments, the EEC, the International Wheat Council and 14 international organizations. It was established as a standing committee of the FAO Council by the Eighteenth Session of the FAO Conference following the recommendation of the World Food Conference and the adoption of the International Undertaking on World Food Security by the FAO Council at its Sixty-Fourth Session.[3] By April 1976, 78 countries had become members of the Committee, and another four countries had joined by mid-November 1976. The Committee agreed that world food security had improved during 1975/76, but that the improvement was only marginal and uneven, and did not provide adequate assurance for the future. Even though stocks had increased in some individual countries, they were still generally below national targets. Of the 38 countries for which information on stock targets was available (mainly developing countries), actual stocks were below national target levels in 31

[3] As stated in Conference Resolution 21/75, the Committee is required to: (*a*) keep the current and prospective demand, supply and stock position for basic foodstuffs under continuous review, in the context of world food security, and disseminate timely information on developments; (*b*) make periodic evaluations of the adequacy of current and prospective stock levels, in aggregate, in exporting and importing countries, in order to assure a regular flow of basic foodstuffs to meet requirements in domestic and world markets, including food aid requirements, in time of short crops and serious crop failure; (*c*) review the steps taken by governments to implement the International Undertaking on World Food Security; and (*d*) recommend such short-term and longer-term policy action as may be considered necessary to remedy any difficulty foreseen in assuring adequate cereal supplies for minimum world food security.

countries. In aggregate, the 38 countries held about 15 million tons in stock at the end of 1974/75, only half of the combined target levels. The geographical distribution of stocks was also considered unsatisfactory. In particular, stocks were below minimum target levels in areas particularly vulnerable to crop failure. Rice stocks appeared to be unevenly distributed between exporting and importing countries, as well as between countries which had established stock policies and those which had yet to do so.

Among the various problems affecting world food security, the Committee noted that the margin between world "shortage" and "surplus" was very narrow. In the absence of an adequate system of world food security, there was a danger that bumper crops in some regions would bring about surpluses on the market which could reduce producer incentives, thus leading to cutbacks in production before cereal stocks had been rebuilt to adequate levels. For instance, there was already an excess of rice supplies over current consumption in many developing countries in 1975/76, but many of them (the major paddy producers) were not in a position to build up rice stocks owing to financial and other constraints. As a result, rice prices declined sharply, even though overall stocks were inadequate. The adverse effect of such situations affecting rice and other cereals would be lessened if national stock policies and programmes were in operation.

Most of the major cereal-producing and -consuming countries have now subscribed to the International Undertaking on World Food Security.[4] In 1975 they accounted for 95% of world exports, about 50% of world imports and approximately 60% of world production of cereals. As follow-up action to the Undertaking, the Committee recommended policy measures whereby priority should be given to meeting requirements of importing developing countries subject to sudden climatic variations or other natural disasters; donor countries and agencies should endeavour to increase their assistance in real terms; developed countries that have a potential to do so should endeavour to increase their food production while avoiding practices that may inhibit the capacity of developing countries to expand their own production, in order to ensure that foodgrain prices do not rise beyond the reach of importing developing countries; and all countries should endeavour by the end of 1977, if possible, to define and adopt national stock policies and targets for basic foodstuffs, primarily cereals, and to modify them as required in order to conform with the guidelines of the Undertaking. In this connection, the Committee stressed the need for a speedy conclusion to the international discussions and negotiations taking place on an international grains arrangement.

Eighty-seven governments and the EEC had agreed to participate in the Global Information and Early Warning System on Food and Agriculture by 29 September 1976. The System came into operation following the FAO Council's approval of its working arrangements at its Special Session in March 1975. A central unit has been established in FAO as a focal point of the System, and a number of periodic reports are now being issued to participating governments. Efforts are under way to improve the flow of information to the System from member countries, with the assistance of the national liaison officers.

[4] Seventy countries had subscribed by mid-November 1976.

Food consumption and nutrition in developing countries

Dietary energy supplies and nutritional requirements

Some indication of improved food supplies in the developing market economies in 1975 is given by the FAO index numbers of per caput food production which show an increase of 2% for this group (Table 1-3). In the Near East food production per caput rose by 3% to regain the record level of 1972. In the Far East the rise of 5% in 1975 almost regained the 1970 peak level. Per caput production in Latin America, declining marginally, fell to 3% below this level. In Africa it fell to 9% below the 1961-65 average. Whereas in Latin America the absolute level of per caput production is higher than in the other developing regions, in Africa the seriousness of the recent declines is enhanced by the already very low absolute level. Per caput food production in 1975 was more than 40% below the 1961-65 average in Equatorial Guinea, almost 40% below it in Algeria, 15 to 40% below it in five of the Sahelian countries, and 15 to 30% below it in twelve other African countries including Ethiopia and Nigeria.

Such data generally provide the only available indications of the most recent situation, but give only a rough idea of actual food consumption levels because they exclude fish and take no account of changes in net trade and in stocks. However, revised and updated food balance sheets up to 1974 are

now becoming available for comparison with the information for 1969-71 presented to the World Food Conference. The new data are summarized in Annex Table 12.

In the Far East region, dietary energy supplies averaged 94% of nutritional requirements in 1969-71, fell to a low point of 90% in 1973, and recovered to 93% in 1974. The number of countries in the region with national average supplies below requirements rose from nine (with a total population of 850 million) in 1969-71 to 10 (with a total population of 930 million) in 1972-74. Among the individual countries in this situation. there were very sharp drops in energy supplies in at least one year in Burma, Democratic Kampuchea (formerly Cambodia), India and Nepal. The only steady decline was in Sri Lanka, which dropped from 104% of requirements in 1969-71 to 91% in 1974. Supplies in Bangladesh and Indonesia have improved in recent years. Most of the countries with supplies above requirements maintained or improved their position.

In Latin America the regional average dietary energy supply stayed at 105 to 107% of requirements throughout the period. The number of countries below requirements remained 10 (with a population of 36 million) in 1972-74 as in 1969-71. Year-to-year changes in these countries were generally small, but there has been a rapid improvement in the Dominican Republic and a steady deterioration in Honduras and, up to 1973, in Argentina. In the countries with supplies above requirements there have been few changes, with the main exception of Cuba, where there was a further improvement on the average.

In Africa dietary energy supplies decreased from 92% of nutritional requirements in 1969-71 to 91% in 1972-74. Of the 40 African countries covered in Annex Table 12, ten exceeded on the average the nutritional requirements in 1972-74, but only six of them were consistently above requirements throughout the period. In 24 countries, representing three quarters of the population of developing Africa, the nutritional situation deteriorated or remained stagnant, and there were sharp falls in at least one year in as many as 18 countries, including Ethiopia, Kenya, Nigeria, Rhodesia, Rwanda, Tanzania, Uganda, Zaire and the Sahelian countries.

The situation in the Near East, in contrast, improved marginally but gradually. The number of countries with supplies exceeding nutritional requirements increased from four in 1969-71 to six in 1972-74 and to eight in the year 1974. Despite this improvement, there were as many as seven countries in 1972-74 with dietary energy supplies below requirements, accounting for almost half the region's population, with exceptionally low levels in Afghanistan and the Yemen Arab Republic. The overall situation deteriorated markedly in Jordan and Democratic Yemen.

National averages provide only a preliminary indication of the nutritional situation, since they conceal the very uneven distribution of food consumption in relation to requirements within countries. Even where national average supplies exceed requirements, many of the poorest people suffer from serious malnutrition. In the many countries where supplies are deficient, even a small fall in the national average implies a considerable worsening in the situation of the poorest groups, who already receive much less than the inadequate average, and who as a rule are most affected by the price increases that usually accompany reductions in supply. The declines in average energy supplies of the magnitude of that in India in 1973 (from 93% of requirements to 85%) must have had very serious consequences for the poorest, worst-nourished people.

Although the drop in average energy supplies in the Far East between 1969-71 and 1972-74 was relatively small, it is extremely serious in view of the substantial energy deficit already existing and of the vast numbers of people involved. Combined with the continued rapid growth of population and with the obvious deterioration of the nutritional situation in Africa, it implies a big increase in the total number of people suffering from severe protein energy malnutrition in the developing market economies. There will have been some improvement in the Far East as a result of the gain in per caput production in 1975, but sustained increases will be needed for many years if there is to be any real and lasting effect on the nutritional situation. Any change in this situation would depend not only on increased production, but also on changes in the distribution of income.

A preliminary examination of the most recent data suggests that changes in dietary composition have generally been small. However, some deterioration in the quality of the diet is indicated by the fact that while energy intakes in the Far East fell by only about 2% between 1969-71 and 1972-74, protein intakes fell by about 4%. In India the per caput consumption of pulses, an important source of protein, dropped by more than 30% from 1970 to 1974 as farmers shifted to more profitable crops.

Drought and nutrition

Although information is still fragmentary, it is now possible to piece together a picture of the effects of recent droughts on the nutrition of affected popu-

lations. The following analysis refers to large areas of sub-Saharan Africa and Ethiopia where acute food shortages developed.

FOOD AVAILABILITY

In the Sahelian zone the rainfall began to decline in 1968, the most severe drought years being 1971-73. As the effects of the drought on pasture became increasingly felt, the livestock-dependent populations moved south, earlier than usual each year, into the cropping areas. The pasture then became exhausted, and by 1973 severe stock losses (later estimated at 30 to 40%[5]) had occurred. The nomads' source of food was normally from both livestock produce and extensive trading to buy grain. For example, it has been estimated that nomads in Niger normally derived 60% of their food supply from millet, purchased or bartered from agriculturists, the remaining part of the diet being livestock products.[5] During the drought livestock prices fell drastically and cereal prices rose sharply. The net effect was a severe reduction in the food available to the cattle-dependent population. Some sought work in the urban areas, which could not absorb them, and many thousands became destitute refugees in relief camps.

The drought brought serious reductions in crop yields. The cereal deficit of Chad, Mali, Mauritania, Niger and Upper Volta combined is estimated to have been about 700 000 to 800 000 tons in 1972 and 1973, a decrease of about 20% from the 1969-71 production average.[6] However, when this deficit is applied to the seriously affected population, estimated at about 5 million (25% of the total), it is clear that this group's food supply from current production was reduced much more than the average of 20%. Domestic food stocks were inadequate to cover the deficit for successive poor harvests, and the situation was again worsened by high grain prices. Estimates of national dietary energy supply levels in 1972-74 are given in Table 1-7.

In Ethiopia erratic rainfall occurred from 1966 onward, with large local variations, and before 1973 there were sporadic food shortages requiring local relief measures. The worst disasters, however, occurred in 1973 and 1974. In the north, following a poor harvest in 1972, the early rains of 1973 failed. Grazing in the lowland and desert areas became non-existent, and unknown numbers of cattle died, many on the roads while being taken to market. As in the Sahelian zone, cattle prices fell and those of grain rose. The early harvest, which would have been used to supplement the poor main crop of 1972, failed in many areas. Large numbers of people (although probably a small proportion of the affected population) moved to the towns. This phenomenon was not new, but the towns' capacity for absorption of displaced rural people was quickly exceeded, and many hungry and sick people became refugees in camps. In 1974 drought struck again in the south-western part of the country, and again thousands of people came to depend on refugee camps. Cereal production deficits are estimated to have been 1.1 to 1.3 million tons in 1973-74 compared to the 1969-71 average, about a 20% decrease.[7] Estimates of national dietary energy supply levels in 1972-74 are shown in Table 1-7.

TABLE 1-7. – NATIONAL DIETARY ENERGY SUPPLY LEVELS AS PERCENTAGE OF REQUIREMENTS IN SIX DROUGHT-PRONE AFRICAN COUNTRIES, 1969-71 AVERAGE AND 1972 TO 1974

	Chad	Mali	Mauritania	Niger	Upper Volta	Ethiopia
	..... Percent					
1969-71 average	88.0	87.5	85.9	85.0	78.4	93.3
1972	75.9	74.6	78.7	78.9	70.6	92.8
1973	72.3	74.5	81.2	81.2	69.7	89.7
1974	75.1	75.5	81.5	78.1	78.4	82.4

SOURCE: FAO Food Balance Sheets.

EFFECTS ON NUTRITION

The effect of the drought was thus to reduce the food available to the affected populations, who responded as far as possible with the traditional pattern of protection. When their responses broke down or were no longer effective because of changed circumstances, their food availability declined rapidly and many of them had no alternative but to rely on outside relief. No direct food consumption data exist for this period, and estimates based on supply figures, whether at national level (Table 1-7) or by regions within a country, are inaccurate if not misleading owing to uncertainties concerning production, trade, and use of domestic stocks. Thus, for example, applying the figures in the table to the

[5] United Nations Research Institute for Social Development, *Famine risk and famine prevention in the modern world*, Geneva, June 1976.

[6] Data from FAO: Supply Utilization Accounts (Food Balance Sheets); reports of multi-donor missions to Chad, Mali, Mauritania, Niger and Upper Volta in 1974 and 1975; reports on food and nutrition situations in these countries: *Synthesis report on the food and nutrition situation in the drought-stricken Sahel*, Rome, 1973.

[7] Data from FAO Supply Utilization Accounts (Food Balance Sheets).

affected portion of the population would indicate that their food availability was anyway less than half of the normal level, or of their nutritional requirements. If this was the case, very extensive malnutrition occurred, and it is therefore necessary to consider nutritional status as a check on this. In fact, data on nutritional status itself are probably more informative and easier to obtain than consumption figures. This approach not only circumvents much of the uncertainty associated with consumption data, but also describes an "end-point" of the process. Thus it can show, whatever the causes, the actual nutrition conditions of the population at any one time.

Nutritional status refers to an individual's physical condition. The most common manifestation of acute malnutrition is body wasting, caused by deficient energy intake. Malnutrition may also be caused by low protein intake, in which case serum proteins decline and finally oedema occurs; and by inadequate vitamin intake, which results first in low body vitamin levels and then in clinical signs, such as, ultimately, blindness with vitamin A deficiency. Similarly, mineral deficiencies deplete body stores, the most common condition being anaemia associated with lack of iron. For "protein-energy malnutrition" it is necessary to distinguish between the effects on adults and on children. Both are subject to body wasting, but children in addition need to maintain growth, and with chronic undernutrition also become stunted from inadequate height gain. Nutritional status is thus usually indicated by body measurement (anthropometry), which makes it possible to estimate the degree of "wasting" as actual weight compared with expected weight for the individual's height, and "stunting" as actual height compared with expected height for age. Other measurements are used, but they basically relate to these criteria. In an acute food shortage, wasting is more significant than stunting. For adults, weight loss is the most relevant measure. Other manifestations of deficiency in protein (which is physiologically related to energy intake), vitamins and minerals are assessed primarily by clinical signs.

Nutritional status depends on the external factors of dietary intake and disease; other factors affect nutritional status through these. In addition, changes in activity modify the energy available for maintenance of body weight, although with intakes below a certain limit (approximately 1.5 times the basal metabolic rate), wasting is bound to occur.

In the absence of local standards for body measurement, arbitrary limits and international standards — which give a reasonable classification of degrees of malnutrition — are used. Thus, children who are below 80% of expected weight-for-height can be considered mildly or moderately malnourished, and those below 70% of weight-for-height regarded as severely malnourished and at considerable risk of dying, usually with infection superimposed on malnutrition.

Only scattered data on nutritional status for the Sahelian zone during the drought period exist, often gathered specifically on populations thought to be affected. They thus cannot be taken as representative of the population as a whole, but nevertheless give some yardstick of the extent of malnutrition. Some of the available data are summarized in Table 1-8. The figures are more readily interpreted in comparison with the usual situation, either in the same country in "normal" years, or in similar countries not affected by drought. Such data are also very scarce, and interpretation is further complicated by pronounced seasonal variations in food availability and by the outbreaks of infectious diseases that occur during the rainy season in these countries; however, selected comparative data are also given in the table.

The nutritional status of the populations in camps was clearly very bad at the time of the surveys, with up to 70% of the child population at least mildly malnourished. The same data show that about 10% of these cases were severely malnourished and at greatly increased risk of death. Furthermore, in a relatively small area in northern Upper Volta there are indications (although the data are not strictly comparable) that malnutrition was much more prevalent than usual in July 1973.

However, the populations observed that were not reduced to dependence on relief camps did not suffer this drastic deterioration in nutritional status. Indeed, compared with similar countries the prevalence of malnutrition could at the time have been judged to be normal. Only in comparison with the later situation in 1975 is it clear that nutrition did deteriorate somewhat in the drought years in most countries. This is particularly true for Chad, where there was also evidence that the child mortality rate increased in 1974; increased child mortality associated with malnutrition was also reported from northern Niger. Thus although the prevalence of malnutrition in the general population was not nearly as bad as in the camps or in some other "famine" situations (e.g. in Nigeria's former Biafra region, and Bihar state in India), it can be seen in retrospect that a two- to threefold increase in the prevalence of at least mild malnutrition occurred in 1973-74 over 1975. For the populations that remained on the land, there is little evidence to support the view that the nomadic populations were worse hit in terms of nutritional status than the sedentary agriculturists; however, the majority of those in camps certainly came from nomadic groups.

TABLE 1-8. – PROPORTION OF CHILDREN OF LESS THAN 80% OF EXPECTED WEIGHT-FOR-HEIGHT [1] IN DIFFERENT POPULATION GROUPS IN FIVE SAHELIAN COUNTRIES, 1973 TO 1975

Year	Chad		Mali		Mauritania		Niger		Upper Volta	
	Population group									
		Per-cent		*Per-cent*		*Per-cent*		*Per-cent*		*Per-cent*
1973	...	...	Nomads in camps	69	Nomads	17	Nomads	12	Nomads	12
	...	...	Agricul-turists	16	Agricul-turists	8	Agricul-turists	...	Agricul-turists	...
1974	Nomads	15	Nomads in camps	21	Nomads	9	Nomads	13	Nomads	...
	Agricul-turists	24	Agricul-turists	11	Agricul-turists	11	Agricul-turists	11	Agricul-turists	9
	Time period									
1975	...	...	February-March	4	February-March	5	...	...	March-April	7
	May-June	12	May-June	6	May-June	8	...	...	May-June	9

SOURCE: Data are from U.S. Department of Health, Education and Welfare, Center for Disease Control (CDC), Bureau of Smallpox Eradication, Atlanta, Ga.: Sahel nutrition surveys, 1973, 1974 and 1975. They refer to children 6 months to 6 years of age.

NOTE: The results quoted are illustrative, and may not be comparable with each other, e.g. 1973 CDC results and those of 1974. Moreover, they are not representative of the countries as a whole, the samples being deliberately selected from drought-affected areas. Also, inter-country comparisons are affected by the age groups used.

[1] The criterion used to calculate the estimates shown in this table is 80% of the median weight-for-height values derived from the Stuart-Meredith reference population. Because this value closely approximates the third percentile of the Stuart-Meredith reference population within this age range, about 3% of a normal population would be expected to fall below this level. Any appreciable excess over 3% below the 80% level is therefore indicative of a population which has recently been subjected to food shortage. See Nelson, W.E., ed., *Textbook of pediatrics*, Philadelphia, 1964; U.S. Department of Health, Education and Welfare, Center for Disease Control, Bureau of Smallpox Eradication, *Sahel nutrition survey 1974*, Atlanta, Ga.

Comparative information on nutritional status in Ethiopia is not available. In the periods following the worst effects of the droughts in the north in 1973 and in the southwest in 1974 the nutritional status of the populations not in camps was judged to be relatively normal.[8] However, an increase in mortality unquestionably occurred at the height of the droughts, particularly in children, affecting the pastoralists more severely than the sedentary agriculturists. The appalling conditions of those in camps, many suffering from disease and severe malnutrition, are well known. although these probably accounted for less than 5% of the affected population. But for the worst periods of drought, the nutritional status of those outside the camps is simply not known.

[8] See Mason, J., Hay, R., Seaman, J., Holt, J. and Bowden, M., Nutritional lessons from the Ethiopian drought, *Nature*, Lond., 248: 646-650, 1974; Seaman, J. and Holt, J., The Ethiopian famine of 1973-74. 1. Wollo province. *Proc. Nutr. Soc.*, Lond., 34: 114A, 1975; Holt, J., Seaman, J. and Rivers, J., The Ethiopian famine of 1973-74. 2. Harerghe province. *Proc. Nutr. Soc.*, Lond., 34: 115A, 1975.

RELATION BETWEEN FOOD AVAILABILITY AND NUTRITION

For the populations in these areas drought is not a new occurrence. When food production from crops or livestock is reduced, food stocks are drawn on, wild-growing foods increasingly utilized, and reserves of cattle sold to buy grain. While this defence operates, food availability may indeed be somewhat reduced, but is is difficult to judge to what extent from production figures and food balance sheets. Nutritional status deteriorates, but not dramatically; it is probably much the same as with "normal" seasonal changes in these countries. Malnutrition increases greatly only when a family runs out of resources to maintain itself and becomes destitute — usually after successive years of drought.

Nonetheless, some relation between average deficit in food supply and nutritional status for the Sahelian countries is apparent in retrospect (Table 1-9). The deficit was apparently the greatest and the nutritional situation the worst in Chad and Mali: indeed on this basis it is to be expected that nutritional status

TABLE 1-9. – NUTRITIONAL STATUS [1] OF AGRICULTURAL POPULATIONS AND FOOD SUPPLY AVAILABLE FOR CONSUMPTION [2] IN FIVE SAHELIAN COUNTRIES, 1972 TO 1974

Year	Chad		Mali		Mauritania		Niger		Upper Volta	
	Children under weight	Food supply	Children under weight	Food supply	Children under weight	Food supply	Children under weight	Food supply	Children under weight	Food supply
	Percent									
1972	...	76	...	75	...	79	...	79	...	71
1973	...	72	16	74	8	81	4	81	...	70
1974	24	75	11	76	11	82	11	78	9	78

SOURCES: Tables 1-7 and 1-8.

[1] Indicated by proportion of children of less than 80% of expected weight-for-height. – [2] Food supply index expressed in terms of energy as percentage of energy requirements.

in Chad continues to be the poorest of the Sahelian countries, and that the improvements indicated elsewhere will not have occurred. Lowered prevalence of malnutrition was generally in line with decreased production deficits, and it appears that by 1975 nutritional status was again normal for most of the area.

NEED FOR NUTRITIONAL SURVEILLANCE

Not only does such nutritional information help to put into perspective the impact of the drought on people, albeit after the event, but also emphasizes the need for surveillance of nutritional conditions. This should not be confined to monitoring the end-points of such events — deteriorating nutrition itself — since by the time this becomes apparent much damage may have been done. As noted above, the increase in malnutrition was the result of certain events. Signs of these were, for example, sharp fluctuations in prices, which rose for grain and fell for livestock; modifications in herd migrations; increased flow of people to towns seeking employment; and the establishment of relief camps. These responses, which could act as indicators of change, in turn were related to declining pasture yields and poor harvests. Difficulties remain in obtaining reliable estimates of agricultural production which, combined with the population's usually unknown capacity for survival by use of home stocks and other food sources, cause considerable uncertainty in assessing the likely impact of drought on nutrition. As indicated in Table 1-9, the relation between food supply estimated from national food balance sheet data and nutritional status is too indirect for supply data alone to be used to predict or monitor nutritional changes. Simple reporting systems of selected indicators of nutritional conditions are needed to reduce this uncertainty. With the addition of nutritional status measurements, such "nutritional surveillance" [9] could help to ensure that preventive measures are taken in time to prevent recurrence of these problems.

[9] See WHO, *Methodology of nutritional surveillance. Report of a Joint FAO/UNICEF/WHO Expert Committee.* WHO Technical Report Series No. 593, Geneva, 1976; Mason, J., Nutritional surveillance, *Food and Nutrition* (FAO), 1(4): 24-27, 1975; Foege, W.H., Epidemiologic surveillance of protein-calorie malnutrition. *In* Disaster epidemiology. Proceedings of an International Colloquium, Prince Leopold Institute of Tropical Medicine, Antwerp, December 1975. *Ann. soc. belge. méd. trop.*, 56 (4/5): 121-134, 1976.

Consumer food prices

During 1975 and early 1976 the rate of increase in consumer food prices tended to decline in most countries as a result of generally easier supplies, the delayed effects of the economic recession and the consequent fall in consumer and import demand. Price controls, newly adopted or reinforced by a large number of governments, also had some beneficial effects. Nevertheless, rates of price increases remained relatively high in 1975 (Table 1-10). Of the 89 countries for which official information on prices is available for 1975, as many as 47 showed a marked deceleration in the retail price increases of all items including food. The decline in rates of increase in food prices was particularly noticeable in the Far East and Latin America. In most western European and African countries food price increases were at the same, or higher, levels than the previous year. Nevertheless, food prices increased faster than prices of other items in most developing countries in 1975. In contrast, the rates of increase in food prices and

prices of other items tended to be similar in the developed countries.

In 1975 retail food price increases in the developed countries fell to an average of 17%, compared to 24% in 1974. However, rates differed widely. Rates of increase generally slowed down toward the end of 1975, but they picked up again during the first quarter of 1976 in almost all developed countries owing to several factors, e.g. a new round of officially administered price increases, the European potato shortage and the gradual strengthening of prices of several major commodities. In the United States food prices rose only slightly during the first half of 1976 and are estimated to have increased by only 3 to 4% during the whole year, compared to 8.5% in 1975. The farm value of a market basket of United States-produced foods for all of 1976 may have averaged slightly below that of 1975. Similarly, retail food prices in Canada remained practically unchanged during the first four months of 1976.

According to official information, food prices in eastern Europe and the U.S.S.R. have remained stable despite changes in world food prices, particularly since 1973. The price stability has been maintained through large government subsidies. But recently the volume of these subsidies has reached such high levels that some radical price adjustments have been sought. In Poland a proposed average increase of about 60% in food prices in June 1976 met with considerable consumer opposition, and in mid-September 1976 the Government decided to abandon all plans to increase basic food prices until mid-1978. In Hungary, however, an average increase of 30% in meat prices took effect on 5 July 1976.

TABLE 1-10. — CHANGES IN CONSUMER FOOD PRICES IN 89 COUNTRIES, 1972-73 TO 1974-75

Percent price increase	1972-73	1973-74	1974-75[1]
	..... *Number of countries*		
DEVELOPING COUNTRIES (64)			
Less than 5	10	2	3
5.1-10	20	4	21
10.1-15	14	13	5
15.1-30	14	36	27
30.1 and above	6	9	8
DEVELOPED COUNTRIES (25)			
Less than 5	—	—	—
5.1-10	15	6	6
10.1-15	6	7	8
15.1-30	4	11	9
30.1 and above	—	1	2

SOURCE: Annex Table 11.
[1] Preliminary.

The price situation in the developing countries also varied widely. There was a substantial drop in the rate of food price increases in the Far East, where the average rate of increase was about 12% in 1975, compared to over 30% in 1974. The most remarkable development was India's success in arresting inflationary pressures. Prices, which reached postwar record levels during the second half of 1974, have subsequently declined steadily. During 1975 the food price index dropped from 184 (1970 = 100) in January to 165 in December and continued to decline during the first quarter of 1976. An improvement in rice supply was a major factor in the decline of food prices in Bangladesh, peninsular Malaysia and Thailand. In Pakistan the increase in food prices dropped from 30% in 1974 to 23% in 1975, and has recently slowed down to a 10% annual rate.

In Latin America most countries showed an improvement from the record inflation levels of 1974. Important exceptions were Argentina and Chile. In Argentina inflation rates were the highest in the country's history, with food prices rising by at least 188% over 1974. More pessimistic estimates indicate a 600% increase in the cost of living index during the 12 months ending April 1976. In Chile food prices rose by as much as 460% during 1975, and the situation appeared hardly better in 1976. In Brazil, although prices rose at lower rates than in 1974, food prices were up by about 30% in 1975 and were a major factor in the general inflation.

In Africa accurate price information is scanty and refers mainly to the many cities and towns which depend heavily on food imports. But disappointing production in sub-Saharan Africa during recent years is a basic factor behind current high food prices. During 1975 the highest inflation rates were recorded in Gabon, Ghana and Niger. In all three countries production problems were compounded by high import and transportation costs, and in Gabon were further complicated by expansionary fiscal policies. Food prices also rose particularly fast in Nigeria (+32%), reflecting supply difficulties and sharp wage increases in the public sector. By contrast, in northern Africa price increases generally tended to remain moderate.

Less than a third of the developing countries were able to hold the rise in consumer food prices below an average of 10% a year during 1970-75. Over a sixth registered increases averaging more than 20% a year. The good crops of 1975 eased the situation somewhat and, with the price of the rice moving in international trade declining by nearly a fifth in the

course of the year, some countries (e.g. Bangladesh, India, Malaysia, Panama, Singapore and Tanzania) enjoyed an absolute reduction in consumer food prices. The proportion of developing countries holding the advance in food prices below 10% rose to nearly 40%.

Despite the improvement in the food situation in some of the major areas, notably South Asia and Southeast Asia, supply problems persisted in many countries and a number of governments reduced the effective degree of food subsidization because of financial difficulties or a desire to mitigate the consequences of price distortions. Thus, in about a third of the developing countries food prices rose in 1975 at more than the 1970-74 average rate. The position of some of the food-deficit countries was still difficult, as the effects of the general liquidity squeeze resulting from the decline in developed market economy demand for their exports, and the continuing rise in both the unit value of imports of manufactures and their debt service obligations, were added to a marked reduction in the cereal purchasing power of their primary exports. Relative to a 1970 base (100), the international index price of the cereals they needed to import stood at 233 in 1975, whereas the prices of the commodity groups they exported were all appreciably lower: mineral ores (buoyed by bauxite) stood at 211, meat at 202, fibres at 197, oils and oilseeds at 170, beverage crops at 157 and non-ferrous metals at 109.

Agricultural production requisites

Fertilizers

World apparent consumption [10] of fertilizers declined in 1974/75 for the first time since the Second World War. In terms of the three primary nutrients (N, P, K) consumption fell by 2 million tons (−2.6%). The drop of nearly 10% in fertilizer used in the developed market economies, even though fertilizer prices were lower than the year before, was due to the late spring in the Northern Hemisphere and lower farm prices and incomes. Consumption in the developing market economies increased by about 4%, or about half the average rate of the previous five years. The rate of increase was also halved in the centrally planned economies, from nearly 12% in 1973/74 to about 6% in 1974/75, apparently owing to weather conditions and transport problems. Even though the increase of more than 4% in world fertilizer production in 1974/75 was less than in 1973/74, available supplies exceeded consumption by about 6%, so that stocks accumulated in both exporting and importing countries. Demand, particularly in the developing countries, was probably also restricted by the higher domestic prices resulting largely from high import prices, and by the shortage of farm credit.

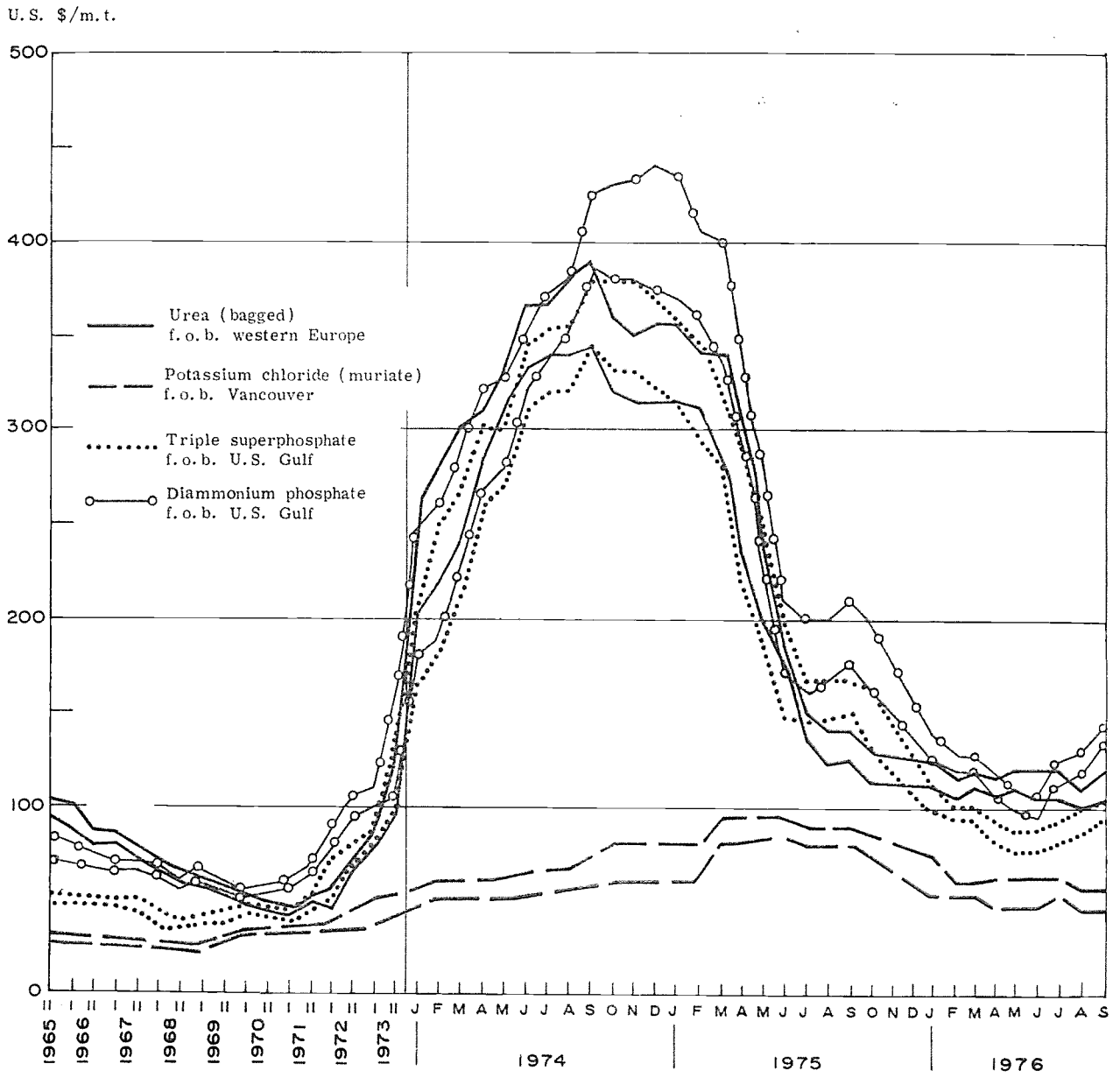
With the decline in consumption and the increase in stocks, international prices of fertilizers declined rapidly in 1975 from the high levels of 1973 and 1974 (Figure 1-1). Prices of fertilizers, particularly of phosphates, began to rise in late 1976 as demand (which had been relatively sluggish in the first part of the year) picked up, particularly in the United States. There were some relatively large export sales which resulted in inventories falling to more normal levels. However, future price increases brought about by market forces and rising costs are expected to be much more moderate than in 1973 and 1974, since with new production coming on stream, supply capability for nitrogen (N), phosphate (P) and potassium (K) is expected to be adequate in 1976/77.

The main longer-term problem to be overcome is the cyclical imbalances in supply and demand which lead to wide fluctuations in fertilizer prices, and the adverse effect which limited supply and high prices have on food production programmes in developing countries. The FAO Commission on Fertilizers, which held its Third Session in Rome in June 1976, acknowledged the value of long-term contracts, provided they include effective arrangements for a suitable base price and a price adjustment formula that is fair and equitable to both producers and consumers, as well as suitable enforcement procedures.[11] The Commission believed that better fertilizer intelligence and forecasting of supply, demand and price developments would go a long way toward avoiding emergency situations in the future. In the short term, the Commission recommended the continuation of the International Fertilizer Supply Scheme (IFS), at least up to the end of 1977, to assist the countries with balance of payments problems in obtaining their fertilizer supplies. Total fertilizer aid to developing countries amounted to 1.4 million tons of material in 1975/76 (6% below 1974/75), of which the IFS

[10] These consumption estimates generally do not include changes in inventories, and thus indicate apparent consumption only.

[11] For a review of the main elements and objectives of world fertilizer policy, see *The state of food and agriculture 1975*, Rome, FAO, 1976, p. 27-29.

FIGURE 1-1. — EXPORT PRICES FOR SOME MAJOR FERTILIZER MATERIALS, 1965-76



SOURCE: World Bank, 1965 to October 1975. Data for November 1975 to September 1976 are based on information obtained from various sources.

NOTE: The double lines indicate the price ranges for each product.

contributed 267 000 tons (20%). Almost all (96%) of the IFS assistance went to these countries.

Projections of world fertilizer supply capability and demand up to 1980/81 prepared by the FAO/UNIDO/World Bank Working Group on Fertilizers indicate that supplies of fertilizer nitrogen, phosphate and potassium are expected to be adequate during the period 1976/77 to 1980/81. Nitrogen supply capability in developing countries is expected to more than double by 1980/81 and thus reduce their dependence on imports. By 1980/81, the quantities available for export from developed market economies are expected to decline, and those of the centrally planned economies are likely to increase. Phosphate supply capability in the developing countries is also expected to double by 1980/81 and provide a small surplus. However, the dependence of developing countries on imports of potassium is expected to grow be-

cause of their limited potash deposits. Although fertilizer supplies are expected to be adequate, prices could rise over the period to reflect the general increase in the cost of factors of production and the escalated investment costs despite the economies of scale of large new plants. Another factor which could affect future supplies and prices is the rate at which existing capacity is operated and the extent to which old plants are taken out of production.

However, projections of the estimated demand for future years indicate the need for investment in new nitrogen and phosphate fertilizer plants to come on stream in the early 1980s, particularly in developing countries, if supply is to continue to be adequate. Moreover, if the world food situation is to be improved significantly and in a reasonable period of time, the rate of expansion in fertilizer consumption, particularly in developing countries, will need to be accelerated beyond that indicated in the forecasts of demand.

While governments have contributed to a greater and more efficient fertilizer use in developing countries through international fertilizer promotion activities such as the FAO Fertilizer Programme and bilateral aid programmes, a major gap remains to be filled both with regard to the number of farmers using fertilizers for food production, and to the amounts of nutrients being applied. Therefore, if demand in the developing countries is to be accelerated, attention must be focused on fertilizer use promotion and all its implications, including price policies, agricultural research, extension and marketing infrastructure.

Pesticides

Pesticide supplies, which remained scarce in 1975, improved in 1976. This was partly due to new production facilities which came into use much earlier than expected, but was mainly the result of high prices, which remained at 1975 levels and sharply curtailed demand, especially in the developing countries.

The developing countries' share in world pesticide consumption is currently less than 10%, far too little to adequately safeguard their food production. FAO estimates prepared for the World Food Conference in 1974 indicated that by 1985 the pesticide requirements of the developing countries would have to increase fivefold over 1970/71 levels before food production could be improved through a significant reduction in harvest losses. Both pre- and post-harvest food losses in these countries are known to be serious, largely owing to insufficient protection against pests and diseases, but it is not yet possible to make a detailed and reliable assessment of such losses. Furthermore, developing countries with limited foreign exchange available for the import of pesticides often give first priority to the protection of their export crops at the expense of food crops, especially if export crops represent a significant part of their foreign exchange earnings.

The limited use of pesticides for food crops in developing countries is a serious constraint on output. Unfortunately, little improvement can be expected in the near future. New capacity is expected to be built up in 1977, but it is doubtful whether it will bring an immediate and substantial reduction in prices which would permit better access to the pesticides market by developing countries affected by serious balance of payments problems. International assistance is urgently needed by many countries if they are to safeguard their crops from pests and diseases.

In the longer run, consumption of pesticides in developing countries can be improved through better formulation of pesticides suited to tropical conditions; through more adequate standards and uniform methods for controlling the chemical, physical and biological properties of products on local markets; and through technical and financial assistance for the establishment of local formulation facilities where raw materials are locally available, or where transformation processes are potentially more economical than the import of final products. Assistance by national and international agencies is also needed to promote the more efficient and safer use of pesticides at the farm level.

Many countries have developed, or are currently developing, legislation relating to this matter. However, proliferation of uncoordinated national restrictions and pesticide registration requirements, and hence availability and use, have led to requests for action at regional/global level to bring about greater uniformity in order to reduce further increases in the cost of developmental research on, and thus the cost of, pesticides. Furthermore, the increasing number and diversity of regulatory requirements within and between countries is greatly slowing the introduction of new pesticides developed by industrial research programmes, and is preventing most non-industrial discoveries from finding a way of reaching the market. This would appear to justify a major study on methods of bringing about some international agreement on regulatory standards and procedures in order to save both time and expense and allow a number of potentially very useful products to become available for special uses.

In this regard, FAO plans to convene an inter-

governmental meeting in 1977 for the purpose of standardizing, where possible, international registration requirements. Meanwhile, FAO guidelines on registration requirements have been used by a number of countries as a basis for establishing such requirements.

More than 40 developing countries either have no specific pesticide legislation, or legislation which is generally inadequate. This should be seen in conjunction with evidence that unsatisfactory and often misleading labelling of some pesticides, especially those offered by local formulators, repackers and persons who dispense materials from bulk containers, is known to be a problem in many of these countries. While most major manufacturers endeavour to label their products carefully, precautions, limitations and directions are often deficient. Hence there is a need for more detailed and specific directions and training, and for an appropriately strong law to control labelling.

However, legislation cannot be effective until sufficiently trained personnel can be recruited to enforce regulations, and technical facilities are established to test samples collected by inspectors. The difficulty in providing adequate inspection services has been widely recognized.

To ensure the required quality and stability, adequate and acceptable specifications should be adopted and purchasing agencies should buy only products meeting specifications, such as those published by FAO for products used in agriculture, and by WHO for those used in public health. Regulatory authorities should legislate for similar specifications to protect not only users, but also competitive manufacturers who are prepared to produce satisfactory, stable formulations. Better storage should be developed wherever possible, but such products should be prohibited where products cannot retain full potency and physical condition for a reasonable period at the temperatures normally encountered in the countries concerned.

It is generally agreed that official control should be vested in the Ministry of Agriculture in order to integrate the legislation with extension and development work. However, it is essential that there be close coordination and cooperation among Ministries of Agriculture, Health, Commerce and Industry and Trade at local, national and regional levels.

Quite often, farmers quickly and erroneously attribute failure to control a pest or disease to ineffective pesticides. In an attempt to overcome this problem, they often adopt changes in their pest control practices, including gross "overdosing," which further worsens the original difficulty.

FAO, in cooperation with WHO and other international, regional and national bodies, and in certain cases with the active participation of industry, has been involved in technical assistance work in developing countries aimed at correcting some of these problems. Results have, without exception, been rewarding in terms of improving the level of competence of local supervisors in using adequate pesticide application techniques, and in equipment maintenance procedures; reducing costs of application through better selection and improved efficiency of equipment and chemicals for specific purposes; improving safety in handling potentially highly toxic chemicals; and materially reducing residues and environmental contamination problems.

Normally, training activities of this nature are organized at a national level and provide training for 20 to 40 selected plant protection supervisors and extensionists, including representatives from the Ministries of Health and Civil Aviation. Course material emphasizes control of particular, local, major pests and diseases of principal crops, and includes a key section on non-chemical methods of control.

Experience with such courses has shown that in order to achieve maximum impact, there is a need for much greater cooperation between governments and industry, and for coordination of their efforts. Furthermore, it is of importance to develop and practise a proper understanding of the psychological processes by which information is received and accepted by farmers, as this often varies not only from country to country, but also within a country. In addition, the success and high standard of many plantations reflect not only the level of managerial skills and capital employed, but also the availability and use of technical information and advice. In this regard, industry's technical service activities can and should play an important and greatly expanded role in the training process. In other words, pesticide manufacturers and distributors, in cooperation with government authorities, should make a substantially greater effort, in their own interest as well as that of the grower, to train the user in proper pesticide handling and application techniques.

Another factor hindering the more effective use of pesticides in developing countries is that the equipment used is often inadequate and the number of units available is not sufficient to meet requirements. Some makes and designs have proved unsuitable and others require excessive maintenance, which often cannot be provided locally. The quality of equipment is considered important, but simplicity of design is also essential. Purchasing agencies often do not have access to technical guides in selecting suitable sprayers, and mistakes in selection are often made.

As far as type of machinery is concerned, simple

hand-operated units easy to operate and requiring a minimum of maintenance are the only types of machines which have proved suitable for large-scale introduction in small farming communities. Standardization of a minimal number of models is essential in facilitating maintenance and continuity in use. Experience has shown that of the two basic types of spray units, the lever-operated type as a rule has proved somewhat superior to the pre-pressurized pneumatic sprayer, mainly because of greater ease in maintaining a constant pressure with no need to interrupt operations for pumping, generally lighter weight and somewhat greater versatility. However, hand-carried spinning disc machines are opening up new possibilities for pest, disease and weed control in the tropical areas.

Agricultural export earnings [12]

Owing to the generally lower level of prices, world export earnings from agricultural, fishery and forest products showed little increase in 1975 after the vigorous expansion of recent years (Table 1-11).[13] However, the volume of world trade in agricultural commodities (crop and livestock products), which had shrunk by about 4 to 5% in 1974, made a good recovery in 1975. The value of exports of major agricultural commodities rose by about 3% to $122 229 million after an increase of 24% in the previous year. Export earnings from fisheries declined in 1975 by nearly 2% to $5 950 million, compared with a gain of 10% in 1974. Earnings from forest products, the sector hardest hit by the world recession, fell by as much as 10% to $26 219 million in 1975, compared with a gain of 30% in 1974.

In 1975 there was little change in the distribution of total export earnings from agricultural, fishery and forest products among the country groupings. In keeping with the longer-term trend, earnings by developed market economies increased by about 2% to 65% of the total, with those of the developing market economies falling slightly to remain at about 27% of the total. Those of the centrally planned economies declined marginally to about 8% of world export earnings. The total increase of $1 071 million came from a gain of $1 594 million in exports from the developed market economies and reductions of $299 million for the developing market economies and $224 million for the centrally planned economies.

Total earnings were badly hit by the decline in trade in forest products, with the developing market economies suffering a drop of 16% (about $600 million) in their forest product exports. There were, however, large gains in the values of world exports of sugar, meat and coarse grains. Trade in citrus fruit, tea and butter also improved. Earnings fell for rice, oilseeds, fats and oils, oil cakes, cotton, jute, kenaf and allied fibres, hard fibres and rubber.

The downward trend in agricultural commodity prices, which started in late 1974, continued until late 1975 with the deepening economic recession and somewhat larger supplies of agricultural products. It was reversed in the first quarter of 1976 when most prices stabilized or began to recover. The United Nations export price index of food products, which reached a peak of 264 (1970 = 100) in the last quarter of 1974, declined to 245 in the first quarter of 1975 and to 202 in the last quarter, while that of non-food agricultural products fell from 201 in the first quarter of 1975 to 190 in the last quarter. The price recovery toward the end of 1975 is reflected in the indices for the first quarter of 1976 which rose to 209 and 194 for food and non-food agricultural products, respectively.

By early 1976, prices of almost all commodities were again well above the low levels of 1975, the main exceptions being rice, tea, mutton and lamb, and dairy products, which continued to fall, and sugar, jute and tobacco, which remained virtually stable. On the other hand, prices of hides and skins, pigmeat and coffee reached boom levels. In real terms, however, the rise in agricultural prices since the beginning of economic recovery was much milder than the price movements suggest, as continuing inflation accounted for a great deal of the increase in current prices. Average prices of agricultural commodity exports for 1975 as measured by the United Nations index of export unit values were thus some 8% lower than in 1974, with foodstuffs somewhat more stable than agricultural raw materials, which dropped by 13%. At the same time, the index for all commodities rose by 8.5% and for manufactured products by more than 12% in 1975, thus further worsening the terms of trade for countries dependent on agricultural exports.

Lower prices and the beginning of economic recovery in 1975 stimulated a recovery in the volume of

[12] For a more detailed review, see *FAO commodity review and outlook, 1975-76*, Rome, 1976, Chapter 1. Trade data in the *Review* accounted for approximately 70% of world agricultural trade, excluding forest products, and were based on information received up to the end of May 1976. The data given in Table 1-11 have a wider coverage, include forest products, and are based on more recent information.

[13] At current prices, based on preliminary estimates for major commodities. Average unit values of selected agricultural, fishery and forest products are shown in Annex Table 4, and FAO index numbers of the value and volume of agricultural trade are given in Annex Tables 6 and 7.

world trade in agricultural commodities, including many foodstuffs and some raw materials. Trade was also stimulated by more ample supplies of basic foods (especially grains and meat) in the main exporting countries, and by shortfalls in eastern Europe and the U.S.S.R. The volume of exports of wheat, coarse grains, beef and veal, coffee, wine, citrus fruit and cattle hides increased markedly in 1975. World trade in a number of other commodities, including rice, dairy products, oilmeal proteins, sugar, tobacco, rubber and pepper, which had been rising throughout the previous decade, slackened in 1975, mainly as a result of lower import demand. Demand in world markets for rice, skim milk and concentrated milk powder, for example, was restricted by balance of payments problems in importing developing countries. Demand for oilmeal proteins remained sluggish, reflecting smaller quantities fed to livestock. World consumption of sugar fell for the first time in 30 years, owing to falling consumer incomes. Reduced incomes also led to lower purchases of bananas, tobacco and pepper, while the economic recession caused a fall in automobile construction and hence in demand for rubber. For cotton, however, the drop in exports for the second year in succession was due to smaller export availabilities and the large stocks held in the main importing countries. The long-term decline in exports of sisal and henequen fibre sharply accelerated with a marked shift to competing synthetics in the importing countries and increased processing in the producing countries themselves.

In the light of developments during the second half of 1975 and the first part of 1976, it can be anticipated that recovery in industrial activity, in consumer incomes, and consequently in demand for agricultural commodities, will continue into 1977. Prices may well rise further if the relatively high rates of economic growth forecast earlier in 1976 materialize. In the first half of 1976, annual rates of expansion in real GNP averaged about 6.5% for the whole group of industrialized countries, in contrast with the decline of 1.5% from 1974 to 1975 following a cessation of growth from 1973 to 1974. The depressed conditions of 1974 and 1975 resulted, though only with a considerable time lag, in an easing of inflation from a peak annual rate of 13.5% in the second half of 1974 to 8.5% in the second half of 1975 and to 7% in the first half of 1976. The revival of demand for most agricultural commodities may gain further momentum, with the consumption of income-elastic foodstuffs recovering most rapidly. The volume of agricultural trade (crop and livestock products) may therefore expand again in 1976, particularly as the volume of world trade in all commodities rose at an annual rate of about 10% in the first half of 1976, and the price of many internationally traded commodities firmed noticeably.

Until the end of 1977, upward pressures on commodity prices are likely to be mitigated by the staggered timing of economic recovery in different countries, by the persistence of unemployment, by the determination of governments to curb inflation, and by the existence of unused production capacity and high commodity stocks. Moreover, some agricultural commodities (e.g. fats and oils) may be in relatively better supply until stocks are disposed of, while the output of others (e.g. bananas and raw materials), which was reduced during the recession, may recover quickly in response to higher prices. Investment in plantation crops such as coffee, cocoa and rubber, which are currently in short supply, has again become profitable, and prospects of larger supplies in the medium term could well limit further price increases.

TABLE 1-11. — VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1974 AND 1975

Sector	Market economies						Centrally planned economies			World		
	Developed			Developing								
	1974	1975 [1]	Change	1974	1975 [1]	Change	1974	1975 [1]	Change	1974	1975 [1]	Change
	Million U.S. dollars		*Percent*	*Million U.S. dollars*		*Percent*	*Million U.S. dollars*		*Percent*	*Million U.S. dollars*		*Percent*
Agriculture	72 439	76 550	+ 6	36 204	36 474	+ 1	9 569	9 275	— 3	118 212	122 299	+ 3
Fisheries	3 897	3 716	— 5	1 685	1 703	+ 1	468	531	+13	6 050	5 950	— 2
Forestry	22 553	20 217	—10	3 721	3 134	—16	2 861	2 868	—	29 135	26 219	—10
Total	98 889	100 483	+ 2	41 610	41 311	— 1	12 898	12 674	— 2	153 397	154 468	+ 1

[1] Preliminary.

Fisheries

Production and trade[14]

Although world fishery production rose rapidly throughout the 1960s to reach a total of 70.3 million tons by 1971, no further expansion in output has taken place. According to preliminary estimates, the total catch in 1975 was slightly below the 70 million tons taken the previous year (Table 1-12). The 1976 catch is estimated to have been slightly better. Catches by the U.S.S.R. and some eastern European countries continued their recent rapid growth, but production by most developed countries declined in 1975. Little change in fishery production was recorded in North America. Output by the EEC and most other countries in western Europe again fell, mainly owing to the fully or over-exploited state of the major commercial species fished and the adoption of restrictions in the interests of stock management.

[14] For a detailed account of the fisheries situation, see FAO, *Yearbook of fishery statistics*, 1974, Vol. 38, Rome, 1975.

A notable influence on world production was the decline of about 250 000 tons in Japan's catch after some ten years of fairly consistent and substantial growth. In contrast, the remarkable expansion of fish output from the worldwide operations of the U.S.S.R. continued in 1975 when production reached 9.9 million tons, almost double the catch of ten years earlier. There was a marked fall in production from the important southeast Pacific anchoveta fisheries, principally as a result of the failure of the second part of the Peruvian fishing year. Acquaculture production, at an estimated 6.1 million tons, was again higher than the year before.

In spite of the drop in the total world catch, landings of fish for direct human consumption have continued to rise and were about 1 million tons higher (+3%) in 1975 than in 1974. The increase in the catch of food fish by the less developed countries was, however, rather small and certainly below the rate of population growth. Although some Asian countries (e.g. India and the Republic of Korea) re-

TABLE 1-12. — ESTIMATED WORLD CATCH OF FISH, CRUSTACEANS AND MOLLUSCS, 1971 TO 1975

Region	1971	1972	1973	1974	1975 [1]	Change 1974 to 1975
	Thousand metric tons					*Percent*
DEVELOPING MARKET ECONOMIES	26 790	21 440	20 120	23 140	22 180	— 4
Latin America	13 920	7 620	5 340	7 530	6 530	—13
Far East [2]	9 020	9 410	10 370	11 080	11 260	+ 2
Near East [3]	670	670	680	760	770	+ 1
Africa [4]	2 880	3 440	3 400	3 430	3 300	— 4
Other developing market economies	300	310	320	340	320	— 6
ASIAN CENTRALLY PLANNED ECONOMIES	8 630	8 670	8 740	8 680	8760	+ 1
Total developing countries	35 420	30 110	28 860	31 820	30 940	— 3
DEVELOPED MARKET ECONOMIES	26 460	26 720	27 570	27 600	26 890	— 3
Western Europe	11 020	11 260	11 450	11 400	11 120	— 3
North America	4 110	3 860	3 830	3 780	3 770	—
Oceania	180	180	190	200	180	—10
Other developed market economies [5]	11 150	11 430	12 110	12 220	11 820	— 3
EASTERN EUROPE AND THE U.S.S.R.	8 410	8 880	9 820	1 0570	11 470	+ 9
Total developed countries	34 860	35 600	37 390	38 170	38 350	+ 1
World	70 300	65 700	66 300	70 000	69 300	— 1

NOTE: Figures, which include aquatic plants and animals other than whales, refer to the weight of the catch in metric tons. The annual changes in percentage terms may therefore differ considerably from those in Table 1-13, were tne quantities of production are weighted by the unit values.

[1] Preliminary. – [2] Excluding Japan. – [3] Excluding Israel. – [4] Excluding South Africa – [5] Israel, Japan, South Africa.

ported significant gains, these were largely offset by reductions in Malaysia, Morocco and some Latin American countries. The total catch of food fish by developing African countries increased very little in 1975. In the developed countries a significant proportion of the rise in the world catch came from greater landings by the U.S.S.R., to which mackerel from the North Atlantic made a substantial contribution. Landings of food fish fell in Japan and in most of the western European producers.

Although the amount of fishmeal and solubles produced in 1975 fell by over 300 000 tons (equivalent to some 1.5 million tons of fish), mainly reflecting a decline of about 20% in output by both Peru and Chile, exports increased for the second successive year and stocks at the end of 1975 were much lower than a year earlier. However, comparatively low prices accompanied the higher quantities exported, and average export values over the year were nearly a third lower than in 1974.

As in 1974 and 1975, many major national fisheries had to operate in 1976 with declining economic returns, mounting costs and generally depressed markets. The world value of fishery exports declined by 2% in 1975 (Table 1-13) and trade value increased only in eastern Europe and the U.S.S.R., North America and the developing market economies of the Far East (Table 1-14). A number of regulatory bodies, faced by the growing threat to commercial fish stocks from increasingly heavy exploitation, took stricter action to control, and in some cases to reduce, fishing effort. Whatever the final outcome of the United Nations Conference on the Law of the Sea, further restrictions on catches are to be expected.

In 1975 international trade in fish for direct human consumption was considerably influenced by the extremely high stocks of preserved fish held by all major consuming countries at the beginning of the year. Lower price levels, subsidies and improving demand gradually reduced stock levels, and markets generally began to improve during the course of the year. The total volume of exports of food fish products showed little change from 1974, and in many cases total export values were lower. A particularly striking feature was the marked fall in fishery exports by Japan. For many years Japan has been a net exporter, but recently imports have exceeded exports, and in 1975 the value of imports was more than double that of exports.

An important factor contributing to the decline in Japanese exports in 1974 was the depressed state of demand for tuna for canning. The markets for most canned fishery products, with the main exception of pink salmon, were generally depressed throughout the year. Shellfish trade, on the other hand, again demonstrated its individuality and was one of the few rewarding sectors in 1975. In the United States, for example, low stocks of shrimp at the end of 1974 and a drop in domestic landings produced a substantial increase in retail prices and very keen international competition for supplies from Asian countries.

The adjustment in the worldwide distribution of fishing capacity that took place in 1975 reflected not only the depressed economic conditions of 1974 and 1975, but also actual or pending changes in

TABLE 1-13. — INDICES OF VOLUME, UNIT VALUE AND TOTAL VALUE OF WORLD TRADE IN FISHERY PRODUCTS, 1971 TO 1975 [1]

	1971	1972	1973	1974	1975[2]	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*
Volume . . .	135	149	148	146	148	+1
Average unit value . . .	151	164	233	262	242	—8
Value	204	244	328	356	348	—2

[1] Excluding China and other Asian centrally planned economies. – [2] Preliminary.

TABLE 1-14. — INDICES OF THE VALUE OF FISHERY EXPORTS BY REGION, 1971 TO 1975

Region	1971	1972	1973	1974	1975[1]	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*
DEVELOPING MARKET ECONOMIES						
Latin America	250	238	206	273	253	— 7
Far East . . .	314	474	768	799	839	+ 5
Near East . .	167	235	334	375	...	...
Africa	178	197	373	392	371	— 5
Other[2] . . .	369	581	696	788	692	—12
DEVELOPED MARKET ECONOMIES						
Western Europe . . .	199	245	344	378	365	— 4
North America	202	239	375	332	358	+ 8
Oceania . . .	412	535	617	588	546	— 7
Other[3] . . .	135	176	212	245	204	—17
Eastern Europe and the U.S.S.R. . . .	200	215	284	356	437	+23

[1] Preliminary. – [2] Includes developing countries in North America and Oceania. – [3] Israel, Japan, South Africa.

national fishing jurisdiction. The decline in the long-distance fleets of a number of western European countries continued, with a corresponding growth of interest in expansion of the coastal fisheries of countries likely to benefit from expanded jurisdiction. In Japan there was further evidence in 1975 of the decline in distant water fishing capacity, although the total tonnage of the skipjack pole-and-line fleet, which may be less immediately vulnerable to limit extensions, continued to increase. At the same time, the Japanese Government continued to encourage production from local waters under its seven-year programme for the rehabilitation and development of coastal grounds. In sharp contrast to Japan, and against the general trend, the U.S.S.R. continued to expand its distant water fishing capacity in 1975.

In the developing countries the steady but unspectacular growth in fishing capacity through mechanization programmes has continued, with the introduction of new vessels of a larger size and a greater range than the current average. The potential increase in fishing effort off the east coast of Malaysia, made possible by modernization of the country's fleet through improved design and the fitting of more powerful engines, is particularly noteworthy. In Latin America there was a substantial increase in the Uruguayan fishing fleet, and in Peru a further decline in the number of vessels, in keeping with government policies, had little effect on the fishing potential of the fleet. In India another anticipated expansion in the shrimp fleet, encouraged by favourable shrimp prices, began to cause fears of overcapacity.

Policies and other issues

Among major issues of international interest, the Third United Nations Conference on the Law of the Sea continued to attract attention. The Conference met three times in 1976, but its deliberations were increasingly overtaken by events as national administrations lost patience and took unilateral action. Among the countries recently announcing their intention to assume jurisdiction over a 200-mile coastal zone are Canada, Norway and the United States; for the latter a Bill authorizing such action was signed by the President in April 1976, and notice was given that enforcement will begin in March 1977.

Together with the continuing trend toward increased jurisdiction, action has been taken to meet these changing circumstances. Apart from changes in the world's fishing capacity brought about as a result of normal entrepreneurial decisions, there have been a number of other initiatives aimed at easing the transition from one legal regime to another. In the north Atlantic, for example, negotiations have been in progress between western European interests with surplus distant water capacity and interests in North America, where the potential yield of the fish stocks falling within the zone of extended jurisdiction is greater than the harvesting capacity of the existing fleet. Details of the negotiations are not known, but clearly they are aimed at some form of licensed fishing with catches to be landed either in the home port, or in ports of the coastal state. There are many agreements of this nature already in existence between developed and developing countries and between countries within these two groups. In the short run, the number of agreements can be expected to increase as major consuming countries attempt to guarantee their supplies, and countries acquiring jurisdiction over large stocks of fish attempt to derive the maximum economic benefit from them. In the longer term, such arrangements are likely to become less important as countries build up their production potential and process locally rather than export raw material.

Negotiations of fishing agreements involve the transfer of discussion previously undertaken multilaterally within regional fishery bodies to a bilateral basis. Two of these negotiating bodies, the International Commission for the Northwest Atlantic Fisheries (ICNAF) and the North-East Atlantic Fisheries Commission (NEAFC) have given explicit recognition to changing circumstances by establishing working groups to consider the future role of the respective commissions in the light of extended coastal state jurisdiction. Both ICNAF and NEAFC scheduled special plenary meetings in late 1976 to consider the reports of these working groups. The two international commissions concerned with the regulation of tuna, the Inter-American Tropical Tuna Commission (IATTC) and the International Commission for the Conservation of Atlantic Tunas (ICCAT), have not yet taken similar action, although their role will also be affected by limit extensions.

In spite of their preoccupation with legal and administrative matters, the north Atlantic commissions continued to regulate catches through the fixing of total allowable catches and their allocation to national participants in the fisheries. In the case of ICNAF, these quotas will have no validity after the extension of coastal state jurisdiction in early 1977, when the allocation of catches will become a matter for the coastal state to decide. In the northeast Atlantic, many stocks of commercial interest will cease to be covered by quota regulations as of 1 January 1977 following the breakdown of negotiations within NEAFC in November 1976. Discussions within the

EEC and between the EEC and other major participants in the fisheries of this area are currently under way to reintroduce effective stock conservation measures. Particular concern continues to centre on the North Sea herring, which has been under heavy fishing pressure for several years; fishing for this species is continuing in spite of a scientific recommendation that there should be no direct fishing in either 1976 or 1977 and that by-catches of herring in other fisheries should be reduced.

Both IATTC and ICCAT continued their work of regulating tuna catches; IATTC again set catch limits for yellowfin in the eastern central Pacific for 1976, while as a result of the activities of ICCAT, regulations limiting fishing mortality of bluefin tuna to the level of recent years are now in force in the Atlantic. The International Whaling Commission again set catch limits for all exploited stocks, and agreed catch limits were lower than in the previous year as a result of the reassessment of some of these stocks. The non-membership of some countries harvesting whales continues to make it difficult for the Commission to set quotas and regulate catches.

Outlook

The immediate outlook for world fishing is marked by a fair amount of uncertainty, but it is possible to be reasonably certain about some trends and events. It is most unlikely, for example, that there will be any significant increase in the catch from northern temperate waters in either the Atlantic or the Pacific, as almost all of the stocks in these waters are already heavily exploited, subject to some kind of quota agreement, or both. While there are a few exceptions, such as the blue whiting in the north Atlantic, production from such sources in the immediate future is likely to be small in relation to the total catch from the area. However, there is greater uncertainty regarding the extent to which the stirrings of recovery of the fishery industry in Europe and North America shown in the first half of 1976 will continue. Price increases for some products can be expected, but they are unlikely to compensate for increases in the cost of inputs or restore the industry to the profit levels of 1973.

In the developing countries there is likely to be some increase in the production of food fish despite the recent apparent levelling off in the rate of increase in landings. It is difficult to quantify these trends with any accuracy since catch statistics in many developing countries are not always reliable, and in recent years the revision of statistical series has had nearly as much influence on trends as real changes in production. Nevertheless, in some regions, notably Southeast Asia and Latin America, there are significant underexploited stocks of fish which under the growing pressure of demand and national development efforts are likely to become more heavily fished.

Production of fishmeal was expected to show a slight recovery in 1976, but not to regain the historically high levels of the late 1960s. Indications of recovery are given by the improvement during the first half of 1976 in the catch of anchoveta by Peru, which despite the much-reduced catches since 1972 still accounts for 20% of world fishmeal production. Catches of raw material for fishmeal by Norway, the second-largest producer, were also substantially higher in the first half of 1976 compared with the corresponding period in 1975. The outlook for prices is rather uncertain. The rise in the price of concentrate feeds, and consequently of their ingredients, has considerably reduced their attractiveness as animal feed, favouring cereals. Some easing of prices can therefore be expected, although the price of fishmeal relative to that of soybean meal is likely to move in favour of fishmeal in view of the drop in United States soybean production in 1976.

Medium-term prospects for increased supplies of fish for human consumption are good. Apart from the possibilities of increased catches, other sources of supply include fish presently being caught but not utilized, or reduced to meal and oil. Besides the stimulation of demand as a result of general economic development, the key to growth in many areas lies increasingly in improved distribution facilities and product development, and in other means of making unfamiliar species acceptable to consumers with basically conservative tastes. Among the types of fish of major commercial importance which offer prospects for increased utilization for human food are cephalopods and shoaling pelagic fish such as sardines and anchovies. The technology for catching and processing these species is well known; major constraints to increased exploitation concern market development.

Problems of management are also likely to remain prominent over the medium and longer term. Extended coastal state jurisdiction will not in itself solve the problem of rational stock management, and the need to limit catches to the rate of renewal of stocks will remain. There will continue to be a need for international negotiation where the stocks fall (or will fall) because of their migrations within the jurisdiction of two or more states. Such bilateral or multilateral discussions can take place either within or outside the framework of the existing regional commissions. With regard to the provision of scientific data and advice, it seems that these can best be provided through existing regional bodies, either to

guarantee impartiality or to avoid the wasteful duplication of substantial research expenditure.

Many countries will, however, need to improve their statistics so that scientific assessments can be made and advice can be given on the resources that they are now exploiting or will be able to harvest in the future. Improved statistical services will be necessary to both fulfil international obligations where they occur and provide a basis for the good management of resources falling within exclusively national jurisdiction. Aid in the provision of such facilities will be one of the principal tasks of the international community over the coming decade.

Finally, countries acquiring jurisdiction over significantly larger marine areas will be faced with the problem of enforcement, the costs of which could in some cases substantially offset the potential benefits arising from the acquisition of additional resources. In the north Atlantic the existing schemes of international inspection of fishing vessels undertaken by national vessels acting within the aegis of the commission have provided one of the more successful examples of international cooperation, and have allowed the enforcement of management measures at relatively low cost. If enforcement is to remain low-cost and effective under coastal state jurisdiction, regulatory measures will have to be developed so that enforcement is relatively simple.

Forestry

Production and trade

The best-monitored activities of the forestry sector are the production of and trade in wood raw materials and manufactured products. The greater part of this activity is in developed countries, but variations in economic activity have a major impact on the developing countries' production and exports of industrial logs, sawnwood and plywood. These exports earned developing countries more than $3 000 million in 1975. Despite their rich forest resources, the developing countries depend on imports for a quarter of their consumption of pulp and paper, which are sensitive to the state of the economy of the industry in developed countries.

Half the wood removed each year from the world's forests is cut as fuelwood. For the developing world, fuelwood constitutes one third of energy supplies, and in some countries and even whole regions it is the source of three quarters of the energy consumed. Current concern about the real price and supply of energy in the world emphasizes the vital importance of this role of the forest.

The recent economic recession affected all major sectors using forest products, especially the housing sector and related activities, in all countries except those with centrally planned economies. Consumption of forest products, which reached a peak in 1973, had declined sharply by 1975 and returned to levels equal to those of the late 1960s. A main preoccupation was to at least partly reabsorb stocks which were at exceptionally high levels in all stages of processing. Hence apparent consumption, which does not take stock changes into account, probably overstates the lower output of many products in 1975. Large reductions in both production of and trade in forest products had marked economic and social effects, especially in the developing countries. There was considerable underutilization of production capacity throughout the forest products sector despite the temporary closing of a number of logging operations and mills with less favourable situations, size or locations. Prices for some products (e.g. pulp and paper) showed good resistance; other products, particularly those from the tropical regions, showed marked price variations in 1974-75 which accentuated the difficulties in facing increased costs, particularly at the prevailing low production levels.

TABLE 1-15. — INDICES OF WORLD ROUNDWOOD PRODUCTION, BY MAIN COMMODITY GROUPS, 1971 TO 1975

	1971	1972	1973	1974	1975[1]	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*
Logs	117	117	125	118	111	— 6
Pulpwood	139	136	143	157	142	—10
Other industrial wood and pitprops	114	112	114	107	107	—
ALL INDUSTRIAL WOOD	119	119	125	121	113	— 6
Fuelwood	108	109	110	112	112	—
TOTAL ROUNDWOOD	116	116	121	118	113	— 4

NOTE: Indices of world roundwood production by main commodity groups and by region have been revised on the basis of improved statistical information, not only for years under review, but also for the base period.

[1] Preliminary.

Toward the end of 1975 and in early 1976 there were signs of improvement in the United States, especially for pulp and paper, and in the Federal Republic of Germany, but in many other countries the forest products market was still uncertain. Some imbalances remained between costs and prices, utilization of production capacities, and stock levels. Forest owners and producers showed reluctance to renew or increase harvesting operations without a clear upturn in demand.

Recent changes in world roundwood production by main commodity groups and region are shown in Tables 1-15 and 1-16. The limitations of this index number approach should be borne in mind. While it provides a good indication of recent variations in production as compared to the longer-term trends for a given commodity or region, it does not provide information about the relative importance of individual commodity groups or regions. In addition, it refers only to roundwood harvested. It does not refer at all to the important output of the manufacturing industries in which technical processing has improved substantially in the last 15 years, with a consequent increase in yield from the raw material transformed.

TABLE 1-16. — INDICES OF TOTAL WORLD ROUNDWOOD PRODUCTION, BY REGION, 1971 TO 1975

Region	1971	1972	1973	1974	1975[1]	Change 1974 to 1975
	..... *1961-65 avarage = 100*					*Percent*
DEVELOPING MARKET ECONOMIES	131	135	141	141	137	— 3
Latin America	124	124	124	126	126	—
Far East . .	140	148	164	160	152	— 5
Near East . .	125	126	121	133	133	—
Africa	126	129	132	131	130	— 1
ASIAN CENTRALLY PLANNED ECONOMIES	121	125	128	132	132	—
DEVELOPED MARKET ECONOMIES	112	110	116	111	101	— 9
Western Europe . . .	111	105	111	108	94	—13
North America	117	116	124	119	110	— 8
Oceania . . .	117	116	123	108	102	— 6
Other[2] . . .	87	85	83	76	70	— 8
EASTERN EUROPE AND THE U.S.S.R.	107	107	108	105	106	+ 1
World . . .	116	116	121	118	113	— 4

NOTE: Indices of world roundwood production by main commodity groups and by region have been revised on the basis of improved statistical information, not only for years under review, but also for the base period.

[1] Preliminary. — [2] Israel Japan, South Africa.

ROUNDWOOD

World production of industrial roundwood declined in 1975 for the second year in succession. In particular, the production of coniferous logs, which represent half of the developed countries' production, declined substantially in the major producing countries of North America and northern Europe. With the exception of China, the roundwood production of developing countries is predominantly non-coniferous. Major cutbacks in removals of non-coniferous logs, including the closure of some logging operations, were reported in some of the major exporting countries of the tropical regions of Africa and Asia. Output of pulpwood, however, fell only slightly in 1975, as the pulp and paper sector was the last to feel the full impact of the economic recession. Thus stocks may have accumulated.

Trade also declined for the second year in a row. World industrial roundwood exports fell by 12%, to 95 million cubic metres. Log exports accounted for 70% of this volume, and of these 45% were non-coniferous logs, most of which originate in developing countries. In 1975 the volume of imports of coniferous logs into Europe fell by some 30% and that of non-coniferous logs by about 20% compared to 1974, when such trade was substantially below the record level of 1973. Japan imported roughly the same quantity of coniferous logs in 1975 as in 1974, but imports of non-coniferous logs fell by more than 30% (from nearly 25 million cubic metres to slightly over 17 million cubic metres). The volume of exports of non-coniferous logs from Africa and southern Asia, which together account for about 90% of the world trade in this commodity, fell by about 20% in 1975. Indonesia was the country most seriously affected, its exports to Japan alone falling by almost 5 million cubic metres.

SAWNWOOD

World sawnwood production and trade also suffered sharp declines in 1975, after falling demand had led to the accumulation of exceptionally high stocks at the end of 1974. Three quarters of world sawnwood production is from coniferous logs. Production of coniferous sawnwood in Europe and North America, at an estimated 147 million cubic metres, was

some 12% below the level of 1974 and 18% below the record 1973 level of 180 million cubic metres; this fall in production accounted for three quarters of the world decline. In 1975 trade in coniferous sawnwood returned to the levels of the early 1960s, but owing to the depletion of stocks, real consumption did not fall as much as apparent consumption. Preliminary figures suggest that production of non-coniferous sawnwood fell more heavily in many tropical exporting countries than in the industrialized countries. Imports into North America in 1975 were about one third below those of 1974. Exports from peninsular Malaysia to North America and Japan in 1975, for example, fell to a mere 20% of the 1974 level, but a large increase in trade to the EEC and the Near East limited the total fall in trade volume to only 12%. Asian exporters generally made strong efforts to improve their trade with Europe to compensate for lower earnings from Japan and North America, and they appear to have withstood depressed trade conditions better than competing African countries, whose trade dropped far more in 1975.

Wood-based panels

Demand for wood-based panels in 1975 was sharply hit by the slump in construction activities which affected not only plywood, which accounts for 40% of production of panels, but also particle board, which acounts for 30% and which had previously been the fastest-growing forest product sector. In 1975 plywood production fell by nearly 10% in Europe and North America, which together account for more than half of world output. There was a particularly sharp drop in production of North American coniferous plywood. The large fall in demand for particle board, which followed a substantial expansion of production facilities, led to a marked deterioration in capacity utilization, particularly in Europe, which accounts for about half the world's production of particle board. Imports of plywood into Europe and North America remained close to the 1974 level and considerably below the 1973 record level. Imports into Japan from Southeast Asia fell sharply to one third of the 1974 level and only one fifth of the record trade of 1973. Trade in particle board, mostly concentrated in Europe, fell by about 10% in 1975.

Pulp and paper

The pulp and paper sector began to show some signs of recovery toward the end of 1975, particularly in the United States. Real consumption was probably somewhat higher than apparent consumption, as demand was partially supplied from large stocks. In spite of production levels being far below capacity, pulp and paper prices increased substantially in 1975, thus enabling the industry to face increased costs. The production of pulp for paper in market economies fell by 13 million tons (13%) in 1975 and capacity utilization ratios for pulp production were down from about 90% in 1974 to 76% in 1975. The production of paper and paperboard in market economies fell by 16% in 1975, with major reductions in North America, Japan and western Europe. The decline was particularly marked for printing and writing papers.

Imports of tropical forest products by developed market economies

In recent years, non-coniferous logs have accounted for over half the total value of exports of forest products from the developing countries, and a further 30% was contributed by non-coniferous sawnwood and plywood. By far the greatest part of this trade is directed to the developed market economies of the Northern Hemisphere. As shown above, the market for forest products has declined sharply since the boom year of 1973. In addition, fluctuations in the annual consumption of forest products in the developed market economies have been exceptionally large during the last few years. Table 1-17 shows consumption of non-coniferous logs, sawnwood and plywood in 1970-75 in developed market economies, and related imports from the tropical developing countries. These three products constitute over 85% of the total value of the tropical countries' exports of forest products. Consumption of logs, sawnwood and plywood are first shown separately, with an indication of the share of direct imports from the tropical producing countries. The equivalent log volume of imported sawnwood and plywood is added to the volume of actual log imports to give the log equivalent of imports obtained directly from the producers of tropical logs. An indication of the share of manufactured products in that total is also given. An additional 15% of tropical sawnwood and plywood is imported from in-transit processors of Southeast Asia. The total volume in log equivalent of imports which come directly or indirectly from the tropical producers is shown at the end of the table. Southeast Asia is the main region of origin, accounting for 80% of the tropical supply, including in-transit processors.

Table 1-17 gives a clear indication of the magnitude of the fluctuations in consumption of non-coniferous logs and derived products in developed market econo-

mies and the related imports from the developing tropical producers. The sharpest movements occurred from 1972 to 1975, with large falls from the highest volumes reached in 1973 to the lowest of 1975, which were substantially below the 1970 level, the beginning of the period reviewed in the table. The difference in consumption of tropical non-coniferous logs, sawnwood and plywood by developed market economies in 1973 and in 1975 was equivalent to 31 million cubic metres of logs, or a drop of 27%. The difference between imports from the tropical producers in 1973 and 1975 was 20 million cubic metres, so that the fall in tropical imports accounted for as much as 66% of the consumption decline and amounted to a 40% drop in import volume compared to 1973.

The substantial contribution of imported tropical logs to the total consumption of non-coniferous logs is clearly shown, as not less than a quarter of the supply is made up of tropical logs. The volume of logs imported from the tropics corresponds to a fairly stable 30% of non-coniferous sawlog and veneer log removals from the forests of the tropical producing countries. This situation mainly arises from the trade flow between tropical producers in Southeast Asia and Japan, which alone imports around 20 million cubic metres annually, with as much as 25 million cubic metres in 1973 compared with only 17 million cubic metres in 1975. The remaining log trade is made up of imports by western Europe from western Africa.

Imports of non-coniferous sawnwood and plywood from the tropical producers make a much smaller contribution to the supply of the developed market economies. They do, however, account for more than half the total trade in these products. Imports of tropical sawnwood are predominantly from Southeast Asia and from Africa into western Europe, and those of plywood from Southeast Asia into North America. Additional imports of manufactured products from in-transit processors of Southeast Asia consist mainly of plywood and some sawnwood directed to North America and western Europe. Japan's imports of manufactured products are negligible in comparison to its log imports.

This review of imports of tropical non-coniferous logs and derived products shows two main features. First, the volume increase in non-coniferous wood product consumption in the developed market economies in 1970-73 was virtually all supplied by increased imports from tropical producers. Two thirds of the reduction in consumption during the 1975 recession was accounted for by reductions in imports from developing countries. The trend for sawnwood and plywood was similar, especially if the total

TABLE 1-17. — APPARENT CONSUMPTION [1] OF NON-CONIFEROUS LOGS AND DERIVED PRODUCTS IN DEVELOPED MARKET ECONOMIES AND RELATED IMPORTS FROM TROPICAL DEVELOPING ECONOMIES, 1970 TO 1975

	1970	1971	1972	1973	1974	1975[2]
	Million cubic metres					
Log consumption	103.7	103.0	105.1	112.0	106.3	89.0
Imports of tropical logs	26.3	27.0	28.0	34.1	31.0	21.8
	Percent					
Share of consumption	25	26	27	30	29	25
	Million cubic metres					
Sawnwood consumption	45.3	46.2	46.3	49.9	48.3	40.0
Imports of tropical sawnwood	2.3	2.4	3.0	3.6	2.9	1.7
	Percent					
Share of consumption	5	5	6	7	6	4
	Million cubic metres					
Plywood consumption	14.5	15.4	17.3	19.0	15.6	13.7
Imports of tropical plywood	0.4	0.5	0.4	0.9	0.4	0.4
	Percent					
Share of consumption	3	3	2	5	3	3
	Million cubic metres					
Imports of manufactured products (log equivalent)	5.1	5.5	6.4	8.6	6.2	4.0
Total imports from tropical producers	31.4	32.5	34.4	42.7	37.2	25.8
	Percent					
of which manufactured products	16	17	19	20	17	16
	Million cubic metres					
Additional imports of manufactured products from in-transit processors of Southeast Asia (log equivalent)	3.2	4.7	6.8	7.5	4.9	4.0
Total imports from the tropics	34.6	37.2	41.2	50.2	42.1	29.8
of which South-east Asia	28.0	29.4	31.6	39.8	33.6	24.4

NOTE: Conversion in log equivalent is based on current FAO conversion factors.

[1] Stocks variations are not taken into account. – [2] Preliminary.

imports from tropical producers and in-transit processors are taken into account. Even when consideration is given to the exceptional nature of recent fluctuations in consumption, production and trade, the way in which the trade of tropical producers was affected illustrates the extreme sensitivity to market demand which characterizes the exports of tropical logs and the derived manufactured products of these countries. Second, imports of manufactured products were apparently more sensitive than logs to the increase in market demand, as they rose from 16% of the total imports in 1970 to 20% in 1973. Perhaps as a consequence of this sensitivity, the efforts to develop processing close to the log-producing countries and to restrain the export of logs do not seem so far to have had enduring results. The share of manufactured products in the total volume of forest product exports of developing countries was down again in 1974-75 to the same level as that of 1970-71.

Policies and other issues

Developed countries

Environmental issues continue to exert a strong influence on forest policy and management. However, a number of other factors are also receiving increased attention.

In western Europe, one such factor concerns the structure and magnitude of the region's forest resources. Recent forest inventories indicate that, contrary to popular belief, the forests of western European countries have not been used to their full production potential during the past few decades, with the exception of Finland and Sweden. As a result, there has been a gradual aging of the forests, and increases in the volume of standing timber and the annual increment. Consequently, there is now an apparent imbalance between the pattern of demand for wood raw material and the pattern of available resources, i.e. demand is being increasingly oriented toward small-sized timber while the pattern of supply would suggest a greater utilization of large-sized timber. It is therefore becoming important in many European countries to find a solution to this problem in order to improve the current and longer-term economics of forestry in general.

Despite the orientation of demand toward small-sized timber, forest thinnings are becoming increasingly uneconomic because of high wages and the slow progress made in mechanizing this operation. However, adequate and timely thinnings are the basis of most of the current management practices in Europe. The lack of suitable solutions to the widespread problem of thinnings may make it necessary to fundamentally revise current forest policies and management practices in the countries of the region, and here environmental policies and considerations may have a delaying influence.

Among the environmental matters affecting forest management are the public's attitude toward and influence on the use of pesticides and even fertilizers, which in some cases have already been reflected in legislation. While there is little evidence that these products have caused environmental damage at the levels of use practised in European forestry thus far, limitations on their use in the future could have an impact on forest productivity. Particular concern over this question has been expressed in Sweden, which is already facing an excess of demand over potential cut from its wood processing industries.

In the United States the courts have been used as a means to pursue a number of environmental issues bearing on forest management, notably with respect to clear-cutting. The most important pending lawsuit has challenged the Forest Service's authority to cut trees unless they are individually marked and they are "dead, mature or of large growth." At the close of 1975, lawsuits had held back the harvesting of more than 83 million cubic metres of National Forest timber. It seems likely that new or revised legislation will be needed to clarify the authority of the Forest Service to sell timber from the National Forests.

Developing countries

In Africa the impetus given to an increased forestry effort by the disastrous effects of drought in the Sahel resulted in the Consultation on the Role of Forestry in a Programme of Rehabilitation in the Sahel, which was held in Dakar from 26 April to 1 May 1976 and was attended by senior forestry officials of the eight Sahelian countries (Cape Verde, Gambia, Upper Volta, Mali, Mauritania, Niger, Senegal and Chad) and by representatives from five foreign donor countries and several international organizations. The Consultation analysed the situation and principal problems of each country and of the region as a whole, and agreed on a general action programme for the mobilization of the potential for forestry at the national and international level. Although the implementation of the proposed action programme involves resolving many difficult technical and political matters, the main problem identified by the participants is the lack of financial resources for subregional and country projects. Con-

tinued cooperation among the countries will be necessary, especially in solving the problem of financing and in setting up common policies and programmes of work for well-balanced overall management and development of the forest and land resources of the Sahel.

In the Near East region there has also been a greater political determination to solve the problems related to forest and land resources management. However, the main issues — the control of desertification and the management and development of forest and land resources — call for further integration of crop and livestock production with forestry and related agro-industries, together with integrated strategies for development of land resources and marginal lands. This integration could be promoted and accomplished at the national and regional level through multi-disciplinary action programmes giving appropriate weight to the economic, technical and social aspects involved.

Concern for the environment has also been reflected by a number of developments in Latin America: the establishment of the Inter-Governmental Technical Commission for the Protection and Management of Amazonian Wildlife, which held its first meeting in Iquitos in June 1976; the Regional Expert Consultation on Environment and Development held in Bogota in July 1976; the establishment of a Commission for the Natural and Cultural Heritage in Central America; the sponsoring of integrated ecological research and training emphasizing the tropical and subtropical ecosystems in Latin America and the publishing of *The state of knowledge of the Andean ecosystems* by Unesco's Man and the Biosphere Programme; the passing by Colombia of the National Code of Renewable Natural Resources and Protection of the Environment (1975); the passing by Venezuela of the Organic Law for the Environment (1976); and the establishment by Chile and other countries of working groups to draft laws for the protection of renewable resources and the environment. It still remains to be seen whether the above and similar policies for environmental conservation will have a direct impact (e.g. if they diminish the impact on the environment of unrestricted shifting cultivation and unplanned use of resources), or whether they will first need to be incorporated into the design and implementation of policies for economic development, especially those related to the utilization of forest and land resources.

Progress has also been made in matters concerning wildlife conservation and national parks established for conservation and recreational purposes. In Africa most countries have subscribed to the African Convention on the Conservation of Nature and Natural Resources. Cameroon has established a Directorate for National Parks and Kenya is strengthening its Wildlife and National Parks Service. In February 1975, FAO and the United Nations Environment Programme organized the Conference on the Ecological Management of Arid and Semi-Arid Rangelands, whose main recommendation was the establishment of the International Programme on Ecological Management of Arid and Semi-Arid Rangelands in Africa, the Near East and Middle East. In Asia, a regional meeting was organized to establish ecological guidelines for development in tropical forest areas of Southeast Asia. In Latin America training courses on national parks and wildlife were being organized, and Bolivia, Peru, Argentina and Chile reached an agreement concerning the protection of the vicuña.

In the area of production and trade, further moves were made during 1976 toward coordinating policies and actions among countries producing and exporting tropical timber and timber products. An Intergovernmental Consultative Meeting of Tropical Timber Producing Countries, held in Geneva from 27 September to 1 October 1976, proposed the establishment of an International Tropical Timber Bureau to foster cooperation among producing countries to develop world markets for tropical timber and timber products. These products also figured among the commodities covered by the UNCTAD IV resolution on the Integrated Programme for Commodities.

At the national level, many countries continue to move toward greater national participation and better control of timber business activities. The main trend has been toward an eventual restriction on, or prohibition of, exports of roundwood, the promotion of domestic processing and the export of higher value-added products in order to obtain greater economic and social benefits from forestry. Ghana, Ivory Coast, Madagascar, Honduras, Paraguay, Bolivia, Indonesia, Malaysia and the Philippines have been moving in this direction. Other countries have been granting forest concessions only to national enterprises, or have revised or modified existing concession contracts. Some countries are also seeking to capture some of the revenue from the shipping of forest products for their own shipping lines. One such example is the arrangement being established by the Indonesian National Shipowners' Association with the Republic of Korea and Singapore. Another development in the tropical timber trade has been the establishment of the Southeast Asia Lumber Producers' Association (SEALPA) through private leadership, with the aim of stabilizing supply and demand factors and improving the terms of sale of tropical timber.

Development assistance and cooperation

Total flow of external resources

The total flow of financial resources from DAC member countries to the developing countries rose to a record level of about U.S.$40 000 million in 1975, approximately $11 900 million (43%) more than in 1974 (Table 1-18). However, the bulk of the increase was in flows from private sources, which rose by about $8 700 million (66%) to $22 000 million. Official flows increased relatively less, by about $3 100 million (23%) to approximately $16 000 million.

NET DISBURSEMENTS OF OFFICIAL DEVELOPMENT ASSISTANCE

Net disbursements of official development assistance (ODA) increased from about $11 300 million in 1974 to nearly $13 600 million in 1975. This represented an increase of 20% in nominal terms and approximately 10% in real terms. As a proportion of GNP of donor countries, ODA rose from 0.33% in 1974 to 0.36% in 1975, but still fell far short of the 0.7% IDS target for the Second United Nations Development Decade that had been accepted by 13 DAC member countries. All DAC countries except Italy increased the volume of their ODA in 1975. Improved "volume of performance" by donor countries recording particularly rapid growth reflected conscious budget choices and adoption of medium-term plans to improve the level of their contributions still further.

The terms of the DAC countries' ODA softened slightly in 1975. There was also some shift in the use pattern of ODA resources, with assistance to projects reaching 23% of the total compared to 18% in 1974, and technical assistance declining as a proportion of total aid flows.

External resources for agriculture

Official commitments [15] of external resources to agriculture in the developing countries from all sources and for all activities covered in the OECD broad definition of agriculture increased to approximately $5 360 million in 1975 from about $4 000 million in 1974 and $2 350 million in 1973. Thus the rise in 1975 was as much as 34% over the previous year and 128% over 1973. In real terms,[16] the increase was 19% over 1974 and 66% over 1973. More than 80% of total external resources were committed by the DAC member countries and multilateral agencies. The remainder was contributed by OPEC, socialist countries, and some developing countries.

At the World Food Conference in 1974, FAO had estimated that to achieve the necessary minimum acceleration in the rate of growth of food and agricultural production by 1980, the flow of external resources to agriculture in developing countries would have to increase by $5 000 to 6 000 million annually, This estimate was based on 1972 prices and covered mainly activities directly contributing to the development of food and agricultural production, which are

TABLE 1-18. — NET FLOW OF FINANCIAL RESOURCES FROM DAC COUNTRIES TO DEVELOPING COUNTRIES AND MULTILATERAL INSTITUTIONS, 1971 TO 1975

	1971	1972	1973	1974	1975[1]
	..... *Million U.S. dollars*				
OFFICIAL DEVELOPMENT ASSISTANCE[2]					
Bilateral grants and grant-like contributions . . .	3 634	4 370	4 462	5 336	6 268
Development lending and capital	2 786	2 397	2 621	2 921	3 547
Contributions to multilateral institutions	1 339	1 905	2 268	3 060	3 770
Total above	7 759	8 672	9 351	11 317	13 585
OTHER OFFICIAL FLOWS					
Bilateral	1 004	1 207	2 073	2 199	2 945
Contributions to multilateral institutions, at market terms	267	374	390	—16	79
Total above	1 271	1 581	2 463	2 183	3 024
Total official flows . .	9 030	10 253	11 814	13 500	16 609
PRIVATE FLOWS AT MARKET TERMS					
Investment and lending .	5 491	7 206	10 254	10 785	17 895
Export credits	2 724	1 412	1 196	2 481	4 067
Total private flows . .	8 215	8 619	11 450	13 266	21 962
GRANTS BY VOLUNTARY AGENCIES	913	1 036	1 365	1 217	1 342
Total official and private	18 158	19 908	24 628	27 983	39 913

SOURCE: Organisation for Economic Co-operation and Development.

[1] Preliminary. – [2] Official transactions which are intended primarily to promote the economic development and welfare of developing countries, and which are provided at concessional financial terms, i.e. with a minimum grant element of 25%, using a 10% discount rate.

[15] Data on flow of external resources to agriculture on a net disbursements basis are not available.

[16] Using the United Nations unit value index of manufactured goods exports as a deflator.

more or less closely covered in the narrow definition of agriculture since adopted by OECD. With the rise in the general level of prices, this figure in 1975 was equivalent to about $8 000 to 9 500 million annually. Thus, the shortfall of between 30% and 40% between commitments and requirements still remained even though requirements were estimated on a somewhat narrower definition of agriculture than that to which the data refer.

According to preliminary estimates, official commitments of external resources to agriculture from DAC member countries and multilateral agencies increased by about 15% as compared to 1974, and were more than double those in 1973. However, the increase in 1975 was accounted for mainly by the substantial expansion in commitments to agriculture by multilateral agencies, which in 1975 increased their lending to the agricultural sector by as much as 58% as compared to 1974, and by more than 140% over 1973. Assistance from DAC bilateral sources, after doubling from $881 million in 1973 to about $1 767 million in 1974, declined in 1975 to an estimated $1 224 million (Table 1-19), or by 31%.

Official development assistance to agriculture, with a concessional element of 25% or more, constituted about two thirds of total official commitments, amounting to $2 633 million in 1975 as compared to $2 604 million in 1974 and $1 635 million in 1973. As a proportion of total official development assistance commitments by DAC member countries, ODA commitments to agriculture increased from 12.6% in 1973 to 17.2% in 1974, but declined to 15.9% in 1975.

The above estimates of official commitments to agriculture refer to the broad OECD definition of agriculture which includes agro-industries, rural infrastructure, construction of fertilizer plants and plants to produce other agricultural inputs, and projects for rural, regional and river basin development. According to the narrow OECD definition, which more accurately defines the activities covered in the estimate of requirements, official commitments of concessional and non-concessional resources to agriculture from DAC member countries and multilateral agencies rose by 50% from about $1 800 million in 1973 to nearly $2 700 million in 1974, and by 17% to nearly $3 160 million in 1975 (Table 1-20).[17] On this basis, the gap between commitments and requirements was about 60%.

The largest single source of external funds for direct investment in agriculture continues to be the World Bank. Bank loans and interest-free credits from the International Development Association (IDA) approved for agriculture in the 1975 fiscal year ending 30 June 1975 totalled $1 858 million (IDA commitments were $636 million), nearly double the level achieved in the two previous years. However, loans and credits approved in the 1976 fiscal year dropped by $230 million to a total of $1 628 million, the reduction being almost entirely in IDA interest-free credits. Significantly, agriculture's share in larger total IBRD commitments dropped from 28% in 1974/75 to 24% in 1975/76, and in higher IDA credits from 40% to 25%. Meanwhile, the Bank hardened its lending terms; it increased its interest rate from the 8.50% to 8.85% for loans approved between 1 June and 1 July 1976, and since has followed a new formula whereby its lending rate is reviewed every three months. Negotiations for the fifth replenishment of IDA resulted in the industrialized countries provisionally agreeing, in mid-October 1976, to provide from $7 000 to 7 500 million. IDA is seeking to get the remaining $1 500 million needed from the OPEC countries.

The Bank's "Third Window" intermediate financing facility, established specifically to help the intermediate group of countries (normally those with 1972 per caput incomes of under $375), became operational in December 1975. Loans are for about 25 years at an interest rate of 4.5% per annum. By

TABLE 1-19. — OFFICIAL COMMITMENTS OF EXTERNAL RESOURCES FOR AGRICULTURE,[1] 1973 TO 1975

	1973	1974	1975[2]
	. Million U.S. dollars .		
DAC bilateral sources	881	1 767	1 224
Official development assistance	809	1 648	1 124
Other official flows	72	119	[3] 100
Multilateral agencies[4]	1 243	1 917	3 025
Grants and loans (grant element 25% or over)	826	956	[5] 1 509
Loans (grant element under 25%)	417	961	[5] 1 516
OPEC bilateral assistance[6]	35	176	931
Centrally planned countries[7]	164	130	150
Others[8]	20	25	30
Total	2 343	4 015	5 360

SOURCE: OECD/DAC Secretariat and FAO estimates.

[1] Covering not only activities directly contributing to the development of agricultural production, but also including agro-industries, manufacture of modern means of production (in particular, construction of fertilizer plants, rural infrastructure and composite projects of rural, regional and river basin development). – [2] Preliminary. – [3] OECD estimate. – [4] IBRD/IDA, Inter-American Development Bank, Asian Development Bank, African Development Bank, European Development Fund, UNDP. – [5] Based on 1974 proportions. – [6] Consultative Group on Food Production and Investment in Developing Countries estimates. – [7] Assumed as 8% of total economic aid commitments to developing countries from eastern Europe and the U.S.S.R., and 15% of such commitments from China. – [8] Technical cooperation among developing countries not covered elsewhere, based on very rough estimates.

[17] Estimated on the assumption that proportions of assistance according to broad and narrow definitions were the same as in the previous year.

TABLE 1-20. — OFFICIAL COMMITMENTS OF EXTERNAL RESOURCES FOR AGRICULTURE [1] FROM DAC MEMBER COUNTRIES AND MULTILATERAL AGENCIES, 1973 TO 1975

	Broad definition			Narrow definition		
	1973	1974	1975[1]	1973	1974	1975[1]
	..... *Million U.S. dollars*					
TOTAL OFFICIAL COMMITMENTS TO AGRICULTURE						
DAC bilateral sources	881	1 767	1 224	802	1 218	848
Multilateral agencies	1 243	1 920	3 025	996	1 467	2 311
Total	2 124	3 687	4 249	1 798	2 685	3 159
OFFICIAL DEVELOPMENT ASSISTANCE (ODA) COMMITMENTS TO AGRICULTURE						
DAC bilateral sources	809	1 648	1 124	739	1 109	756
Multilateral agencies	826	956	1 509	613	660	1 040
Total	1 635	2 604	2 633	1 352	1 769	1 796
OTHER OFFICIAL COMMITMENTS TO AGRICULTURE						
DAC bilateral sources	72	119	[2] 100	63	109	92
Multilateral agencies	417	961	1 516	383	810	1 271
Total	489	1 080	1 616	446	919	1 363

[1] According to OECD classification. Data for 1975 are preliminary and their breakdown according to narrow and broad definitions and between ODA and other flows from multilateral agencies are based on 1974 proportions. – [2] OECD estimate.

June 1976, commitments from this facility for agriculture had reached $300.7 million.

Lending by the regional development banks to the agricultural sector rose considerably in 1974 and 1975. Loans for agriculture from the Asian Development Bank increased sharply from about $30 million to $50 million annually during 1971-73 to $134 million in 1974 and $246 million (37% of total loans) in 1975. Agriculture was also the main beneficiary of loans by the Inter-American Development Bank (IDB), which during 1975 provided a total of $332 million (about 24% of all loans) for the agriculture sector. The African Development Bank and the African Development Fund committed approximately $197 million in 1975 (compared to $135 million in 1974), of which about $45 million were for agricultural development. In its second year of operation, the Fund committed 35% of its loans on highly concessional terms to agriculture in the least developed countries of the region.

Commitments for agriculture from sources other than DAC member countries and multilateral agencies amounted only to about $200 to 300 million in 1973-74 (Table 1-19), less than 10% of the total external resources available. However, in 1975 commitments to agriculture by OPEC bilateral sources rose to approximately $930 million, which raised the share of assistance from other sources to about 20%.

The share of agriculture in OPEC bilateral concessional assistance was modest in 1973 and 1974 (less than 5%), but it rose to about 25% of total commitments in 1975. OPEC commitments on concessional terms to the developing countries and multilateral organizations totalled an estimated $4 134 million in 1975, a slight increase from 1974, but more than five times as much as that committed in 1973. Net disbursements on a concessional basis also increased dramatically, from less than $500 million in 1973 to nearly $2 600 million in 1975. However, with a faster increase in OPEC donors' aggregate GNP, their concessional disbursements as a proportion of GNP declined from 1.40% in 1974 to 1.28% in 1975. Assistance from OPEC members continues to show a marked geographic concentration. Members of the Arab League and the Islamic Development Bank accounted for 92% of total OPEC bilateral concessional commitments in 1973 and 90% in 1974.

As regards OPEC bilateral agricultural commitments during 1973-75, 55% were made to countries in the Near East, 28% to those in the Far East and 17% to Africa. Nearly half of the total agricultural commitments were for the development of the fertilizer industry, and about 13% for irrigation projects.[18]

In addition to the many multilateral and bilateral channels through which OPEC countries are at present extending development assistance, a new facility, the OPEC Special Fund, was recently established. Contributions to this interest-free, long-term loan fund have reached $800 million, of which over $400 million are earmarked for IFAD, $200 million are to help alleviate the balance of payments problems of the 45 most seriously affected developing countries, and $150 million are for project financing.

In November 1976, the Governing Committee of the Fund decided on the details of disbursement of $200 million in aid to support the balance of payments of the 45 most seriously affected countries.

[18] Consultative Group on Food Production and Investment in Developing Countries, *Further analysis of resource flows in agriculture*. Document D, Third Meeting of the Consultative Group on Food Production and Investment in Developing Countries (CGFPI), 22-24 September 1976.

Of these countries, the main beneficiaries are to be Egypt, India, Pakistan and Bangladesh, the eligibility quotas being calculated on the basis of per caput income, foreign exchange reserves, ratio of imports and debt payments to reserves, and increased cost of oil imports. The loans are interest-free, carry a 0.5% service charge, are repayable in 25 years, and allow a five-year grace period.

International cooperation

The creation of IFAD was approved in principle by the United Nations Conference held in Rome in June 1976. At the Conference more than $930 million were pledged — $ 400 million by the OPEC countries and more than $530 million by the traditional donor countries. The signing of the agreement for the formal establishment of the Fund was, however, postponed until the $1 000 million target in convertible currencies could be reached. At the First Session of the Preparatory Commission of IFAD, held in Rome in September 1976, it was announced that total contributions had reached $965 million. Supplementary contributions included $20 million from Iran, $5 million from the United Kingdom, $2.5 million from Denmark and $1.8 million from Norway. An interim secretariat was set up whose work will include the preparation of a study on the lending criteria and policy of the Fund.

At the Second Session of the Preparatory Commission, held in Rome in December 1976, IFAD attained and surpassed its target of $1 000 million in convertible currencies, as the original contributions of Norway and Venezuela made to the United Nations Special Fund, with the approval of the United Nations General Assembly, were transferred to IFAD, and additional contributions were announced by some members. The total initial pledges for the Fund in convertible currencies amounted to $1 012 million, with an additional $10 million available in non-convertible currencies. Achievement of the target enabled the agreement for the formal establishment of the Fund to be opened for signature by the Secretary-General in December 1976. At this Session, the Preparatory Commission also decided to establish a Working Committee on Lending Policies which would meet in February 1977 to work out detailed guidelines for the Fund's lending operations. The Committee will include experts from Bangladesh, Egypt, Iran, Japan, Kuwait, Mexico, Sweden, the United States and Venezuela. The Commission also finalized recommendations on a number of legal and procedural matters, including a draft relationship agreement with the United Nations and the draft rules of procedure of the IFAD Governing Council and Executive Board.

At its Second Session held from 14 to 17 June 1976, the World Food Council endorsed the report of its Preparatory Meeting containing recommendations on increasing food production in the developing countries and on improving world food security and food aid. These included the establishment of criteria identifying the developing countries most in need of food production increases and those with the greatest capacity to expand food production rapidly. Among other recommendations were those to governments and agencies concerning the direction of external assistance flows for food production and the measures needed to overcome resource, policy and other constraints in developing countries most in need of increased food production.

UNCTAD IV, held in Nairobi from 5 to 31 May 1976, was seen by its Secretary-General as "an occasion for implementing the essential elements of a 'new order'." While the Conference chiefly represented the conclusion of two years of effort by UNCTAD to establish an Integrated Programme of Commodities in the context of a New International Economic Order, a number of other key issues were also discussed, including debt relief, transfer of technology, and trade with socialist countries. A resolution [19] concerning the Integrated Programme and the proposed Common Fund to finance buffer stocks of commodities was finally adopted by consensus at the end of the Conference.

The broad objectives of the proposed Programme are:

(*a*) to improve the terms of trade of developing countries and to ensure an adequate rate of growth in the purchasing power of their aggregate earnings from their exports of primary commodities while minimizing short-term fluctuations in those earnings; and

(*b*) to encourage more orderly development of world commodity markets in the interests of both producers and consumers.

The initial commodity coverage specified in the resolution includes 18 commodities and groups of closely related commodities, of which six are minerals and twelve are agricultural products.[20]

[19] Resolution 93(IV).

[20] The commodities are: bananas, bauxite, cocoa, coffee, copper, cotton and cotton yarn, hard fibres and products, iron ore, jute and jute products, manganese, meat, phosphates, rubber, sugar, tea, tropical timber, tin, and vegetable oils (including olive oil and oilseeds).

Preparatory meetings on a Common Fund were scheduled for November 1976. The resolution "requests the Secretary-General of UNCTAD to convene a negotiating conference open to all members of UNCTAD on a Common Fund no later than March 1977." It further requests the Secretary-General to convene, in consultation with the international organizations concerned, preparatory meetings for international negotiations on individual products. The work should be completed not later than February 1978. The FAO Secretariat is taking part in preparations for the meetings on agricultural commodities.

The requests by the developing countries for a generalized approach to debt relief and the convening of a conference on the debt problem of developing countries were not accepted. However, a resolution was adopted which noted the pledge of the developed countries to give quick and constructive consideration to individual requests for debt relief within a multilateral framework.

Meanwhile, the GATT multilateral trade negotiations continued within six negotiating groups under the supervision of the Trade Negotiations Committee covering agriculture, tropical products, tariffs, non-tariff barriers to trade, safeguards, and the sector approach. The Group on Tariffs aimed at bringing about a significant general reduction in all tariffs and providing special favourable tariff treatment for the exports of developing countries. Its immediate objective was to arrive at an agreement on the main elements of tariff-negotiating plans by the end of 1976. The Group on Non-Tariff Barriers to Trade also sought to achieve an agreed approach to some of the most important types of non-tariff obstacles to trade by the end of 1976. It is currently discussing subsidies, countervailing duties, quantitative import restrictions and customs matters. Within the Group on Agriculture, negotiations in a sub-group on meat were reported to have entered a new phase in early 1976. They were concerned with various proposals related to the expansion and liberalization of trade, to concerted efforts of importing and exporting countries to achieve stable and secure trading conditions, and to the special and differentiated treatment which is to be given to developing countries. In the Group on Tropical Products, industrialized countries tabled initial offers in response to requests by more than 40 developing countries for tariff and non-tariff concessions affecting tropical products. The aim was to reach an agreement during 1976. Finally, it is expected that the GATT Trade Negotiations Committee will discuss at its next meeting a proposal to set up a negotiating group specifically to give consideration to improvements in the framework for the conduct of international trade.

The Conference on International Economic Cooperation held its first meeting at ministerial level in Paris in December 1975, when commissions on energy, raw materials, development and financial affairs were established to initiate a dialogue between industrialized and developing countries with the aim of arriving at a more equitable world economic order. A mid-year review of the progress of the Conference was held at a high-level meeting on 8 July 1976, when there was general agreement that it should be directed to more action and that the commissions should concentrate on "formulating concrete action proposals" to be submitted to the ministerial conference in mid-December. The group of 19 developing countries called for a complete remission of debts of the poorest countries, as well as guarantees for the stabilization of purchasing power in the energy and raw materials sectors. As at the UNCTAD IV Conference, this matter could not be resolved. The two Conference co-chairmen were to remain in close contact in this regard.

The United Nations/FAO Committee on Food Aid Policies and Programmes held its first session in Rome in April-May 1976. It reviewed the action taken toward implementing the recommendations of Resolution XVIII of the World Food Conference and noted that although some progress had been made to achieve the minimum annual food aid target of 10 million tons of cereals, the target was not likely to be attained in 1975/76. It therefore urged the countries that had not increased their food aid to do so at an early date. The Committee regarded the substantial improvement in multilateral channelling of food aid in 1975 as a welcome development. Some delegates felt that donor countries which are party to the Food Aid Convention should raise their food aid under the Convention from the present level of 4.2 million tons to 10 million tons of foodgrains. The Committee also considered ways and means of implementing Resolution 3362 (S-VII) of the Seventh Special Session of the United Nations General Assembly for the establishment of an International Emergency Food Reserve of not less than 500 000 tons of cereals by the earmarking of national stocks and/or funds. It agreed on the modalities of the Emergency Food Reserve and referred them to the Second Session of the World Food Council, which endorsed them and invited all potential donors to indicate their contributions to the Reserve. The Federal Republic of Germany announced that it would hold ready 30 000 tons toward the Reserve, to be drawn down through the quick action procedure of the World Food Programme, to which Norway and Sweden were already contributing.

The International Wheat Agreement of 1971, which

consists of the Wheat Trade Convention and the Food Aid Convention, was extended for the third time by the 1976 Protocol to 30 June 1978. Meanwhile, discussions continued in the International Wheat Council to examine the possible bases for a new international arrangement with substantive economic provisions to replace the present Agreement. Various issues connected with such an arrangement are currently under consideration at a technical level, including possible reserve stocks and price provisions. At its session in November 1976, the International Wheat Council considered action to be taken toward the convening of a negotiating conference.

Other negotiations aimed at the conclusion of international commodity agreements for coffee, cocoa and sugar have been completed or are continuing, and considerable progress has been made toward a price stabilization scheme for natural rubber. The new International Coffee Agreement [21] and the renegotiated International Cocoa Agreement [22] provide for a system of export quotas to protect an agreed price range, provisionally set far below current price levels for both coffee and cocoa, and the Cocoa Agreement also provides for buffer stock operations. The International Sugar Organization is working on a draft of a new international sugar agreement, which will serve as a working basis at a negotiating conference to be convened in April-May 1977.

The Association of Natural Rubber Producing Countries was expected to finalize a price stabilization scheme for natural rubber by the end of 1976. This scheme combines supply rationalization, limiting national production of rubber to levels consistent with demand conditions, with an internationally managed buffer stock.

The most seriously affected countries

The group of poor countries which since late 1973 have been hard hit by the sharp increase in prices of essential imports such as food, oil and fertilizers are known as the "most seriously affected" (MSA) countries.[23] Despite a record 1975 cereal crop of 180 million tons (compared to 161 million tons in 1974), the general situation of the 45 MSA countries [24] remained serious in 1975/76. With their heavy dependence on imported food, these countries not only had to finance traditional imports, but also sought to replenish pipeline stocks and build up food reserves. The cereal import requirements of these countries in 1975/76 are estimated to have been more or less the same as in 1974/75. Cereal production in 1976 is estimated to have been slightly higher than the large 1975 crop, and the total import bill for cereals and fertilizers is expected to be lower in 1976/77 than in the previous year, reflecting decreases in both prices and volumes. Their cereal import requirements for 1976/77 are provisionally forecast at 14 to 15 million tons, or 3 to 4 million tons less than actual imports in 1975/76.

Fertilizer consumption in the MSA countries increased by only 2.5% in 1973/74 and declined by 4.0% in 1974/75 (when world consumption fell by 2.6%), mainly reflecting a decline in India. This followed several years of rapid growth in fertilizer consumption averaging 18% annually between 1966 and 1972. These countries' fertilizer consumption in both 1973/74 and 1974/75 was about 1.6 million tons of nutrients below what it would have been had their consumption grown at past rates. Preliminary data show that fertilizer use increased slightly in 1975/76 as prices eased and large domestic stocks were reduced. Import requirements for 1976/77 are forecast at about 2.4 million tons, some 14% below those of the previous year, and are likely to cost about $755 million (c.i.f.). Domestic production of fertilizers in the MSA countries in 1976/77 is currently projected at 3.4 million tons, or 57% of estimated total demand.

The total flow of fertilizer aid to MSA countries increased from 911 900 tons of fertilizer material in 1974/75 [25] to 1 321 900 tons in 1975/76, of which 18.7% was made available through the International Fertilizer Supply Scheme.

The MSA countries' ability to finance their non-agricultural import requirements out of their agricultural export earnings weakened in 1975. Provisional figures indicate that while the combined agricultural export earnings of the 45 countries increased in 1975 by approximately $438 million, or by less than 4% as compared to 1974, the value of their total agricultural imports increased by about $960 million. The net result was a further deterioration in their overall agricultural trade balance and its contribution toward the financing of the non-agricultural trade deficit. The agricultural trade balance of these countries improved somewhat in 1976 owing to economic recovery in most of the industrialized countries, even though the overall trade and balance

[21] Negotiated in November 1975, the Agreement will run for six years from 1 October 1976, provided there are enough signatories.

[22] Scheduled to come into operation on 1 October 1976, when the current Agreement expires, provided it is ratified by at least five exporting countries having no less than 80% of the basic quotas, and by importing countries accounting for at least 70% of total imports.

[23] For a detailed review of the concept of the MSA countries, see *The state of food and agriculture 1975*, Rome, FAO, 1976, p. 23-24.

[24] Gambia and Nepal were added to the list in January 1976 and Guatemala in March 1976.

[25] Thirty-three countries.

of payments deficit may not have been lower than in 1975.

The MSA countries' general balance of payments situation has steadily deteriorated since 1973. According to UNCTAD estimates, the current account deficit, which had jumped from $3 900 million in 1973 to $8 700 million in 1974, rose to $12 700 million in 1975 and was expected to grow to $13 000 million in 1976 and as much as $28 000 million in 1980. As their external public debt continues to grow, service charges are increasingly siphoning off a growing proportion of their foreign exchange earnings. On the other hand, the external aid received by low-income countries, most of which are included in the MSA list, is relatively much less than that provided to higher-income developing countries: for instance, in 1971-73 countries with a per caput GDP of less than $200, which account for 72% of the developing world's population, received little more than one third of the total official development assistance channelled to the developing countries as a whole. Unless this share is increased and the total volume of financial assistance and food aid is expanded, the MSA countries will continue to find it difficult to buy sufficient food supplies on the world market without reducing basic imports needed for development.

Food aid

Food aid allocations for cereals in 1975/76 totalled about 9.2 million tons. Although information for 1976/77 is still incomplete, data available by October 1976 indicated that about 9 million tons of cereals were allocated. Thus, unless donor countries make additional allocations of food aid, the minimum food aid target of 10 million tons set by the World Food Conference will again not be reached in 1976/77. The EEC Council of Ministers has under consideration the Commission's proposal to raise Community food aid in cereals from the present total of 1.28 million tons to a higher level ranging from a minimum of 1.65 million tons to a maximum of 2.5 million tons of cereals a year for 1976/77 to 1978/79. United States food aid in cereals for 1976/77 (now covering the period October/September) is expected to amount to about 5.6 million tons, and an amendment to Public Law 480 specifies that 75% of aid under Title I should be allocated to countries having an annual per caput gross national product of $300 or less. As in 1975/76, Canada's food aid in 1976/77 will amount to 1 million tons of cereals. Contributions from other donors are expected to total about 600 000 tons.

Food aid in non-cereal commodities recovered sharply in 1975. Aid supplies of skim milk powder, the principal non-cereal food aid commodity, rose to 121 500 tons in 1975 from the very low yearly average of 76 500 tons in 1973-74. Availabilities in 1976 were estimated at 250 000 to 300 000 tons and are likely to remain relatively large in 1977. Food aid in vegetable oils went up to 186 000 tons in 1975 from a yearly average of 131 000 tons in 1973-74. Availabilities in 1976 are likely to have remained at the 1975 level but may increase in 1977. Food aid in butter oil in 1977 is also expected to be higher than the 1976 level of about 50 000 tons.

So far only Canada and Sweden have adopted the concept of forward planning of food aid. In the EEC, a proposal for its adoption is under consideration by the Council of Ministers.

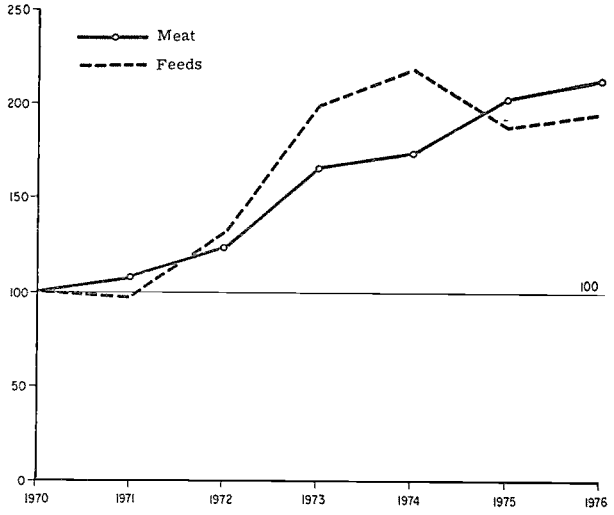
Recent changes in world livestock/feed price ratios

Livestock/feed price ratios have undergone considerable change in recent years. In this section these relationships are examined for the period 1970 to 1976, and the effect the changes have had on the production and consumption of livestock products and concentrate feeds is analysed.

The livestock/feed price ratio is one of the main indicators of the profitability of animal production. This ratio fluctuates when the prices of livestock products and feed change at unequal rates or in opposite directions, and it is constant if the two prices show the same rate and direction of change.

For livestock producers, the changes in price ratios have important implications for adjustments in the allocation of resources, the selection of production technique and the timing of marketing. With the exception of futures trading and contract farming, the changes are never simultaneous because inputs are paid before the output is sold. It is also important how a given price ratio emerges, even if it remains stationary. For instance, if the constant ratio is due to an equal increase in livestock product and feed prices, the higher price of the product (e.g. meat) may reduce consumer demand. It should also be kept in mind that the same increase in the two prices more than compensates the producer for a rise in the price of feed because the cost of feed is only a part of the total cost of production. In contrast, an identical decline of both prices is unfavourable to producers, since the decreasing cost of feed does not

FIGURE 1-2. — CHANGES IN PRICES OF MEAT AND FEEDS ON WORLD MARKETS, YEARLY UNWEIGHTED AVERAGES, 1970-76 (1970 = 100)



NOTE: Meat includes beef, pork, poultry and lamb. Feeds comprise barley, maize, wheat, groundnut cake, soybean meal and fishmeal.

compensate for smaller proceeds from the sale of livestock products.

During recent years, violent fluctuations in the prices of both livestock products and concentrate feeds have made decision-making for both producers and consumers extremely difficult and complex. In the developing countries, the analysis of these changes is made even more difficult by the lack of a well-defined concept of "feedgrains" and the scarcity of information on the prevailing systems of livestock husbandry. The use of concentrate feeds in the developing countries remains very low, about 10% of world consumption. This is due partly to the dominant type of livestock raised and the feeding system used. Meat production consists more of beef and mutton, which rely largely on grazing, than pigmeat or poultry meat, which require use of concentrate feeds.

The use of concentrate feeds in developing countries is further limited by technological and institutional factors. The rate of conversion of feed into meat or other livestock products is much lower than in developed countries because of the poorer quality of livestock breeds and feeds, poorer hygiene and health conditions, higher mortality rates and inferior organization of production. Moreover, the supply of standardized compound feeds required by large-scale operations, especially in intensive broiler production and hatcheries, is seldom ensured in developing countries.

Furthermore, inflation in the developing countries, particularly in Latin America, is as serious a problem as in the developed countries. Consequently, investment in, and the replacement of, existing capital become progressively more costly, so that higher and higher returns are expected, particularly in ventures such as beef cattle production, where the gestation period is long and large outlays of capital are necessary.

Finally, in countries where the markets for both consumer and capital goods are largely underdeveloped, livestock is often held as a more stable form of asset. Naturally, in relation to the size of the herd, the offtake rate is low since it is guided largely by necessity. These limitations of the market, combined with the other reasons mentioned above, restrict the volume of production and contribute to higher livestock/feed price ratios in developing countries than in developed countries, especially for poultry meat and eggs. However, for ruminants the price ratios tend to be lower in developing countries because of their greater reliance on grazing.

Changes in world prices of livestock and feed products during 1970-76

In 1960-72 world prices of livestock products generally increased more rapidly than the prices of the main feedgrains and other concentrate feeds, raising livestock/feed price ratios. In 1972-74 the prices of concentrate feeds increased more rapidly than the prices of meat, thus lowering the price ratios (Figure 1-2 and Table 1-21). This was reversed in 1975, when the prices of livestock products continued to rise while the prices of all concentrate feeds dropped sharply, thus raising the price ratios again. In 1976 feed prices rose at about the same rate as the prices of livestock products, so that on the whole the price ratio (calculated on incomplete data) remained unchanged despite changes in individual product ratios.[26]

In detail, the sequence of these recent changes in livestock product and feed prices was as follows:

The economic boom in most of the developed countries during the 1960s stimulated demand for meat (especially veal, high-grade beef and poultry). In 1970-71 the prices of meat rose faster than feed costs and created favourable investment conditions for the expansion of livestock production. In contrast to beef, poultry and pigmeat production had a much more rapid expansion, which was achieved largely through the increased use of cereals (maize, barley, oats, denaturized wheat), oil cakes and fishmeal. The

[26] Data for the third quarter of 1976 indicate that there was a fall in the prices of livestock products, especially those of beef and poultry meat.

TABLE 1 .1 — CHANGES IN LIVESTOCK/FEED PRICE RATIOS ON WORLD MARKETS, 1970-76

Livestock product	Year	Barley	Maize	Wheat	Total cereals	Ground-nut cake	Soybean meal	Fish-meal	Total feeds
				1970 = 100[1]					
Beef	1970	100	100	100	100	100	100	100	100
	1971	116	126	123	122	133	104	130	122
	1972	126	151	132	136	123	48	133	119
	1973	100	110	82	97	74	96	74	89
	1974	73	78	57	69	97	106	89	83
	1975	89	107	74	90	133	134	159	116
	1976[2]	102	118	94	105	164	162	127	128
Pork	1970	100	100	100	100	100	100	100	100
	1971	102	110	108	107	117	91	114	107
	1972	110	131	114	118	107	42	116	103
	1973	88	96	72	85	65	84	65	78
	1974	67	71	51	63	88	97	81	76
	1975	84	100	69	84	125	126	149	109
	1976[2]	84	97	78	86	135	133	133	110
Poultry meat	1970	100	100	100	100	100	100	100	100
	1971	103	111	109	108	118	92	115	108
	1972	100	119	104	108	98	38	106	94
	1973	83	91	68	81	62	79	61	74
	1974	72	76	55	68	95	104	87	81
	1975	87	104	72	88	129	130	154	113
	1976[2]	77	89	71	79	123	122	96	96
Lamb	1970	100	100	100	100	100	100	100	100
	1971	99	107	105	71	114	89	111	104
	1972	125	149	130	135	122	48	132	118
	1973	111	122	91	108	82	106	82	99
	1974	80	86	62	76	107	117	98	92
	1975	96	114	79	96	142	143	170	124
	1976[2]	101	117	93	104	163	160	126	127
Total meat	1970	100	100	100	100	100	100	100	100
	1971	105	113	111	102	120	94	117	110
	1972	115	137	120	124	112	44	122	108
	1973	95	105	78	124	71	91	70	85
	1974	73	78	56	69	97	106	89	83
	1975	89	106	73	89	132	133	158	115
	1976[2]	91	105	84	93	146	144	120	115

[1] Index numbers based on data published in FAO, *Monthly Bulletin of Agricultural Economics and Statistics*, 19(1-12)-25(1-5). – [2] Preliminary data for April-May 1976.

expansion of beef output initially resulted in more intensive use of grassland, where possible, but as suitable grassland subsequently became short, it also led to a rise in the demand for concentrate feeds and in their prices. Consequently, the huge stocks of cereals, accumulated for over a decade in the granaries of exporting countries, were soon reduced to very low levels, and cereals became progressively more expensive to obtain.

The increased use of concentrate feeds made the production of some types of livestock products, particularly beef and mutton, more costly, and this in turn put pressure on their prices. This pressure was weaker for pig and poultry product prices, since the higher feed efficiency, the faster turnover and the technological progress in these lines of production compensated for the higher cost of concentrate feeds. Moreover, while poultry and pig production can be increased relatively quickly, the acceleration of beef production requires more time. Thus there was a fairly acute world shortage of beef. However, the rise in beef prices provoked a positive producers' response, and in 1971/72 a new expansion phase of the cattle inventory cycles began, stimulating world demand for concentrate feeds and resulting in a further increase in their prices.

These price increases were reinforced by several exogenous factors which curtailed the supply of con-

centrate feeds. First, a change of direction in the ocean current off the Peruvian coast caused the anchoveta catch to decline, reducing fishmeal production in Peru (the world's biggest exporter) from an average of 2 million tons in 1970-71 to 0.9 million tons in 1972 and 0.4 million tons in 1973. The shortage and high prices of fishmeal led to an increase in the demand for cereals as partial substitutes in livestock feeding. But at the same time, world production of cereals in 1972 declined substantially owing to bad weather in the U.S.S.R., Japan, China, India, Pakistan and a number of Central American countries. Consequently, import demand rose worldwide and boosted the prices of cereals. In particular, the U.S.S.R. imported large amounts of cereals to remedy the domestic crop shortage and meet the requirements of an expanding livestock production, while the developing countries increased their foodgrain imports by more than 60%. The rising prices of cereals and fishmeal contributed, in turn, to strengthening the demand for other substitutes, especially soybeans, which pushed soybean prices to record levels in the world market. In turn, the high prices, shortages and temporary non-availability of soybeans in the world market resulting from the United States export ban boosted the demand and prices for all other oil cakes. With prices of all concentrate feeds rising, the profitability of livestock production was greatly reduced.

At the end of 1973 a fourfold increase in petroleum prices was closely followed by large increases in the prices of a number of farm inputs, notably fertilizers, agricultural chemicals and machinery. As a result, the economic recession in the developed countries was deepened, and demand for livestock products, especially beef, was adversely affected. Demand fell just when the new beef production initiated in 1971/72 reached the marketing stage. In the developed countries, the livestock producers, faced with high input costs, low meat prices and marketing difficulties, often preferred to slaughter and sell even unfinished animals in order to avoid potential losses, and thus contributed to a further fall in meat prices. Where grassland was still available, beef producers again put their animals out to graze. Poultry and pig farmers also suffered from these developments, but since the production cycle was shorter, they were able to adjust more quickly. Moreover, the high feed efficiency of pigs and poultry and the consumers' substitution of pigmeat and poultry meat for beef brought a rise in the prices of these products, partly compensating farmers for the increase in feed prices.

In the developing countries, livestock and meat prices did not rise as sharply as cereal and oilseed prices. Between 1971/72 and 1973/74, livestock product prices rose by about 30% and cereal prices by about 40%. Thus, livestock product/feed price ratios were also reduced. In this situation, beef and mutton production in the developing countries relied increasingly on the use of comparatively cheap grazing land, while traditional methods continued to be employed in pigmeat production. Poultry production was probably more immediately and seriously affected by the increase in the prices of concentrate feeds since its short-run supply depends heavily on the use of cereals. Over the last ten years imports of coarse grains by developing countries were rising at an average rate of 15% a year. A sizable part of these imports was used to expand poultry production, which is attractive because it generally requires less capital outlay and has a faster turnover than the other types of livestock.

In 1975 world livestock/feed price ratios began to rise. This was largely caused by the fall in feed prices under the combined impact of reduced demand and increased supply of feed crops and of fishmeal (due to a reverse change in the ocean current near Peru). In fact, prices of fishmeal, oil cakes and soybeans began to decline in late 1974, and this downward movement accelerated in 1975 as the prices of all main feedgrains dropped. Preliminary data for 1976 indicate approximately parallel increases in the prices of livestock products and concentrate feeds and hence a fair stability in price ratios.

On the other hand, in 1975 the cattle inventory cycle in many developed countries was steadily declining. In the U.S.S.R. the shortage of feedgrains arising from poor harvests in 1975 led to substantial slaughtering. The decline in the cattle inventory cycle was further accentuated in 1976 by heavy slaughtering prompted by severe drought in North America, Europe and Australia. Consequently, beef prices weakened in North America and the EEC, but only temporarily because EEC intervention buying siphoned off excess supply, preventing a further decline in prices. In Argentina, where in 1976 beef production was estimated at 15% above the 1975 level, the high rate of slaughtering was due to the improvement in producer prices as a result of recent policy changes which, in general, reduce taxes on agricultural exports and, in particular, set beef prices at realistic levels in relation to the world market.

It appears that with substantial exportable supplies of beef in the main exporting countries still facing stiff resistance in the import markets, world beef prices will remain low in early 1977. But as the impact of drought-induced slaughtering in western Europe and the reduction of cattle herds in many other areas begin to restrict supply, beef prices could improve in late 1977 or early 1978.

Small farms

Some additional information on the numbers and characteristics of small farms has become available through an analysis carried out by FAO and the World Bank of the data for a representative selection of developing countries obtained mainly in the 1970 World Census of Agriculture. Whether or not a farm should be classified as "small" depends on a number of criteria other than physical size, including particularly soil quality and the availability of irrigation, but the summary data shown in Table 1-22 clearly confirm the heavy preponderance of small farms in most developing countries.

TABLE 1-22. — SMALL AND LARGE FARMS IN SELECTED DEVELOPING COUNTRIES, 1970

Country	Holdings below		Output per person in agricultural labour force		Output per hectare	
	5 ha	1 ha	Small farms[1]	Large farms[2]	Small farms[1]	Large farms[2]
	Percent of total		*Million kilocalorie equivalent*[3]			
Brazil	37	8	2.7	5.2	[4]5.9	4.2
Colombia	58	22	...	...	7.0	3.7
Ghana	86	38	...	...	5.8	5.6
India[5]	90	46	...	...	6.1	3.4
Iraq	51	20	1.4	8.1	10.6	2.0
Jamaica	96	...	...	...	8.0	28.0
Korea, Rep. of	100	67	2.7	...	13.7	...
Liberia	93	52	2.0	38.2	7.8	3.7
Malawi	96	39	1.9	...	6.0	...
Pakistan[5]	68	4	1.0	2.8	6.6	4.1
Peru	72	18	...	...	3.9	11.0
Philippines	85	57	...	...	...	...
Surinam	83	22	...	...	...	...
Uruguay	14	...	2.8	40.7	3.5	4.5

SOURCE: FAO 1970 World Census of Agriculture; data analysed in World Bank Small Farms Study.

[1] Below 5 ha. – [2] Above 20 ha. – [3] Non-food products converted on basis of wheat price relatives. – [4] Partial coverage. – [5] 1971.

Farms smaller than 5 ha were only 14% of the total in Uruguay (where livestock enterprises predominate) and 37% in Brazil (where land is still abundant) in 1970, but in the other countries studied they ranged from 51 to 100%. Those smaller than 1 ha were as much as 46% of the total in India, 52% in Liberia, 57% in the Philippines, and 67% in the Republic of Korea. The number of small farms has increased strikingly in recent years with the growing pressure of population on land resources, those smaller than 5 ha doubling in India between 1950 and 1970, trebling in Brazil and quintupling in Iraq.

The numbers of landless agricultural labourers also appear to be even greater than hitherto realized. Data are available for seven of the countries studied, where they ranged from 26% of the agricultural labour force in Brazil in 1970 to as much as 41% in Jamaica, 42% in Colombia, and 55% in Uruguay.

The study also confirms some well-known characteristics of labour and land productivity on large and small farms. Labour productivity is uniformly much greater on farms above 20 ha than on those below 5 ha. Productivity per hectare of land, however, is greater in the small-scale sector in seven of the 10 countries for which comparable data are available, and more than five times as great in Iraq. Where the reverse is the case, the explanation lies mainly in the concentration of the large-scale sector on high-value export crops, such as sugar in Jamaica, cotton in Peru, and livestock products in Uruguay.

2. REGIONAL REVIEW

Tables

DEVELOPED REGIONS

DEVELOPING REGIONS

2. REGIONAL REVIEW

Developed regions

Western Europe

Since 1962, the countries of the European Economic Community have progressively established a Common Agricultural Policy which has as its main feature a structure of common markets. During this period, the agricultural situation in the EEC has undergone important changes, latterly reflecting the enlargement of the Community to include Denmark, Ireland and the United Kingdom. The Common Agricultural Policy has great political significance to the EEC because it represents one of the few important areas in which the Community has attempted to function as anything more than an evolving customs union. Periodically, the EEC Council of Ministers has reviewed this policy. It requested the Commission to prepare such a stocktaking in October 1974 and this document [1] was presented by the Commission in March 1975 and discussed in detail by other Community institutions (the Council of Ministers, the European Parliament and the Economic and Social Committee).

The Stocktaking derived major significance from the fact that the Federal Republic of Germany made its continuing support for the Common Agricultural Policy conditional on a fundamental review of the policy. The Stocktaking is the source of such practical proposals for reform as the Commission has subsequently made.[2]

The objectives of the Common Agricultural Policy are defined in Article 39 of the Treaty of Rome as follows:

> to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilization of the factors of production, in particular labour; thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture; to stabilize markets; to ensure the availability of supplies; to ensure the delivery of supplies to consumers at reasonable prices.

In addition, Article 38 covers the freedom of movement of agricultural goods, which is also a basic objective of the policy.

It was against this background that the Council of Ministers drew the following conclusions from its examinations of the Stocktaking.

The Common Agricultural Policy has attained a very high degree of integration. In many areas, its results may be regarded as positive: farm incomes have risen and have approached the level of incomes in other sectors, although the increase has not always been the same for all categories of producers and in all regions of the Community; labour productivity has risen faster in agriculture than in other sectors; relative price stability has been achieved in spite of the disturbances on the world market and security of food supplies has been assured — developments which have also been in the interests of consumers; trade in the Community has increased appreciably, but not to the detriment of trade with third countries.

In an enterprise of such magnitude, difficulties have inevitably arisen. This is partly because the Common Agricultural Policy cannot be judged as an isolated phenomenon, but must be seen in the context of the whole of Community policy. This is particularly true when account is taken of the stagnation of the European integration process, above all in the area of economic, monetary and social policy. Other difficulties are, however, linked to the implementation of the Common Agricultural Policy itself.

In spite of all these difficulties, the Council acknowledged that the Policy is and must remain an indispensable factor in European integration.

It examined the problems relating to market balance, considering both external and internal forces likely to influence the markets, and stressed the need to take into account the obligations arising for the

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[1] Commission of the European Communities, *Stocktaking of the Common Agricultural Policy*, COM(75)100, Brussels, February 1975.

[2] The major proposals so far made are to be found in Commission of the European Communities, *Commission proposals to the Council*, COM(75)600, Brussels, December 1975.

Community from its outward-looking policy toward non-member countries. In this connection, the Council found that difficulties had arisen for the Common Agricultural Policy as a result of Community foreign policy decisions, particularly undertakings concerning certain products, e.g. sugar and butter, and import preferences in respect of certain third countries. These problems may be aggravated by future trade agreements, but also by new associations and accession agreements. The Council stressed that producers alone cannot bear the consequences of this policy, and moreover that the costs should not be borne by agricultural policy. Consequently, the mechanisms for overcoming the problems resulting from such agreements must be improved.

Just as the Council viewed the import of agricultural products into the Community as particularly significant, it likewise underscored the need for the Community to be represented on the world market by its agricultural exports, taking account of changes which have taken place or which may take place on the world market.

The Council considered that, while keeping farmers' incomes in mind, steps should be taken to improve market balance. To this end, in addition to price policy, and taking account of its limits and of the possibility of aligning it on modern farm holdings, additional measures regarding policy concerning stocks, consumer policy, export policy, food aid, producer participation in market risks and measures concerning production potential could be considered.

The Council recognized the need to improve market management, particularly as regards procedures and forecasting possibilities.

As to structural policy, the Council emphasized that the problems of agricultural structures and related incomes also have to be considered. There are continuing discrepancies in the Community between the various categories of farmers and regions. In this respect, the Council accords particular importance to structural and regional policy. One view is that the results of implementing the three 1972 structural directives, the directive on hill and mountain farming and the Regional Fund Regulation should be examined first. Another is that structural measures taken to date should be revised as soon as possible and supplemented by new measures, and that provision should be made for increased financial participation by the Community.

The unity of agricultural markets has been jeopardized in recent years by the consequences of monetary fluctuations and by divergencies in the economic development of Member States. This situation has made it more difficult to maintain the common price system. The methods used to overcome difficulties have made it possible to avoid disturbances for a certain period, but their continued use in their present form might well give rise to other types of distortion; the latter could, however, be eliminated by pragmatic solutions.

The granting of direct aids under Article 43 of the Treaty could constitute a useful adjunct in specific instances where price policy alone is not enough to achieve certain objectives. Such aids can also be used on a temporary basis to rectify certain situations. The Council nonetheless emphasized that in certain circumstances such aids could run counter to the efforts to be made under structural policy. The cost of such aids could escalate rapidly if they were used indiscriminately and permanently as a means of supporting farm incomes. It would then be difficult to finance these aids from the Community budget, and recourse to financing on a national basis could be a source of disparities if the Member States were not all able to grant their farmers the same amount of aid.

The fact that the agricultural budget accounts for the major part of the Community budget is not surprising if it is borne in mind that the Common Agricultural Policy is at present the most highly developed of the Community's policies and the only one for which the Member States have transferred a major part of their financial responsibilities to the Community.

The Council acknowledged the need to implement the Policy as efficiently and cheaply as possible, as regards both resource costs and budget costs. While considering that the fixing of a financial ceiling is incompatible with the market organizations, the Council will study and adopt the necessary procedures to guarantee the indispensable links between agricultural and budgetary policy.

The Council, in the course of a more detailed examination of the markets for individual products, has at this stage of its work reached the following conclusions:

Milk. The aim is to restore market balance and prevent an excessive buildup of stocks; one view is that it will be sufficient to improve market management and step up measures to promote sales; the other is that additional measures are necessary to stabilize production (price policy more oriented toward market balance; where appropriate, producer participation in market risks; reduction of production potential).

Beef and veal. The aim is to limit cyclical surpluses and shortfalls by making adjustments to the support system.

Cereals. The aim is to improve the price relationships between the various types of cereals and to

adapt the price of fodder wheat to the prices of other feedgrains.

Wine. Work aimed at adjusting the organization of the market in wine is currently in progress in the Council.

The opinion of the European Parliament on the Stocktaking is expressed in a Resolution adopted at the session of 17 June 1975 and in a series of general principles. In the Resolution the European Parliament noted that the Common Agricultural Policy had been "successful in achieving a certain degree of regularity of supply to the consumer and relative price stability," but that it had had "only limited success in reducing regional disparities in agricultural incomes." The European Parliament considered that "price policy related to the concept of the modern farm remains one of the most important instruments for implementing the Common Agricultural Policy, and that the solution to the income problem facing the agricultural sector is also to be found in effective long-term structural and marketing policies." Additional short-term policies were, however, needed "to ensure adequate incomes to less favoured farmers, reasonable prices to consumers" so as to avoid serious imbalances between supply and demand.

Among the General Principles relating to the Stocktaking, the European Parliament believed that the Common Agricultural Policy review should lead to "a set of agricultural estimates, to serve as a permanent instrument of forward planning and action" and that such reviews should include "five-year production targets reviewed each year to allow for the maximum utilization of agricultural resources." The fixing of production targets should take into account the domestic consumption to be covered by Community agriculture, Community import and export requirements, imports from poor countries and stock policies. The application of a system of direct income subsidies was extremely useful, but "it should be restricted to selective, digressive aids adapted to particular situations with the aim of overcoming structural handicaps." The Commission was requested to "propose measures to encourage the regional specialization of production, but realizes that this is an objective requiring careful implementation to avoid too great a social upheaval." Producer subsidies "can help only to overcome short-term market disturbances, particularly in the beef sector, and in those sectors where Community production falls short of demand, such as the durum wheat and olive oil sectors." Consumer subsidies provide "a useful short-term method for disposing production surpluses to special categories of Community consumers." The absence of substantial proposals to improve processing and marketing organization was regretted, and the Commission was requested to provide some quickly. The need for producers to contribute through producers' organizations to maintaining market stabilization was emphasized, particularly in the fruit and vegetable and fishing sectors.

Both the Council of Ministers and the European Parliament thus concede that the Common Agricultural Policy has so far had only limited success. Considering the complex nature of agricultural adjustment within the common market, this is not altogether surprising. Some market stability has been achieved, but one of its consequences has been to stimulate overproduction and surplus in some markets over long periods. The basic reason for the limited performance has been the attempt to achieve several, and often conflicting, objectives with an extremely limited choice of policy measures. Price policy has been the only measure to be developed systematically, and this has led to important conflicts between objectives of income and market stability, and between income and "reasonable consumer price" objectives. Similar difficulties have arisen in the past in United States farm price support programmes. As the Common Agricultural Policy evolves, new policy measures will be needed to overcome these difficulties, and particularly to satisfy consumer price objectives. New measures are needed to deal with agricultural incomes, since it is the standard of living objectives of the Policy that have been behind both major conflicts in implementing price policy.[3]

Policy developments in other western European countries include the Five-Year Development Plan (1976-80) in Greece which is partly concerned with preparing the country for entrance into the European Economic Community. The agricultural sector plan gives particular emphasis to improving irrigation, soil conservation and mechanization, and to better rural living conditions. Irrigated areas are to be increased to 1.1 million hectares by 1980 (compared with 830 000 hectares in 1974), with a major effort in eastern Macedonia to increase production of milk, meat, fruit, vegetables and cotton. Some rural development programmes are also included to help slow down the rural exodus. In Yugoslavia the "Green Plan" [4] aims to develop agricultural production for both domestic and export markets. Particular attention is being given to the wheat-producing areas where output could be increased to several

[3] For further analysis, see Mackerron, Gordon and Rush, Howard J., Agriculture in the EEC taking stock, *Food Policy*, August 1976, p. 286-300.

[4] Social Agreement on the Development of Agriculture and the Food Industry (1976-80).

times its present level. Few changes are reported from Spain, where the current price support system covers more than half the total value of agricultural production. For the 1976/77 campaign the level of guaranteed farm prices has been raised by an average of 11% compared to 1975/76. In Norway a "White Book" [5] referring to future food policy, published early in 1976, proposes that the general level of health be assured by higher consumption of certain vegetable and fish products, and that of food security by an extension of cultivated land. It recommends selective food subsidies on items with high dietetic content and emphasizes the necessity of reducing fats and sugar in the diet. In Sweden, where food security and dietary considerations have long influenced food and agricultural policies, there have been few changes recently. The programme for consolidated small farms continues to be a major element in national policy, although it is hindered by high land prices offered by non-farm investors and speculators.

Eastern Europe and the U.S.S.R.

In eastern Europe and the U.S.S.R. the performance of the agricultural sector under the 1971-75 plans varied considerably from one country to another. However, most eastern European countries performed considerably better than the U.S.S.R., if plan fulfilment is taken as the main criterion.

According to the U.S.S.R. plan, agricultural output was to increase by 20 to 22% above the 1966-70 level, which actually corresponds to what was achieved between 1961-65 and 1966-70. The results fell short of expectations, however, and the actual increase was only 13%.

The average annual production of grains, considered as the most important target, was expected to reach 195 million tons, but the actual figure was only 181.5 million tons (some 14 million tons higher than the 1966-70 average), leaving the country in a heavy deficit position. In fact, with the exception of cotton, where the actual figure of 7.7 million tons exceeded the 6.5 million-ton plan target, none of the important targets in the crop sector was actually achieved. In the livestock sector, which on the whole did considerably better, production of meat practically attained the 14.3 million-ton target, output of eggs overshot the target, while milk and wool, though registering fair increases compared to the preceding period, fell short of the stipulated figures.

Though by no means new, the year-to-year variations in the performance of the crop sector of the U.S.S.R. constituted one of the most striking features in the 1971-75 period. The difference in the extremes recorded in grain output between 1972 and 1973, and then in the opposite direction between 1974 and 1975, exceeded 50 million tons. This highlights the fact that despite the country's huge area and all the technical improvements made so far, its agricultural potential tends to be seriously constrained by natural conditions. Large parts of the U.S.S.R. have a short growing season, low rainfall and lack of humidity prevail in many other areas, and areas which account for almost two thirds of total agricultural production are subject to intermittent droughts. Therefore, irrigation combined with drainage and soil improvement remains the country's main agro-technical problem.

The average annual growth rates obtained in eastern European countries during the 1971-75 period ranged from 2.1% in Bulgaria to 4.6% in Romania, compared with 2.5% in the U.S.S.R. Hungary and Czechoslovakia exceeded their plan targets, Poland and the German Democratic Republic about met their targets, while Bulgaria and Romania, which had set rather ambitious targets (Romania in particular) and suffered more from bad weather than did other countries of the region, were not able to fulfil their plans. With the exception of Bulgaria and Czechoslovakia (the latter having deliberately adopted a policy of slower growth), all countries recorded higher rates of growth than in the preceding quinquennium. Combined output of grains of the eastern European countries reached an annual average of 73 million tons, which represents an increase of 23% above the 1966-70 average.

In contrast with developments in the U.S.S.R., a remarkable degree of stability in the performance of agriculture was witnessed in the majority of eastern European countries (Romania and Bulgaria were the only exceptions). This positive feature, already observable in the late 1960s, was due to improvements made in the crop sector (e.g. widespread adoption of high-yielding and more resistant varieties, more intensive use of fertilizers and pesticides), and to the fairly rapid development of the livestock sector, which came to increasingly influence overall growth rates. Production of pork and poultry meat in particular, based on industrial methods, has indeed made spectacular progress in several eastern European countries.

The recently adopted plans for the 1976-80 period in all countries of the region continue to regard agriculture as a high priority sector. For reasons which are easy to understand, emphasis on a rapid development of the sector is particularly strong in the less industrialized countries and in the U.S.S.R., while

[5] Report to the Storting No. 32 1975/76 on Norwegian Nutrition and Food Policy.

the economically more advanced countries primarily aim at maintaining a smooth growth of agricultural production in line with the already well-established trends. However, all the national plans pay increased attention to what might be called the qualitative aspects of agricultural growth — quality and diversification of products, efficiency of investment and of the factors engaged in the sector, environmental considerations, etc.

The overall growth target stipulated in the U.S.S.R. plan — 17% above the average for 1971-75 (corresponding to an average annual rate of 3.4%) — is more modest than the target for the preceding quinquennium, although it exceeds the overall result achieved in this period. The target for grain output (215 to 220 million tons annually) seems reasonable, given an even incidence of good and bad years despite the fact that climatic conditions over large parts of the U.S.S.R. are not particularly favourable, and that the crops remain highly sensitive to the vagaries of the weather. Considerable technical improvements along many lines are, however, expected to take place in the period ahead. Nevertheless, achievement of the grain target will continue to depend on factors which can be only partly controlled by the planning authorities. Implementation of many other parts of the plan will, of course, continue to depend on what will be achieved in the grain economy.

The U.S.S.R. plan provides for an increased share of coarse grains in the total and, more generally, for an accelerated expansion of high-protein feeds (with soybean production to be developed on irrigated lands in the Russian Soviet Federated Socialist Republic, the Ukrainian Soviet Socialist Republic, the Moldavian Soviet Socialist Republic and the Transcaucasian republics. The average annual output of cotton, planned at 8.5 million tons, is only slightly above the record 1974 crop, but it seems that the high-quality types are expected to expand considerably. Higher yields are expected to be achieved through a systematic introduction of cotton-lucerne crop rotation, expansion of irrigated area and higher mechanization. The average increases stipulated for the output of sugar beet and sunflowerseed (25 to 29% and 27%) may at first sight appear ambitious, but account should be taken of the fact that the average output of both crops in 1971-75 was some 6% lower than during the preceding five-year period. Expansion of output of potatoes, vegetables and fruit, as well as improvement of quality, have been provided for in the plan. The plan foresees the establishment of "zones of guaranteed production" for early potatoes and vegetables in irrigated and climatically favourable areas, and calls for a considerable expansion of "hothouse combines."

Livestock output is planned to increase at a lower rate than that of the crop sector. This reflects the expected negative effects of the disastrous 1975 harvest on livestock production in the early years of the new plan, and also a more realistic attitude of the authorities concerning the feed situation in general. The need for establishing an appropriate balance between livestock numbers and feed supplies was emphasized both in the plan and in the discussions which had preceded its adoption. The plan also calls for increased grain storage capacity and for the creation of necessary reserves, including feed emergency stocks. The trend toward specialization and concentration of livestock production is to be continued through the establishment of new large-scale complexes endowed with up-to-date equipment. It is also worth noticing that the production of mixed feed, which in 1975 was about 45 million tons, is planned to reach 80 million tons by 1980.

Total investments in the U.S.S.R. economy in the 1971-75 period increased by 42% above those in the preceding quinquennium, while investments in agriculture rose by about 60%, reaching 131 500 million rubles. According to the new plan, total investments should increase by 25% only, and those in agriculture by 31%. The share of agriculture in total investment outlays will therefore slightly increase above the already high share of 26% attained in the 1971-75 period (and compared with some 17% in the early 1960s).

The plan target for new deliveries of tractors is 1.9 million units (with an average power of 84 hp) compared with 1.7 million units (with an average power of 70 hp) delivered in the 1971-75 period. Fertilizer supplies are planned to grow much faster than those of other inputs — 467 million tons (in standard units), compared with 304 million tons in 1971-75 and 185 million tons in the preceding quinquennium. The irrigated area which in 1971-75 was extended by 4.5 million hectares (compared with a 3 million-hectare target) should increase by another 4 million hectares. The area under watered pastures in the arid, semiarid and mountainous regions is expected to expand by more than 37 million ha, while some 4.7 million ha (particularly in the surplus moisture parts of the non-black soil zone) are to be drained.

No important policy changes have been provided for in the plan. The policy of planned procurement at centrally planned prices, combined with the above plan purchases at considerably higher prices, will be continued. The methods of procurement are expected to be improved through a further development of direct ties between the producing units on the one hand, and the procurement agencies, processing and trade enterprises on the other.

Between 1971 and 1975 wages on collective farms rose at a considerably slower pace than originally planned (25% compared with 30 to 35%) as a consequence of the crop failures in 1972 and 1975. Wages for workers and employees in other agricultural enterprises and state farms rose in the same period by 20% only. Under the new Five-Year Plan, wages on collective farms should rise by 24 to 27% on average, and those for other workers and employees in the agricultural sector by 16 to 18%. Labour productivity on state and collective farms should increase by 27 to 30% on average.

In the majority of the eastern European countries the planned average annual growth rates — ranging from 2.1% in the German Democratic Republic to 3.6% in Poland — are about the same as (or only fractionally higher than) those actually achieved in the 1971-75 period. Only Romania (6.8 to 7.2%) and Bulgaria (4%) expect more rapid growth. The growth target for Bulgaria is one third lower than the 1971-75 plan rate.

All plans aim at increasing self-sufficiency, particularly in livestock products, where the rapid rise of domestic demand continues to exert pressure. Available information does not permit judgement on whether the recent developments on the beef market in the European Economic Community have necessitated major readjustments in the plans of such countries as Romania, Poland and Hungary, which at an earlier stage had been contemplating becoming major beef suppliers of the EEC countries. It appears that the development of the livestock sector as a whole, irrespective of what the final destination of its individual products might be, is the dominant feature of 1976-80 plans in the great majority of countries. However, since such an objective makes additional claims on grain and feedstuffs supplies, these two lines of output remain a major concern of the planning authorities. Output of grains is to expand everywhere, though at varying rates, and there is a more or less general tendency to give priority to coarse grains. Another crop to which particular attention seems to be given is sugar beet, as many countries intend to increase their own production of beet sugar.

In order to meet production targets, increased investment outlays and additional quantities of inputs of all kinds have been provided for in the plans. In terms of total investment, Poland seems to be in the lead with a figure which exceeds by 50% the actual volume of investment in the 1971-75 period. Numbers of tractors in this country are expected to increase by 70% over those of the preceding quinquennium. By far the greatest increase in fertilizer supplies is planned in Romania, where by 1980 the quantity applied per hectare should reach 280 kg, compared with less than 100 kg in 1975. As in the preceding five-year period, Romania also plans by far the most important extension of its irrigated area, with 1.1 million ha to be added during the 1976-80 period.

In the eastern European countries concentration, specialization and, more particularly, vertical integration of the primary, secondary and tertiary activities within agro-industrial complexes are recurring themes, whereas in the U.S.S.R. there is hardly any reference to the major institutional or policy issues. The impression is that despite the considerable differences which exist in the region, the balance between centralized and decentralized decisions achieved in individual countries is considered as about right, and that the process of institutional and policy changes, which has been proceeding everywhere at varying rates since the mid-1960s, has practically come to an end, at least for a few years to come.

Among the more recent changes in structural policy,

TABLE 2-1. — AGRICULTURAL PRODUCTION IN 1966-70 AND 1971-75, AND 1976-80 PLAN TARGETS IN THE U.S.S.R., ACTUAL AND PLANNED ANNUAL AVERAGES

	1966-70	1971-75		1976-80 plan	
	Actual production	Planned production	Actual production	In absolute terms	Over 1971-75 actual performance
	..... *Thousand million rubles* [1]				*Percent*
Gross output	80.5	96.4-98.0	91.1	104.0-106.0	114-117
	..... *Million tons*				
Grain	167.6	195.0	181.5	215.0-220.0	118-121
Sugar beets	81.1	87.4	76.0	95.0-98.0	125-129
Potatoes	94.8	105.7	89.7	...	...
Vegetables	19.5	24.7	22.8	...	...
Sunflowerseed	6.4	7.0	6.0	7.6	127
Cotton	6.1	6.8	7.7	8.5	111
Meat	11.6	14.3	14.1	15.0-15.6	107-111
Milk	80.6	92.3	87.5	94.0-96.0	107-110
	..... *Thousand million units*				
Eggs	35.8	46.7	51.5	58.0-61.0	113-118
	..... *Thousand tons*				
Wool	397.8	474.0	439.4	...	...

SOURCES: National statistics; plan fulfilment reports; guidelines for the development of the national economy of the U.S.S.R. for 1976-80; Brezhnev, L.I. [Report]. Kosygin, A.N. [Report]. XXV Congress of the CPSU. (In Russian)

[1] At 1965 constant prices.

a growing importance is attached to regional aspects of agriculture. In Poland and Hungary in particular, the increased attention given to agricultural problems in the less developed areas has greatly strengthened the role of regional development planning. Another closely related subject which also requires an integrated regional approach is the protection and more rational use of land and water resources; new laws dealing with these matters were passed in 1975 in Bulgaria, Czechoslovakia, Poland and Romania. Large-scale land reclamation schemes which are being implemented in virtually all eastern European countries are increasingly supplemented with special programmes concerning the type of seeds, fertilizers, mechanization etc., in order to create the so-called "zones of guaranteed production" for cereals. It is expected that these zones will be much less sensitive to climatic variations than other areas; moreover, the highly capital-intensive production methods used should help to alleviate the shortage of manpower — a problem which is increasingly felt in the more industrialized countries of the subregion.

Horizontal and vertical integration as well as specialization continue to be promoted everywhere, but the methods applied are more varied and more flexible than in the past, and are not necessarily associated with further concentration of resources within large production units. Concentration still goes on in some countries (e.g. Bulgaria and Romania), while there has been a rapid proliferation of flexible forms of "inter-farm cooperation" in others such as Czechoslovakia and Hungary. Inter-farm cooperation (which as far as institutional arrangements are concerned may range from formal legal agreements to rather loose *ad hoc* arrangements) enables farms to engage in all sorts of joint undertakings (e.g. building of processing plants or storage capacity, the creation of certain transport or distribution facilities, the establishment of specialization schemes, etc.) while committing only a well-defined part of their respective resources and preserving their legal independence. Experience acquired so far clearly indicates that inter-farm cooperation has been successful and that it will continue to expand in the coming years.

With the exception of the dramatic developments in Poland, no important changes in price policies have been reported recently. Small upward adjustments in procurement prices (for meat and milk, some industrial crops and a few less important products) occurred in 1975 and 1976 in several countries, and in a few cases subsidies were increased to compensate for the rise in prices of industrial inputs. However, virtually all governments appear to be carefully studying the problems of prices and price policies, so new policy developments in this particular area might be expected in the near future.

In Poland, on the other hand, the tight supply situation resulting from two consecutive poor crop years compelled the authorities to announce in June 1976 steep increases in consumer food prices for a large number of products (ranging from 30% for some vegetables to 100% for sugar) as well as important increases in procurement prices aimed at stimulating production. However, in view of strong consumer reaction, the original decision was radically modified around mid-July. In early September, after rationing of sugar had been introduced (2 kg per person per month and a 148% price increase for additional quantities), the implementation of the modified decision (mainly concerning a 35% increase in the average price of meat) was postponed in order to permit the authorities to re-examine the whole question. Five commissions will be meeting soon, and their findings are expected to profoundly influence price policies and agricultural policies in general. In the meantime, however, the deficit in domestic supplies will have to be made up for by increased imports.

North America

In the United States, Congress will undertake new farm legislation in 1977, following the Agricultural Act of 1970, as amended and extended by the Agriculture and Consumer Protection Act of 1973 which will expire at the end of the 1977 crop year. Senate hearings on the proposed legislation, and other recent developments in United States agriculture, have helped to focus attention on national food policy. While some assert that the United States has no food policy and must adopt one, others hold that there is a food policy, one of full production. In a very real sense, the debate on this point is semantic. Clearly, the United States has a food policy, whether it be cohesive and planned, or an aggregation of decisions over the years which, taken collectively, make up a food and agricultural policy.

The question which confronts policymakers as Congress prepares to enact a farm bill in 1977 is whether a complete overhaul is needed of the many parts of United States food policy, or whether the basic tenets which have served for more than 40 years should be left virtually intact.

The Acts of 1970 and 1973 marked a clear departure from the costly and restrictive programmes of the past and gave farmers the freedom to produce for market demand instead of for government-planned incentives. The Acts provided authority for

the cropland set-aside approach (and acreage diversion), the substitution of acreage allotments for feedgrain base acreages; established a new limit on the amount of payments a person could receive annually; initiated an established or "target price" approach for feedgrains, cotton and wheat, with deficiency payments as required; and made provision for payments if producers were prevented from planting any portion of the farm acreage allotment because of disaster conditions. The programmes were voluntary.

The United States Department of Agriculture recommended at the Senate hearings on new farm legislation [6] that the direction of farm legislation remain basically unchanged, comparing the results achieved under the Acts of 1970 and 1973 with those under previous farm legislation. The main points raised by the U.S. Department of Agriculture were as follows:

(*a*) Existing food policy offered maximum incentive to those who produce food. The combination of "market orientation" and unrestricted production had permitted farmers to apply their capabilities to the fullest in using their resources efficiently. There had been no set-aside of cropland under the Act of 1973. Production of wheat or feedgrains had not been curbed since 1973, nor had cotton output been restricted since 1972. Sixty million acres previously held idle had been released and 38 million acres had been brought back into cultivation.

The best food security "arises from a policy which encourages a profit flow into agriculture; a policy that gives farmers the economic incentive to maintain and increase production at a lower unit cost; and a policy that permits farmers and the trade — instead of Government — to carry food reserves." Privately held wheat stocks on 1 July 1976 totalled an estimated 540 million bushels when the Government owned no stocks of wheat or corn and held only 17 million bushels of wheat and 59 million bushels of corn under loan. Producing plenty ... "is the best grain reserve system any nation can have."

(*b*) Full production on the farm had contributed to relative stability of food prices, which after increasing by 14.5% for 1973 and 1974, dropped to 8.5% for 1975 and were expected to rise only 3 to 4% in 1976. While the percentage of annual food price increases had dropped, farmers' costs of production had steadily increased. Nevertheless, U.S. consumers still spent only 17% of their disposable income for food, the lowest in any country.

(*c*) Government farm programme payments had dropped from an average of $3 400 million for 1966-69 to $278 million in 1975 (in addition to that total, $490 million were paid to farmers in 1975 for losses sustained due to natural disasters). The cost of operating the Commodity Credit Corporation, which had been more than $3 000 million in fiscal year 1969, was $710 million in fiscal year 1975.

(*d*) Farm people had increased their per caput disposable income under "market-oriented" farm programmes to an average of 97% of that of non-farm people during 1973 through 1975. From 1971 through 1975 the average was 90%. These percentages compare with an average of only 65% from 1960 through 1969.

While per-bushel, per-bale payments had been discontinued, provisions were retained in farm legislation for government loans on the major crops, for payments to farmers if prices fell sharply, and for standby acreage diversion.

(*e*) Under the Acts of 1970 and 1973 the United States farmer "had been freed ... from the stigma of being dependent on the Federal Treasury, and of being paid by the Government not to produce."

(*f*) Coupled with significant improvements in farm income and changes in cropping patterns was a pronounced change in the rural demographic profile. The average age of U.S. farmers, which was long thought to be too high and going higher, was going down. In 1970 only 14.6% of all farmers were under 35 years of age. At the start of 1976, 20.8% were below that age level.

Another trend that has been virtually halted is the decline in the U.S. farm population.

(*g*) The old government cropping limitations had prevented crops from being shifted to areas where production costs were lowest. In contrast, both Acts of the 1970s had made it possible for farmers to shift production to the crops they considered were most profitable in a given year.

Despite improvements associated with the Acts of 1970 and 1973, however, it became evident during the world food crisis of 1972-75 that the United States did not have a comprehensive national food policy. Instead, a policy of "freedom to farm" went together with export embargoes, price restrictions and grain sales cancellations. The precarious, unpredictable world food situation of the early 1970s underlined the need for the United States to develop a broad food policy in which national goals would be established

[6] U.S. Senate, Committee on Agriculture and Forestry, *Farm and food policy 1977*, p. 6-11, 94th Congress, 2nd Session, 1976, Washington, D.C., U.S. Government Printing Office.

and programmes developed to accomplish those goals. It is hardly controversial that the basic elements of such a policy would require production incentives, market or natural risk sharing, assured supplies of energy and other production inputs, adequate credit resources and other "on-farm" programmes. But a comprehensive policy also demands careful attention to reserve stocks, nutrition programmes, agricultural research, international programmes, market development, food aid and conservation of natural resources. The structure of food policy decision-making would also have to be re-examined in order to bring about better coordination and administration.

A step in this direction was made on 5 March 1976, when the President announced a reorganization of the agricultural policy-making machinery. He established a new Cabinet-level Agricultural Policy Committtee which was given the central role in the development and direction of United States farm and food policies, with the Secretary of Agriculture as Chairman. Other members include the Secretaries of State, Treasury, and Commerce, and representatives of eight other government offices or agencies. The Committee will consider both domestic and international issues.

The development of a politically acceptable national food policy will be difficult because of conflicting objectives and goals for stabilization. Since the Great Depression of the 1930s, instability has been the key issue in U.S. farm policy. It is still a major consideration in relations between agriculture and the economy. The non-farm economy has not attained the stability presaged by the Employment Act of 1946. But agriculture is itself intrinsically unstable, irrespective of the behaviour of the non-farm economy, because farming is a biological process subject to all the changes of weather, and because the demand for its products is so inelastic that any market fluctuation magnifies into sharp swings in prices and income. Farm prosperity in the mid-1970s may invite disregard of this basic fact of instability, but farming's ever greater financial commitments make it more susceptible than before to erratic variations of internal or external origin.

Supplementary food programmes (e.g. the Food Stamp Plan) have brought more stability to domestic demand for the food products of agriculture. The export market has shown greater instability during the last decade, and so far only partial attempts have been made to stabilize it, e.g. through negotiating longer-term export commitments. Problems associated with the building of buffer and reserve stocks as a guarantee of U.S. capacity to fulfil export and domestic demand in all years, including short-crop ones, have still to be resolved. Appropriate grain reserve policies are probably the most sensitive U.S. farm policy issue at present.

Paradoxically, the storage reserve programmes of earlier years were not originally designed to help the non-farm public, but arose rather by chance out of activities to protect farmers' interests. Similarly, most U.S. farm legislation since the early 1930s has been of a short-term, often emergency, nature with little attention given to long-term relationships between agriculture and the economy which affect not only economic goals, but also social and political objectives.

More recently, participants other than farmers in U.S. food and agricultural policy (consumers, taxpayers and the public at large) have begun to emphasize their interests. Most notable is the emergence of consumer interest, which since 1973 has become better informed, organized, vocal and influential. Also notable is the rise in public interest in environmental protection and energy conservation. A detailed account of the objectives of each group of participants is not required here. Clearly, goal conflicts and trade-offs arise. No policy simultaneously provides high farm income, low food cost and low taxpayer cost. Yet there are broad elements of common interest on which a national food policy could be established. The national food policy proposal by the Consumer Federation of America at the Senate hearings on farm and food policy in 1977 [7] illustrates this point. Among the ten main elements, it calls for (1) an estimate of U.S. annual food needs (in terms of domestic requirements including commercial, institutional and food assistance programmes; commercial exports; foreign aid commitments; and supplies to maintain food reserves once a domestic and world reserve programme is developed); (2) the establishment of domestic and international food reserve systems; (3) a production incentive programme which legislates price supports and loan rates which would enable farmers to get parity income assurance, based on cost of production plus a reasonable profit; (4) an export policy which would specify that the domestic requirements in the national food budget are guaranteed; and (5) funding and designing a research programme aimed at ensuring adequate nutrition and securing a food supply with maximum nutritional content, at a lower real cost. Other elements, such as a major effort to reduce the degree of economic concentration in food processing and distribution, may be more controversial, but surely not that of increasing consumer and small farmer participation in all government programmes affecting food policy.

[7] U.S. Senate, Committee on Agriculture and Forestry, *op. cit.*, p. 97-100.

In Canada, few changes have been made in food and agricultural policy. Like other sectors of the economy, the agricultural industry has been confronted with inflation. Farmgate prices of agricultural commodities are exempted from the three-year Anti-Inflation Act of October 1975, but these prices are subject to the control of the various agricultural marketing boards. Measures designed to stabilize farm income were, however, enacted in the Agricultural Stabilization Act.

The Government aims to maintain flexibility in production and encourages farmers to make voluntary adjustments to meet changing economic conditions. During the last few years, farmers have been encouraged to increase grain production to help meet the enlarged demand on world markets. No mandatory supply control mechanisms are imposed on grain producers. The Government encourages producers to maintain output in balance with market expectations, but producer compliance within government production guidelines is entirely voluntary. Grain movement is, however, regulated to ensure that appropriate grades and quantities are available in various commercial positions in order to adequately service domestic and export market requirements. Canada does not have a formal grain stock-holding policy. However, most Canadian grain is marketed by a central marketing agency, the Canadian Wheat Board. The Board is guided by certain requirements and considerations in its constant review of stock levels, which include coverage of domestic needs, the servicing of regular and potential commercial markets, aid undertakings by the Government and the transitional period between old and new crop deliveries. From a national viewpoint, the major concern of the Government is to see that domestic and aid requirements are covered.

A significant development in Canadian farm policy during 1976 was the announcement on 31 May of changes in the Government's feedgrains policy, which came into effect on 1 August 1976 at the start of the new crop year. As a result, the Wheat Board is now offering feedgrains at Thunder Bay and at country elevators in western Canada at prices competitive with U.S. maize. The policy changes were made to guarantee a dependable flow of feedgrains to the domestic market at competitive prices, relieve any temporary shortages and disparities in regional markets, and assure the fulfilment of the overall objectives of the domestic feedgrain policy announced 22 May 1974. The basic feedgrain policy objectives (i.e. encouraging the growth of livestock and feedgrain production across the country according to the natural potential of each region) remain unchanged. Any discrimination in freight rates between meat and grain had to end, however, and both a "fair pricing system" for all Canadian feedgrains and security of supplies were required. The new developments include not only the availability of domestic feedgrains at prices competitive with maize, but also relocation of reserve stocks, modifications in feed freight assistance, and funding for programmes to assist the feed industries.

In September 1975, the Government set forth its "Strategy for International Development Cooperation, 1975-1980" in which it reaffirmed its determination to reach the official United Nations target of 0.7% as the proportion of GNP represented by official development assistance. The Canadian International Development Agency proposes to focus its assistance to a greater extent on the most crucial development problems: food production and distribution, rural development, education and training, public health and demography, shelter and energy. The bulk of the programme's resources and expertise will be directed to the poorest countries, and bilateral assistance will be concentrated in a limited number of countries selected on the basis of need, commitment to development, general Canadian interests and the geographic distribution of other donors' bilateral assistance. New emphasis will also be placed on more flexible terms of assistance adapted to the economic conditions of each partner country. Procurement regulations are to be liberalized so that developing countries will be able to compete for contracts.

Oceania

In order to offset the impact of the economic recession on agriculture in 1974-75, the Governments of Australia and New Zealand at first fell back upon the tested panoply of various price support and compensation measures which had been created over the years.

In Australia they consisted primarily of a number of price support, stabilization and equalization schemes for the principal commodities. The oldest of them is the system of dairy product equalization arrangements, first created in 1916 and considerably enlarged since, with the purpose of maintaining a stable domestic income structure for butter, cheese, skim milk powder and casein under which producers receive payments from separate pools for each product category, ensuring roughly equal net margins where costs vary widely.

Of more recent creation, and greater importance, is the system of wool price and sales stabilization operated by the Australian Wool Corporation, founded

in 1972. The Corporation purchases wool for auction sales, operates floor price schemes, keeps wool reserves in order to maintain floor prices and handles price averaging among producers. It intervened in a massive way during the latter half of 1975, purchasing 467 000 bales (e.g. 25% of the total offerings), thus increasing stocks to 1.7 million bales. Similarly, a wheat stabilization scheme has operated for 27 years in Australia, but the continuing high prices for grain and strong international demand have made its role less immediately significant.

In the meat sector, no national floor price system is in existence as yet, but the outgoing government had already prepared plans to create a Beef Industry Stabilization Committee. There has been a lamb rationalization scheme since 1972, and the West Australian Lamb Marketing Board has greatly helped to protect producers in that state from harsh market fluctuations. The farm sector also benefits from a Drought Bond Scheme acting as an indirect income equalizer, as the purchase of its bonds is deductible from income tax. In addition, federal tax legislation includes various income tax averaging provisions. Finally, a system of input subsidies, mainly for fertilizers, has since 1963 cushioned the impact of high fertilizer costs, especially for superphosphates.

In New Zealand, price stabilization boards set up by the Government for the major commodity groups were authorized to set minimum payment scales when depressed prices fell below production costs. Such payments were to be refunded to the boards in periods of better farm prices and incomes. Initially, the Government contributed N.Z.$50 million as a direct grant, $35 million of which were for the meat sector and $15 million for wool. There is also a system of direct input subsidies to farmers, the outlay of which rose by 75% in 1975 to N.Z.$67.5 million over 1974 as a consequence of the Government's earlier decision not to allow any increase in prices in 1975 which would affect cost levels of the farming industry. Although this decision proved extremely costly and risky for the budget, the Government elected in November 1975 promised the farmers that it would be maintained.

On the whole, however, official support policies in Australia or New Zealand have not proved to be able to protect agriculture from the devastating impact of the recession in the farm sector.

In Australia, the new Government elected in November 1975 lost no time in presenting the farmers a comprehensive list of new policies which involve legislation in 1976 and the following years. The main objectives are to check inflation, reduce the budget deficit as a source of inflationary pressure, and counterbalance price fluctuations. Other more specific points concern schemes to improve the situation of family farms, to provide for a larger set of emergency powers in support of the farm sector in times of both natural and economic disasters, to take steps toward further development of export markets, to devote greater attention to soil and resources conservation, to increase budgetary outlay for agricultural research, and to improve quarantine facilities against pests and animal diseases. Earlier, the Australian Wool Corporation had decided to reinforce overseas stocking points where wool is being stored in order to respond more quickly to localized market demand, thus improving Australia's competitive position *vis-à-vis* other wool exporters.

In New Zealand, the new Government not only committed itself to continue the various input subsidy schemes, as for fertilizers, but has also subscribed to the agricultural income stabilization policies which had been devised and proposed by the preceding government in 1975. These policies covered such items as relief from inheritance taxation in order to keep existing farms in owner families; assistance to young farmers who were running into financial difficulties on account of rapidly rising land values and soaring land purchase prices, and low farm returns; and a promise to assume the costs of sanitary measures such as meat inspection. However, all these measures did not meet the farm community's anxiety as to how rising off-farm costs relating to transport, shipping, processing, etc., could be tackled when farmers were receiving less and less of the total revenue from agricultural exports. In a combative mood after broadening its export base to include forest products and a growing range of manufactured products, the Government announced that it would in future treat economic and trade issues together, as in the negotiations held in 1976 on fishing rights for Japanese fishing fleets in New Zealand coastal waters, which would be linked to problems such as renewed access of New Zealand meat to Japan.

Japan

In Japan, the Government went ahead in 1976 with a new Integrated Food Policy Plan initially framed to operate for three years which aims at raising the self-sufficiency rate for wheat, maize other feedgrains, and even soybeans, to at least 10% of total consumption. Reinforcing its recent policy of encouraging shifts in land use from paddy cultivation to wheat and secondary grains, the new programme provides for direct subsidies of 400 000 to 500 000 yen per hectare of paddy land which is changed over to wheat, barley, feedgrains, vegetables, soybeans, fruit

or sugar crops. To this will be added direct producer subsidies of 2 000 yen per bag (60 kg) of wheat and 5 000 yen per bag of coarse grains delivered. Under a production cost/income guarantee formula, further support steps will guarantee the farming community a certain income stability relative to operational costs of farms and changes in purchasing power. According to a new Agricultural Area Promotion System and an Area Improvement Promotion Act, new or abandoned cropland may be identified for opening up, while the conversion of cropland to non-agricultural uses has been restricted. More government investment in land reclamation, irrigation and drainage is foreseen, as well as the grant of financial support and scholarships to "deserving young farmers" in order to promote the diffusion of modern farming methods in rural areas. Support for group farming schemes has been envisaged. Livestock farming is gradually to be shifted from the vicinity of heavily populated areas to the cooler, larger and less populated areas of Hokkaido, where pasture improvement has increased the hilly areas suited to the keeping of cattle herds. Another interesting scheme gives strong official support to several Japanese farming projects in southern Brazil destined to large-scale production of maize and soybeans for the Japanese market.

The Government has also decided to adopt a stocking policy on a much wider scale than foreseen during previous years, and to earmark adequate funds to it. The policy will apply to domestic as well as imported produce. Long-term food import contracts are encouraged (e.g. those for United States and Canadian grain, and sugar from Australia) wherein government credits and tax exemption are granted to importers.

In 1976-78 continued emphasis upon self-sufficiency will probably only result in small increases in output of wheat, barley and soybeans, while paddy production may continue to exceed domestic consumption as a direct consequence of the price policies favouring rice. Production of fruit and vegetables may increase more strongly, but output of oilseeds and vegetable oils will probably remain relatively low. Meat production may be expected to increase, with a small gain in beef and a stronger one for pigmeat. But if the earlier official demand forecasts are to be borne out in practice, demand may increase vigorously over the longer run, especially for meat and other animal products. If, however, the necessary feedgrain quantities are then to be available and the self-sufficiency target rate of 41% is to be approached, Japan could need some 860 000 ha of new farmland — an area which may theoretically be available, but for which both funds and manpower would have to be allocated rather soon if it is to be accomplished. This problem and others arising from the targets suggest that Japan may have to settle for something less than full attainment of the self-sufficiency goals for 1985.

Developing regions

Latin America

National planning systems in Latin America have gradually become consolidated in recent years despite large and difficult economic changes. Plans and programmes are proving their worth in the face of the increasing complexity of development, especially when subjected to periodic evaluation and revision. Yet, the process of optimum national development can be fully achieved only through a multinational process, and efforts toward achieving regional integration in Latin America have not, so far, been very successful. Probably the most encouraging developments are taking place in the Caribbean Community and the Caribbean Common Market, which have established the Caribbean Food Corporation.

At the national level, new plans [8] as well as those being executed at the beginning of 1975 are of special interest for the increased attention they give to agricultural and rural development. This change reflects not only a greater awareness by governments of the importance of these sectors and of the heavy cost of their neglect in the past, but is also related to growing official concern over the persistence of poverty and unemployment, particularly in the rural areas.

Since the world depression of the 1930s and especially since the Second World War, the development strategies of most Latin American countries have stressed industrialization. In some instances this priority was carried to the point where it actually held up development. Recent events including the world food crisis of 1972-75, the quadrupling of oil prices, improved planning, and probably opportunism, have led to a reassessment of agriculture's role in Latin America's development, and given it higher priority. There are basic reasons for this change in outlook and emphasis: the agricultural sector has

[8] New national and/or agricultural development plans have been drawn up in Brazil (1975-79), Colombia (1975-78), Cuba (1976-80), Chile (1975-80), Guatemala (1975-79), Mexico (1975), Nicaragua (1975-79), Peru (1975-78), the Dominican Republic (1976-81) and Venezuela (1975-79). See Annex Table 13 for details.

been one of the most backward in the region in terms of income and productivity, and thus offers scope for improvement; it also provides most opportunities for absorbing unemployed rural labour; it requires relatively less investment than new capital-intensive urban industries; very often there is considerable scope for import substitution and the domestic market for its products has not yet been satisfied, while export prospects for several commodities (e.g. soybeans) have improved and encouraged agricultural diversification.

Significantly, Bolivia, Ecuador and Venezuela — which are probably the region's countries most favoured in the current world economic situation in being petroleum exporters, and are actually increasing their foreign exchange reserves — have recently adopted plans favouring agricultural growth and a more balanced economy.

Recent large increases in food import bills and attractive prices for some exports have given incentives to some Latin American countries, including Argentina and Brazil, to expand traditional and new agricultural exports. Efforts to promote and diversify exports, however, generally require modernization of farming methods, better marketing facilities and, sometimes, restrictions on domestic consumption. Thus Uruguay is planning to substantially increase exports of meat, wool and wheat, which once accounted for a large proportion of its export trade, and possibly place some restriction on domestic meat consumption in the interests of export sales. Brazil aspires to the position of the "world's food supplier," principally in maize, soybeans and sugar. Export promotion includes remission of taxation and favours export of processed products, but some of the programmes are now being dismantled after protests by competing exporters. Guatemala is giving top priority to the promotion and diversification of its agricultural exports, and Costa Rica, the Dominican Republic and Panama are all considering the adoption of plans to stimulate exports, preferably non-traditional ones. Chile's efforts to expand agricultural exports may only be restricted by the need to conserve certain natural resources, such as timber. Virtually all current plans in Latin America show recognition of the need to take full account of both economic and social factors. In practice, however, there is considerable difficulty in achieving an integrated approach. Although most countries in the region have repeatedly stressed that some form of land reform is necessary, little progress has been made in this area. Attention is now shifting from comprehensive land reform to specific programmes emphasizing integrated rural development.[9] Governments now recognize that supervised schemes of land settlement can become very costly on both a farm and total basis. Nevertheless, they are important in Latin American countries which still have major agricultural areas that are sparsely populated. Against widely different backgrounds, Brazil, Bolivia, Colombia, Ecuador, Mexico and Panama have included programmes of integrated rural development in their development strategies with the primary aim of reducing rural poverty through creating more employment and helping the people to increase their own capacity for self-reliance.

The concern for nutrition in Latin America is reflected by increasing efforts in many countries to formulate and execute national food and nutrition plans and policies as recommended by the World Food Conference in 1974 (Resolution V), and to create the necessary planning and administrative structures for this purpose. Jamaica, for example, formulated its first national food and nutrition policy in 1974, and Colombia and Bolivia approved food and nutrition plans in 1975. For similar purposes, a Ministry of Food and Nutrition (Ministerio de Alimentación) was established in Peru in 1975. Food and nutrition planning activities are actively pursued in several countries, particularly in Central America.

Lack of reliable data generally handicaps the formulation of such efforts. Brazil has recently undertaken a large-scale household food consumption and budgetary survey on a nationally representative sample of 55 000 families belonging to the different economic and social strata in both rural and urban areas. The results of this survey, currently being processed and analysed, will provide a comprehensive basis for the formulation of national food and nutrition policies. Data collection for similar purposes is also under way in Paraguay on a much smaller scale.

National efforts in this field are supported by many bilateral and multilateral agencies and institutions, including the Caribbean Food and Nutrition Institute (CFNI), the Institute of Nutrition of Central America and Panama (INCAP) and the Inter-Agency Project for the Promotion of National Food and Nutrition Policies, sponsored by the Economic Commission for Latin America, FAO, the Pan-American Health Organization, WHO, Unesco and UNICEF.

Neglect of agricultural development in the past was characterized by low levels of government investment in agriculture, and policies which often led to an unbalanced transfer of resources from the agricultural to the urban industrial sector. In many Latin American countries agriculture, including forestry and fisheries, is still the prime source of income

[9] For an analysis of integrated rural development programmes in Ecuador and Peru, see *The state of food and agriculture 1974*, Rome, FAO, 1975, p. 69-72.

for financing the development of other sectors, as in Uruguay and most countries of Central America and the Caribbean. In other countries, such as Argentina and Brazil, agriculture's function as a provider of capital has become progressively less important with the rapid growth of the industrial sector, and also in countries such as Bolivia, Chile, Peru and Venezuela, where extractive industries, mining and oil are of key importance.

There is now evidence of an encouraging trend toward increased investment in agriculture in Latin America, with public funds directed to the opening up of the agricultural frontier, expansion of irrigated districts and the provision of roads and other infrastructure. Serious national efforts are also being made to increase credit supplies to farmers by making greater use of the supervised credit system. Colombia and Ecuador have included in their investment plans the building of dams and irrigation canals. Bolivia, Brazil and Nicaragua are giving priority to access roads to push back agricultural frontiers. Storage facilities have received special attention in several countries, including Costa Rica, Cuba, Guatemala, Honduras and Panama. Major programmes of investment include land reform in Peru, land settlement in Bolivia, Brazil and Ecuador, agricultural research in Chile and integrated rural development in Brazil, Colombia and Ecuador. Colombia is paying particular attention to improving the productivity of the minifundio sector. Venezuela plans to quadruple the amount of private credit in the agricultural sector.

Given the large amounts of investment funds required, governments are generally resorting to foreign sources of financing in order to supplement their own resources. Such financial aid has increased rapidly in recent years. More than half of the loans provided by the World Bank and the Inter-American Development Bank during 1971-74 have been for agricultural credit projects and associated programmes for rural health, research and extension.

Limited availability of foreign capital is encouraging governments to increase their own capacity for financing national development. Costa Rica, for example, is trying to attain this objective by imposing heavier taxation, while Chile hopes that higher domestic interest rates will lead to larger national savings to help finance agricultural development.

It can be inferred from this analysis of national plans that the region will continue to absorb foreign technology. There is as yet little evidence of any striking changes in technology developed locally and appropriate to the type, magnitude and variety of the productive resources of each country, nor of employment programmes to support new technologies. The choice of foreign technology has in many instances led to unfortunate results relating particularly to employment and income distribution. Many agricultural plans do not yet fully take account of the dynamic aspects of new technology.[10] Nicaragua, for example, is relying heavily on adoption of new crop varieties in a package deal involving fertilizers, pesticides, research, extension, etc. It hopes to achieve as much as 70% of its planned increase in production by this means, but the plan gives no explicit indication of the likely impact on farm employment and income distribution. A policy of selective mechanization to allow for fuller employment is, however, being attempted in countries such as Cuba, Nicaragua and Peru.

Regional economic integration

The four integration movements now in progress in Latin America are the Central American Common Market, the Caribbean Common Market, the Andean Group (Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela) and the Latin American Free Trade Association, whose members are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela. These subregional integration processes are aspects of a wider process — the economic and social integration of the continent. The Latin American countries have not yet established an agency to take charge of the process of regional integration proper. One agency — the Organization of American States (OAS) — is of too general a nature, and its range of functions has not allowed it to concentrate on the question of economic and social integration of the continent. However, it has made some valuable contributions to that process. Another agency is the United Nations Economic Commission for Latin America (ECLA). This lack of an "integrational" regional agency makes it difficult to programme projects of a regional nature, for consultation with a score of countries is an arduous and complex operation. However, the countries of the region have recently established a new agency, the Latin American Economic System (SELA), whose main purpose is to institute a permanent system of intraregional cooperation, consultation and coordination of the positions of Latin America in both international economic agencies and fora, and in relation to third countries and groups of countries. This new agency could play a very important part in promoting the economic integration of the region.

Recent developments affecting the agricultural sector in these integration movements include an agreement

[10] For a detailed discussion, see *The state of food and agriculture 1973*, Rome, FAO, 1973, Chapter 3.

relating to production of and trade in cereals within the Central American Common Market, agreement by the countries of the Caribbean Community and the Caribbean Common Market in December 1975 to establish the Caribbean Food Corporation, and the adoption by the Andean Group countries of two measures relating to agricultural health measures and agricultural trade.

The main target of the cereal agreement in the Central American Common Market is the achievement of self-sufficiency in basic grains before the end of the decade. Measures are being taken to promote a rapid increase in cereal production in each Member Country, to define the institutional structures and mechanisms required to coordinate the intraregional supply of cereals, to consider the formation of a regional fund for price stabilization (with the assistance of the Central American Bank for Economic Integration), and to stimulate intraregional trade through price harmonization and coordination of marketing policies.

The initiative which the Caribbean Community and the Caribbean Common Market are taking in food production by launching the Caribbean Food Corporation is significant, since the Community's activities during the past three years have been centred on settling questions of intraregional trade. All Member Countries have signed the agreement establishing the Corporation, which has taken over direct responsibility for a $450 million livestock development programme and for a scheme to establish large-scale food farms in Member Countries. These programmes are the first part of a major effort to change the production structure in the region in order to reduce its annual $470 million food import bill, and help to eradicate malnutrition among the 4.5 million people of the Caribbean Community.

In the Andean Group countries, a system of agricultural health measures has been established to facilitate the flow of trade in products meeting minimum health standards. A second decision relates to market intelligence for agricultural trade. The Board of the Cartagena Agreement, which is the agency of the integration movement, has created a central office responsible for the maintenance of a regional information system on markets and prices for the Member Countries' agricultural products and inputs. National organizations are to be responsible for providing appropriate information.

Far East

New development plans [11] became effective in 1975 in Nepal and Western Samoa and others went into operation in 1976 in the Republic of Korea and Thailand. Malaysia's Third Development Plan, originally due to start in 1976, was postponed. Although India's draft Fifth Five-Year Plan (1974-79) was officially launched in April 1974, its revision was made inevitable by the oil crisis, food shortages, foreign exchange problems and inflation. The final document was not approved by the National Development Council until late 1976. Difficulties similar to those faced by India have led to revisions in other national plans.

In general, the new plans give emphasis to the elimination of poverty, more equitable distribution of income, increased employment and improved nutrition. Agriculture is receiving greater priority than in previous plans in all the new or revised plans. Greater self-reliance is a common theme, adopted by India's latest plan, for example.

Substantial efforts to create more jobs in rural areas are featured in the plans of India, Thailand, the Socialist Republic of Viet Nam and Western Samoa. These efforts are based on intensifying land use through irrigation, drainage, high-yielding varieties, fertilizers, etc. and through wider rural development projects. Land reform programmes are included in the plans of India and Sri Lanka. Special attention is given to the problems of small and marginal holdings in India's plan, where the small farmers' development agencies and the marginal farmers' and agricultural labour agencies have now been merged in a programme covering 160 projects. Similarly, India's Drought Prone Areas Programme, which began in 1970-71, is to be broadened from mainly employment creation through public works into an integrated programme where emphasis is placed on ecological balance, involving afforestation and conservation, and changes in cropping patterns and livestock development.

Food production strategies

No single food production strategy is applicable to all the countries of the Far East region with their various climates, population pressures, social structures, and land and other resources. There are, however, particular components of a food production strategy which are relevant to groups of countries, such as the food deficit countries of South Asia with their high man/land ratios.

Recent experience of declining per caput food production and consumption, high prices of imported food, growing foreign indebtedness, lower foreign aid in both real and per caput terms, and

[11] See Annex Table 13 for details.

the lack of adequate systems of national food security are leading governments to reappraise existing food policies. One consequence is a definite shift toward more self-reliance in food supplies. What this important change may involve is discussed below.

Experience has already shown that it involves hard decisions by governments as they change the order of investment priority to benefit agriculture, provide farmers with better prices and other incentives, restrict imports, and adopt other measures which may lead at least temporarily to higher consumer food prices and which are generally likely to antagonize the politically articulate urban voters.

Measures are needed to increase the effective area of land under food crops, to raise land productivity by increasing both yields and cropping intensity, to diversify the food basket and change dietary habits, to outline a livestock strategy which can meet minimum nutritional needs within the limited available resources, to lower sharply pre- and post-harvest losses and, finally, to develop a better food marketing system. None of these are novel measures, but their application and coordination have so far often been weak.

Given the shortage of capital, land and time, it is imperative to concentrate on raising yields and maximizing net returns per unit of land. However, the possibility of expanding the cultivated area also requires attention. In Asia, however, only a relatively small area of land potentially suitable for arable farming is available. Such land is currently being developed at a rate which implies that by 2040 the region will have used it all, although there is still room for considerable expansion in some Southeast Asian countries. Moreover, area expansion involves heavy capital expenditure and relatively long gestation periods.

One way of expanding the cultivated area within a shorter time and at less cost would be to bring back into cultivation abandoned, unused or underutilized arable land through such means as drainage, supplementary irrigation and improved cropping practices including the use of high-yielding varieties. Area under food production could also be increased by lowering the proportion of cultivated land used for traditional export crops (usually in the plantation sector). Changes in price relationship between imported foodgrains and certain exported agricultural commodities (tea, palm oil, jute, etc.) have in recent years been decidedly unfavourable to developing countries owing to the relative stagnation of raw material export prices as against steeply rising foodgrain import prices. A partial shift of land away from raw material or export crops to food production may not only be sound economics, but also an essential step for national survival. If relative price movements do not bring about this desired change, then structural changes may be needed to compel diversification, as is currently happening in Sri Lanka in the wake of the land reform programme.

Cropping area can also be increased by multiple cropping. This is discussed more fully later. Finally, food production may be expanded by promoting the cultivation of crops such as coarse grains, cassava and sweet potatoes on uplands and on rainfed and marginal lands. Such areas are at present often underutilized because they are not suitable for the cultivation of staple cereals such as rice and wheat.

The successful and widespread adoption of technology associated with the Green Revolution has amply demonstrated the importance of raising yields. However, new technology is required to maintain the momentum of this revolution, particularly in the face of the high cost of inputs. Recent work at the International Rice Research Institute (IRRI) in the Philippines on root zone placement of fertilizers and insecticides has shown that yields can be maintained with half the quantity of fertilizer and one third the amount of insecticides currently used. Increased and more efficient use of organic fertilizer, either in crude or processed form, is also a source of greater food output. The expansion of traditional systems of green manuring and the introduction of better systems of crop rotation require new and inexpensive methods of processing available organic manure, including night soil, and the biological fixation of nitrogen. China has made great advances with organic manures while other countries (e.g. India and the Socialist Republic of Viet Nam) have reported new gains relating to nitrogen fixation.

New directives are needed, however, to raise the national output of food per hectare by increasing yields on a base broader than that of the present 20% of irrigated land in the region, as was done with earlier strategies for the adoption of high-yielding varieties. Such a policy would go beyond maximizing yields only on the better lands, and only for the preferred cereals, to cover other foodgrains grown on rainfed uplands and even marginal lands. In regard to rice, for example, large increases in production could be obtained by using improved varieties on the large areas of rainfed lands in the countries of Southeast Asia, on partly flooded lands in Bangladesh, and by the multiple cropping of rainfed lands using supplementary irrigation, as in Sri Lanka. Similarly, attention given solely to limiting land under shifting cultivation, estimated at over 110 million hectares in the region, would perhaps yield greater benefits if it were directed to improving the management and yields of such lands,

leading ultimately to their stabilization and permanent cultivation.

Given the fact that more than 80% of land in food production in Asia is in smallholdings (of which there are more than 320 million), any realistic attempt to increase output must, at present, be based on them. Changes in technology are therefore needed to meet their particular combinations of land, capital, labour, levels of skill and management. India's establishment of small farmers' development agencies and marginal farmers' and agricultural labour agencies is a recognition of this fact.

Although cropping intensity in the Far East is higher than in any other region, and has been increasing in most Far Eastern countries over the past decade, it has traditionally involved heavy investment in irrigation and long periods of gestation. As a short-term measure, especially for the humid tropics, it would be possible to increase cropping intensity on rainfed lands. There is still plenty of scope for improvement through earlier sowing and better cropping cycles, as well as through supplementary irrigation and water stabilization. FAO has estimated that cropping intensity on such rainfed lands could be raised from 89% in 1970 to 105% in 1985, providing an additional 42 million hectares of cropped area.[12] It is an approach which appears to provide greatest scope at least cost for a rapid expansion in crop area.

Irrigation has already become less demanding in terms of capital and more immediately available through rapid adoption of pumps and tubewells, as in Bangladesh, India and Pakistan. There is, however, ample scope for better returns from existing systems through improved water storage and distribution channels, operational and maintenance facilities, on-farm irrigation practices, and, in general, better water management.

Coarse grains such as maize, sorghum and millet, as well as roots and tubers, continue to provide more than 25% of the dietary energy of the region, and could provide a greater share. A shift to these crops, particularly on uplands and drylands, would not only help to improve nutritional levels of large numbers of marginal and sub-marginal farmers and their families as a result of increased employment and income, but would also provide an opportunity to reduce imports of foodgrains. Further, roots and tubers provide an additional insurance in that they often survive in conditions which destroy or seriously damage the major cereals, as shown in India during the poor harvests of 1974 when many poor people survived on cassava. They also tend to maintain more uniform and higher energy yields per hectare than cereals despite the fact that rice and wheat have used the best land, most of the irrigated land and most of the fertilizers, machinery and other inputs. Despite the lack of a conscious policy to encourage production of roots and tubers in the region, it is not surprising that their output has risen sharply compared to cereals in the period of food scarcities since 1970 (Table 2-2).

TABLE 2-2. — PRODUCTION AND AREA OF SELECTED FOOD CROPS IN THE FAR EAST REGION, 1965, 1970 AND 1975

	1965	1970	1975	Annual change 1965-70	Annual change 1970-75
	.... Million tons			*.. Percent ..*	
Production					
Rice (paddy)	117.4	151.2	148.3	+ 5.2	—0.4
Wheat	17.4	28.2	32.6	+10.1	+3.0
Coarse grains	31.2	42.5	42.9	+ 6.4	+0.2
Roots and tubers	34.0	37.3	46.1	+ 1.8	+4.4
	.. Million hectares ..				
Area					
Rice	77.7	81.3	76.1	+ 0.9	—1.3
Wheat	19.2	23.5	24.5	+ 4.1	+0.9
Coarse grains	54.3	56.8	57.0	+ 0.9	+0.1
Roots and tubers	4.3	4.3	4.9	—	+2.9

Greater dependence on coarse grains and tubers may present some difficulty in changing dietary habits, but in times of food shortage people will eat whatever food is available, which in turn influences their future demand and the acceptability of the food concerned. Thus the people in Bangladesh and Sri Lanka have come to accept (imported) wheat as part of their diet, and, in Sri Lanka, sorghum, cassava and soybeans as well. Moreover, maize, sorghum and cassava flour can gain easier consumer acceptance when used as "extenders" of wheat or rice flour in composite flours and foods. Such a marginal addition of 10 to 20% of cassava or coarse grain flour in a composite flour would make most Asian countries self-sufficient in foodgrains. However, it would entail some restrictions on grain imports, and determination on the part of governments to take some unpopular decisions.

[12] *Review of the medium and long-term problems of the food and agriculture sector*, Rome, FAO, March 1975. COAG/75/3.

As to measures to increase livestock production, it is necessary to re-examine existing policies to determine whether they really make the best use of existing resources and possibilities. There is clearly a danger of following livestock policies adapted to developed countries, where conditions are entirely different from those in the region. An expansion in the raising of pigs, goats and poultry, which are well suited to small farms, could be encouraged, but large-scale beef and dairy enterprises are generally not practicable in the region owing to limited land and feed availability. Cattle could, however, be raised in large commercial units in parts of Malaysia, the Philippines, Thailand and the outer islands of Indonesia where relatively abundant grazing is available. Adapting milk and beef production to small farms and plantations also has some possibilities, as shown by recent experience in Malaysia, the Philippines and Sri Lanka, e.g. through intercropping cassava, maize and other crops between coconut rows, and improvement in grasses. Inclusion of livestock within the pattern of small farm production requires an integrated system possibly including acquaculture.[13]

Finally, a common element of any food production strategy is the reduction of crop losses at pre- and post-harvest stages. Losses occur all along the line through poor management in harvesting, insect, rodent and fungus damage in storage, poor-quality sacks and other containers, inexperienced handling in transport, inefficient or poorly maintained milling equipment and faulty distribution of milled products. The use of extremely low extraction rates to meet the presumed tastes of urban consumers means less food for humans and more food for animals as well as a less nutritive end product. Avoidable losses also occur in the handling and processing of other crops (e.g. oilseeds), since in many small factories an unnecessarily high proportion of oil is left in the by-products. For perishable fruit and vegetables, wastage in distribution quite normally reaches 30 to 40%.

These examples sufficiently indicate the scope for increasing food supplies through reduction of losses, but they also suggest that no single programme would have a significant impact on the general problem. Because the problems are diverse, their solution requires improvements in several directions. Among the most compelling are investment in modern storage for grains and other crops in both villages and larger centres, better packaging materials and transport facilities, modifications in milling practices for cereals and oilseeds, and, more generally, efforts to modernize the organization of wholesale and retail distribution.

[13] *The state of food and agriculture 1974*, Rome, FAO, 1975, p. 37-38.

Regional economic integration

The first meeting of the Association of South-East Asian Nations (ASEAN) to be attended by Heads of State was held in February 1976 to discuss urgent economic, trade and political problems. It resulted in the establishment of a permanent ASEAN secretariat and cooperation in imposing tariff duties and settling balance of payments problems. The Bali Concord arising from this meeting emphasized that political and economic cooperation go together with pledges of principle. Agreement was reached on establishing large-scale industrial plans, preferential trading arrangements and a cooperative programme on basic commodities including food and energy.

A follow-up meeting of the Ministers of Economy of the ASEAN countries in March 1976 agreed on a wide range of projects for economic cooperation. Rice and crude oil were accepted as the first commodities for which they will give preferential trading arrangements. The list of commodities given special trading facilities may be expanded later to include raw sugar, maize, beef, fish, vegetables, coconut and palm oil, logs and sawn timber. Issues that were holding up completion of an international agreement on the stabilization of natural rubber prices were resolved.

The first institutional links between ASEAN and the EEC were established in May 1975 with the setting up of a joint study group to explore possible areas of cooperation. ASEAN is reported to be seeking a trade agreement with the EEC, possibly along the same lines as the EEC's arrangement with the African, Caribbean and Pacific (ACP) countries. ASEAN is also seeking an agreement giving preferential import quotas and tariffs for Southeast Asian goods in the EEC.

Harmonization of development plans and economic policies still remains to be achieved.

In July 1975 six countries (the Republic of Korea, India, the Lao People's Democratic Republic, the Philippines, Sri Lanka and Thailand) signed the Bangkok Agreement for liberalized trade among developing countries in Asia, patterned on the EEC. Bangladesh and Pakistan are also expected to sign under arrangements covered by the terms of the Agreement. The Agreement, which will enter into force when ratified by a minimum of three of the governments involved, may be regarded as the modest beginning of a new era in trade and development in this region. It provides for a continuing process of negotiations aimed at much wider trade

concessions between Member Countries. Initially, it covers 160 commodities and products involving up to U.S.$50 million in trade between the participating Member Countries, with tariff reductions averaging around 33.5%. A wide range of items is covered, including food products (sugar, fish, coconut oil and beans) and a number of manufactured goods, chemicals and minerals. Subregional trading arrangements are also included. Adoption of trade liberalization measures is expected to continue, taking into account the trading interests of third countries, particularly those of other developing countries. While Member Countries are to take measures for the gradual relaxation of quantitative and other non-tariff restrictions to trade, national interests (e.g. a serious balance of payments situation) are protected under the Agreement. Special emphasis is given in the Agreement to the position of the least developed Member Countries.

Groupings based on special interests or commodities continue to make some progress. Agreement to establish an international buffer stock of rubber was reached recently at Kuala Lumpur by the Association of National Rubber Producing Countries.[14] In the first two years of operation the international buffer stock will be about 100 000 tons, of which 52% is to come from Malaysia and 24% from Indonesia.

The Pepper Community has decided to set up its secretariat in Indonesia. The International Seminar on Pepper, which met in India in March 1976, recommended that the Pepper Community take action on a number of matters including the creation of agencies for production statistics and market intelligence, the coordination and stimulation of research on technological and economic aspects of production, and exchange of information on mutual production programmes and policies. The Seminar recommended that national-level agencies (Pepper Authority, Spices Council, Apex Federation) should be established in all the producing countries to maintain contact with the Pepper Community, and that adequate funding should be provided by the respective governments to both the national agencies and the Pepper Community. Other recommendations related to quality control, grades, standards and promotional measures to popularize pepper on a multinational basis. The Pepper Community should undertake studies on the uses of pepper and its products, on marketing and distribution aspects, including promotional efforts to open up new markets, and price stabilization measures, including possibly buffer stocks.

The Asian Coconut Community is beginning to put more emphasis on the production and productivity aspects in its work programme. A large-scale UNDP project to assist the Community for a period of three years was approved in 1975, with long-term objectives of establishing a series of production goals and appropriate processing facilities to meet domestic and foreign market demand for semi-finished and/or finished coconut products. It will help to plan and coordinate Community activities involving coconut production and productivity and prepare annual surveys to make recommendations for further national and/or regional efforts. Efforts will also be made to improve the efficiency and diversification of the coconut processing industries and to provide group training for country participants in the biennial COCOTECH panel meetings, which are held in rotation in Member Countries.

Four countries of the region (Bangladesh, India, the Philippines and Sri Lanka) have joined the Asian Rice Trade Fund, inaugurated in February 1975. The Secretariat of the Economic and Social Commission for Asia and the Pacific (ESCAP) has now commissioned two studies relating to the clarification of the operational details of the Fund and of the rice economy of the ESCAP region, in order to set this scheme on a working basis.

China

1975 was a good year for China's agriculture, with considerable increases in the output of many commodities. The cereal harvest is reported to have reached another all-time high, and although no exact figures have been issued so far, is estimated to have substantially exceeded the 275 million-ton record crop of 1974.

At the same time, 1975 was the last year of the Fourth Five-Year Plan. In the absence of official planning data it is difficult to gauge the country's success in attaining the targets set in 1971, but the Government has issued a number of percentage figures which allow a rough assessment of the progress made between 1949 and 1974. By 1974 the cereal harvest had exceeded the 1949 level by 2.4 times, cotton production had grown by 5.7 times, and the output of cooking oil, sugar, tea and silk cocoons had increased by 12 times or more. The forest area had expanded by more than 100%, and timber output had risen nearly sixfold. Livestock production had grown considerably, with the number of pigs up 5.5 times over 1949.

Drought, pest and cold-resistant, quickly maturing and high-yielding new varieties of all major crop categories have been bred, tested, and introduced so

[14] Association members include India, Indonesia, Malaysia, Papua New Guinea, Singapore, Sri Lanka and Thailand.

rapidly that by the last years of the Fourth Five-Year Plan, the main seed material in use had been genetically totally overhauled three times. Over 80% of the seeds of the principal cereal species in use now come from such improved strains. This has led to a very considerable geographical expansion in the cultivation of many major food crops. Wheat, for instance, is now grown in all provinces, and even in Tibet, where winter wheat has been harvested at an altitude of 4 000 m with yields of over 3 tons/ha. Rice cultivation has expanded northward into many regions which previously were too cold for traditional rice strains. Tea is now harvested on the Yunnan plateau, and rape, formerly a plant of the Yangtze valley, is now grown south of the valley, and considerably further to the north. A favourite new cropping pattern in many communes south of the Yangtze alternates rape with paddy rice, so that two rice crops and one rape crop are harvested each year. This system has made it possible to expand the crop area under rape by 1 million ha since 1970, increasing output by 50%. Similarly, jute and ambari hemp are now being intercropped with several other grains in the southern lowlands or planted on marginal uplands, and this has increased output fivefold since 1971 and helped China to approach self-sufficiency in hard fibres.

One of the long-term performance goals introduced into Chinese agricultural planning almost simultaneously with the creation of the people's communes in the late 1950s was the concept of "passing the Yangtze river" by the country's rural production communes in their efforts to improve yields per hectare. The communes were given the task of raising their cereal production to levels which originally had been attained only by the rich and fertile areas south of the Yangtze. This meant that collectives north of the Yellow river strove to surpass the level of 3 tons/ha; those between the Yellow and the Huai rivers, 3.75 tons; and those south of the Huai, 6 tons. For ginned cotton the respective targets were 300, 450 and 750 kg/ha. For a long time it was doubted whether their attainment was feasible, but by 1975 eight provinces and municipal areas, 44 prefectures and over 700 counties had already "crossed the Yangtze." Moreover, some cereal-deficit areas such as Hobei, Honan and Shandong, although not yet "passing across," were producing surpluses, while self-sufficiency had been reached in provinces such as Shenxi and Gansu, and in Ningxia and Tibet.

The programme for the improvement of land productivity mentioned above forms part of a much more comprehensive policy framework for agricultural modernization, which was first published in 1956 as the "National Programme for Agricultural Development" with a target date of 1968. After some updating and extension to a new time horizon (1980), it has been built up round the "Eight-Character Charter" of farming development covering soil conservation, water control, fertilization, seed improvement, planning, plant and animal protection, cultivation methods, and tool reform and mechanization.

The implementation of this comprehensive programme included the opening up of wasteland for cultivation at a rate of nearly 1 million ha a year during the last plan period. Several million hectares of red lateritic soils in the south have been improved each year by the application of plant nutrients, erosion control, the collection of washed-out topsoil, and terracing. By 1975, 34 million ha, or nearly a fourth of the arable land, had been turned into "high- and stable-yield" crop area, and the number of pump wells in northern China, previously a particularly drought-prone region, had risen to 1.7 million. Water control, irrigation and drainage are now practised on one half to two thirds of all arable land. Each winter, well over 100 million farmers turn out in the slack season to carry out water control and irrigation work in the countryside. The area under "full irrigation" has thus expanded by an average of 1.4 million ha a year.

Twenty-eight large and 700 small fertilizer factories began production during the Fourth Five-Year Plan, while import contracts for 13 more, mostly urea plants, awaited fulfilment from 1976 onward. At the same time, the use of organic fertilizers was greatly expanded, and in some villages now reaches more than 200 tons/ha. Dense planting, a priority for Chinese rice farmers, raised the number of seedling clusters from 90 000-150 000 to 300 000-600 000/ha. Pre-growing and subsequent transplantation of seedlings are now not only applied to rice, but also to other crops, such as wheat in the north. During the Fourth Plan period ten of the major plant pests were successfully eliminated, and the incidence of the rice borer was reduced from 10% to less than 1% of all paddy fields.

With such vastly expanding activities gradually absorbing the former huge surplus of manpower in the villages, a situation has arisen where only sharp increases in labour productivity can meet the growing need for more labour. Some of the most advanced communes reported increases in manpower requirements of up to 70% in three years. Farm mechanization, already selectively started during the two previous plan periods, has therefore become an urgent concern.

This problem provided a major topic at the National Conference on Agriculture held in Tachai,

the renowned Shanxi model village, in September-October 1975. It was emphasized that China would have to attain full mechanization "in the main" by 1980. Other guidelines agreed at the Conference included the continuation and generalization of the political and social reforms by which Tachai and the entire county of Hsiyang Hsien had become models of Chinese agricultural development. These reforms include the use of political labour incentives, the formation of more forward-looking party committees as management centres in the communes and counties, the reinforcement of poor and lower middle class peasant control in commune management, and the intensified participation of village cadres in manual labour. Apart from mechanization, specific economic measures include further diversification of commune production, further reinforcement of agricultural infrastructure, the expansion of research at the county level, higher rates of capital accumulation and of produce marketing, and a higher "level of collectivity." The income and productivity of the poorer work teams are to be raised to the present county average levels. The Conference stated that about 300 out of roughly 2 200 rural counties had now reached "Hsiyang qualities," and recommended that this number should be increased to about half of the total by 1980.

Near East

In the Near East the planning of national economic and social development is well established. Many countries launched new development plans in 1976 [15] and there appears to be a substantial improvement in the planning methodology used. Preparation of annual plans within the framework of the medium-term plan provides some countries with an important tool in adjusting the national plan to changing socio-economic conditions and monitoring its progress. As the availability of financial resources has increased greatly in the region in recent years, more attention is being devoted by planners to investment and plan implementation. Regional aspects of development are also receiving increasing attention, and almost all national plans are concerned with this problem to some extent. Agriculture is receiving greater priority in all the latest plans.

In Iran the Fifth Plan (1973-78) has undergone considerable revision, reflecting the rapid increase in the country's financial resources. It now calls for considerably higher growth rates, with the GDP target being set at 26% per year at constant market prices. The annual growth in agriculture (value added basis) is set at 7% and the share of agriculture in total GDP will decline during the plan period to about 8% in 1978 compared to 18% in 1973. Other objectives for this sector include the efficient exploitation of resources and prevention of their misuse, closing the gap between rural and urban incomes, and the reduction of underemployment through labour-intensive farming practices.

Ambitious targets have also been set in Saudi Arabia's Development Plan (1975-80), of which major objectives are reducing the country's dependence on oil in the long run, and increasing industrial and agricultural output. Agricultural production is expected to increase by 4% annually in order to reduce the country's dependence on food imports. A large increase in the irrigated area by 1980 is planned. Saudi Arabia has many problems in implementing the plan, in particular the shortage of trained manpower, inadequate infrastructure and inflation. An important part of investment is accordingly earmarked for physical infrastructure and education in order to increase the country's development capacity.

Iraq has been actively engaged for the last year or so in the preparation of the next plan covering the period 1976-80. Although no official data are available, it appears that total planned investments will amount to the equivalent of about $30 000 million, of which as much as one third would be devoted to agricultural development. These investments will help to diversify the economy and reduce dependence on oil. Planned increases in agricultural production are expected to reduce food imports and enable the country to attain self-sufficiency in major agricultural products.

Details of Libya's new Five-Year Plan (1976-80) are not yet available, but early reports indicate that the general strategy of the previous plan is unchanged. Development efforts to diversify the economy and to make the country more self-sufficient in food supplies will continue. Total investment in the new plan is believed to exceed $2 000 million, of which approximately 17% will be spent in the agricultural sector.

Jordan has started the implementation of its Five-Year Plan (1976-80) with GDP expected to grow by nearly 12% a year, and agricultural production by some 7%. Agricultural production under the plan is expected to meet a relatively higher proportion of local food demand. Although imports of wheat, beef, mutton and milk will still be needed in 1980, self-sufficiency in barley, potatoes, grapes, poultry meat and eggs should be reached by then.

Oman has launched its first Five-Year Agricultural Development Plan (1976-80) with the basic objective

[15] See Annex Table 13 for details.

of considerable increases in agricultural production and income in order to improve the country's food self-sufficiency and the standard of living of the agricultural population.

Sudan's new Six-Year Development Plan (1977-83) is in preparation. Although no official information on the plan has been released, the sectoral plan for agriculture will probably follow the pattern recommended in the 25-Year Plan (1976-2000) prepared recently in cooperation with the Arab Fund for Economic and Social Development. Under this long-term plan, to be implemented in two phases covering 10 and 15 years, agricultural production is expected to grow rapidly in response to the growing demand for food in the neighbouring Arab countries. Major emphasis is placed on the country's great potential for agricultural development and on investment programmes to remove the infrastructural and institutional restraints holding up the country's development. The plan estimates that investment in the first 10 years will total about $6 500 million, to be financed mainly by the Arab oil-producing countries. An inter-Arab authority has been created to assist in the programme's implementation.

Other countries in the region, including Egypt and Syria, are in the process of preparing or launching new development plans. The Government of Kuwait has established a Planning Board which is now preparing a Five-Year Plan likely to be limited to the definition of broad guidelines for the country's development. Bahrain and Qatar are also attempting to prepare medium-term plans of investment. The Yemen Arab Republic is preparing a Five-Year Plan (1976-80) to follow the current Three-Year Plan.

A REGIONAL APPROACH TO AGRICULTURAL DEVELOPMENT

The Near East faces a unique challenge. The recent large increases in oil revenues provide an extraordinary opportunity for changing the current unbalanced or distorted economic structures of many countries of the region. Most of these countries are clearly intent on breaking the continuity of old patterns of underdevelopment and transforming their oil revenues into productive assets by absorbing modern technology and starting the process of self-sustaining development.

However, the region has a highly skewed distribution of largely different but complementary resources. These large differences in national endowments relate to population, capital and natural physical resources. Oil, the major resource, is subject to rapid depletion. Financial resources earned from extracting oil are also subject to loss and erosion unless converted into reproducible capital. Fortunately, there is plenty of scope for oil revenues to be invested in the region in inter-country activities or projects. Such a regional approach could take advantage of the existing differences in the distribution of resources among countries in the Near East and promote complementarities among them. This could lead to striking improvements in the structure of production, particularly in agriculture.

Oil revenues provide only a temporary accumulation of financial surpluses, at the expense of exhausting the supply itself. If they are to have an impact on the long-term development of the region, the bulk of these revenues should be channelled into efforts to make fuller and more effective use of existing human and physical resources so as to create new reproducible capital assets and thus to increase productivity and raise incomes.

The logic of financial profitability as the sole criterion for determining investment strategy in the region should, in the above context, be seriously questioned. The cumulative concentration in industrialized countries of oil revenues originating in the Near East and northern Africa only intensifies international economic dualism, widens income disparities and perpetuates the underdevelopment of the countries of the region. In view of the limited absorptive capacity of most countries, the thrust of any approach to regional development strategy should focus on raising the absorptive capacity in each country and on the fuller use of underutilized resources. In Sudan, for example, the frontal attack of current regional efforts will focus on the removal of the limitations on the country's absorptive capacity, with major emphasis on institutional and infrastructural development and on technical assistance to facilitate a fuller utilization of its vast agricultural resources.

Until recently, development strategies in the Near East region have given only a subordinate role to the agricultural sector, and attention is still mainly focused on industrialization. However, owing to the uncertain prospects regarding long-term food supplies, and to the increasing import bill, there is now greater official interest in and concern for food problems. As a result, higher priority is being given to agricultural projects at both regional and country levels.

In the absence of an appropriate regional development framework, objectives for agricultural development, as reflected in the development plans of the countries of the region, have been almost entirely focused on the individual interests of these countries. Conflicts in agricultural production and trade policies among Near Eastern countries have eventually arisen.

At present, major emphasis in most current agricultural activities with some regional dimension is on research and the diffusion of technical knowledge. However, it should not be difficult to establish clear and consistent objectives for regional agricultural development which take account of national priorities and interests. The establishment in November 1976 of the Arab Authority for Agricultural Investment and Development, with an authorized capital of $510 million to implement the first investment plan of the basic programme for agricultural development in Sudan, provides concrete evidence of the new regional orientation in agricultural development and increased food production.

About 60% of the region's total labour force draws sustenance and income from agriculture. Although the ratio of agricultural resources to population engaged in agriculture is rather low, the agriculture sector generally plays a key role in non-oil producing countries in the provision of domestic food requirements, export earnings, employment and raw materials for manufacturing. Per caput food production in the Near East has in recent years been improving, but food imports have risen so fast that the region has become the highest per caput food importer of the developing regions. The increase in food production has not only fallen short of the growth in domestic demand, but is also below the growth of population in many countries.

The Near East was a net exporter of food only 15 years ago, but at present a large portion of its food, particularly wheat, is imported. The large increase in the region's food demand in recent years is due to the rapid increases in population and incomes, and to changes in consumption patterns.

With demand for food in the region steadily rising, production will have to expand at a much higher rate than that achieved so far if food imports are not to rise at an even higher rate. Even with a reasonably high growth in food production, in 1985 the projected regional [16] deficits for major food commodities could amount to about 5 million tons of wheat, 2.5 million tons of sugar, 0.5 million tons of vegetable oils and 0.7 million tons of meat. Possibilities for increased food production in the region can be briefly assessed in the light of its agricultural characteristics and current strategies for agricultural development.

The Near East is characterized by arid or semi-arid climatic conditions with seasonal but erratic rainfall. Deserts comprise the bulk of the region's area; only 6 to 7% of land is cultivated and only about 15% consists of pastures and meadows. The scarcity and variability of rainfall constitute a major constraint to the expansion of rainfed crop production. Major development projects thus have logically been concentrated on irrigation. Such projects have made a significant contribution to the expansion of the region's food producing capacity and have helped to reduce excessive annual fluctuations in output, in addition to their role in earning foreign exchange. Where irrigation has been impossible and rainfall inadequate, nomadism and shifting cultivation have been two possible approaches for survival in this arid or semi-arid environment.

Preliminary FAO estimates of the potential for agricultural expansion in the region [17] indicate that over the 1977-85 period about 7 million ha could be brought under irrigation and some 23 million ha could be added to the existing area of rainfed arable land. In rainfed agriculture the critical influence on production is likely to be improvement in land use patterns based on the ecological zoning approach. Despite its relatively limited farm resources, the region appears to possess potential for a significant increase in output from both irrigated and rainfed agriculture, and there are also fair prospects for both livestock and fishery development.

However, the potential for development of the countries of the region varies in relation to the availability of natural resources and the intensity of their utilization. The diversity of agricultural potential arises mainly from climatic differences; the tropical countries in Africa are suited to livestock production and the semi-arid countries of Asia and the Mediterranean have an environment more favourable to growing winter cereals.

In the early 1970s agriculture received about 15% of total investment in the Near East, with agriculture's share in total investment varying from country to country.[18] The general pattern of investment in agriculture in most countries of the region indicates the major role of the public sector. In many development plans, the distribution of investment allocations among the various subsectors of agriculture shows a continued interest in the provision of agricultural infrastructure as reflected in the attention given to large-scale irrigation and land reclamation projects. As these projects are costly and slow-yielding, they have inevitably been the primary concern of the public sector. Irrigation was a major investment in the earlier plans of all countries of the region and current plans continue to show this pattern. In contrast to the emphasis on investment in irrigation, drainage and land reclamation, rela-

[16] Including Algeria, Mauritania, Morocco, Somalia and Tunisia.

[17] Including Algeria, Mauritania, Morocco, Somalia and Tunisia.

[18] See Annex Table 13.

tively little attention has been given to rainfed farming. The livestock, forestry and fishery sectors have also had only a small share of total investment in agriculture, and have been almost entirely neglected in many plans. However, in most plans adequate levels of investment are generally earmarked for the improvement of institutions and supporting services.

At present more than one fourth of total arable land in the region [19] is irrigated, and the same ratio is likely to prevail in 1985. As irrigation has been the traditional field for investment, most of the easily accessible water resources have now been mobilized. Consequently, new irrigation projects have a higher investment cost per unit of area. Agricultural development strategies in new irrigated areas thus need to ensure high net returns through better yields, higher cropping intensity and more appropriate cropping patterns. On the other hand, investment in the existing irrigation areas should be geared to the expansion of their production capacity through effective rehabilitation programmes. As the investment cost per unit of area is lower in this case than in new irrigation schemes, old irrigation systems are generally given higher priority in investment allocation.

Development strategies in rainfed farming have so far emphasized extension of area under crop cultivation, primarily through the introduction of mechanization. This emphasis on horizontal expansion merely reflects the acknowledged limitations on the intensification of crop production under conditions of low and variable rainfall. However, significant increases in production are now possible in many areas with annual rainfall of about 350 mm with the application of suitable techniques and increased inputs. The fallow system in these areas could often be eliminated, and good prospects exist for the expansion of cereal production.

Development strategies in the livestock sector have generally emphasized reliance on natural grazing in marginal and low-rainfall areas. Where the carrying capacity of grazing lands is adequate, livestock herds have increased with the improvement of the range and the regulation of its management. The promotion of semi-settlement around watering points, which allow for the provision of basic social services, has also led to positive social results. Where livestock ownership is considered a symbol of wealth, the value system has hindered technological changes from being carried to their positive conclusions. Under such circumstances, the introduction of production technologies needs to be accompanied by institutional changes.

[19] Including Algeria, Mauritania, Morocco, Somalia and Tunisia.

In some areas, on the other hand, mechanization has been progressively using up marginal rainfed lands that were formerly pastures. Here, the conflict between man and livestock in the use of marginal rainfed land can be meaningfully resolved in many countries of the region by ecological zoning and the adoption of adequate institutional measures. Further emphasis also needs to be given to the integration of crop and livestock production in rotational systems. Where there are possibilities for improving the carrying capacity of natural pastures, prospects for cattle and particularly sheep production appear to be good.

Africa

Food problems and plan responses

The slow pace of change in the predominantly dual agricultural system of most African countries, where food is generally produced on a subsistence basis while large-scale farms produce the greatest part of export crops, is proving insufficient to ensure adequate and sustained levels of nutrition for a fast-growing population. The unfavourable events which have affected Africa in recent years — principally the drought in the Sahel and in several parts of eastern Africa, and the world economic recession — have highlighted the weaknesses in the agricultural economies of African countries and consequently emphasized the need for policy reorientation in food production in particular and agricultural production in general.

In spite of the region's large land and water potential, population pressure on the existing land resources has increased in a situation characterized by a general lack of capital investment for land improvement and the persistence of traditional cultivation methods. Population pressure has on the one hand caused declines in soil fertility and even desertification in various areas by prompting more exploitative or irrational land use and reductions in fallow periods, and on the other hand has caused migrations either toward marginal areas, where vulnerability to weather variations is higher, or outside agriculture. Migrants from agriculture, mostly young people, are moving toward the cities or, within the rural areas, toward part- or full-time tertiary activities, with high levels of open unemployment in both cases. As a result, the age structure of the agricultural population is becoming distorted. Although these phenomena do not occur on a massive scale throughout the region, they appear to be large enough to affect production patterns, especially in the absence of major improvements in technology. While farmers

are still able to produce enough food for themselves and their families when natural conditions are favourable, they are becoming increasingly incapable of producing enough surplus to feed the growing non-agricultural population, partly as a result of the lack of adequate market incentives.

Many African countries have therefore become increasingly dependent on food imports, and projections of cereal deficits indicate that the situation will continue to deteriorate in the future. Dependence on food imports has become a serious hindrance to the development of African countries, especially at a time when, as in recent years, the balance-of-payments deficits of many of them have grown dramatically under the combined effect of rapid increases in prices of manufactured goods and oil and oil-derived products, and of the decline in economic activity in developed countries which has caused a lowering in the volume of exports from tropical African countries. Although there were signs of improvement in 1976, particularly in the prices of coffee and cocoa, the long-term picture remains basically unaffected.

There has recently been a growing awareness of these problems on the part of African governments, and many countries now advocate more inward-looking strategies of development in which agriculture and agro-based industries play a major role. Food self-sufficiency has become a major goal in development planning. It was emphasized by the Ninth FAO Regional Conference for Africa, held in Freetown, Sierra Leone, in November 1976. In the Freetown Declaration, Member Governments "request the FAO, WFC and any other relevant international organizations, in cooperation with member states of the OAU and the ECA, to draw up a Regional Food Plan which would, on its implementation, enable member states of the OAU to be self-sufficient in food within a period of 10 years."

A number of recent national development plans explicitly express the attainment of food self-sufficiency as a major goal. Among these are the plans of Congo, Ivory Coast, Mauritania and Nigeria. Self-sufficiency in food will be the leading objective of Zambia's development plan for 1977-81, and is expected to be one of the main goals of the Third National Development Plan of Tanzania. In other plans the intention of increasing food production to the point of attaining non-reliance on imports is expressed in relation to given commodities. Such is the case in Sierra Leone, which aims at attaining self-sufficiency in rice, the main staple of the country, for the current plan period (1975-79), and in Somalia, which expects to be self-sufficient in sorghum, maize, edible oils, fruits and vegetables by 1978. Preliminary information on Tunisia's new plan indicates that one of the targets will be self-sufficiency in meat by 1981.

The formal adoption of these goals represents a distinct shift of emphasis, and constitutes an initial response to the recommendations of the World Food Conference, as well as to the challenges posed by the critical food situation of the first half of the 1970s. To what extent declarations of principle will be translated into action remains to be seen. Clearly there is a need for higher investment in agriculture. In the plans issued in the early 1970s in Africa, however, the share of agriculture in total investment seldom exceeded 20% and was often below 10%. New plans generally call for higher investment in agriculture, but an overall pattern showing intensification of financial commitments in agriculture in relation to other sectors has not yet emerged clearly.

The relatively low level of savings and foreign exchange earnings makes the level of investment in African countries heavily dependent on the availability of external resources. From recent plans or preliminary plan information, it appears that the share of external resources in the total plan outlay varies widely, ranging, for example, from zero in Nigeria, an oil-exporting country, to 15% in Kenya, 20% in Morocco, 33% in Sierra Leone and considerably more than 50% in Niger and Senegal. Apart from oil-exporting countries, very few countries in Africa can claim full control over the level of investment.

Increasing food production is only one aspect of a strategy for self-reliance. Other important elements are protection against the oscillations of external demand for African products, and reduction of vulnerability to weather fluctuations. With respect to the first point, several new plans (e.g. those of Cameroon, Liberia and the Sahelian countries) call for a diversification of agricultural production. The countries of the Sahel illustrate the second point as well, since they have recently adopted a common long-term strategy aiming at the achievement of food self-sufficiency independent of climatic vagaries, and the promotion of their self-sustained development.

In December 1976 the Council of Ministers of the Permanent Inter-State Committee for Drought Control in the Sahelian Zone (CILSS) approved in principle a strategy proposal for the attainment of these goals as recommended in FAO's perspective study for the development of the Sahel.[20] The quantitative long-term objectives for the year 2000 envisaged by CILSS are to double (in comparison with the situation before the drought) the production of maize, millet, sorghum and meat, obtain

[20] *Perspective study on agricultural development in the Sahelian countries, 1975-1990*, Rome, FAO, 1976.

a fivefold increase in output of rice, and reach a target of 500 000 tons of wheat per year. By far the largest part of the cereals will still be grown in rainfed areas while one fifth to one quarter will be produced on irrigated land. The strategy includes development of new land for rainfed cultivation, especially in the less arid areas of the south, to prevent soil overexploitation and degradation; intensification of productivity in presently rainfed areas, with a diversified application of fertilizers, pesticides and mechanical implements; reduction of plant vulnerability to drought through the use of quick-growing varieties; development of irrigation in up to one quarter of the 2.3 million hectares constituting the potential irrigable land in the Sahel; development of livestock production to ensure by the year 2000 a slightly better meat production per caput and bring exports back to the 1970 level, while avoiding the deterioration of the ecological equilibrium of the Sahel and the recurrence of massive drought-induced mortality; and development of fisheries to provide a quantity of proteins equivalent to those supplied by livestock. These lines of strategy would have to be accompanied by the development of human resources through a strong rural reorientation of the educational system; by programmes of reforestation; by adaptation of research and technology to local conditions; by price policies encouraging the producer; and by better marketing, storage and transport systems.

It is expected that national plans will reflect the principles expressed in the CILSS proposed strategy. Niger's plan for 1976-78 calls for an increase in food crop area (while a reduction in the area for cash crops would be compensated by higher productivity), as well as for the creation of a food reserve system and the development of an irrigation network to improve the food security situation in the country.

While most African countries appear to perceive clearly the importance of pursuing the growth and stability of agricultural production, in particular food production, they are also concerned with the problems of social inequalities in growth and the exclusion of part of the population from the process of development. Thus, some of the recent plans (e.g. those of Congo, Kenya and Liberia) recognize the need to promote a more equitable regional and social distribution of the benefits of development, while Nigeria's plan aims at fostering rural employment and promoting integrated rural development. Similarly, one of the goals of Cameroon's plan is to raise the incomes and improve the living standards of small farmers and livestock breeders, Zambia's plan aims at providing better social infrastructures and improving the level of housing, education and health services in rural areas, and that of Liberia calls for the total involvement of the population in the development process.

However, as the Conference of African Planners noted in its Sixth Session held in Addis Ababa in October 1976, while most development plans in Africa do contain priority objectives concerning the equity aspects of growth and the people's participation in development, "these objectives frequently seem to be lost sight of in the formulation of concrete development activities or to be essentially very long-term objectives with little chance of realization in the foreseeable future." Uneven social distribution of growth and its attendant problems are recognized in many of the plans in Africa, "but they are rarely dealt with in explicit terms. Although employment generation, income distribution, popular participation, improvement of levels of living of the poor majority and population programmes are mentioned, specific statements are generally not made about them as targets to be achieved during the planning period ... While regional balance through regional development activities has recently been appearing prominently as a development objective, it is not evident that many concrete steps are being taken to deal with the main issues." [21]

The gap between plan targets and results actually achieved partly reflects the inadequate economic policies followed in Africa. This is not only applicable to the social goals to which the Conference of African Planners referred but, at least for many countries, to economic goals as well. The identification in development plans of the need for a higher, more stable and more diversified food and agricultural production, for a less skewed income distribution, for an increase in the number of the employed, especially in rural areas, are positive signs of the perception on the part of African governments of the fundamental issues which face their society, and of their will to solve them. However, formidable constraints still make it difficult to realize such goals. Actual results will depend on the firm determination of governments to carry out plans, on the betterment of the existing administrative structures through which government decisions are executed, and on the active commitment of the international community to easing the financial limitations with which the less privileged African countries are faced. The Club des amis du Sahel offers a significant positive example in the latter respect, through its active role in identifying the crucial development problems of the Sahel, bringing them to the attention of the international community,

[21] United Nations, Economic Commission for Africa. Conference of African Planners, Sixth Session, Addis Ababa, 21-29 October 1976, *Application of a unified approach to development analysis and planning under African conditions.* Document. E/CN.14/CAP.6/4.

and mobilizing and coordinating the financial resources needed by the Sahelian countries to overcome these problems.

Rural development strategies aimed at attaining self-reliance

Many different approaches to rural development adopted in Africa have been aimed at attaining self-reliance, with particular emphasis on the lowest income groups. The diversity of the approaches lies in their design and implementation, the breadth of their objectives, the size and composition of their target populations, and the degree of integration of production activities with other development activities. As examples of these strategies, which are increasingly gaining hold in the region, the experiences in Ivory Coast, Ghana, Nigeria, Ethiopia and Tanzania will be briefly reviewed below.

In Ivory Coast, the administration of rural development is mainly the responsibility of public and parastatal agencies whose primary aim is to expand the production of specific crops, especially cocoa, cotton, rice, sugarcane, tobacco, oil palm and coconuts. This has been facilitated by the evolution of a relatively dense and well-organized network of development agencies and institutions in the rural areas. The institutions that form the core of the rural development effort include the Autorité pour l'aménagement de la région sud-ouest and the Autorité pour l'aménagement de la vallée du Bandama, the two autonomous regional development corporations; the Centres de formation des animateurs ruraux, whose programme includes the training of "master" farmers in special institutions; the Office national de promotion rural, which promotes community development programmes; and the Centre national de promotion des entreprises coopératives, which guides the promotion and formation of cooperative societies. The combined effort of these institutions has made the rural development programme in Ivory Coast relatively successful in raising agricultural productivity and average rural incomes. However, the objective of involving rural people in the formulation of policies that affect them and in the direction of rural development programmes that are designed to help them is proving less easy to attain.

In Ghana and Nigeria, the worsening food shortages and the consequent increase in food prices since the 1960s have inspired campaigns for self-sufficiency in food production. The "Operation Feed Yourself" programme in Ghana and the "Operation Feed the Nation" programme in Nigeria have been placed on an emergency footing, and through the Ministries of Agriculture, armed forces and paramilitary units, farmers have been exhorted to grow more of certain essential food crops for which the governments have assured market outlets and guaranteed minimum prices.

Convinced that large-scale mechanized farming units lend themselves to immediately larger increases in productivity than the traditional small-scale peasant farm units, the Governments of Ghana and Nigeria have established state farms (operated by state corporations) and settlements consisting of large-scale farm units (operated by young farmers with government assistance in the form of extension services and financing) as alternatives to the plantation system of producing export crops and the traditional small-scale farming system of producing food crops and raising livestock. Farm institutes have been established to train young prospective farmers for these settlements, whose sizes range between 200 and 600 ha per farm.

Although there were immediate increases in certain food crops, such as rice in Ghana, these approaches have the disadvantage of requiring high capital outlays. They also leave the mass of small peasant farmers unaffected.

In Ethiopia an integrated rural development strategy, in which scarce resources are concentrated within clearly defined geographical areas in the form of a coordinated package of activities and services, was adopted in 1967 as the major means of initiating and accelerating economic growth and development. The package consisted of adaptive research, extension, credit, input supply and marketing services. Farmers' participation in decision-making and the dissemination of new techniques were sought by promoting multi-purpose cooperative societies and by the election of "model" farmers.

Initially, emphasis was put on "intensive" package programmes covering limited geographical areas that have the greatest potential for success, but this approach proved too costly for expansion on a larger scale. Therefore, the MPP (Minimum Package Programme) was initiated in 1971, based on the concept of concentrating efforts on a few proved innovations (mainly fertilizers and improved seeds), but covering a large number of farmers throughout the country. Both the intensive and the minimum package projects have generated substantial increases in output and income. But by March 1975 they had reached no more than 10% of the target population. At that time the conditions under which the package projects operated were changed considerably as a result of the Land Reform Proclamation, by which land was nationalized and the former land tenure system abolished. Their future should be enhanced by the viability of the "farmers' associations" that were

created after the Land Reform Proclamation with the following purposes: (1) either to collectively farm or to distribute land to farmers living within an 800-hectare area; (2) to establish judicial committees to hear land disputes arising within their area; (3) to provide the structure for agricultural services (e.g. credit, marketing and agricultural operations) by establishing cooperative societies and labour associations; and (4) to obtain resources and set priorities for the development of social and economic infrastructure (e.g. schools, clinics, roads and water supply), more or less along the lines of the ujamaa villages in Tanzania.

Ujamaa vijijini (or rural socialism) is Tanzania's unique approach to rural development. What makes it different from most of the approaches discussed above is that it is as much an ideology as a development programme. It is a movement based on the explicit assumption that rural development means more than economic progress. Ujamaazation is a process in which a group of farm families is brought to live together in a village and work together on a common farm for the common benefit. The activities of the village and the type of production undertaken, as well as the distribution of crops and other goods they produce, are determined by the villagers themselves. The ultimate goal is the transformation of Tanzanian society by improving the living standards of the poorest segments of the population and organizing rural life on a collective basis.

The concept of ujamaa was worked out over a number of years and was crystallized in the Arusha Declaration of 1967. Prior to this declaration, the Village Settlement Scheme, which relied on a high-cost programme of establishing cooperative farms on virgin land, and the continuation of conventional extension methods, suffered from insufficient farmer participation. It appeared neither to benefit them nor to restructure their societies as was anticipated. With the Arusha Declaration and the Government's firm commitment to create an egalitarian society, the ujamaa movement has been accelerating considerably.

An indication of the Government's commitment to improve overall rural welfare is the increased allocation of social services to ujamaa villages in the past few years, and the restructuring of administrative procedures, which since 1972 has allowed for decentralized decision-making in the planning and implementing of ujamaa activities. The role of the central ministries was reduced to one of developing broad policies and providing specific technical advice, and ujamaa village activities were made the responsibility of regional and area commissioners. It was hoped that this reform would encourage the initiation of development plans at the very botton of the administrative structure (i.e. the ujamaa villages themselves) to be brought up to the central political authority for approval through the district and regional organs.

It appears that ujamaazation has to offer clear-cut economic advantages over traditional modes of social organization in order to have long-lasting success.[22] With this in mind, the Government has adopted a go-slow policy toward enforcing collectivization, while allowing the rate of villagization to be accelerated. By December 1976, 85% of Tanzania's 15.4 million people were living in 7 684 ujamaa villages. These villages vary widely in the level of their organization, functioning and attainment of self-reliance, in accordance with one of the basic tenets of ujamaa.

Regional economic cooperation and integration

Interest in fostering economic cooperation and integration schemes has been steadily gaining ground in Africa. Several regional and subregional groupings have sprung up during the past 10 to 15 years,[23] and concrete initiatives have recently been taken by African governments to pave the way for more tightly knit schemes that would promote intra-African trade and other economic links on a wider scale. As agriculture is the most important economic activity in Africa, almost all of the integration schemes have significant bearing on the development of agriculture in the region.

The progress of most of the integration schemes, whose major aim is the promotion of intra-African trade, has been much slower than anticipated, as the level of intra-African trade is estimated not to exceed 10% of the region's total external trade. Even more disappointing is the fact that there has been a declining trend in intraregional trade in the past few years, whereas external commercial exchanges of African countries have shown slight increases. Hence it would be important to consider the reasons for such a slow progress, as they would provide valuable lessons for both existing and future schemes. The reasons are complex, and specific details tend to vary from case to case. However, there are a few

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[22] Vail, D.J., *Technology for socialist development in rural Tanzania*, document, Seventh Annual Meeting of the African Studies Association, Chicago, November 1974.

[23] Some of the major groupings that were still functional in 1976 include: the West African Economic Community (ECOWAS), the West African Rice Development Association (WARDA), the West African Clearing House (WACH), the Mano River Union (MRU), the East African Community (EAC), the Joint Afro-Malagasy and Mauritian Organization (OCAMM), the Customs and Economic Union of Central Africa (UDEAC), the Onchocerciasis Elimination Programme (OEP), the East African Agricultural and Forestry Research Organization (EAAFRO), and a number of river basin development groups, such as those for the Niger, Senegal and Gambia river basins.

problems which appear to have been common to most of them.

Several of the early economic alignments in independent Africa were modifications of earlier colonial groupings. With the emergence of independent African governments that have varied political outlooks and economic interests, these groupings have often had to face severe threats to their continued existence. The continuously waning enthusiasm is to a large extent due to the fact that, under the original setups of the schemes, member states in general had very little to offer each other in economic terms. They are usually traders of primary produce or raw materials whose main markets are outside the continent. In fact, the primary reason why the colonial governments initiated these groupings was to coordinate the flow of essential raw materials and primary products to their own countries.

Even in cases where the integration schemes had few or no connections with the colonial period, there were major obstacles to their progress because most of the member countries have traditionally produced a similar range of goods, leading to a widespread prevalence of competing rather than complementary economic structures. In Africa it is not uncommon to find similar processing industries and agro-industrial development programmes on both sides of common borders.

The fragility of integration schemes is further enhanced by the disparity in economic strength of member states. There is a tendency for a disproportionate share of benefits of integration to flow to the relatively more developed partner countries. Quantified measurement of benefits and costs of economic cooperation and integration is complex, but in general the improvements in the intraregional balance of trade of a particular member country and/or the concentration of new regional investment projects in that country represent crude evidence of gains from an integration scheme. Therefore, in the absence of special programmes to counteract tendencies toward polarization, the poorer member states have generally felt that it is only the richer ones that benefit most definitely from the schemes, while their own prospects for future gains remain speculative.

Associated with this problem of unbalanced development of members of integration schemes is the weakness in regional infrastructure that is generally found throughout Africa. Most integration schemes in the region are required to function without adequate intraregional transport and communication facilities and with poor financing and clearing facilities for intraregional trade. Absence of such facilities, together with limitations on storage and market intelligence, seriously weaken the promotion of intra-regional trade. In particular, the least developed member countries are placed in a very unfavourable position, as they tend to depend initially on relatively bulky agricultural products for expanding their exports to the regional markets.

Another important factor that has weakened the effectiveness of economic cooperation schemes in the past is that Africa has remained divided into different monetary zones which have maintained close relations with the former colonial powers, as clearly exemplified by the existence of a "franc zone" and "sterling zone." This represents a negative element in the growth of intra-African trade, particularly since trade settlements among African countries are made in the major reserve currencies, i.e. the U.S. dollar, the French franc and the pound sterling, and the payment orders for bills are processed by foreign banks situated in New York, London, Paris, etc. Among the numerous disadvantages of such a practice are the delays in settling payments, the high cost of services performed by intermediaries, and the greater possibility for imprudently using the meagre foreign exchange reserves for non-priority items. Furthermore, the existence of exchange controls in the different countries has introduced a certain amount of rigidity in transactions, and makes for an excessively long and costly administrative procedure in monetary transfer operations.

The above review of experience in cooperation and integration schemes in Africa suggests that future initiatives should give greater emphasis to an integrated development of key sectors that would lead to a greater balance in development among individual member countries. The pooling of scarce resources should be encouraged to facilitate their more effective and efficient utilization. This is particularly important with respect to the facilities for basic research, high-level technical training, and production of basic agricultural inputs such as fertilizers, pesticides and improved seeds, etc. Cooperation in these areas also facilitates exchange of information and experience. Elimination of payments and exchange control problems through the creation of appropriate regional and subregional institutions could also facilitate the promotion of intra-African trade.

Only a few integration schemes in Africa have been designed to pool scarce resources from member countries to develop common subsectors that are vital to their economies and to combat livestock and crop diseases and pests that transcend national boundaries. Among these are the West African Rice Development Association (WARDA), whose members include Benin, Gambia, Ghana, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo; the East African Agricul-

tural and Forestry Research Organization (EAAFRO), whose current members include Kenya, Tanzania and Uganda; and the Onchocerciasis Elimination Programme (OEP), whose membership consists of Benin, Ghana, Ivory Coast, Mali, Niger, Togo and Upper Volta. WARDA's major aim is to make western Africa self-sufficient in rice, the most important staple food, through a coordinated long-term programme of research and development in collaboration with national and regional research institutions. Through coordinated national efforts that may require as long as 50 years of continuous involvement, OEP aims to eradicate the buffalo gnat (*Similium damnosum*), which transmits river blindness, from infested areas and render vast territories available for livestock and other agricultural development.[24]

Another new African integration scheme is the West African Clearing House (WACH), which was created as the first major African experiment in multilateral monetary cooperation in order to eliminate some of the pressing payments and exchange control problems that have been retarding intratrade in western Africa. The major objective of WACH (whose current members are Benin, Gambia, Ghana, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo and Upper Volta) is to provide facilities through which the participants can use their own national currencies for imports from members of WACH, thereby economizing on the use of foreign exchange reserves and transfer costs. Through its promotion of the use of currencies of member countries for subregional trade and other transactions, WACH also hopes to encourage trade liberalization and monetary cooperation among members. Past experience in the settlement of payments of goods and services on a multilateral basis seems to favour the attainment of this major objective. For example, at present about 75% of recorded trade flow within western African countries is accounted for by members of the "franc zone" while the remaining 25% is among members of the former "sterling zone." The major reason for this lies in the payment mechanism, through which transactions among countries in the same monetary area are easily settled in the area's currency, as is the case with the West African Monetary Union, whose common currency is the CFA franc, and where all transfers within the area are free.

[24] FAO, WHO and the World Bank are pooling their resources and expertise in jointly assisting OEP.

3. ENERGY AND AGRICULTURE

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3. ENERGY AND AGRICULTURE

Introduction

With the introduction of agriculture, man began to apply energy to control the growth of plants and animals, in order to make better use of the solar energy stored in plants by photosynthesis. For many thousands of years, the only energy he used for this purpose was his own human energy. The energy he drew from the biosphere was limited to the dietary energy provided by his food, and to the use of vegetation as fuel for heating and cooking. Later he learned to harness animal, water and wind energy in order to obtain power for transport and for simple agricultural and industrial processes. As his numbers grew, his use of energy increased steadily, but all of it came from renewable resources.

It is only in the last 100 years or so that man has come to draw significantly on non-renewable sources of energy in the form of fossil fuels. These are deposits of organic material that over millions of years have been transformed by geological processes into such products as coal, oil and natural gas. Rapid improvements in technology made it possible to locate and extract increasing quantities of fossil fuels with little or no increase in cost. By the 1950s and 1960s the world had come to take for granted what appeared to be a plentiful and assured supply of cheap petroleum.

At U.S.$1.50 per barrel of petroleum, the ruling price at the end of the 1960s, one dollar purchased 4×10^9 joules [1] of energy. A man requires 1.05×10^6 joules (250 kilocalories) of dietary energy per hour of moderate activity. One dollar's worth of petroleum was thus equivalent in energy terms to 3 800 hours of human labour. No wonder, then, that energy-intensive methods of production spread rapidly in both the industrial and agricultural sectors of the developed countries, and that the developing countries too were launched along the same path.

All this changed abruptly with the raising of petroleum prices in the 1970s, and especially since October 1973. Not only had the essential energy input into so many industrial and agricultural processes suddenly become much more expensive, but there was also a belated realization that the finite, non-renewable resources of fossil fuel were being rapidly depleted. Many oil-importing countries ran into serious balance-of-payments difficulties, and inflation rates accelerated. In the agricultural sector the relative prices of inputs and of agricultural products changed sharply (although this was not entirely the result of the higher oil prices), affecting the profitability of using the energy-intensive inputs, such as chemical fertilizers and farm machinery, on which farmers had come to rely.

It therefore became imperative to find ways of economizing in the use of the expensive and rapidly depleting supplies of fossil fuel, and to develop alternative sources of energy as quickly as possible. In the last few years a large number of studies have consequently been made of world energy resources and requirements, including several dealing with the agricultural sector. Although agriculture uses only a small share of the world's total energy consumption, it is generally recognized that its needs are crucial, since the existing technologies for increasing production rely so heavily on energy-intensive inputs.

The studies of energy use in agriculture have been mainly confined to the developed countries. Most of the readily available information concerns these countries, and they are responsible for a very large proportion of the total energy used in the world's agriculture. A recent FAO study [2] made a preliminary examination of energy for agriculture in the developing countries, and the present study is essentially a continuation and expansion of this. Although it aims to present a world picture, it concentrates wherever possible on the developing countries.

This emphasis appears justified for several reasons.

[1] The "joule" is the conventional unit measuring energy. One joule is equivalent to one watt-second, 2.78×10^{-7} kilowatt-hours, 0.239 calories, 9.48×10^{-4} British Thermal Units, 3.4×10^{-5} grams of coal, 2.3×10^{-5} grams of oil. 1×10^6 joules = 1 million joules, 1×10^9 joules = 1 000 million joules, and so on.

[2] Energy for agriculture in the developing countries, in FAO, *Monthly Bulletin of Agricultural Economics and Statistics*, 25(2), February 1976, p. 1-8. See also Makhijani, Arjun and Poole, Alan, *Energy and agriculture in the Third World: a report to the Energy Policy Project of the Ford Foundation*, Cambridge, Mass., Ballinger Publishing Company, 1975.

An attempt to assemble the limited available information on these countries is badly needed. It is in the developing countries that the biggest increases in food and agricultural production are required. Because of the relatively early stage of their agricultural development, and because for many years these countries will still possess abundant supplies of cheap agricultural labour, it is possible that they may have alternative options to the energy-intensive path of agricultural development followed in the developed countries.

The study begins by summarizing some of the available estimates of the existing and potential energy resources of the world, and the present and likely future consumption patterns. As this subject is somewhat remote from agriculture and most of those concerned primarily with agricultural development are probably unfamiliar with it, the summary provided here may be essential background for them to examine the energy requirements of agriculture. The account of energy resources and consumption, moreover, pays particular attention to those areas in which the agricultural sector is itself a source of energy. Plant and animal products and residues, especially fuelwood, are already important energy sources. They could become even more important through the further development and use of methods for their transformation into such readily usable fuels as methane.

The study distinguishes between commercial and non-commercial sources of energy. The former are those which either involve a technology of energy conversion or enter commercial channels. The latter are consumed directly as fuel, without being altered through the use of a conversion technology and without being formally marketed. Non-commercial sources of energy, including fuelwood, plant and animal residues and human and animal energy, are very important in the developing countries, especially in rural areas. Unfortunately, however, data on such sources are extremely scanty.

The main basis of the study consists of preliminary estimates of the commercial energy consumed in the production and use of chemical fertilizers, farm machinery, irrigation equipment, and pesticides. Although they are still capable of considerable refinement, and exclude a number of more minor agricultural inputs that use commercial energy, these estimates make possible a preliminary assessment of such important magnitudes as the total use of commercial energy in agricultural production,[3] agriculture's share of the world's total commercial energy consumption, commercial energy use in agriculture at different levels of development, and the share of the main energy-intensive inputs in the agriculture of each of the main regions of the world.

The study of these inputs pays particular attention to the possibilities for economizing in their use. There is also a discussion of the energy requirements of the whole food chain, including processing, transport, marketing and food preparation, besides food production itself. The available information on this is confined to the developed countries, but it is clear that it is in these parts of the food chain that the developing countries have the greatest scope for taking a different path from the energy-intensive one so far followed by the developed countries.

The concluding section of the study looks at the limited available information on the recent changes in the economics of using the main energy-intensive inputs for agriculture, and attempts a broad assessment of future prospects. It is hoped that, together with the basic information contained in the earlier parts of the study, this will assist governments, especially those of developing countries, in arriving at a realistic assessment of the energy requirements of their agricultural sectors and how best to obtain them.

[3] The study is confined to crop and livestock production, and excludes the use of energy in fishery and forest production.

Energy resources

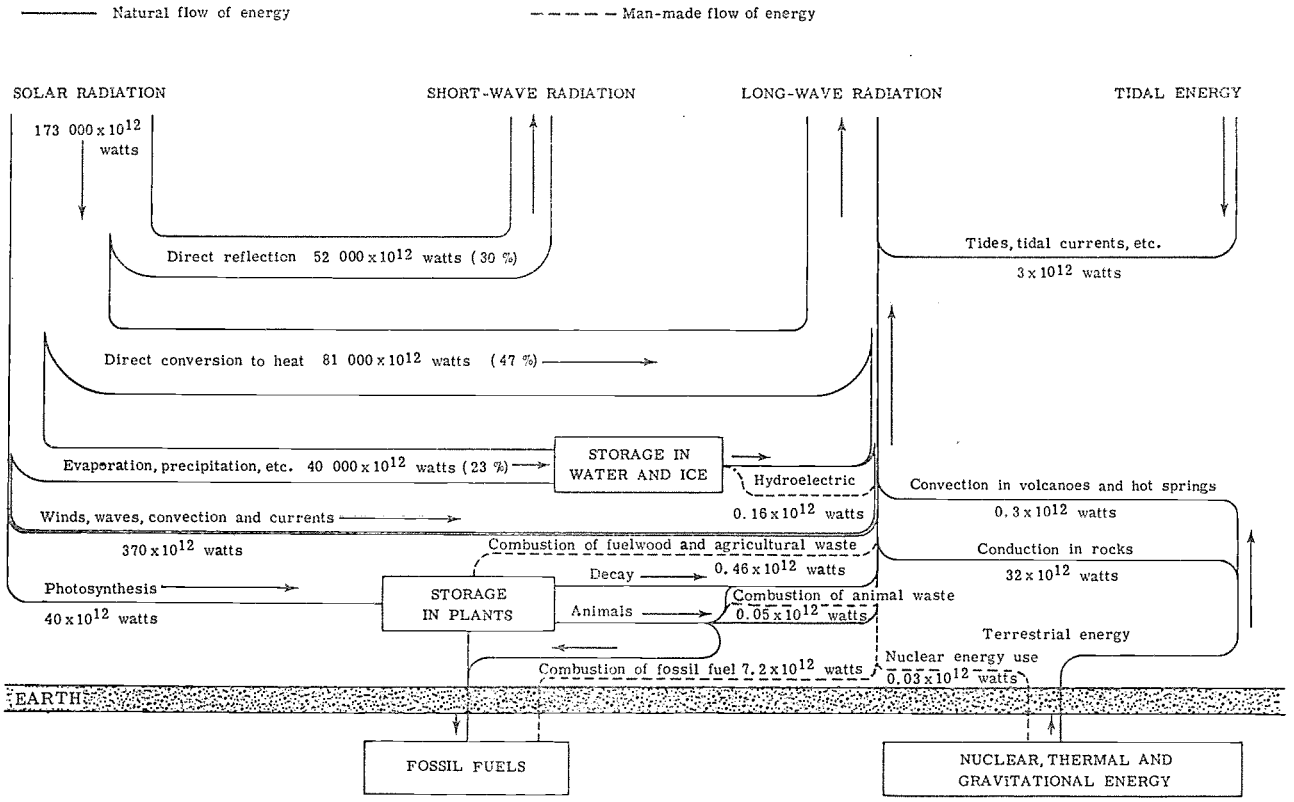
Energy flow through the biosphere

Energy enters the biosphere either naturally or through the action of man. The main natural sources are solar, geothermal, and gravitational energy. Those introduced by man include fossil fuel and nuclear energy. In addition, man can alter the energy flow within the biosphere by controlling moving water to produce hydropower, by using wind, tides and naturally occurring steam or hot water to produce power, and by utilizing vegetation and animal wastes as fuel.

The solar radiation reaching the outer fringe of the terrestrial atmosphere is about 1 395 watts/sq.m.[4] The total solar radiation intercepted by the earth is thus approximately $173\,000 \times 10^{12}$ watts

[4] Hubbert, M.K., The energy resources of the earth, *Scientific American*, 225(3), September 1971, p. 61.

FIGURE 3-1. — ENERGY FLOW THROUGH THE BIOSPHERE



SOURCES: Adapted from Hubbert, M.K., The energy resources of the earth, *Scientific American*, 225(3), September 1971, p. 62-63. Data on man's energy use of hydroelectric, fossil fuel and nuclear energy from United Nations, Statistical Office, *World energy supplies 1950-1974*, New York, 1976, Statistical Papers, Series J, No. 19; fuelwood from FAO estimates in Table 3-3; and agricultural waste from Earl, D.E., *Forest energy and economic development*, Oxford, Clarendon Press, 1975, p. 20.

(Figure 3-1). About 30% of this total is reflected back into space as short-wave radiation. Some 47% is converted into heat and absorbed by the atmosphere, the oceans, and the earth's land masses, but most of this is immediately returned to space as long-wave thermal radiation. About 23% is responsible for the action of the hydrological cycle (mainly evaporation and precipitation). To power the wind, waves, and convection currents of the earth requires 370×10^{12} watts. Finally, about 40×10^{12} watts are used in photosynthesis for plant growth.

The rate of flow of geothermal energy into the biosphere as heat by conduction from the surface of the earth is about 32×10^{12} watts, and as heat convection by hot springs and volcanoes is about 0.3×10^{12} watts.

The rate of flow of gravitational energy, in the form of ocean tides derived from the relative motion of the earth, moon and sun, is estimated to be 3×10^{12} watts.

Of the energy flow introduced into the biosphere by man, fossil fuel is by far the most important source, being introduced at the rate of 7.2×10^{12} watts in 1974. Nuclear power accounted for only 0.03×10^{12} watts in that year. Man also introduces energy flows through his conversion of resources available within the biosphere, mainly through the combustion of fuelwood and agricultural waste (0.46×10^{12} watts in 1974), the generation of electricity using hydropower (0.16×10^{12} watts), and the combustion of animal waste (0.05×10^{12} watts). Harnessing the energy available in ocean tides, hot springs and wind is being attempted, but energy from these sources was insignificant in 1974.

In comparison with solar radiation, the rate energy is released by man is minute, but it is very large in relation to many of the other natural flows of energy. For example, the rate of release as a result of man's activities in 1974 (8×10^{12} watts) was almost 30 times the rate of energy flow from hot springs and volcanoes, almost three times the rate from tides, and one fifth of the rate energy is stored in plants through photosynthesis each year. If recent trends continue, man will be releasing energy at the rate of 18×10^{12} watts by the year 2000.

Classification of energy resources

Energy resources may be classified as renewable or non-renewable (Table 3-1). The latter include fossil fuels such as coal, oil and natural gas, as well as nuclear fuels. Millions of years are required to form exploitable deposits of these fuels.

Renewable energy resources include photosynthetic products such as fuelwood and agricultural waste, direct solar conversion, water and wind power, and geothermal energy. If they are utilized rationally, they can provide energy indefinitely, but if they are exploited too rapidly some of them may be subject to depletion and eventual exhaustion. For example, photosynthetic energy resources have biological limitations on their rate of growth, so that where they are exploited faster than regrowth is taking place their capacity to regenerate may be destroyed.

It is also desirable, as already noted, to differentiate between commercial and non-commercial energy resources. The former include fossil fuels, nuclear fuel, geothermal energy, wind and water power, and the conversion of solar energy to mechanical or electrical energy, as well as forest products if converted to charcoal, and agricultural waste if used to produce gaseous fuels such as methane through a biological conversion process.

Non-commercial energy resources include fuelwood, crop residues and animal waste when consumed directly as fuel. Whereas nearly all the energy consumed in developed countries comes from commercial sources, in the developing countries a large part is non-commercial.

TABLE 3-1. — CLASSIFICATION OF ENERGY RESOURCES

Energy source	Non-renewable	Renewable
Solar	Fossil fuel: Coal Oil Natural gas Oil shale Peat	Photosynthetic: Fuelwood Agricultural waste Photosynthetic fuel Direct solar conversion Hydropower Wind power
Gravitational		Tidal energy
Interior	Nuclear: Thorium Uranium	Geothermal energy

Commercial energy resources and consumption

The major commercial energy resources in use at present are fossil fuels, nuclear fuel, and hydroresources. The total energy content of "proven recoverable" resources of these three categories was estimated as about 21.6×10^{21} joules in 1971.[5] Over 96% of this energy was in the form of fossil fuels (coal 69%, oil 18%, and natural gas 9%). Nuclear fuel accounted for about 3.9%, and hydroresources 0.1%.

The distribution of these resources is very uneven. The developed countries, including eastern Europe and the U.S.S.R., have over 68% of total proven resources (more than 30% in North America alone); Africa, Latin America and the Far East each have only 2 to 3% of the total. The Asian centrally planned economies have 10% and the Near East 13%.

North America has by far the largest reserves of coal, with 37% of the world total. The Near East has 60% of the known reserves of oil. Hydropower, although a very much smaller source than the fossil fuels, is the most evenly distributed of the commercial energy resources. Africa has about 26% of the potential, followed by Latin America with 17%, the Far East with 11% and the Asian centrally planned economies with about the same proportion. North America, western Europe, and eastern Europe and the U.S.S.R. each have about 9 to 10% of the potential hydropower.

World consumption of commercial energy was about 234×10^{18} joules in 1974,[6] or about 1.1% of the estimate of "proven recoverable" resources quoted above. The latter, however, represent only a small proportion of the ultimately recoverable energy from non-renewable sources, which has been estimated as more than 223×10^{21} joules.[7] This is more than 10 times the "proven recoverable" resources in 1971, and equivalent to about 1 000 years' supply at 1974 consumption levels.

The developed countries accounted for more than 83% of the world's commercial energy consumption in 1974, and North America alone consumed one third of the world total. The two thirds of the world's population living in the developing countries consumed less than 17%. The per caput consumption of 175×10^9 joules in the developed countries in 1974 was about 13 times that of the developing countries (14×10^9 joules). Projections of the con-

[5] Usmani, I.H., *Review of the impact of production and use of energy on the environment and the role of UNEP*, Nairobi, UNEP, 1976, Table I (based on data in United States National Committee of the World Energy Conference, *Survey of energy resources 1974*).

[6] United Nations, Statistical Office, *World energy supplies 1950-1974*, New York, 1976, Statistical Papers, Series J, No. 19, p. 10-123, 707-762.

[7] Hubbert, M.K., *op. cit.*, p. 66.

sumption of commercial energy up to the end of the century and beyond indicate a further widening of the gap in per caput consumption between the developed and developing countries.[8] Although non-commercial sources provide a large part of the total energy consumption of the developing countries, their addition would make little difference to the wide disparity in per caput consumption of energy.

Fossil fuel

Thus a major feature of the situation is the large and widening gap in the per caput consumption of commercial energy as between the rich and poor countries. A second major feature is the large and growing proportion of commercial energy consumption coming from fossil fuel sources, particularly petroleum and natural gas (Figure 3-2). In 1960 coal, the most abundant of these resources, also made the largest contribution to consumption (47% as compared with 34% from petroleum, and 14% from natural gas). By 1972, petroleum had become the predominant source (45%), coal had been sharply reduced to 32%, and natural gas had risen to 21%. In spite of the recent increases in prices, petroleum is expected to continue to provide the largest proportion of the world's commercial energy. By 1990 its share is expected to fall only slightly, to about 40%, as compared with 22% for coal, 19% for natural gas, and 15% (a very substantial increase) for nuclear energy.

Estimates have been made of the fossil fuel resources recoverable at twice the present cost,[9] and of those ultimately recoverable.[10] At the 1974 rate of consumption, coal resources recoverable at no more than twice the present cost would be sufficient to meet demand for 425 years, and those ultimately available sufficient for 2 700 years. This is in sharp contrast to the other fossil fuels. At 1974 consumption, the oil estimated to be available at twice the present cost would last only about 60 years and the ultimate resources only 110 years, while the expected increases in consumption would shorten these time periods even more. For natural gas the resources available at twice the present cost would provide 110 years' supply at 1974 consumption levels, decreasing to 75 years at 1990 consumption levels, and the estimated ultimate resources would be sufficient for 216 years at 1974 levels and 149 years at 1990 levels. Thus, petroleum and natural gas should continue to provide major amounts of energy well into the next century. However, because of the ultimate limits on the supply of these energy resources, the development of alternatives to fossil fuel is of the utmost importance.

[8] Usmani, I.H., *op. cit.*, Table XIV.
[9] Starr, C., Energy and power, *Scientific American*, 225(3), 1971, 43.
[10] Hubbert, M.K., *op. cit.*, p. 66.

Nuclear energy

As shown in Figure 3-2, by 1990 nuclear energy is expected to account for 15% of total world consumption of commercial energy. However, known resources of low-cost uranium fuel are limited, and the conventional fission reactors (using uranium 235 as fuel) which are expected to be in operation in the next few years are likely to use up the more accessible resources by the end of the century.[11] Thus, without a transition to the breeder reactors (using plutonium with either uranium 238 or thorium 232 as fuel) that are now being developed for the fission process, an acute shortage of low-cost nuclear fuel is likely to develop in a very short time.[12]

In the breeder reactor it is possible to create more nuclear fuel than is consumed. Since the efficiency of fuel use is increased, the use of higher-priced ore is feasible, so that virtually the entire supply of natural uranium and thorium would become available. It has been estimated that by using the breeder reactor, nuclear resources could supply 9.5×10^{24} joules of energy,[13] which is more than 42 times the energy contained in the ultimately recoverable fossil fuel resources. However, there are drawbacks, the most serious of which is the radioactive wastes generated in the fission process, which remain toxic for thousands of years. Thus, it is probably desirable that nuclear fission should be used only as a temporary means of energy production until alternative methods can be developed.

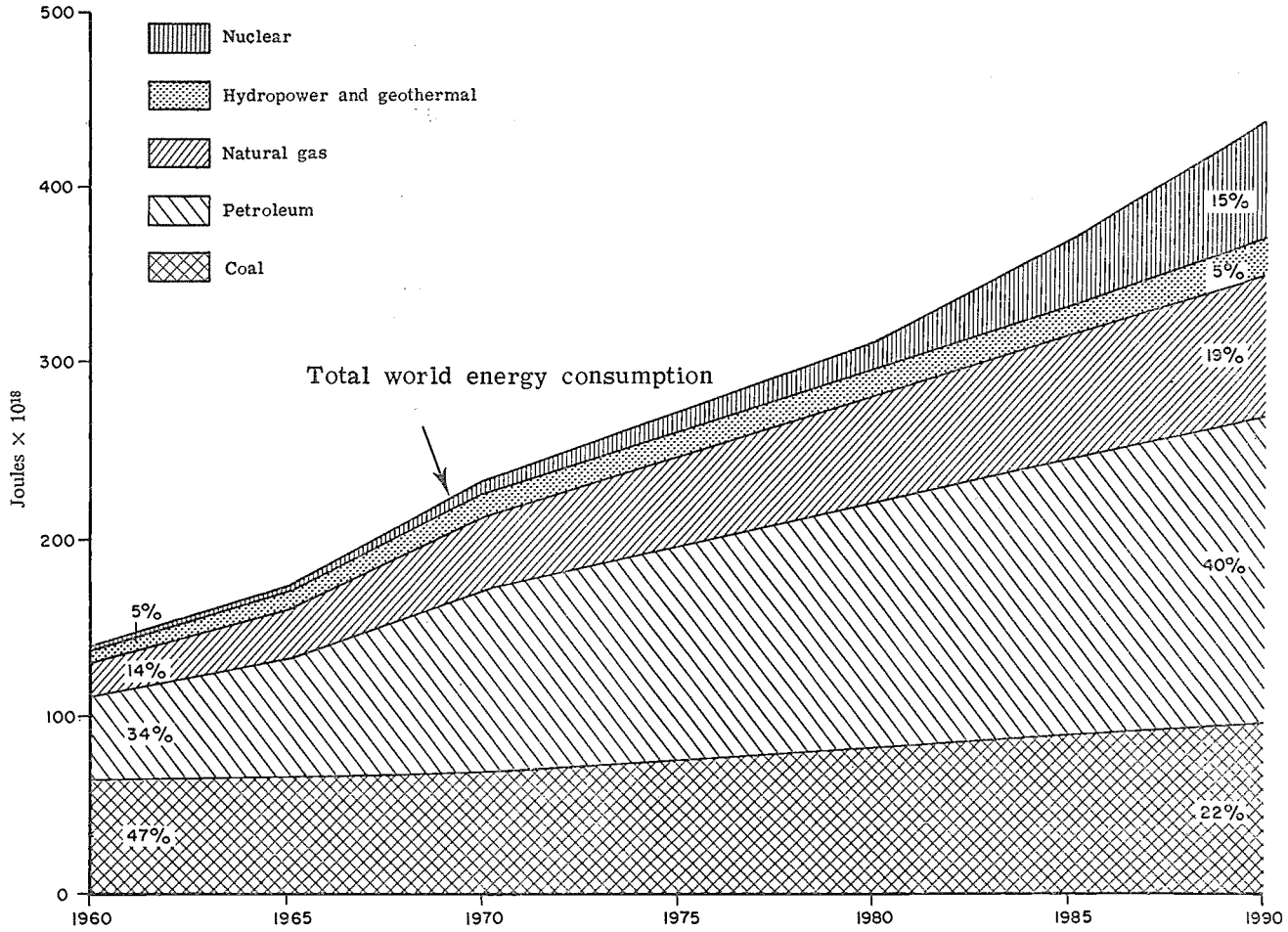
Nuclear fusion is one possible alternative. The main source of fuel for fusion reactions is a type of hydrogen called deuterium, available in sea water. It has been estimated that if enough deuterium were withdrawn from the oceans to reduce its concentration by 1% and this were used in fusion reactors, the energy released would amount to about 500 000 times the world's initial supply of fossil fuels.[14] However, control of the fusion process is not yet fully understood, and its engineering feasibility has yet to be seriously studied.

Direct conversion of solar energy

The total solar radiation received at the earth's surface under ideal conditions is usually about 6

[11] Organisation for Economic Co-operation and Development, *Energy prospects to 1985*, Paris, 1974, Vol. 2, p. 191.
[12] Hubbert, M.K., *op. cit.*, p. 68.
[13] Starr, C., *op. cit.*, p. 43.
[14] Hubbert, M.K., *op. cit.*, p. 70.

FIGURE 3-2. — WORLD COMMERCIAL ENERGY CONSUMPTION, BY SOURCE, 1960-90



SOURCES: Adapted from U.S. Department of Interior, *Energy perspectives*, Washington, D.C., February 1975. (Past energy use was based on historical data provided by the United Nations in 1974, future energy use on U.S. Department of Interior projections.)

to 8 kilowatt-hours (22 to 29 × 10^6 joules) per square metre per day, but it is intermittent. There is no sun at night, and it practically disappears at high latitudes during the winter months when energy is most needed. Thus it will be necessary to develop storage systems if the direct conversion of solar energy is to be used as a continuous source of energy.

Solar energy has so far been used on a small scale for certain specific purposes, such as water heating, the distillation of sea water, home heating and cooking. It has also been successfully used in special circumstances where cost considerations are not important or where alternative sources of energy are difficult to obtain, as in remote desert areas. For the large-scale commercial conversion of solar energy, the most favourable sites would be desert areas not more than 35° north or south of the Equator.[15]

Large-scale solar installations are expected to be operational on a limited basis in the early 1980s, while in the more distant future it is likely that small-scale installations will be operating at the village level on an economic basis. However, at least for the rest of the century, their contribution to the commercial energy supply is expected to be small.

HYDRO-RESOURCES

Hydropower is the most highly developed of the renewable resources at present in use to produce commercial energy, accounting for 2.2% of the total consumed in 1974. Only about 12% of the world's potential water power capacity has been harnessed so far (only 5.1% in South America, 4.5% in Asia and 1.7% in Africa).[16]

However, although there appears to be consid-

[15] *Ibid*, p. 66.

[16] Usmani, I.H., *op. cit.*, p. 43.

erable potential for increasing the contribution of hydropower, there are serious limitations on its development. There are few easily accessible sites for water storage and the construction of dams, and they are rarely located near the areas of major energy consumption, so that losses in electricity transmission can be substantial. Hydropower dams are also very costly and take a long time to build, and the recovery of their costs requires many years. In developed countries environmental concerns have sometimes held up the development of hydro-resources. Thus, the expansion of hydropower use will probably be fairly slow during the rest of the century.

Tidal energy

Power from tides is obtained through the filling and emptying of a bay or estuary which can be closed by a dam, so that water flows through a turbine which generates electricity. Total potential tidal power amounts to about 2×10^{18} joules, or only 2% of the world's potential water power.[17] Since it is very diffuse, can be used only in a limited number of locations, and generates power only intermittently, it is a very marginal resource.

Geothermal energy

With present technology it is possible to generate electricity by exploiting geothermal fields producing either dry steam, steam with hot water, or hot water. In 1974 the energy production from geothermal sources was 24×10^{15} joules, which was only a small fraction of the total electrical power supply. Increased exploitation of such resources is expected, but it is likely to be limited, since naturally occurring steam and hot water are usually depleted after a certain period. The total stored thermal energy in the major geothermal areas has been estimated at about 400×10^{18} joules,[18] or about one fifth of the 1971 proven recoverable resources of natural gas. Geothermal areas are somewhat localized, and sizable capital investments are required for exploration. Geothermal energy is thus not expected to make a significant contribution to world energy requirements for the foreseeable future.

Wind power

Wind power varies with the cube of the wind velocity, and is therefore most applicable in areas with strong winds. Wind velocity is also often erratic, so that wind power can best be utilized where fluctuations in power are not critical. The maximum exploitable energy potential from wind has been estimated to be about 3.2×10^{18} joules per year, or about 60% of the present supply of hydroelectric power.[19] Prototypes for the commercial production of wind energy are now being developed and tested, so it is possible that wind power may begin contributing to commercial energy resources by the end of this century. Wind velocities are generally high in temperate regions and in the tropical islands of South Asia and the Caribbean, but they are low in most developing countries, although the small-scale use of windmills has been successful in some of them, especially for water pumping.

Photosynthetic fuel

Photosynthetic fuel is based on organic matter, in the form either of plant products grown specifically to produce fuel, or of plant residues and animal wastes collected as by-products of crop and livestock production. For the most part, photosynthetic fuel and non-commercial energy are based on the same initial products. However, in order to obtain a photosynthetic fuel, they must be processed, with the basic objective of changing bulky and inconvenient forms of fuel into gases or liquids with a high energy content. For example, the typical energy content of organic matter is between 14×10^6 and 16×10^6 joules/kg, while that of the processed products is usually between 35×10^6 and 58×10^6 joules/kg.[20]

The available processes for converting organic matter into gaseous or liquid fuel include both dry (non-biological) and wet (biological) processes. The simplest dry process is burning in excess air, with complete combustion of the material. Commercial applications are mainly for steam production for electrical generation.

A second dry process is combustion in a controlled atmosphere. This is a gasification process, involving the burning of tightly packed organic matter with a limited air supply at temperatures above 1 100°C. Its typical product is a mixture of hydrogen and carbon monoxide (producer gas), with an energy content about one sixth of that of natural gas. Producer gas technology is well developed, and stationary gas generators are in operation using many organic materials, including rice hulls, olive pits,

[17] Hubbert, M.K., *op. cit.*, p. 67.
[18] *Ibid.*, p. 67.
[19] Starr, C., *op. cit.*, p. 43.
[20] Stout, B.A. and Loudon, T.L., *Energy from organic residues* (paper for UNEP/FAO Seminar on Residue Utilization in Management of Agricultural and Agro-industrial Wastes, Rome, 18-21 January 1977), East Lansing, Agricultural Engineering Department, Michigan State University, September 1976, p. 7.

straw, camel dung and cottonseed hulls, as well as more conventional fuel sources such as wood and sawdust. Producer gas can be used for cooking and heating, and has also been used to power internal combusion engines.

A third dry process is heating in the absence of oxygen, which results either in destructive distillation or pyrolysis. Charcoal is one of the major fuels produced by destructive distillation. Little is known about the total quantities of charcoal used, but in developing countries it is widely used in rural and urban households, and in the commercial processing of food. In many respects it is a high-quality fuel and in terms of efficiency in domestic use may actually be cheaper and more convenient than fuelwood. In some countries (e.g. Thailand) as much as half of all the wood which is used as fuel is first converted to charcoal. The potential for the further use of charcoal is considerable. Because of its greater calorific value and efficiency, it can be produced from resources too far away from the market to be drawn upon for fuelwood. As virtually all kinds of wood can be converted to charcoal, it can be produced from the large quantities of non-commercial tree species which are destroyed or abandoned when tropical forests are cleared or harvested. Properly controlled, charcoal production can therefore be an important tool of forest management,[21] although uncontrolled working of the forest for charcoal can be as destructive as uncontrolled fuelwood cutting.

Pyrolysis is essentially a refined method of destructive distillation, involving the heating of organic matter at high temperatures (550 to 1 100°C) in the absence of oxygen for several hours, and produces various proportions of gas, oil and charcoal. The gas products have about half the energy content of natural gas, and the oil products about three quarters of that of petroleum.

A fourth dry process is hydrocarbonization, which combines high temperature and high pressure to produce oil or gas. Fuels can be produced with energy contents essentially the same as petroleum and natural gas, but operating costs are much higher than for pyrolysis.

There are two wet (biological) processes. One is anaerobic fermentation (fermentation in the absence of oxygen), a process that has been in use for centuries for the production of methane (biogas). Animal manure and municipal sewage sludge have been the main materials used for this process, which has the major advantage that human and animal waste can be used to generate energy while at the same time retaining their nutrient value for use as organic fertilizer. The production of methane from crop residues has also been attempted, but it has not been very successful since a fairly precise balance between carbon and nitrogen in the material to be digested is necessary for the biological process to take place. Temperature is also very important, and in many parts of the world it is difficult to maintain biogas production throughout the year unless supplementary heat is provided to the digester. In an efficient digester, the biogas produced can generally be expected to have an energy value of about 60% of that of natural gas. The uses of biogas include heating, the operation of engines, crop drying and cooking. The second biological process is also anaerobic, involving the splitting of sugars by yeast to produce alcohol from crops such as cereals and sugarcane. Alcohol can be mixed with gasoline, as has been done in Brazil, for example, where about 250 million litres of alcohol were used to extend the gasoline supply by about 2% in 1974, and the goal is to raise the average alcohol content to 10% by 1980.[22]

Organic material is the only alternative energy source producing fuels resembling and directly substitutable for petroleum and natural gas. All of the others produce either electricity or, to a limited extent, stationary mechanical power. In theory, virtually all the organic material deriving from plants and animals could be used to produce commercial energy. However, it is also important that part of the organic matter produced from the land be returned to it, in order to maintain the soil nutrient balance and fertility. Taking this into account, it has been estimated that organic material could be utilized to produce as much as 19×10^{18} joules of energy annually by the year 2000, and that maximum production could reach from three to 12 times this level.[23] The potential production level for the year 2000 is over three times the hydropower production of 1974. A further constraint, however, is that the major sources of organic material are already being used as non-commercial energy sources in many developing countries.

Non-commercial energy resources and consumption

Although the use of commercial energy is expanding rapidly in the developing countries, non-commercial energy remains very important in these countries, and especially in their rural areas. Until recently, however, very little attention has been paid

[21] Earl, D.E., *Forest energy and economic development*, Oxford, Clarendon Press, 1975.

[22] Calvin, M., Photosynthesis as a resource for energy and material, *American Scientist*, 64(3), 1976, p. 273.

[23] Starr, C., *op. cit.*, p. 43.

to non-commercial energy resources, and the data concerning them are very scanty.

Wood is the principal source of non-commercial fuel, but animal dung and crop residues are also widely utilized. Human power and animal power still provide a large part of the energy resources of the developing countries. Solar energy is directly used for such purposes as crop drying, the drying of mud-bricks, and the production of salt by the evaporation of sea water.

It has been estimated that the main sources of non-commercial fuel (fuelwood, animal dung and crop residues) account for about 70% of the total energy consumption of the developing countries, or about two and a half times their consumption of commercial energy.[24] Total per caput energy consumption in these countries would thus amount to about a quarter of that in the developed countries, in contrast to the much wider disparity in per caput commercial energy consumption noted earlier. However, these estimates are not explained in any detail in the source, and it seems probable that they are too high. The estimates presented below for fuelwood, animal dung and crop residues suggest that they account for closer to 30% of the total energy consumption of the developing countries as a whole and perhaps almost 40% in the developing market economies.

In many developing countries the proportion is much higher. Even in India, with a well-developed commercial energy sector and a shortage of wood in most areas, non-commercial fuels accounted for 56% of total energy consumption in 1970/71.[25] The data shown later in Table 3-3 indicate that in the African region as a whole fuelwood consumption alone is almost one and a half times the consumption of commercial energy.

The role of non-commercial energy is even greater in the rural areas of the developing countries. Estimated energy budgets drawn up for six "prototypical composite villages" in different parts of the developing world are summarized in Table 3-2. In five of the villages commercial energy (including chemical fertilizers) ranges from 0 to 11% of the total gross energy input, non-commercial fuels from 28 to 88%, human energy from 7 to 20%, and animal draught from 0 to 51%. In the sixth village (northern Mexico), where commercial energy provides 59% of the total, non-commercial fuels account for 23%, human energy 6%, and animal draught 12%.

[24] Makhijani, Arjun and Poole, Alan, *op. cit.*, p. 19.

[25] Henderson, P.D., *India, the energy sector*, Washington, D.C. World Bank, 1975.

TABLE 3-2. — ESTIMATED ENERGY BUDGETS FOR SIX PROTOTYPICAL COMPOSITE VILLAGES

Energy source	Bihar, India	Eastern Hunan, China	Tanzanian plateau	Northern Nigeria	Bolivian Andes	Northern Mexico
	Percent of total gross energy input					
Fuelwood	7	64	88	80	71	23
Crop residues	7		—	—	—	
Animal dung	14		—	—	—	
Total non-commercial fuel	28	64	88	80	71	23
Coal, oil products and gas	—	9	—	—	—	15
Electricity	—		—	—	—	31
Chemical fertilizer	1	2	—	—	—	13
Total commercial energy	1	11	—	1	—	59
Human energy	20	9	12	15	7	6
Animal draught	51	16	—	4	22	12
	Average for six villages = 100					
Total gross energy input per caput	44	44	76	57	141	187

SOURCE: Adapted from Makhijani, Arjun and Poole, Alan, *Energy and agriculture in the Third World: a report to the Energy Policy Project of the Ford Foundation*, Cambridge, Mass., Ballinger Publishing Company, 1975, p. 27, 34, 43, 46, 52, 54.

Many problems arise in maintaining sufficient supplies of non-commercial fuels to sustain the minimum essential needs of the large and growing rural populations for which commercial sources of energy are not yet a viable alternative. The depletion of the more accessible supplies of fuelwood in many areas is leading to deforestation and to the growing diversion of household labour to the gathering of fuel. The increased use of organic material for the production of commercial energy could deprive the poorest people, who cannot afford commercial energy, of the non-commercial energy they require to cook their food and to ensure a minimum level of warmth. Such problems, which have received scant attention so far, require careful study.[26] They are at least as important as the problem of the impact of higher petroleum costs on that part of the rural sector which can and does use commercial energy.

Fuelwood and agricultural residues are discussed in more detail below. Human energy and animal draught power are briefly discussed in a later section on non-commercial energy and agricultural production.

[26] A study of wood as a source of energy in the developing countries is now in preparation in FAO.

FUELWOOD

The most recently published figures of fuelwood consumption are for 1974, when it was estimated that 1.17×10^9 cubic metres of fuelwood were consumed.[27] However, recent surveys of domestic fuelwood consumption in several developing countries indicate a significantly higher consumption than was previously thought. These are taken into consideration in the revised estimates shown in Table 3-3, which indicate that the consumption of wood for fuel in 1974 was about 1.5×10^9 cubic metres, with an energy content of 14×10^{18} joules. Thus, fuelwood made the fourth largest contribution to the total world energy consumption, after petroleum, coal and natural gas. If it is added to commercial energy, it accounts for about 6% of the total consumption.

Although the contribution of fuelwood to the world's overall energy consumption is small, its contribution in developing countries is very large. About 90% of the world's fuelwood consumption is in these

[27] FAO, *Yearbook of forest products, 1963-1974*, Rome, 1976, p. 17.

TABLE 3-3. — FUELWOOD AND ROUNDWOOD CONSUMPTION AND FUELWOOD ENERGY, 1974

Region	Fuelwood[1]	Total roundwood[2]	Fuelwood as percent of roundwood	Energy[3] from fuelwood	Commercial[4] energy	Fuelwood as percent of fuelwood and commercial energy
	× 10⁶ cubic metres	*× 10⁶ cubic metres*	*Percent*	*× 10¹⁵ joules*	*× 10¹⁵ joules*	*Percent*
DEVELOPED MARKET ECONOMIES[5]	54.9	790.6	6.9	531	140 449	0.4
North America	17.6	474.7	3.7	170	77 763	0.2
Western Europe	32.3	240.8	13.4	312	45 161	0.7
Oceania	2.5	21.5	11.6	25	2 654	0.9
EASTERN EUROPE AND THE U.S.S.R.	99.7	462.1	21.6	964	54 267	1.8
Total developed countries	154.6	1 252.7	12.3	1 495	194 716	0.8
DEVELOPING MARKET ECONOMIES[5]	1 145.3	1 336.1	85.7	11 074	22 038	33.4
Africa	268.3	299.6	89.5	2 594	1 848	58.4
Latin America	243.9	298.0	81.8	2 358	9 383	20.1
Far East	577.0	667.9	86.4	5 579	7 577	42.4
Near East	56.1	70.6	79.4	543	3 230	14.4
ASIAN CENTRALLY PLANNED ECONOMIES	153.5	205.7	74.6	1 485	16 790	8.1
Total developing countries	1 298.8	1 541.8	84.2	12 559	38 828	24.4
World	1 453.4	2 794.5	52.0	14 054	233 544	5.7

[1] Revised FAO estimate of fuelwood consumption. – [2] FAO, *Yearbook of forest products. 1963-1974*, Rome, 1976, p. 35-36. – [3] Assuming 1 cubic metre of fuelwood contains 9.67×10^9 joules of energy. – [4] United Nations, Statistical Office, *World energy supplies 1950-1974* New York, 1976, Statistical Papers Series J, No. 19, p. 10-123, 707-762. – [5] Including countries in other regions not specified.

countries. In 1974 fuelwood accounted for about one third of the total (commercial energy plus fuelwood) consumed in the developing marketing economies, and about 86% of the wood consumed in these countries was used for fuel. In Africa the amount of energy coming from fuelwood was actually about 40% more than that from commercial sources.

In most developing countries where wood is available, it is the dominant source of energy for low-income families. An estimated 1 000 to 1 500 million people prepare their daily food using wood fuel, and depend upon it to a greater or lesser degree for heating purposes.[28] It is also widely used for such purposes as the drying and curing of fish, tea, tobacco and rubber, brickmaking, and the commercial preparation of food. The extent and level of fuelwood use mainly depend on the physical availability of wood resources. Most rural use is outside the monetary economy, and supplies are limited to what can be collected for the family's own use. Even commercial supplies are seldom transported over distances exceeding 50 km.

This localization of the demand for fuelwood frequently results in the progressive depletion of the wood resources. This can lead not only to the provision of fuel becoming an increasing burden on household labour and on household budgets, but eventually also, in the absence of alternative fuels, to destructive deforestation, with its harmful environmental effects, and to an absolute decline in the availability of fuel for essential needs such as cooking and heating. It has been estimated that in Gambia, for example, whereas fuelwood could a few years ago be collected in the immediate vicinity of most households, it now commonly has to be fetched from half a day's walk away, so that the gathering of a year's supply of fuelwood requires an average of 360 man-days per household.[29] Even where there is usually widespread rural unemployment and underemployment, there are likely in such circumstances to be peak seasons of labour demand for agriculture when the labour needs for fuel gathering could become a constraint.

The potential for the increased use of wood as a fuel appears quite large. As already noted, one well-established method is by the conversion of wood to commercial energy in the form of charcoal before use.[30] As charcoal has twice the calorific value of air-dried wood and is much more efficient in use, it can be transported economically over much longer distances and can therefore draw on more remote wood resources.

The renewable nature of the forest makes possible the sustained production of wood for fuel, provided appropriate harvesting and management can be instituted. Although this can often imply a degree of control that is difficult to organize and administer, this need not necessarily be so. In an area of central India, for example, destructive cutting of the forests was halted and sustained fuelwood production built up by devising a control system which could be implemented by the local populations within the framework of their established tribal customs and practices.

Fuelwood resources can also be established or renewed by growing suitable tree species in plantations. This, however, faces a number of limitations. In areas of high population density there may be little land for fuelwood plantations. Complex ownership and tenure patterns and traditional rights of usage may also make it difficult to set aside land for such purposes, and traditional attitudes toward fuelwood as a free resource may be difficult to alter.

However, in many situations the potential for fuelwood plantations is very large. As the inputs are predominantly land and labour, they constitute the principal way in which rural populations can create fuel supplies with little, if any, cash outlay. They therefore offer viable solutions for populations that are either too poor to afford the cash outlay entailed in virtually all other fuels (except other non-commercial fuels), or too remote to have economic access to commercial fuels.

Large and successful self-help schemes to create fuelwood plantations have been put into effect in a number of countries, notably in China, India and the Republic of Korea. In the latter country, for example, villages within the Saemaeul (new community) movement are establishing fuelwood plantations in 1976/77. The success of such schemes can be attributed in large part to the active involvement of the people concerned and the availability of planting stock and technical support.

The demand for fuelwood in developing countries is growing at an estimated 1 to 2% per year, and could reach 2 000 million cubic metres by the year 2000. It appears likely that the rural populations in most developing countries will have to continue to rely on fuelwood and other organic fuels for the greater part of their energy needs for many years to come. Much more active and widespread attempts should therefore be made to improve supplies of fuelwood in those situations where it can continue to be an important substitute for commercial fuels.

[28] FAO, unpublished study on wood as a source of energy in developing countries, to appear during 1977 in *Unasylva*, FAO, Rome.

[29] Openshaw, Keith, *The Gambia: a wood consumption survey and timber trend study 1973-2000*, unpublished report to the ODA/LRD Gambia Land Resources Development Project, Midlothian, 1973.

[30] The figures of fuelwood consumption shown in Table 3-3 include both that consumed directly as non-commercial energy, and that consumed as commercial energy in the form of charcoal. It s estimated that charcoal probably accounts for about 5% of world fuelwood consumption, most of it being for urban and industrial use.

AGRICULTURAL RESIDUES

In the developing countries fuelwood is usually the first choice as a non-commercial energy source, but when it becomes scarce agricultural residues (including animal dung) are commonly used as substitutes. In India, for example, 68 million tons of dried cow dung, with an energy content of 790×10^{15} joules, and 39 million tons of vegetable waste, with an energy content of $1\,085 \times 10^{15}$ joules, were used for fuel in 1970/71.[31] This plant and animal waste material accounted for about 35% of non-commercial energy consumption in India in 1970.

Little accurate information is available on the use of animal dung for fuel. However, it is a very widespread practice in Asia and in parts of Africa. Its annual use has been estimated at about 150 million tons, with an energy content of 1.8×10^{18} joules.[32] This places the annual consumption of energy from dung at about 13% of the energy consumed as fuelwood.

The potential energy from cattle dung may be estimated as about 16×10^{18} joules annually,[33] and with other animal wastes the total would be substantially higher. However, animal dung is also useful as a fertilizer, and its fertilizer value is destroyed if it is burned. As already noted, the use of dung to generate commercial energy through anaerobic digestion overcomes this problem, since methane gas is produced as a fuel while the nutrient value of the organic matter remains. There have been substantial efforts in India and other countries to introduce biogas plants to replace the direct burning of dried dung. The major obstacle has usually been the need for a cash outlay both to construct the biogas plant and to utilize the methane which is produced. Since the poorest people usually cannot afford this, they continue to rely on burning the dung directly.

It has been estimated that non-commercial energy production from crop residues is about 293×10^{15} joules annually,[34] or about 16% of the energy produced from animal dung. Since the energy content of exploitable crop residues is estimated to be between 20×10^{18} and 60×10^{18} joules,[35] its present use as a non-commercial fuel is very small. Thus, the potential for producing significant quantities of commercial energy from crop residues would appear to be promising, and to offer a method by which some of the commercial energy used in crop production could be recovered.

Both crop residues and animal dung are spread fairly thinly over large areas of land, and their collection and transport can be expected to be expensive in most parts of the world. However, they could become potential sources of commercial energy if the prices of other sources continue to rise.

[31] Henderson, P.D., *op. cit.*, p. 27.
[32] Earl, D.E., *op. cit.*, p. 18.
[33] 1.27×10^9 head of cattle and buffalo × 1 100 kg of dry manure per head per year × 11.6×10^6 joules of energy per kg of dry manure, in Stout, B.A. and Loudon, T.L., *op. cit.*, Tables 7, 8, 10).
[34] Earl, D.E., *op. cit.*, p. 20.
[35] Starr, C., *op. cit.*, p. 43.

Energy use in agricultural production

Different levels of agricultural development

Dramatic increases in crop yields per hectare have been achieved in the developed countries through the use of energy-intensive inputs. Although many developing countries still have reserves of unused but potentially productive land, most of them will be able to meet the rapidly rising food demand of their growing populations only by substantially raising yields on both existing and new land. Even the opening up of the remaining new land, which is increasingly inaccessible and difficult to clear, will require large inputs of commercial energy. Raising yields by means of the improvements at present in use involves a rapid increase in the application of commercial energy to agriculture.

This is illustrated in Table 3-4, which shows estimates of the commercial energy required for the production of rice and maize at different levels of technology. The only commercial energy input in traditional farming is that required to produce hand tools and animal implements. Since the traditional farmer uses no commercial fertilizer and plants seed from his previous crop, there is no commercial energy involved for these inputs. However, yields per hectare with traditional farming are very low.

In the transition from traditional to modern farming methods, the use of commercial energy, especially for machinery and fertilizer, increases sharply. Primary tillage is usually one of the first operations to be mechanized and there is an increase in the commercial energy requirement not only for the production of farm machinery, but also for fuel to operate it. Improved varieties are often introduced during the transitional phase, requiring commercial energy for their production and distribution. To help realize their yield potential entails the use of chemical fertilizers and pesticides, both of which

TABLE 3-4. — COMMERCIAL ENERGY REQUIRED FOR RICE AND MAIZE PRODUCTION BY MODERN, TRANSITIONAL AND TRADITIONAL METHODS

Input	Rice						Maize			
	Modern (United States)		Transitional (Philippines)		Traditional (Philippines)		Modern (United States)		Traditional (Mexico)	
	Qty/ha	*Energy/ha × 10^6 joules*	*Qty/ha*	*Energy/ha × 10^6 joules*	*Qty/ha*	*Energy/ha × 10^6 joules*	*Qty/ha*	*Energy/ha × 10^6 joules*	*Qty/ha*	*Energy/ha × 10^6 joules*
Machinery and implements [1]	4.2×10^9 joules	4 200	335×10^6 joules	335	173×10^6 joules	173	4.2×10^9 joules	4 200	173×10^6 joules	173
Fuel [2]	224.7 litres	8 988	40 litres	1 600	—	—	206 litres	8 240	—	—
Nitrogen fertilizer [3]	134.4 kg	10 752	31.5 kg	2 520	—	—	125 kg	10 000	—	—
Phosphate fertilizer [4]	—	—	—	—	—	—	34.7 kg	586	—	—
Potassium fertilizer [5]	67.2 kg	605	—	—	—	—	67.2 kg	605	—	—
Seeds [6]	112.0 kg	3 360	110 kg	1 650	107.5 kg	—	20.7 kg	621	10.4 kg	—
Irrigation [2]	683.4 litres	27 336	—	—	—	—	351×10^6 joules	351	—	—
Insecticides [7]	5.6 kg	560	1.5 kg	150	—	—	1.1 kg	110	—	—
Herbicides [7]	5.6 kg	560	1.0 kg	100	—	—	1.1 kg	110	—	—
Drying	4.6×10^9 joules	[8] 4 600	—	—	—	—	$1\,239 \times 10^6$ joules	1 239	—	—
Electricity	3.2×10^9 joules	[8] 3 200	—	—	—	—	$3\,248 \times 10^6$ joules	3 248	—	—
Transport	724×10^6 joules	[8] 724	31×10^6 joules	31	—	—	724×10^6 joules	724	—	—
Total		64 885		6 386		173		30 034		173
Yield (kg/ha)		5 800		2 700		1 250		5 083		950
Energy input (joules × 10^6/kg)		11.19		2.37		0.14		5.91		0.18

SOURCES: Pimentel, D., Hurd, L.E., Bellotti, A.C., Forster, M.J., Oka, I.N., Sholes, O.D., and Whitman, R.J., Food production and the energy crisis, *Science*, 182, November 1973, p. 444-445, and FAO estimates.

[1] Energy input to produce 1 kg of equipment assumed to be 68.7×10^6 joules. – [2] 1 litre of fuel assumed to contain 40×10^6 joules. – [3] Production of 1 kg of nitrogen fertilizer assumed to require 80×10^6 joules. – [4] Production of 1 kg of phosphate fertilizer assumed to require 14×10^6 joules. – [5] Production of 1 kg of potassium fertilizer assumed to require 9×10^6 joules. – [6] Production of 1 kg of high-quality seed assumed to require 30×10^6 joules in the United States and 15×10^6 joules in the Philippines and Mexico. – [7] Production of 1 kg of pesticide assumed to require 100×10^6 joules. – [8] Assumed to be similar to figures given for maize by Pimentel, D. *et al.*, *op. cit.*, p. 444.

require commercial energy for their manufacture. For the production of rice during the transitional phase in the Philippines, about 70% of the commercial energy inputs are used for fertilizer, seed production and pesticides, and about 30% for farm machinery and fuel for its operation. The table shows no commercial energy inputs for irrigation, since it is assumed that existing traditional irrigation methods and facilities are used. However, supplementary irrigation with mechanically powered pumps is often introduced during the transitional phase. This would substantially increase commercial energy requirements but also increase yields. On the whole, the transitional stage achieves an approximate doubling of yields through the application of only a modest amount of commercial energy.

For modern rice production in the United States, the commercial energy input is 10 times that in transitional production in the Philippines. About 42% of total commercial energy is used for irrigation, 20% for the manufacture and operation of farm machinery, 18% for fertilizers, and 7% for drying. For modern maize production in the United States, total commercial energy use is only about half that in modern rice production, mainly because little or no irrigation is required. The manufacture and operation of farm machinery take the largest share of commercial energy in modern maize production, requiring 41% of the total, followed by fertilizers with 37%.

The commercial energy used in modern methods of production is 65×10^9 joules/ha (equivalent to 1 500 kg of petroleum/ha) for rice, and 30×10^9 joules/ha (700 kg petroleum/ha) for maize. With this commercial energy use, yield levels of more than 5 tons/ha are obtained, five times those obtained with traditional methods.

However, the table suggests that the use of commercial energy is much less "efficient" in modern than in traditional or transitional agriculture. The comparison with traditional agriculture probably means rather little, since this uses only very small quantities of commercial energy and relies almost entirely on

human energy and animal draught power. But it is more significant that modern rice production uses about five times as much commercial energy per unit of crop yield as does transitional production.

The commercial energy used in agricultural production in each of the main regions of the world is estimated later in this study. These estimates are compared in Table 3-5 with cereal output per hectare and per agricultural worker. These comparisons tend to confirm that commercial energy is used less efficiently in modern agriculture, since the developed countries are estimated to use more than six times as much as the developing countries per ton of cereal output.

There is a close relation in all regions between commercial energy input and cereal output per agricultural worker. The largest input of nearly 556 × 10^9 joules per worker in North America corresponds with the largest cereal output of 67.9 tons/worker. Similarly, the rank of the other developed regions in the use of commercial energy per worker corresponds with their rank in output per worker. Of the developing regions, Latin America has the largest input per agricultural worker of 8.6 × 10^9 joules, and the largest output per worker with 1.9 tons. The lowest commercial energy input per worker is in Africa, with only 0.8 × 10^9 joules, corresponding with the lowest cereal output per worker of 0.5 tons.

TABLE 3-5. — COMMERCIAL ENERGY USE AND CEREAL OUTPUT PER AGRICULTURAL WORKER AND PER AREA OF LAND, 1972/73

Region	Output/ ha	Output/ agricultural worker	Energy/ ha	Energy/ agricultural worker	Energy/ ton
	Metric tons		..... × 10^9 *joules*		
DEVELOPED MARKET ECONOMIES[1]	3.1	10.5	24.8	107.8	8.0
North America	3.5	67.9	20.2	555.8	5.8
Western Europe	3.2	5.8	27.9	82.4	8.7
Oceania . . .	1.0	20.7	10.8	246.8	10.8
EASTERN EUROPE AND THE U.S.S.R. . . .	1.7	4.1	9.3	28.5	5.5
Total developed countries . . .	2.4	6.9	17.3	62.5	7.2
DEVELOPING MARKET ECONOMIES[1]	1.3	0.8	2.2	2.2	1.7
Africa	0.8	0.5	0.8	0.8	1.0
Latin America	1.4	1.9	4.2	8.6	3.0
Far East . . .	1.3	0.8	1.7	1.4	1.3
Near East . .	1.3	1.4	3.8	4.4	2.9
ASIAN CENTRALLY PLANNED ECONOMIES . .	1.8	0.9	2.4	1.7	1.3
Total developing countries . . .	1.9	1.0	2.2	2.0	1.1
World	1.8	1.7	7.9	9.9	4.4

SOURCES: Energy use from later tables; other data from FAO, *Production yearbook 1974*, Rome, 1975, p. 17-21, 41-43.

[1] Including countries in other regions not specified.

For the developing market economies there is also a close relation between commercial energy input and cereal yield per hectare. Latin America leads these regions in the commercial energy applied per hectare (4.2 × 10^9 joules) and has the highest cereal yield of 1.4 tons/ha. The other developing market economies also rank in commercial energy use per hectare in the same order as in cereal output per hectare. Again, the lowest input is 0.8 × 10^9 joules/ha in Africa, where output is only 0.8 tons/ha.

In the developed countries, however, the relation between energy input and cereal output per hectare is less close. While North America ranks only second in energy input per hectare, it leads all regions in yield, in part probably because of the high natural fertility of many of its soils. For the other developed regions the yield level corresponds more closely to their use of commercial energy per hectare. However, Oceania has lower yields per hectare than any of the developing regions except Africa, although its energy use per hectare is much higher. This appears mainly to reflect (as is shown in Table 3-8) the high proportion of commercial energy used in Oceania for labour-saving mechanization and the low proportion for fertilizer, in contrast to the developing regions, where a much higher proportion is used for fertilizer. Eastern Europe and the U.S.S.R. also have rather low yields in relation to energy use per hectare.

It would be highly desirable to make a marginal analysis of the relationships presented above in average terms, but the scanty available data do not permit this. Time series data for United States maize production from 1945 to 1970, during which period the commercial energy input per hectare rose by 217% and yield per hectare by 38%, indicate no consistent pattern. The elasticity of commercial energy input to maize yield per hectare rose from 2.6 in 1945-50 to 3.5 in 1950-54, fell to 0.7 in 1954-59 and 1959-64, and rose again to 1.5 in 1964-70.[36]

Agriculture's share of commercial energy

It is apparent from the above discussion that, with existing technologies, rapid increases in the use of

[36] Pimentel, D., Hurd, L.E., Bellotti, A.C., Forster, M.J., Oka, I.N., Sholes, O.D., and Whitman, R.J., Food production and the energy crisis, *Science*, 182, November 1973, p. 444-445.

inputs requiring commercial energy are likely to be needed if agricultural production is to be increased sufficiently to meet demand, especially in the developing countries, where the main increases in production are required and where the use of these inputs is at present very low. In view of the difficulties experienced by most oil-importing countries, developed and developing alike, in financing a sufficient supply of commercial energy since the rise in prices that began in 1973, it is important to determine how much of their total supply of commercial energy is required for agricultural production.

For this purpose, the estimates of the use of commercial energy in each of the main regions of the world that are made later in this study for fertilizers, farm machinery, irrigation and pesticides are summarized in Table 3-6 and compared with total commercial energy use.

It is evident that agriculture is responsible for only a very small part of total commercial energy use. At the world level this is estimated to have been 3.5% in 1972/73. The developed countries as a whole were close to the world average, and in the developing countries the proportion was only slightly higher, at 4.0% (4.8% in the developing market economies). In the individual regions, agriculture's share in total commercial energy use ranged from 2.8% in North America to 5.3% in the Far East, 5.6% in Oceania, and 6.4% in the oil-rich Near East. It would thus appear that continued expansion in the use of modern agricultural inputs will have only a very small effect on the total requirements for commercial energy.

Table 3-6 also shows the total commercial energy consumption per caput of the total population, and the commercial energy used in agricultural production per agricultural worker. In only two regions, North America and Oceania, is the energy used per agricultural worker larger than the per caput consumption of the population as a whole. In the developing countries the average commercial energy use per person in the total population is seven times that used to provide inputs for an agricultural worker.

TABLE 3-6. — TOTAL USE OF COMMERCIAL ENERGY AND COMMERCIAL ENERGY USED IN AGRICULTURAL PRODUCTION, 1972/73

Region	Total energy	Energy used in agricultural production		Total energy per caput	Energy in agricultural production per agricultural worker
	.. × 10^{18} *joules* ..		*Percent*	.. × 10^{9} *joules* ..	
DEVELOPED MARKET ECONOMIES[1]	135.7	4.6	3.4	184	107.8
North America	76.9	2.1	2.8	333	555.8
Western Europe	42.9	2.1	4.9	119	82.4
Oceania . . .	2.4	0.1	5.6	154	246.8
EASTERN EUROPE AND THE U.S.S.R. . . .	49.8	1.6	3.3	141	28.5
Total developed countries . . .	185.5	6.3	3.4	170	62.5
DEVELOPING MARKET ECONOMIES[1]	19.3	0.9	4.8	11	2.2
Africa	1.6	0.1	4.5	5	0.8
Latin America	8.1	0.3	3.8	28	8.6
Far East . . .	7.0	0.4	5.3	6	1.4
Near East . .	2.6	0.2	6.4	24	4.4
ASIAN CENTRALLY PLANNED ECONOMIES . .	14.3	0.4	2.9	17	1.7
Total developing countries . . .	33.6	1.3	4.0	13	2.0
World	219.1	7.6	3.5	59	9.9

SOURCES: United Nations, Statistical Office, *World energy supplies 1950-1974*, New York, 1976, p. 18-123, 707-762; FAO, *Production yearbook 1974*, Rome, 1975, p. 11-13; later tables.

[1] Including countries in other regions not specified.

Commercial energy for agricultural production

PRESENT AND FUTURE USE OF COMMERCIAL ENERGY

Estimates of the amount of commercial energy used in the production and application of farm machinery, chemical fertilizers, irrigation and pesticides are elaborated below. They are summarized for each input category in Tables 3-7 and 3-8.

In 1972/73 the manufacture and operation of farm machinery took the largest share of commercial energy in agricultural production, accounting for 51% of the total at the world level, ranging from 8% in the Far East to 73% in Oceania. Chemical fertilizer was a close second, with 45% of the world total, ranging from 26% in Oceania to 84% in the Far East. In the developing regions, however, fertilizer was in first place, in contrast to the position in the developed regions. The manufacture and operation of irrigation equipment and pesticide production and application each used only about 2% of the total commercial energy input for agricultural production in 1972/73. The highest proportions were 18% for irrigation in the Near East, and 6% for pesticides in the Asian centrally planned economies.

TABLE 3-7. — USE OF COMMERCIAL ENERGY FOR INPUTS TO AGRICULTURAL PRODUCTION, 1972/73 AND PROJECTIONS FOR 1985/86

Region	Fertilizers		Farm machinery		Irrigation		Pesticides		Total		Total by region	
	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86
	... × 10^{15} *joules* ...										... *Percent* ...	
DEVELOPED MARKET ECONOMIES[1]	1 635	2 800	2 851	3 355	57.0	66.7	93.6	107.4	4 637	6 329	61.0	47.0
North America	750	1 429	1 299	1 427	36.6	42.0	55.3	64.5	2 141	2 963	28.2	22.0
Western Europe	724	1 130	1 337	1 656	15.5	18.4	36.8	41.4	2 113	2 846	27.8	21.1
Oceania	35	69	100	121	1.3	1.7	0.7	0.7	137	192	1.8	1.4
EASTERN EUROPE AND THE U.S.S.R.	843	2 125	738	1 241	15.2	21.8	36.8	41.5	1 633	3 429	21.4	25.5
Total developed countries	2 478	4 925	3 589	4 596	72.2	88.5	130.4	148.9	6 270	9 758	82.4	72.5
DEVELOPING MARKET ECONOMIES[1]	586	2 003	257	670	68.6	122.1	9.3	53.4	921	2 849	12.1	21.1
Africa	38	111	30	73	1.2	3.1	1.2	8.3	70	195	0.9	1.4
Latin America	153	468	148	349	6.1	13.7	5.3	13.8	313	845	4.1	6.3
Far East	309	1 073	29	81	30.5	50.6	1.4	23.0	370	1 228	4.9	9.1
Near East	86	351	50	167	30.8	54.7	1.4	8.3	168	581	2.2	4.3
ASIAN CENTRALLY PLANNED ECONOMIES	317	683	40	108	35.3	39.5	23.0	32.2	415	863	5.5	6.4
Total developing countries	903	2 686	297	778	103.9	161.6	32.3	85.6	1 346	3 712	17.6	27.5
World	3 381	7 611	3 886	5 374	176.1	250.1	162.7	234.5	7 606	13 470	100	100
Percent of total energy for each input	44.5	56.5	51.1	39.9	2.3	1.9	2.1	1.7	100	100		

SOURCE: Tables 3-9 to 3-12.
[1] Including countries in other regions not specified.

Tables 3-7 and 3-8 also show projections of the use of commercial energy for the four main input categories for 1985/86, based mainly on recent trends. They indicate that the total world use of commercial energy in agricultural production would rise from 7.6×10^{18} joules (equivalent to 176 million tons of petroleum) in 1972/73 to 13.5×10^{18} joules (312 million tons) in 1985/86. This increase of more than three quarters would slightly raise agriculture's share of the world total from 3.5% in 1972/73 to 4.1% in 1985/86.

In 1972/73 the developing countries, with about two thirds of the world's population, accounted for only about 18% of the total commercial energy used for agricultural production. This is very close to their share of the world's total commercial energy consumption. The projections to 1985/86 indicate that energy use in agriculture would increase by 178% in the developing countries, as compared with only 56% in the developed countries. Thus the share of the developing countries would rise to 28% by 1985/86. The most rapid increases would be in the Near East and the Far East (more than 200%), but the increases would also exceed 150% in each of the other developing regions. Among the developed regions, only eastern Europe and the U.S.S.R. would increase its share of the world total.

At the world level, fertilizers would move into first place by 1985/86, their share of the total commercial energy used in agricultural production rising sharply from 45% in 1972/73 to 57% in 1985/86. The share of farm machinery would fall equally sharply from 51% to 40%. The small shares of irrigation and pesticides would also decline slightly.

The share of fertilizers would rise in all regions (to as much as 72% in the developing regions as a whole). They would remain in first place in the developing regions and move into first place in the developed (although remaining second to farm machinery in the developed market economies). The share of farm machinery would fall everywhere except in the Asian centrally planned economies. Irrigation's share would decline in all regions, particularly in the Near East. The share of pesticides would fall in each of the developed regions, and rise in each of the developing regions with the exception

TABLE 3-8. — TOTAL COMMERCIAL ENERGY USE IN AGRICULTURAL PRODUCTION AND SHARE OF EACH INPUT, 1972/73 AND PROJECTIONS FOR 1985/86

Region	Total		Fertilizers		Farm machinery		Irrigation		Pesticides	
	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86
	.. × 10^{15} *joules* ..		..... *Percent*							
DEVELOPED MARKET ECONOMIES[1]	4 637	6 329	35.3	44.2	61.5	53.0	1.2	1.1	2.0	1.7
North America	2 141	2 963	35.0	48.2	60.7	48.2	1.7	1.4	2.6	2.2
Western Europe	2 113	2 846	34.2	39.7	63.3	58.2	0.7	0.6	1.7	1.5
Oceania	137	192	25.5	35.9	73.0	63.0	0.9	0.9	0.5	0.4
EASTERN EUROPE AND THE U.S.S.R.	1 633	3 429	51.6	62.0	45.2	36.2	0.9	0.6	2.3	1.2
Total developed countries	6 270	9 758	39.5	50.5	57.2	47.1	1.2	0.9	2.1	1.5
DEVELOPING MARKET ECONOMIES[1]	921	2 849	63.6	70.3	27.9	23.5	7.5	4.3	1.0	1.9
Africa	70	195	54.3	56.9	42.9	37.4	1.7	1.6	1.7	4.3
Latin America	313	845	48.9	55.4	47.3	41.3	1.9	1.6	1.7	1.6
Far East	370	1 228	83.5	87.4	7.8	6.6	8.2	4.1	0.4	1.9
Near East	168	581	51.2	60.4	29.8	28.7	18.3	9.4	0.8	1.4
ASIAN CENTRALLY PLANNED ECONOMIES	415	863	76.4	79.1	9.6	12.5	8.5	4.6	5.6	3.7
Total developing countries	1 336	3 712	67.6	72.4	22.2	21.0	7.8	4.4	2.4	2.3
World	7 606	13 470	44.5	56.5	51.1	39.9	2.3	1.9	2.1	1.7

SOURCE: Table 3-7.
[1] Including countries in other regions not specified.

of Latin America and the Asian centrally planned economies.

Each of the four main input categories is now reviewed in turn, in order to see how commercial energy is used in production and application, and whether there might be opportunities for the saving of energy.

FERTILIZERS

Chemical fertilizers are likely to soon take the biggest share of the total commercial energy that goes into the world's agricultural production, and they already account for a particularly high proportion in the developing countries. This reflects their predominant role in the technologies at present used to increase agricultural production by raising crop yields. Nevertheless, the proportion of the total energy used for fertilizers that is applied in the developing countries is projected to rise only from 27% in 1972/73 to 35% by 1985/86 (Table 3-9). The production of chemical fertilizers is even more unevenly distributed, with only 17% in the developing countries in 1972/73, which thus relied on imports for 51% of their total supplies.

Nitrogen fertilizer is by far the most important chemical fertilizer, not only in terms of the amount of plant nutrient used in the world's agriculture, but even more so in terms of energy requirements. World consumption is projected to rise from 36.2 million tons of nutrient in 1972/73 (28% in developing countries) to about 84 million tons in 1985/86 (37% in developing countries). It is very energy-intensive, one kilogram of nutrient requiring about 80×10^6 joules (equivalent to about 2 kg of fossil fuel) for its manufacture, packaging, transport, distribution and application.[37] About 83% of the 1972/73 world production of nitrogen fertilizer was in developed countries, and the developing countries imported about 48% of their consumption. New production capacity is increasingly being constructed close to the abundant supplies of natural gas in some developing countries, particularly in the Near East. Nitrogen fertilizer is made from synthetic ammonia, the production of which requires pure gaseous nitrogen and hydrogen. The former is fairly simple and inexpensive to produce, but the production of pure

[37] Leach, G., *Energy and food production*, Washington, D.C., International Institute for Environment and Development, June 1975, p. 85.

TABLE 3-9. — COMMERCIAL ENERGY FOR FERTILIZER PRODUCTION, 1972/73 AND PROJECTIONS FOR 1985/86

Region	Nitrogen[1]		Phosphate[2]		Potassium[3]		Total		Regional shares	
	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86
	..... × 10^{15} *joules*								.... *Percent*	
DEVELOPED MARKET ECONOMIES[4]	1 352	2 400	188	263	95	137	1 635	2 800	48.4	36.8
North America	640	1 267	71	101	39	61	750	1 429	22.2	18.8
Western Europe	592	964	85	104	47	62	724	1 130	21.4	14.8
Oceania	16	34	17	30	2	5	35	69	1.1	0.9
EASTERN EUROPE AND THE U.S.S.R. . .	720	1 835	68	143	55	147	843	2 125	24.9	27.9
Total developed countries	2 072	4 235	256	406	150	284	2 478	4 925	73.3	64.7
DEVELOPING MARKET ECONOMIES[4] . . .	528	1 850	43	112	15	41	586	2 003	17.3	26.3
Africa	32	96	4	12	2	3	38	111	1.1	1.5
Latin America	128	398	18	52	7	18	153	468	4.5	6.1
Far East	288	1 025	15	28	6	20	309	1 073	9.1	14.1
Near East	80	331	6	20	—	—	86	351	2.6	4.6
ASIAN CENTRALLY PLANNED ECONOMIES	296	628	17	42	4	13	317	683	9.4	9.0
Total developing countries	824	2 478	60	154	19	54	903	2 686	26.7	35.3
World	2 896	6 713	316	560	169	338	3 381	7 611	100	100

SOURCES: 1972/73 fertilizer consumption from FAO *Annual fertilizer review 1974*, Rome, 1975, p. 105, 142, 164; projections for 1985/86 based on projected growth rates for 1974/75-1980/81 as estimated by FAO/UNIDO/World Bank Working Group on Fertilizers, FAO, Rome, April 1976; energy coefficients from Leach, G., *Energy and food production*, Washington, D.C., International Institute for Environment and Development, June 1975, p. 85.

[1] Production of 1 kg (nutrient content) of nitrogen fertilizer requires 80 × 10^6 joules of energy. – [2] Production of 1 kg (nutrient content) of phosphate fertilizer requires 14 × 10^6 joules. – [3] Production of 1 kg (nutrient content) of potassium fertilizer requires 9 × 10^6 joules of energy. – [4] Including countries in other regions not specified.

hydrogen is more difficult. The main sources of hydrogen for fertilizer production are natural gas and coal. Hydrogen can also be extracted from water, but this requires very large quantities of electrical energy. Since in many areas the simplest and cheapest source of hydrogen is natural gas,[38] the price of nitrogen fertilizer is closely related to that of natural gas. Nitrogen fertilizer prices rose sharply between 1972 and 1974 because of cyclical developments in the industry, resulting in inadequate production capacity in relation to demand, as well as because of the raising of petroleum prices. By the end of 1975, production capacity had increased and demand moderated, so that prices of nitrogen fertilizers fell back to less than half their 1974 levels.

World consumption of phosphate fertilizer is projected to increase from 22.5 million tons of nutrient in 1972/73 (14% in developing countries) to about 40 million tons in 1985/86 (28% in developing countries). About 87% of the 1972/73 world production was in developed countries, and the developing countries imported about 40% of their consumption. The major known deposits of phosphate ore are in Morocco and the United States (Florida). The ore, which contains 12 to 15% P (P_2O_5), is concentrated to 35%, and most of it is then reacted with sulphuric acid to produce superphosphate. Phosphate fertilizer is much less energy-intensive than nitrogen, and the energy requirement to mine, concentrate, process, package, transport, distribute and apply one kilogram of nutrient is estimated at about 14 × 10^6 joules (0.33 kg of fossil fuel).[39]

The total consumption of potassium or potash fertilizer is projected to rise from 18.8 million tons of nutrient in 1972/73 (9% in developing countries) to about 38 million tons in 1985/86 (16% in developing countries). It is usually manufactured from salts (e.g. potassium chloride), which occur in a nearly pure state in many parts of the world. About 97% of the 1972/73 world total was nevertheless produced

[38] Much of this resource is now wasted. It is estimated that in 1972, 62% of the natural gas produced by OPEC members was flared, and that this would be sufficient to produce five times the nitrogen fertilizer consumption projected for the developing countries in 1980 (United Nations World Food Conference, *The world food problem: proposals for national and international action*, Rome, August 1974, p. 45. E/CONF. 65/4.

[39] Leach, G., *op. cit.*, p. 85.

in developed countries, and the developing countries imported more than 87% of their consumption. Since the ores are generally soft and are often found near the surface, the energy requirements for mining are less than for phosphate, although there are usually subsequent energy requirements for enrichment. The total energy required to mine, concentrate, package, transport, distribute and apply one kilogram of nutrient is estimated to be about 9×10^6 joules (0.21 kg fossil fuel).[40]

Since chemical fertilizers account for such a large and increasing proportion of the total use of commercial energy in agricultural production, and are so important in raising crop yields with existing technology, it is essential to examine how they can be used more efficiently. An important factor here is the relative proportions of available supplies used in developed and developing countries. It may be assumed, as a rough order of magnitude, that the first 15 to 30 kg/ha of nitrogen fertilizer bring an increase in yield of 10 to 15 kg/ha of grain per kg of nitrogen, after which the response slowly declines. Thus in many developed countries additional applications of fertilizer will bring much smaller marginal returns than in most developing countries, where both yields and fertilizer use are so low. There is also considerable scope for the more efficient use of fertilizer production capacity, including its energy efficiency, in many developing countries.

There are a number of ways in which chemical fertilizers can be used more efficiently in both developed and developing countries. Improved practices such as timely sowing and better water management can greatly enhance the efficiency of fertilizer use. Improved methods for the application of fertilizers, including proper placement in the soil, the timing of applications to coincide with the nutrient demands of crops, and split doses to reduce leaching losses, as well as better choice of fertilizer materials, can also greatly increase efficiency. Such improved methods are labour-intensive, and thus suit the rural employment situation in most developing countries. The breeding of high-yielding varieties of cereals and other crops, which are very responsive to fertilizer use, has contributed to the more efficient use of fertilizers, and has been a main factor in increasing the demand for it.

Research that is under way to improve the efficiency of conversion of solar energy by plants should make possible higher yields with less fertilizers. Recent research also offers the hope that the biological fixation of atmospheric nitrogen through a symbiotic relationship with certain bacteria, which is at present found only in legumes, could possibly be genetically transferred to cereal and other crops.

The use of chemical fertilizers is still a comparatively recent phenomenon in the long history of agriculture. Until Chilean nitrate and Peruvian guano were first introduced into European agriculture in the 1830s, and until the manufacture of superphosphate began in the 1840s, the limited use of "artificial" fertilizers was confined to such substances as soot, bones, hoofs and horns, saltpetre and lime. The main reliance for the maintenance and restoration of soil fertility was on such practices as shifting cultivation, fallowing, crop rotation, catch-cropping (especially with nitrogen-fixing legumes), and the recycling of crop and animal residues.

With the abundant supply at relatively low prices of chemical fertilizers possessing the advantages of concentration and portability and of adaptability to different soil conditions and to the requirements of different crops, there has been a steady decline in the emphasis on the use of crop and animal residues to return fertility to the soil. In many developing countries, especially where there is no tradition of "mixed" crop and livestock farming, crop and animal residues have never been much used for fertilization, but have been burned as non-commercial fuel. In these countries the modernization of agriculture has sometimes gone straight to the stage of using energy-intensive chemical fertilizers. Major exceptions are China, Japan and the Republic of Korea, where although the use of chemical fertilizers has increased rapidly, there is still a very substantial use of crop, animal and human residues.

There is little doubt that the immense increases in population in the last century, and particularly the last quarter century, could never have been fed (even at the present levels, which are so inadequate in many countries) without the rapid increase that has occurred in reliance on chemical fertilizers. However, in the context of the need to economize in the use of increasingly expensive commercial energy, it is necessary to examine the possibility of making greater use of crop and animal residues as fertilizer.

It has been roughly estimated that the total plant, human and animal wastes available in the developing market economies in 1971 that could potentially be used for organic manuring contained 103 million tons of plant nutrients (48 million tons nitrogen, 16 million tons phosphate, and 39 million tons potassium). This is almost eight times the consumption of chemical fertilizer in these countries in 1970/71, and worth (at 1973 world prices for chemical fertilizer) about U.S.$16 000 million. By far the biggest potential source of organic fertilizer was animal manure, which accounted for 37 million tons of

[40] *Ibid.*, p. 85.

plant nutrient, or 36% of the total estimated to be available from all sources.[41]

There are many difficulties in the mobilization and use of even a small part of this great potential. The main constraints in developing countries have been identified as the need to adjust the whole farming system, the heavy labour requirement, the low level of technological development, the lack of opportunities for profitably raising output, the need to develop skills, cultural attitudes, and the lack of a mixed livestock and crop husbandry.[42] To these may be added the fact that part of the waste products involved is at present used as fuel to provide non-commercial energy. Special importance therefore attaches to the further development of the anaerobic fermentation process, discussed earlier, whereby methane (biogas) is produced as fuel, while the plant nutrient value of the organic material is retained.

Farm machinery

In 1972/73 farm machinery still took the largest share of the total commercial energy applied in the world's agriculture. In the developing countries it occupied second place after chemical fertilizers, and in the developed countries and in the world as a whole it is likely soon to fall back to second place.

Like chemical fertilizers, farm machinery in its most advanced form of mechanical power is a comparative newcomer to the inputs used for agricultural production. In fact, as is discussed later in connection with non-commercial energy for agricultural production, human and animal energy still contribute a large share of the total power used for traction in agriculture in the developing countries.

The great improvements in farm machinery that were made in Europe and North America in the Eighteenth and Nineteenth Centuries, such as improved ploughs, seed-drills and reapers, were initially for animal traction. Animal, wind and water power were used to operate stationary machinery such as threshers and grinders. Steam power was introduced for stationary farm machinery early in the Nineteenth Century, and was applied to field operations from about the middle of the century. But there was no really effective replacement for animal traction in field operations until the introduction of the internal combustion engine, in the form of the agricultural tractor, around the turn of the century.

Except at the most primitive level, using only wooden tools, both hand tool and animal draught technology require some input of commercial energy for the manufacture of implements. But they consume a negligible amount of energy in comparison with the requirements of mechanical power technology, which uses large quantities of commercial energy for both the manufacture and the operation of farm machinery. Thus the rapid tractorization of agriculture in the developed countries that has characterized the last 50 years, combined with the more recent spurt in the use of mechanical power technology in the developing countries, has led to a substantial rise in agriculture's use of commercial energy.

The number of four-wheel and crawler tractors at work in agriculture is projected to rise from 16.1 million in 1972/73 (9% in developing countries) to 20.6 million by 1985/86 (13% in developing countries). The annual production of tractors was 1.6 million units in 1972/73 (8% in developing countries), and is projected to increase to about 2.2 million in 1985/86. In addition to tractors, the farm machinery industry manufactures tillage, planting, cultivation, harvesting and other equipment, and the total weight of farm machinery manufactured by the industry is estimated as 15.0 million tons in 1972/73, rising to 20.5 million tons in 1985/86.

The manufacture of tractors and other farm machinery is fairly energy-intensive, and it is assumed here that 86.7×10^6 joules (2 kg fossil fuel equivalent) are required for the manufacture of each kilogram of machinery. On the basis of this and certain other assumptions (in particular concerning the average weight of the tractors and associated equipment in the different regions), the total energy requirement for this purpose is estimated in Table 3-10.

The table also shows estimates of the commercial energy that is required as fuel for the operation of farm machinery. The annual fuel consumption of a tractor varies with its size and with the agricultural operations it performs. In North America, for example, the number of tractors has decreased since 1968, with the replacement of old tractors by fewer but more powerful new ones. Not only is the average tractor size larger than elsewhere, but tractors and other machinery are used to perform nearly all crop production operations; annual fuel consumption in North America is therefore assumed to have been 4 tons per tractor in 1972/73 and is expected to reach 5 tons in 1985/86. In the developing countries, on the other hand, the average tractor size is much smaller, and they are mainly used for tillage. Annual

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[41] van Voorhoeve, J.J.C., *Organic fertilizers: problems and potential for developing countries*, World Bank Fertilizer Study, Background Paper No. 4, Washington, D.C., International Finance Corporation, Office of the Economic Adviser, 1974, p. 5, 7.

[42] Duncan, A., *Economic aspects of the use of organic matter as fertilizer*, FAO/SIDA Expert Consultation on Organic Materials as Fertilizers, Rome, 2-6 December 1974, Rome, November 1974, p. 22. AGL:TMOF/74/24. See also FAO, *Organic materials as fertilizers*, Soils Bulletin No. 27, Rome, January 1974; and FAO/UNEP, *Development of a programme promoting the use of organic materials as fertilizers*, Rome, FAO, 1976. AGL/MISC/76/1.

TABLE 3-10. — COMMERCIAL ENERGY FOR FARM MACHINERY MANUFACTURE AND OPERATION, 1972/73 AND PROJECTIONS FOR 1985/86

Region	Manufacture[1]		Operation[2]		Total		Share of each region	
	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86
	..... × 10^{15} *joules*						..... *Percent*	
DEVELOPED MARKET ECONOMIES[3]	957	1 082	1 894	2 273	2 851	3 355	73.4	62.4
North America[4]	429	473	870	954	1 299	1 427	33.4	26.6
Western Europe[5]	458	519	879	1 137	1 337	1 656	34.4	30.8
Oceania[6]	35	42	65	79	100	121	2.6	2.2
EASTERN EUROPE AND THE U.S.S.R.[7] . . .	233	400	505	841	738	1 241	19.0	23.1
Total developed countries	1 190	1 482	2 399	3 114	3 589	4 596	92.4	85.5
DEVELOPING MARKET ECONOMIES[3]	99	254	158	416	257	670	6.6	12.5
Africa[8]	11	27	19	46	30	73	0.8	1.4
Latin America[8]	56	128	92	221	148	349	3.8	6.5
Far East[8]	11	31	18	50	29	81	0.7	1.5
Near East[8]	21	68	29	99	50	167	1.3	3.1
ASIAN CENTRALLY PLANNED ECONOMIES[8] . .	15	41	25	67	40	108	1.0	2.0
Total developing countries	114	295	183	483	297	778	7.6	14.5
World	1 304	1 777	2 582	3 597	3 886	5 374	100	100

SOURCE: FAO estimates.

[1] Average energy requirement for manufacture assumed to be 86.7 × 10^6 joules per kg of machine weight; replacement rate of 8% per year assumed. – [2] Average energy content assumed as 43.2 × 10^6 joules per kg of fuel. – [3] Including countries in other regions not specified. – [4] Average weight of tractor and associated equipment assumed to be 15 tons per tractor in 1972, increasing to 17.75 tons per tractor in 1985, and annual fuel consumption 4 tons per tractor in 1972 increasing to 5 tons per tractor in 1985. – [5] Average weight of tractor and associated equipment assumed to be 8 tons per tractor, and annual fuel consumption 3.5 tons per tractor. – [6] Average weight of tractor and associated equipment assumed to be 10 tons per tractor, and annual fuel consumption 3.5 tons per tractor. – [7] Average weight of tractor and associated equipment assumed to be 6 tons per tractor, and annual fuel consumption 3 tons per tractor. – [8] Average weight of tractor and associated equipment assumed to be 8 tons per tractor, and annual fuel consumption 4 tons per tractor.

fuel consumption in these countries is assumed to be 3 tons per tractor. The energy content of the fuel used to operate farm machinery has been estimated as 43.2 × 10^6 joules per kg.[43]

It is apparent from the table that the commercial energy required annually to operate farm machinery is about twice the requirement for its manufacture, although the proportion is somewhat lower in the developing countries. The share of these countries in the total commercial energy devoted to the manufacture and operation of farm machinery was only 8% in 1972/73, and it is projected to increase to no more than 15% in 1985/86.

The importance of power-operated farm machinery to the world's agriculture is threefold. In the first place, it has to be used if certain operations such as deep ploughing and heavy land clearance are to be performed effectively. It is thus particularly important in the development of new land, but its greatest importance probably lies in its ability to perform crucial operations, such as tillage and planting, with great speed. If these and other operations are performed at the correct time, yields are increased and losses due to pests or weather are reduced. Speedy tillage and planting are of key importance in semi-arid areas, where the total crop area depends on how much land can be prepared and planted in the brief period when the uncertain rains arrive. In sub-tropical and tropical areas, they are usually essential if the potential for multiple cropping is to be realized.

The third and most basic function of farm machinery is to replace human labour. This has been of particular importance in the developed countries, where agricultural labour has become scarce and costly. Except in limited areas, this function is unlikely to assume much importance for many years to come in the developing countries. On the basis of the United Nations medium population assumption, and fairly optimistic assumptions about the growth of non-agricultural employment opportunities, it is estimated that the agricultural labour force of the developing world as a whole will continue to

[43] Leach, G., *op. cit.*, p. 6.

grow in absolute numbers until the early years of the next century.[44] In the meantime, however, there is an urgent need for the rapid mechanization of certain agricultural operations in developing countries, in some cases in order to reduce the appalling human drudgery involved.

Because of the need to maximize agricultural employment opportunities in the developing countries for a long time to come, it has become generally agreed that these countries should pursue more "selective" or "appropriate" mechanization policies than most of them have in the past. Such policies have so far found little application in practice, and it is to be hoped that one of the beneficial results of the energy crisis will be a more rational approach by the developing countries to the use of their scarce capital and foreign exchange resources for agricultural mechanization. However, it would be disastrous if the increased costs of the manufacture and operation of farm machinery should slow down its application in the many areas where it is essential for a sufficiently rapid rise in the food and agricultural production of the developing countries.

In these circumstances, it is imperative to examine ways of improving the efficiency of farm machinery use. In the developed countries attempts have been made in recent years to promote minimum tillage practices, and energy requirements have also been reduced by combining operations such as planting and fertilization. It has been estimated that in the United Kingdom reduced tillage consumes about 62% and direct sowing 35% of the fuel required for traditional methods, while in the United States reduced tillage requires 57%, minimum tillage 46% and "zero" tillage 17% of that for conventional methods.[45] Economies in fuel consumption can also be made by better maintenance and tuning of engines, keeping implements in good condition, using diesel engines, and using the right appliance for each operation.

There are many cases in developing countries where defective planning and management have resulted in as many as half of the country's tractors being out of operation, while the other half is operating well below capacity. One factor among many is that spare parts are often subject to taxation and delays from which imported machinery is exempt. More attention is also needed to the design and manufacture of farm machinery that is better suited to the conditions of the developing countries.

More effective use of human and animal draught power could reduce the need for mechanized power in many developing countries. Renewed attention to the development and local manufacture of improved equipment for use with draught animals could be of importance in many areas. Much could also be done to improve the efficiency of hand tool application. Labour productivity could often be increased by the better design and use of hand tools, and by planning farm operations to avoid unnecessary seasonal peaks in labour requirements. The effectiveness of all these power sources may also be increased by combining their use in developing countries. Mechanized power is often the most effective method for tilling the soil, but animal power may then be used for planting and secondary cultivation, and human labour for inter-row cultivation and harvesting. Power mechanization in the developing countries should thus be used to complement rather than replace human and animal power.

Irrigation

Controlled irrigation is mainly of two types: large-scale gravity flow irrigation, where dams or water diversion structures and channels have been built to bring the water to the fields, and pump irrigation, where water is pumped either from groundwater or from surface sources. Agricultural production is often only a secondary use of water from large dams, the primary use being electrical power generation, and the energy used in the construction of dams is therefore excluded from the estimates made here. Since the development and maintenance of irrigation canals are largely performed by machines, the energy requirements for this purpose have been included under farm machinery. The irrigation equipment discussed here is limited to pumps, engines, pipes, and other irrigation materials such as sprinkler equipment.

In 1972/73 the quantity of irrigation equipment in use in the world amounted to about 2.5 million tons, of which almost half (1.2 million tons) was in developing countries. By 1985/86 the quantity of such equipment is projected to increase to 3.6 million tons, with 2.2 million tons (59%) in the developing countries. The annual production of irrigation equipment supplied to agriculture was about 331 000 tons in 1972/73, and production capacity is projected to increase to 480 000 tons by 1985/86. It is assumed that the energy required to produce this equipment is about the same as for farm machinery: 86.7×10^6 joules (2 kg petroleum equivalent) per kg of equipment. Estimates on this basis are shown in Table 3-11.

[44] *The state of food and agriculture 1973*, Rome, FAO, 1973, p. 140 (reprinted as *Agricultural employment in developing countries*, Agricultural Planning Studies No. 16, Rome, FAO, 1974).

[45] *The use of energy in European agriculture* (document prepared for European Commission on Agriculture, Twentieth Session, Rome, 17-23 June 1976), Rome, FAO, March 1976, p. 6. ECA: 20/76 (5).

TABLE 3-11. — COMMERCIAL ENERGY FOR IRRIGATION EQUIPMENT MANUFACTURE AND OPERATION, 1972/73 AND PROJECTIONS FOR 1985/86

Region	Manufacture[1]		Operation[2]		Total		Share of each region	
	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86	1972/73	1985/86
	.....		× 10^{15} *joules*	.....			..... *Percent*	.....
DEVELOPED MARKET ECONOMIES[3]	9.6	10.5	47.4	56.2	57.0	66.7	32.4	26.7
North America[4]	6.0	6.4	30.6	35.6	36.6	42.0	20.8	16.8
Western Europe[4]	2.8	3.0	12.7	15.4	15.5	18.4	8.8	7.4
Oceania[4]	0.2	0.3	1.1	1.4	1.3	1.7	0.7	0.7
EASTERN EUROPE AND THE U.S.S.R.[4]	3.0	4.2	12.2	17.6	15.2	21.8	8.6	8.7
Total developed countries	12.6	14.7	59.6	73.8	72.2	88.5	41.0	35.4
DEVELOPING MARKET ECONOMIES[3]	11.9	21.3	56.7	100.8	68.6	122.1	39.0	48.8
Africa[5]	0.2	0.6	1.0	2.5	1.2	3.1	0.7	1.2
Latin America[6]	1.6	2.6	4.5	11.1	6.1	13.7	3.5	5.5
Far East[6]	4.4	7.7	26.1	42.9	30.5	50.6	17.3	20.2
Near East[5]	5.7	10.4	25.1	44.3	30.8	54.7	17.5	21.9
ASIAN CENTRALLY PLANNED ECONOMIES	4.2	5.6	31.1	33.9	35.3	39.5	20.0	15.8
Total developing countries	16.1	26.9	87.8	134.7	103.9	161.6	59.0	64.6
World	28.7	41.6	147.4	208.5	176.1	250.1	100	100

SOURCE: FAO estimates.

[1] Energy requirement for manufacture assumed to be 86.7 × 10^6 joules per kg of equipment, and replacement rate seven years for engines and 15 years for pumps (average life 10 years). – [2] Energy content assumed to be 43.2 × 10^6 joules per kg of fuel. – [3] Including countries in other regions not specified. – [4] Weight of equipment assumed to be 140 kg/ha irrigated, and fuel requirement 160 kg/ha. – [5] Weight of equipment assumed to be 100 kg/ha irrigated in 1972, increasing to 120 kg/ha in 1985, and fuel requirement 200 kg/ha. – [6] Weight of equipment assumed to be 140 kg/ha irrigated, and fuel requirement 180 kg/ha. – [7] Weight of equipment assumed to be 100 kg/ha irrigated, and fuel requirement 180 kg/ha.

In addition to the energy needed for the manufacture of irrigation equipment, energy (usually in the form of petroleum fuel) is needed for its operations. The fuel requirement per hectare of land irrigated varies with the depth of the water being pumped, the type of irrigation system, and the water requirement of the crop. It is estimated that fuel requirements vary from 160 kg per hectare in the developed countries to 200 kg in Africa and the Near East. The energy required to operate irrigation equipment is about five times that required for its manufacture.

Irrigation is of particular importance in the developing countries, especially in the Near East and Far East. Of the total commercial energy used for the manufacture and operation of irrigation equipment in 1972/73, 59% was in the developing countries. By 1985/86 this proportion is projected to rise to 65%.

More efficient use of irrigation water, with savings in the energy consumed, appears both necessary and feasible in many areas. Many existing irrigation schemes are badly in need of renovation. The interdependence of land development methods, irrigation practices, and systems of cultivation and crop production is seldom fully appreciated. Both increased efficiency in the use of irrigation water and higher cropping intensities can be achieved by improving water distribution channels and providing for the drainage of the fields, improving field layouts, land grading and levelling, and improving cropping practices through the use of better implements and water application methods. Such improvements are often impeded, however, by fragmented land holdings and the difficulty of organizing the necessary group action.

There are extensive arid areas of the world that could be used for crop production only through the desalinization of sea water and its use for irrigation. Enormous quantities of energy would be required, not only for the desalinization process itself, but also to transport the irrigation water long distances from the coast. Such a development must therefore await the availability of cheap alternative sources of energy.

PESTICIDES

The world market for pesticides in 1974 is estimated at U.S.$7 000 million at consumer prices.

TABLE 3-12. — COMMERCIAL ENERGY FOR PESTICIDES MANUFACTURE AND APPLICATION, 1972/73 AND PROJECTIONS FOR 1985/86

Region	Commercial energy[1]		Share of each region	
	1972/73	1985/86	1972/73	1985/86
	× 10^{15} joules		... Percent ...	
DEVELOPED MARKET ECONOMIES[2]	93.6	107.4	57.5	45.8
North America	55.3	64.5	34.0	27.5
Western Europe	36.8	41.4	22.6	17.7
Oceania	0.7	0.7	0.4	0.3
EASTERN EUROPE AND THE U.S.S.R.	36.8	41.5	22.6	17.7
Total developed countries	130.4	148.9	80.1	63.5
DEVELOPING MARKET ECONOMIES[2]	9.3	53.4	5.7	22.8
Africa	1.2	8.3	0.7	3.6
Latin America	5.3	13.8	3.2	5.9
Far East	1.4	23.0	0.9	9.8
Near East	1.4	8.3	0.9	3.5
ASIAN CENTRALLY PLANNED ECONOMIES	23.0	32.2	14.2	13.7
Total developing countries	32.3	85.6	19.9	36.5
World	162.7	234.5	100	100

SOURCE: FAO estimates.

[1] Production of 1 kg of pesticide assumed to require 101.3 × 10^6 joules of energy, *in* Leach, G., and Slesser, M., *Energy equivalents of network inputs to food producing processes*, Glasgow, University of Strathclyde, 1973, p. 38. – [2] Including countries in other regions not specified.

About 7% of the total use in 1974 was in developing countries. Although the rate of growth of pesticide consumption in these countries has recently slowed down to about 9% a year, in comparison with 23% a year in 1971-73, they continue to account for an increasing proportion of the world total.

The commercial energy required to produce a pesticide can be substantial. The raw materials for modern pesticides mostly come from the petrochemical industry, and further inputs of energy are required in manufacturing. A pesticide also contains a number of formulating agents and often a solvent, and these too require an energy input. Smaller energy inputs are also required for packaging, transport, distribution and application. The total energy required to provide a kilogram of pesticide has been estimated to be about 101 × 10^6 joules (2.3 kg petroleum equivalent).[46] Thus pesticides are the most energy-intensive agricultural input (Table 3-12). However, since they are mostly used in small quantities (seldom more than 1 kg active ingredient per hectare), they represent only a small part of the total commercial energy used in agricultural production.

In addition to their energy-intensiveness, concern about possible detrimental effects to the biosphere from the use of chemical pesticides has stimulated the search for ways of economizing in their use. Weed control through better tillage and mechanical or hand weeding is in many cases still the best alternative to herbicide use. These methods may be especially appropriate in developing countries, where labour is usually abundant and cheap in relation to the cost of imported materials. The need for insecticides and fungicides can also be reduced by developing new pest control methods based on the principle of integrated pest control, which relies mainly on natural elements for the control of pests, including pest-resistant varieties of crops. These new techniques are gradually finding wider application.

Nevertheless, continued growth in the use of pesticides appears unavoidable. Their expanded use is particularly needed in developing countries, where crop losses (both pre- and post-harvest) because of inadequate pest control are very large. The declining share of world pesticide use projected for the developed countries probably mainly reflects environmental concerns. A number of pesticides have been banned for environmental reasons, and this has caused difficulties in developing countries since suitable substitutes for them have not yet been developed.

Non-commercial energy for agricultural production

The large share of non-commercial sources in the total energy consumption of the developing countries has already been emphasized. The main sources of non-commercial fuel (fuelwood and agricultural residues), although themselves deriving from plant and animal products, do not contribute energy to agricultural production except to the extent that they are converted to commercial energy in such forms as producer gas or methane. Human energy and animal energy are, however, of major importance in the agriculture of the developing countries, while limited use is also made of wind and water power to operate simple machinery, and direct solar energy is used for crop drying.

In primitive agriculture, only human energy was added to the basic conversion of solar energy performed by plants. Animal draught power was later added in many areas. These two sources still contribute a large proportion of the total power used for traction in agriculture in many parts of the world,

[46] Leach, G., and Slesser, M., *Energy equivalents of network inputs to food producing processes*, Glasgow, University of Strathclyde, 1973, p. 38.

TABLE 3-13. — DISTRIBUTION BY SOURCE OF POWER USED IN AGRICULTURE IN DEVELOPING COUNTRIES

Region	Total available power	Share of available power		
		Human	Animal	Mechanical
	hp/ha	.....	*Percent*	.....
Africa	0.10	35	7	58
Asia[1]	0.22	26	51	23
Latin America .	0.25	9	20	71
Total	...	24	26	50

SOURCES: Giles, G.W., The reorientation of agricultural mechanization for the developing countries: Policies and attitudes for action programmes, *in* FAO, *Effects of farm mechanization on production and employment, Report of the expert panel held in Rome, 4-7 February 1975*, Rome, 1975, p. 76.

[1] Excluding China.

perhaps about a quarter each in the developing countries as a whole (Table 3-13).

More than 60% of the economically active population of the developing countries derived its livelihood from agriculture in 1975. Probably about half of the work energy expended by the agricultural labour force is for agricultural production, although the proportion may be as high as three quarters in areas (such as many parts of Africa), where there are virtually no draught animals.[47] The work output of much of the agricultural labour force is impaired by severe malnutrition, especially at the time of the harvest when labour requirements are at their peak. It is also seriously underemployed for much of the year, so that the fuller use of this abundant resource offers the opportunity not only for increasing the incomes of the poor but also for economizing in the use of commercial energy for agricultural work. The abundant labour supplies of the developing countries also make it more economic than in the developed countries to collect crop and animal residues for use as organic fertilizer and as commercial or non-commercial fuel. On the other hand, it is urgently necessary to reduce the drudgery of agricultural work in the developing countries, and this is a major stimulus to mechanization in many areas.

Draught animals supply a large part of the motive power for agriculture in many developing countries, especially in Asia, although there are large areas (such as the tsetse belt in Africa) where they are almost unknown. They are very inefficient converters of plant energy, however, requiring large areas of land to feed them, so that they cannot be used to any great extent where land is short unless crop yields are very high. Their traction and speed of operation are also limited. In comparison with tractors, they have the major disadvantage that they have to be supplied with fuel (in the form of plant energy) even when they are not working. When, as is often the case, they can be used for only part of the year and the supply of feedstuffs for them is limited, the amount of plant energy required for their maintenance becomes a very high proportion of their total intake. Nevertheless, there are many areas where the use of animal traction is capable of considerable further development, and renewed attention is needed to the improvement of animal draught equipment, which has tended to be neglected in recent years.

In the developed countries the motive power for agricultural production is now almost entirely provided by machines. Agriculture accounts for less than 20% of the economically active population (as little as 3% in North America), and much of the agricultural labour force is engaged mainly in managerial activities and the operation of machines, rather than the direct application of human energy to agricultural production. The labour input for maize production in the United States is estimated to have fallen by about 60% between 1945 and 1970, and its share of the total energy input for this purpose from 1.4% in 1945 to 0.2% in 1970.[48] The number of draught animals has also fallen rapidly in the developed countries, and their contribution is now very small except in a few areas such as parts of eastern Europe. Their numbers have also fallen in the developing countries with more advanced agriculture. For example, in Argentina horse numbers declined by two thirds between 1937 and 1965, although it appears that, here as elsewhere, it is probably much more in the form of transport for people and goods than in the form of agricultural tractors that the internal combustion engine has replaced work animals and freed land.[49]

[47] Makhijani, Arjun, and Poole, Alan, *op. cit.*, p. 21.

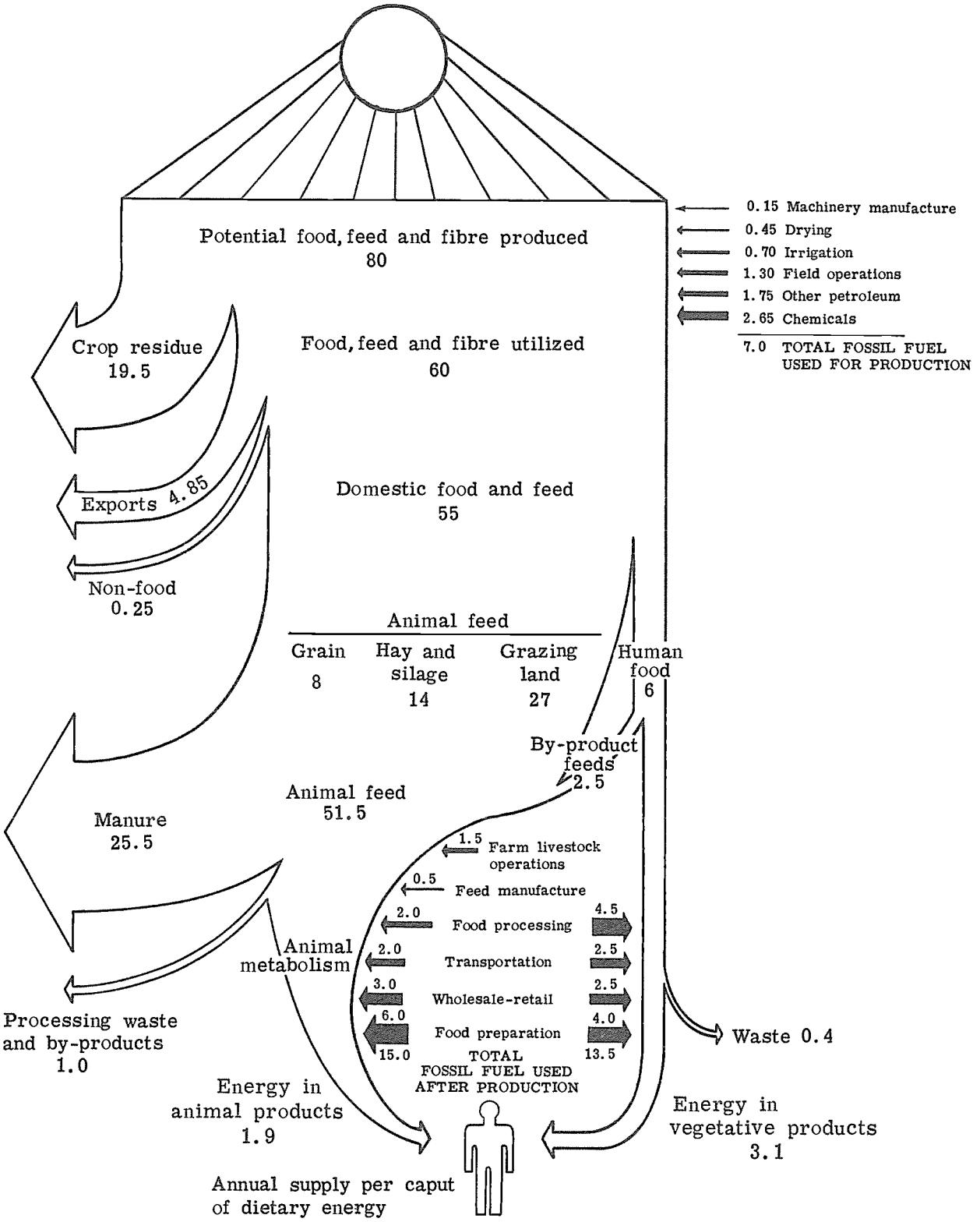
[48] Pimentel, D. *et al.*, *op. cit.*, p. 445.

[49] Abercrombie, K.C., Agricultural mechanization and employment in Latin America, *International Labour Review*, 106(1), 1972, p. 23.

Energy use in the total food chain

Very large amounts of energy are required to provide the diets that are consumed in the developed countries, with their high content of animal protein and processed products, and dependence on a sophisticated marketing chain. A great deal of potential dietary energy is lost in the conversion of plant

FIGURE 3-3. — ENERGY FLOW IN THE UNITED STATES FOOD CHAIN (in joules x 10^9)



SOURCE: Adapted from Stickler, F.C., Burrows, W.C. and Nelson, L.F., *Energy from sun, to plant, to man*, Moline, Ill., U.S.A., Deere and Company, 1975, Figure 2.

products by animals. Much more commercial energy is used in the developed countries in the processing, transport, marketing and preparation of food than in its initial production on the farm.

Figure 3-3 shows the energy flow in the total food chain in the United States. Excluding exports and non-food crops (and the associated crop residues and use of fossil fuel energy), it may be estimated from the data shown there that 73×10^9 joules of solar energy stored in plants by photosynthesis, plus 35×10^9 joules of fossil fuel energy, are required to provide the average annual supply per caput of 5×10^9 joules of dietary energy (3 275 kilocalories per day).

Crop residues that remain in the field after harvest account for a quarter of the initial total of solar energy captured in United States crop production. Of the 55×10^9 joules that remain for domestic food and feed use, as much as 94% are used for animal feed. Only 15% of the animal feed is grain, however, the rest coming from grazing land, hay and silage, and by-products from the processing of human food. Of the 51.5×10^9 joules used for animal feed, almost half becomes manure, and only a little less is required for the maintenance rations of livestock. Thus it may be roughly estimated that 69×10^9 joules of solar energy in plants (94% of the initial total of 73×10^9 joules), plus approximately 19×10^9 joules of fossil fuel energy (assuming, probably conservatively, that two thirds of that used in crop production is ultimately destined for animal feed), are required to provide 1.9×10^9 joules of dietary energy in the form of livestock products.

Of the total fossil fuel input for food production, only 8.5×10^9 joules (6.5 for crop production, 1.5 for farm livestock operations, and 0.5 for feed manufacture), or about a quarter, are expended at the farm level. Three times as much fossil fuel energy is used in the United States for the processing, transport, marketing and preparation of food as in its production on the farm. Food preparation alone accounts for far more fossil fuel energy than is used for farm production, food processing for about the same as farm production, and wholesale and retail marketing only slightly less. Once again the heavy demands of livestock products are apparent, for it takes about the same amount of energy to process, transport, market and prepare 1.9×10^9 joules of dietary energy in the form of livestock products as for 3.1×10^9 joules in plant products.

Another estimate of energy use in the United States food system [50] confirms that only about a quarter of the total is at the farm level. The farm level share rose from 18% in 1940 to 27% in 1950, since during that period commercial energy use grew more rapidly in farm production (partly replacing human labour and draught animals) than in the rest of the food system. Subsequently it slowly declined, and was about 24% in 1970. The authors indicate that, even though their estimates should be reduced by 5 to 15% to allow for net exports, the net total might be raised by as much as 30 to 35% by adding items they have omitted. Even so, their estimates indicate that the food system accounted for 12.8% of total United States energy use in 1970. The largest single items were home refrigeration and cooking, the food processing industry, commercial refrigeration and cooking, and fuel for transport in the processing industry, with the direct use of fuel on the farm coming only fifth. Food processing was the fourth largest energy user in the Standard Industrial Classification (SIC) groupings, after primary metals, chemicals, and petroleum refining.

For the United Kingdom, it has been estimated that 23.6×10^9 joules of commercial energy were required to provide the food consumed by one person in 1968.[51] This estimate excludes cooking, the inclusion of which might perhaps take it up to about 33×10^9 joules, in comparison with the 35×10^9 joules shown earlier for the United States.

These high figures must be compared with the 13×10^9 joules shown in Table 3-6 as the total per caput commercial energy consumption for all purposes in the developing countries. To feed the whole world population with a United Kingdom or United States type food system would use up 40 to 60% of the present world commercial energy consumption.

Little information is available on energy use in the whole food chain in developing countries. However, as the greater part of the food in most of these countries is consumed locally, much of the energy involved must be the human and animal energy used in subsistence production, and the organic fuel used for the preparation of food.

It is estimated that about half of the total use of wood fuels in developing countries is for cooking food, with a substantial part of the other half being used for food preservation and preparation. Given the problems of continuing to supply growing populations with wood and other organic fuels, more attention should be paid to economies, through more efficient practices, in the use of fuel for these purposes. In a study of Indonesia, it was found that the consumption of fuelwood for cooking could be reduced by about 70% as a result of air-drying the wood before use, simple improvements in stove

[50] Steinhart, John S., and Steinhart, Carol E., Energy use in the U.S. food system, *Science*, 184(4134), 19 April 1974, p. 307-316.

[51] Leach, G., *op. cit.*, p. 312.

design, and a new type of cooking pot.[52] The constraints on achieving such improvements evidently include the cash costs entailed, but such costs are probably smaller than those required to adopt other fuels.

It seems probable that the use of commercial energy for the processing, transport, marketing and preparation of food in the developing countries is so far no greater than that in farm production itself. However, world energy use is so dominated by the developed countries that the use of commercial energy in the food system as a whole may well be as much as 10% of total world consumption, or about three times the 3.5% estimated for agricultural production. While the developed countries are estimated to account for about 80% of the total commercial energy used in world agricultural production, their share of that used in the total world food system might be as high as about 90%.

[52] Singer, H., *Report to the Government of Indonesia on improvement of fuelwood cooking stoves and economy in fuelwood consumption*, Rome, FAO, 1961. FAO/EPTA Report No. 1315.

Conclusions and prospects for the future

The two most salient features of the world energy situation are the very small share of the developing countries in total consumption, and the world's growing dependence on the rapidly depleting resources of fossil fuels. The need for the development of alternative sources of energy is therefore urgent, although it is still too early for any definitive assessment of the future prospects in this regard.

The developing countries' share of the total commercial energy used in agricultural production, at about 18%, is almost the same as their share of world energy consumption for all purposes. Agricultural production in the developed countries took 2.9% of world commercial energy consumption in 1972, as compared with only 0.6% in the developing countries. The disparities would be even greater if it were possible to consider the whole food system, including the processing, transport, marketing and preparation of food. They are not much reduced by the inclusion of the non-commercial energy sources which contribute a large part of total consumption in the developing countries. Like most of the so-called "development gaps," the difference between the developed and developing countries in the per caput use of energy in agricultural production is likely to continue to widen.

Although fossil fuel resources are limited, it is generally believed that they can continue to provide major quantities of energy until well into the next century and even beyond it, if the growth in consumption can be moderated. This should give sufficient time for the development of alternative sources of energy, such as nuclear energy and, eventually, the direct conversion of solar energy. It is, however, desirable to pursue the search for alternative energy sources on the broadest possible front, not neglecting those which may make only a small contribution at the global level but may be of great significance in individual countries where they are readily available.

Rising petroleum prices have already stimulated work on the development of alternative energy sources, and both such sources and the exploitation of less easily accessible sources of fossil fuel have become more economic.

The higher prices have adversely affected the economies of a very large number of countries. Because so few countries have major resources of fossil fuel, the great majority, developed and developing alike, depend on imports for a large part of their supplies of commercial energy. According to United Nations data, crude petroleum prices in the second quarter of 1976 were six and three quarters times the 1970 level (Table 3-14). The prices of fertilizers, of which most developing countries import the bulk of their

TABLE 3-14. — WORLD EXPORT PRICE INDEXES [1]

	1971	1972	1973	1974	1975	1976[2]
	..... 1970 = 100					
Manufactured goods[3] . . .	105	113	133	162	182	180
Food products	106	122	175	232	219	209
Non-food agricultural products	104	122	196	224	196	207
Non-ferrous ores	98	102	137	181	198	194
Crude petroleum	127	143	196	641	651	675
Crude fertilizers	101	106	121	409	576	458
Non-ferrous base metals	87	87	121	153	120	136

SOURCE: United Nations, *Monthly Bulletin of Statistics*, 30(9), September 1976, Special Table D.

[1] Market economies only. – [2] Second quarter. – [3] Developed market economies only.

supplies, were five and three quarters times the 1970 level in 1975, and by the second quarter of 1976 were still about four and a half times this level. Price increases have been very much smaller, however, for the food and other agricultural products, minerals and manufactured goods on the export of which most countries have to rely to pay for their petroleum imports.

The import bill of the most seriously affected (MSA) countries rose by 560% for fertilizers between 1972 and 1975, by 338% for fuel, and by 140% for food. Special measures of assistance, including the United Nations Emergency Operation and FAO's International Fertilizer Scheme, have had to be mounted for these countries. The OPEC members have themselves contributed substantially to such assistance.

The economics of the use of energy-intensive inputs at the farm level have only partly reflected the trends in world prices shown in Table 3-14, since farm prices are affected by such factors as taxes, subsidies, and other government policies. Comprehensive information is, however, limited. In most of the developed market economies for which data are available, the ratio of prices received by farmers to the prices paid by them for production requisites reached a peak in 1973 and by 1975 had fallen by 5 to 30%. In the Republic of Korea, the only developing country for which there are comparable data, this ratio fell by only about 4% between 1973 and 1975.[53]

Although these overall falls in price ratios have been quite small, they conceal much greater declines in the profitability of using individual energy-intensive inputs like fertilizers and farm machinery, and especially in their marginal productivity. For example, in the United States farm prices of agricultural products rose by 7% and of production requisites as a whole by 18% between 1973 and 1974, but those of fertilizers increased by as much as 70%. In Australia farm prices of agricultural products fell by 12% in 1974, those of production and marketing requisites as a whole rose by 30% and those of fertilizers by 131%.[54] It is therefore hardly surprising that the world consumption of fertilizers, which has risen steadily ever since the Second World War, fell by 2.6% in 1974/75, as a result of a drop of almost 10% in the developed market economies.

Some specialized subsectors of agriculture, such as horticulture under glass, and intensive livestock production requiring air-conditioned units, have been particularly affected by the higher energy prices. Energy accounted for 42% of the total costs of horticultural production under glass in the EEC in 1972. The heating of glasshouses accounts for about 79% of all the energy directly consumed by agricultural production in the Netherlands, and 40% in Belgium. Hothouse farming is undergoing some modifications in such countries, including the use of lower temperatures, improved insulation, alternative energy sources, and changes in its geographical distribution.[55]

A major problem in the developed countries is whether or not to cushion agriculture against the increased energy costs. Most European countries have increased the relevant subsidies to their farmers, but the EEC Commission has recommended that such distortions should be avoided, and that agriculture will have to adjust to higher energy costs.[56] In the developing countries, only those with substantial fossil fuel resources of their own are at present in a position to subsidize energy costs to agriculture.

Obviously the much higher prices of petroleum, the balance of payments difficulties of the oil-importing countries, as well as the rapid depletion of fossil fuel resources, dictate the need for substantial economies in overall energy use, at least until alternative cheap sources are available on a major scale. The lavish use of energy in the processing, transport, marketing and preparation of food in the developed countries is an obvious candidate. But agricultural production itself provides little scope for economies. Agricultural production took only 3.5% of total world commercial energy use in 1974, and this proportion is projected to rise only to 4.1% by 1985. Thus agriculture's needs are certainly not a major factor in the pressure on overall energy supplies. The sector's small call on energy resources clearly deserves the highest priority, in view of the dependence of the high yields prevalent in developed countries and of the increases aimed at with the existing "green revolution" technology in developing countries on the heavy use of energy-intensive inputs such as fertilizers, machinery and pesticides. The natural gas required for the production of nitrogen fertilizer is a particularly crucial need, since there is no cheap alternative at present.

However, it is clear that if sufficient energy is to be available for those purposes for which it is really essential in agricultural production, economies must be achieved where it is less necessary and where alternative sources of energy are appropriate. Moreover, economies are required in order to keep down the cost of food and other agricultural products.

Productivity per unit of energy, particularly fossil

[53] *Monthly Bulletin of Agricultural Economics and Statistics* (FAO), 25(5), May 1976, Table 12.
[54] FAO, *Production yearbook 1975*, Rome, 1976, p. 431-437.
[55] *The use of energy in European agriculture, op. cit.*, p. 7-10.
[56] *Ibid.*, p. 5.

fuel energy, should be considered along with the conventional measures of productivity per unit of land and labour. Greater efficiency in the use of solar energy by plants has so far been achieved mainly at the expense of greater inputs of fossil fuel, especially in the form of chemical fertilizer. In addition to increased efficiency in using these inputs themselves, there should be greater emphasis in the future on increasing the efficiency of solar energy conversion in order to economize on the need for fossil fuel inputs. It has sometimes been suggested that the basic criterion should be the efficiency of output of dietary energy in relation to the input of solar and fossil fuel energy,[57] but this approach is probably exaggerated, since the purpose of agricultural production is more complex and diverse than simply to produce dietary energy.

In the developed countries the new price relations seem likely to bring (as already in 1974/75) a slowdown in the recent rapid increase in the use of energy-intensive inputs, although these price relations have recently somewhat improved again. At the very high levels both of yields and of fertilizer use in most of these countries, additional applications bring relatively small returns. The changed economics of fertilizer use could have serious consequences in the interim period before a sufficient acceleration is achieved in the rate of increase in the agricultural production of the developing countries. Later, however, it could help to contribute to the better distribution of agricultural production between developed and developing countries that is so badly needed. The trend toward larger tractors and larger farms in some developed countries appears to be bringing economies in the use of fuel.

It is often suggested that a reduction in the consumption of livestock products in developed countries would release sufficient cereals to eliminate hunger and malnutrition in the developing countries. While this is true, it would unfortunately not provide the means for the poor people in the developing countries to purchase the supplies so released, although it could be of great importance in emergency shortage situations, provided some means could be found for the supplies so released to be made available effectively and speedily to those in need. The energy crisis, however, provides a new argument for reducing the proportion of livestock products in the extravagant diets of rich people in developed countries. Not only does livestock production use very large quantities of the solar energy captured by plants, but the United States example quoted above indicates that it also uses large amounts of fossil fuel energy.

However, it is in the processing, transport, marketing and preparation of food in the developed countries that economies in the use of energy in the food and agricultural sector are most desirable and feasible. This may account already for as much as 90% of the total use of commercial energy in the world food system. Economies here would entail a reversal of the present rapid trend toward the use of highly processed "convenience" foods. Such changes in life styles are at present advocated by many groups, particularly young people, but it seems unlikely that they will do more than slow down the trend.

It is in this area of the processing, transport, marketing and preparation of food that the developing countries probably have the greatest possibilities for following an alternative path to the energy-intensive one taken by the developed countries. The rapid urbanization taking place in the developing countries will undoubtedly entail further increases in the commercial energy used for the transport and preservation of food. But there are many simple preservation and processing techniques that use much less energy than those current in the developed countries, while some food processing industries can be based on the energy derived from their own waste products (for example, bagasse for sugar milling, rice husks for parboiling and palm fibre for oil extraction).[58] For a long time to come, a large part of the food supplies in the developing countries will be for the subsistence of the families that produce them, and an even larger proportion will not leave the immediate area of production.

Nevertheless, some economies in the use of commercial energy in agricultural production itself in the developing countries will certainly be needed, if large increases in the prices of food and agricultural products are to be avoided. Here again, these countries would seem to have different options open to them from the highly energy-intensive path of agricultural development chosen by the developed countries when commercial energy was so cheap. Their agricultures are in the process of substantial change, and there is still scope for altering the direction of change to some extent.

The raising of crop yields in the developing countries will inevitably entail increasingly input-intensive methods of agricultural production. However, it is not inevitable that the inputs should all be energy-intensive and involve the increasing dependence of their agricultural sectors on expensive imports. Indeed, the more efficient and economical use of

[57] Breimeyer, H.F., *The food-energy balance* (paper prepared for Seminar on Population and Food and Agricultural Development organized by the International Association of Agricultural Economists in collaboration with FAO and the United Nations Fund for Population Activities, Rome, 1-5 December 1975), FAO/ESP/IAAE/75/19, Rome, December 1975.

[58] Energy for agriculture in the developing countries, *op. cit.* p. 7.

domestic sources of energy for agricultural production could well be one of the most important aspects of the greater self-reliance of developing countries that is called for in the Declaration and Programme of Action on the Establishment of a New International Economic Order.

Some of the ways in which energy-intensive inputs such as chemical fertilizers, farm machinery and pesticides can be used more efficiently and economically were discussed earlier. One of the most important would be the recycling of the vast resources of plant and animal residues, most of which are at present not utilized, to provide both commercial energy and organic fertilizer. Another would be to reserve farm machinery for the uses for which it is indispensable, and to make fuller use in agricultural production of the abundant supplies of human energy available in the developing countries. But there are many other methods as well, and it is urgent that every country elaborate a detailed policy for the use of energy in agriculture as an important part of national development planning.

ANNEX TABLES

ANNEX TABLE 1. — VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
World													
AGRICULTURAL PRODUCTS													
Wheat	239.63	277.90	267.58	310.17	299.08	331.50	314.45	318.89	353.75	346.86	376.70	359.87	354.32
Barley	101.81	109.29	106.30	117.26	119.68	131.06	136.87	139.43	151.50	153.21	169.42	170.97	156.07
Oats	47.37	44.32	46.61	48.57	50.79	54.29	55.11	55.36	57.75	51.33	54.37	51.01	48.95
Maize	221.78	215.55	227.45	241.50	266.39	252.18	266.67	261.69	306.28	305.00	311.19	295.17	324.38
Rice (milled equivalent) [1]	165.84	172.73	166.93	165.93	179.87	186.07	192.57	200.64	200.72	192.72	210.10	208.80	225.21
Sugar (centrifugal)	53.11	62.74	63.74	64.02	66.12	66.26	67.09	74.11	74.72	73.16	77.52	77.88	80.00
Apples	18.69	19.56	19.48	19.15	22.13	20.49	23.10	21.96	21.35	19.61	22.52	21.41	23.38
Citrus fruit	24.53	25.62	27.82	30.99	34.10	33.45	36.76	37.53	40.13	42.48	45.57	47.88	48.99
Bananas	24.30	26.88	28.82	29.83	30.52	32.48	33.73	34.39	35.34	35.60	35.75	36.41	36.99
Olive oil	1.94	1 34	1.37	1.49	1.48	1.37	1.58	1.65	1.55	1.65	1.54	1.76	1.74
Soybeans	31.66	32.35	36.51	39.08	40.74	44.00	45.19	46.47	48.60	52.30	62.68	57.01	67.99
Groundnuts	16.07	16.99	16.03	16.10	17.54	16.10	17.09	18.32	19.18	15.98	17.08	17.39	19.48
Cottonseed	20.60	21.31	22.06	20.62	20.22	21.77	21.46	22.26	23.75	25.34	25.80	26.50	23.05
Copra	3.70	3.50	3.50	3.79	3.46	3.63	3.54	3.67	4.00	4.28	3.74	3.54	4.15
Total vegetable oils and oilseeds (oil equivalent)	26.85	29.21	30.52	31.10	31.93	32.64	33.06	35.53	37.00	36.29	39.64	38.78	41.80
Coffee	4.26	3.73	5.05	3.90	4.47	3.82	4.36	3.86	4.70	4.60	4.04	4.80	4.48
Cocoa	1.25	1.55	1.22	1.34	1.39	1.24	1.41	1.51	1.60	1.49	1.38	1.49	1.58
Tea	1.12	1.12	1.14	1.19	1.21	1.27	1.30	1.35	1.36	1.48	1.54	1.52	1.59
Wine	25.80	28.43	28.74	27.26	28.48	28.32	27.70	30.31	28.66	26.71	35.38	33.65	31.43
Tobacco	4.50	4.89	4.59	4.58	4.88	4.77	4.63	4.68	4.54	4.87	4.94	5.28	5.43
Cotton (lint)	11.12	11.51	11.95	11.10	10.71	11.46	11.52	11.81	12.55	13.26	13.39	13.66	12.14
Jute [2]	3.32	3.31	3.53	3.75	3.81	2.85	3.75	3.58	3.35	3.98	4.74	3.92	3.90
Sisal	0.69	0.73	0.71	0.69	0.67	0.65	0.68	0.66	0.71	0.72	0.69	0.75	0.75
Wool (greasy)	2.59	2.61	2.66	2.65	2.73	2.73	2.78	2.80	2.77	2.73	2.57	2.53	2.64
Rubber	2.21	2.24	2.36	2.45	2.43	2.70	2.99	2.94	3.04	3.02	3.45	3.40	3.28
Milk (total)	349.10	354.45	369.69	378.02	386.93	394.59	393.73	395.82	398.89	408.20	414.32	422.63	424.29
Meat [3]	83.48	84.42	87.97	91.73	95.81	98.84	100.93	104.79	108.11	110.28	111.06	116.71	118.27
Eggs	16.40	16.75	17.25	17.74	18.98	19.44	20.18	21.11	21.68	22.14	22.39	22.90	23.34
FISHERY PRODUCTS [4]													
Freshwater and diadromous fish	6.57	7.58	8.55	9.18	8.96	9.27	9.80	11.22	11.82	12.17	12.48	12.41	12.80
Marine fish	34.92	39.54	39.64	42.99	45.95	48.66	47.22	52.80	52.44	47.08	47.00	50.59	48.40
Crustaceans, molluscs and other invertebrates	4.15	3.90	4.17	4.30	4.54	4.97	4.76	4.92	4.89	5.32	5.31	5.37	5.40
Seals and miscellaneous aquatic mammals	—	—	—	0.01	—	—	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Miscellaneous aquatic animals and residues	0.22	0.27	0.24	0.14	0.15	0.13	0.10	0.14	0.11	0.14	0.16	0.14	0.14
Aquatic plants	0.69	0.58	0.65	0.68	0.83	0.82	0.77	0.90	0.94	0.92	1.13	1.32	1.20
FOREST PRODUCTS													
Fuelwood [5]	1053	1074	1083	1089	1089	1100	1107	1113	1137	1150	1155	1177	1178
Industrial roundwood [5]	1053	1110	1131	1151	1177	1203	1233	1277	1295	1288	1355	1331	1246
Sawn softwood [5]	273.3	288.5	293.0	290.1	292.6	306.0	311.0	312.0	324.0	333.0	342.0	323.0	303.0
Sawn hardwood [5]	78.0	81.0	82.0	84.0	86.0	88.0	93.0	92.0	94.0	96.0	97.0	97.0	91.0
Plywood [5]	20.2	22.3	24.3	25.6	26.6	29.9	30.8	32.9	36.6	39.9	42.3	36.9	34.5
Particle board [5]	6.0	7.6	9.2	10.9	12.5	14.8	17.3	19.2	22.8	27.4	31.9	31.2	30.6
Fibreboard [5]	11.3	12.4	12.8	12.5	12.7	13.8	14.5	14.3	15.6	16.7	18.0	16.7	15.2
Mechanical wood pulp	19.8	21.0	21.8	22.9	22.6	24.2	25.8	26.7	26.7	27.7	28.5	30.0	25.7
Chemical wood pulp	42.0	46.0	49.0	53.0	55.0	59.0	63.0	66.0	66.0	71.0	75.0	77.0	68.0
Newsprint	15.0	16.2	17.0	18.3	18.5	19.3	20.9	21.6	21.2	21.9	22.4	23.0	20.9
Printing and writing paper	17.4	18.6	19.6	21.8	22.2	24.1	26.2	27.3	27.6	29.9	33.1	34.9	28.8
Other paper and paperboard	53.0	57.0	61.0	65.0	66.0	72.0	77.0	79.0	81.0	87.0	93.0	95.0	82.0

See notes at end of table.

ANNEX TABLE 1. — VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
Western Europe													
AGRICULTURAL PRODUCTS													
Wheat	41.56	46.84	48.91	44.52	52.18	51.84	50.14	47.70	56.71	56.07	55.47	62.85	52.91
Barley	28.50	29.53	30.91	32.57	37.95	37.91	39.49	35.99	42.04	44.22	45.08	47.46	45.39
Oats	12.62	11.96	11.86	11.89	13.40	13.09	12.53	11.99	13.89	12.64	11.74	12.70	12.17
Rye	5.85	6.34	5.40	4.86	5.56	5.59	5.12	4.74	5.37	5.19	4.68	4.79	4.03
Maize	15.21	15.44	14.90	18.29	17.89	19.32	21.73	23.42	25.56	25.43	28.93	26.48	27.49
Sugar (centrifugal)	8.55	10.20	9.08	9.46	10.16	10.38	11.21	10.71	12.45	11.63	12.23	11.20	12.65
Potatoes	80.64	68.48	63.17	65.04	69.00	66.43	59.88	63.69	60.81	56.00	55.95	57.28	47.58
Apples	10.02	10.44	10.75	9.79	12.16	10.64	12.15	11.59	10.65	9.02	11.57	9.92	11.44
Citrus fruit	4.26	4.44	4.55	5.15	4.93	5.15	5.91	5.48	5.62	6.46	6.47	6.61	6.57
Olive oil	1.63	0.65	1.10	1.08	1.18	1.15	1.15	1.21	1.28	1.13	1.32	1.11	1.34
Rapeseed	0.41	0.65	0.77	0.61	0.94	1.02	0.98	1.08	1.29	1.46	1.45	1.62	1.34
Total vegetable oils and oilseeds (oil equivalent) [6]	2.03	1.25	1.70	1.62	1.85	1.81	1.83	1.94	2.18	2.14	2.34	2.16	2.50
Wine	16.72	19.74	19.44	18.34	18.83	18.62	17.60	20.53	17.62	17.55	23.64	22.34	19.97
Tobacco	0.34	0.38	0.37	0.33	0.37	0.32	0.29	0.32	0.30	0.33	0.35	0.33	0.38
Cotton (lint)	0.21	0.16	0.16	0.18	0.17	0.16	0.18	0.17	0.17	0.19	0.18	0.18	0.16
Milk (total)	110.18	110.36	114.04	116.64	119.27	122.19	119.11	117.69	117.44	122.25	123.32	124.25	124.48
Meat [3]	16.33	16.70	17.32	17.97	18.89	19.68	19.90	21.09	21.98	21.73	22.53	24.39	24.42
Eggs	3.70	3.94	3.89	4.00	4.08	4.22	4.46	4.69	4.64	4.75	4.77	4.76	4.96
FISHERY PRODUCTS [4]	8.50	9.17	10.25	10.91	11.30	11.01	10.41	11.02	11.02	11.26	11.45	11.40	11.12
FOREST PRODUCTS													
Fuelwood [5]	66.0	61.0	58.0	54.0	50.0	48.0	43.0	42.0	40.0	35.0	33.0	32.0	31.0
Coniferous logs [5]	66.0	75.0	76.0	74.0	74.0	74.0	79.0	85.0	86.0	85.0	95.0	87.0	69.0
Broadleaved logs [5]	20.0	22.0	23.0	23.0	23.0	22.0	23.0	25.0	23.0	22.0	22.0	22.0	20.0
Other industrial roundwood [5]	78.0	82.0	83.0	84.0	90.0	83.0	90.0	99.0	102.0	91.0	90.0	99.0	93.0
Sawn softwood [5]	39.0	42.0	42.0	41.0	42.0	43.0	46.0	47.0	49.0	49.0	53.0	52.0	42.0
Sawn hardwood [5]	9.4	10.1	10.5	10.8	10.9	11.2	11.5	11.7	12.2	12.1	13.0	11.9	9.9
Plywood [5]	2.5	2.6	2.6	2.6	2.7	2.8	3.0	3.1	3.3	3.6	3.7	3.0	2.9
Particle board [5]	3.4	4.3	5.1	5.8	6.6	7.8	9.3	10.5	12.0	14.4	16.9	16.8	16.1
Fibreboard [5]	2.9	3.2	3.3	3.1	3.0	3.1	3.2	3.2	3.2	3.4	3.4	3.5	2.8
Mechanical wood pulp	5.8	6.2	6.4	6.7	6.5	7.1	7.6	8.0	7.6	7.9	8.2	8.4	6.8
Chemical wood pulp	9.9	10.9	11.5	11.6	12.3	12.7	13.8	14.4	13.9	14.8	16.0	16.5	14.4
Newsprint	4.1	4.4	4.7	4.9	4.8	5.0	5.3	5.6	5.3	5.3	5.3	5.1	4.6
Printing and writing paper	5.3	5.7	6.0	6.7	7.1	8.1	9.0	9.6	9.5	10.5	11.9	12.8	9.7
Other paper and paperboard	13.9	14.8	15.6	16.0	16.2	17.5	19.2	19.8	19.7	20.8	22.8	23.6	19.2
Eastern Europe and the U.S.S.R.													
AGRICULTURAL PRODUCTS													
Wheat	63.15	88.83	78.25	118.59	98.06	114.45	100.61	118.99	123.46	111.86	136.68	111.75	90.57
Rye	21.92	23.78	27.64	23.65	23.65	25.58	21.66	20.58	23.26	20.58	21.66	25.97	17.62
Barley	25.95	34.73	27.18	34.89	32.39	36.92	41.53	46.77	45.00	47.89	66.99	68.38	49.41
Oats	8.79	9.48	10.37	13.70	16.61	16.47	18.25	19.04	19.92	19.19	22.52	20.43	17.11
Millet and sorghum	1.96	3.65	2.25	3.29	3.38	2.81	3.46	2.23	2.16	2.23	4.57	3.18	1.26
Maize	23.27	26.80	19.34	23.32	22.27	22.20	27.58	23.18	24.53	29.15	30.06	28.31	27.37
Pulses	8.99	12.05	7.86	8.27	7.75	7.93	8.71	8.49	7.81	7.79	9.09	9.52	6.17
Cotton (lint)	1.78	1.82	1.96	2.09	2.07	2.01	1.93	2.15	2.37	2.38	2.45	2.68	2.67
Flax (fibre)	0.48	0.44	0.58	0.58	0.61	0.51	0.60	0.56	0.61	0.57	0.54	0.51	0.58
Sugar (centrifugal)	10.09	14.87	13.01	13.31	13.46	13.68	12.65	12.92	11.96	12.67	13.76	11.96	11.83
Total vegetable oils and oilseeds (oil equivalent) [6]	3.17	3.94	3.89	4.41	4.68	4.62	4.29	4.48	4.45	4.10	5.15	4.88	4.30
Sunflowerseed	5.27	7.04	6.46	7.36	7.90	7.99	7.79	7.44	7.09	6.55	8.77	7.98	6.32
Potatoes	141.52	167.15	152.14	159.11	169.23	177.53	155.38	169.30	152.57	149.75	181.03	153.75	150.74
Milk (total)	90.00	92.62	103.63	109.25	114.27	117.09	116.51	118.11	118.67	120.19	126.65	131.11	129.96
Meat [3]	15.03	13.72	15.79	16.69	17.75	18.25	18.32	18.88	20.23	21.27	21.57	23.37	24.44
Wool (greasy)	0.45	0.42	0.44	0.45	0.48	0.51	0.48	0.51	0.52	0.51	0.53	0.56	0.56
Eggs	2.51	2.45	2.65	2.81	3.00	3.10	3.19	3.50	3.81	3.98	4.20	4.51	4.67

See notes at end of table.

ANNEX TABLE 1. — VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
FISHERY PRODUCTS [4]	4.47	5.05	5.73	6.01	6.54	6.94	7.40	8.24	8.41	8.87	9.82	10.57	11.46
FOREST PRODUCTS													
Fuelwood [5]	118.0	125.0	121.0	117.0	112.0	107.0	104.0	102.0	102.0	101.0	98.0	97.0	97.0
Coniferous logs [5]	173.0	178.0	146.0	147.0	155.0	156.0	158.0	166.0	166.0	167.0	170.0	169.0	169.0
Broadleaved logs [5]	34.0	36.0	30.0	30.0	33.0	33.0	34.0	35.0	36.0	36.0	36.0	36.0	36.0
Other industrial roundwood [5]	113.0	126.0	151.0	151.0	155.0	158.0	152.0	159.0	157.0	155.0	162.0	155.0	165.0
Sawn softwood [5]	105.0	111.0	112.0	109.0	110.0	111.0	113.0	116.0	119.0	119.0	120.0	117.0	118.0
Sawn hardwood [5]	21.0	19.0	19.0	19.0	19.0	20.0	19.0	20.0	21.0	21.0	18.0	19.0	20.0
Plywood [5]	2.3	2.4	2.5	2.5	2.6	2.7	2.7	2.8	2.9	2.9	3.0	3.0	3.0
Particle board [5]	1.2	1.5	1.9	2.3	2.7	3.1	3.4	3.8	4.4	4.9	5.6	5.8	6.1
Fibreboard [5]	1.4	1.5	1.7	1.8	2.0	2.2	2.3	2.5	2.6	2.8	3.3	3.4	3.5
Mechanical wood pulp	1.7	1.7	1.8	2.0	2.0	2.2	2.2	2.4	2.5	2.5	2.5	2.7	2.6
Chemical wood pulp	3.8	3.7	4.0	4.4	4.8	4.9	5.1	5.9	6.1	6.4	6.7	7.0	7.0
Newsprint	0.8	0.9	1.0	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.6
Printing and writing paper	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.9	1.9
Other paper and paperboard	4.4	4.7	5.2	5.7	6.2	6.6	6.8	7.5	7.9	8.3	8.8	9.3	9.5
North America													
AGRICULTURAL PRODUCTS													
Wheat	50.90	51.28	53.48	58.03	57.17	60.05	57.53	45.81	58.44	56.56	62.57	62.18	75.15
Barley	13.37	12.07	13.31	15.10	13.64	16.38	17.38	17.95	23.19	20.51	19.40	15.42	17.86
Oats	20.89	17.72	19.66	17.44	16.18	19.30	19.49	18.76	18.40	14.67	14.72	12.84	14.00
Maize	103.01	89.85	105.73	107.55	125.34	115.10	120.94	108.10	146.24	144.10	146.24	121.04	150.11
Sorghum	14.87	12.44	17.09	18.16	19.20	18.58	18.54	17.36	22.25	20.56	23.62	15.98	19.27
Rice (milled equivalent) [1]	2.07	2.16	2.25	2.51	2.64	3.07	2.71	2.47	2.53	2.52	2.74	3.31	3.76
Sugar (centrifugal)	5.04	5.25	4.87	4.94	4.93	5.51	5.20	5.38	5.58	5.90	5.33	5.02	6.50
Potatoes	14.40	13.10	15.30	16.43	15.65	15.81	16.54	17.09	16.72	15.43	15.75	18.03	16.44
Apples	3.08	3.28	3.24	3.04	2.90	2.88	3.49	3.24	3.29	3.06	3.20	3.37	3.90
Citrus fruit	5.95	5.67	6.95	7.94	10.37	7.56	10.17	10.29	11.14	11.03	12.60	12.17	13.23
Soybeans	19.16	19.27	23.23	25.52	26.80	30.37	31.05	30.96	32.29	34.96	42.50	33.34	41.77
Cottonseed	5.62	5.66	5.52	3.59	2.91	4.21	3.69	3.69	3.85	4.89	4.55	4.09	2.75
Total vegetable oils and oilseeds (oil equivalent) [6]	5.25	5.38	6.37	6.34	6.30	7.30	7.57	8.04	8.24	8.61	9.95	8.10	9.76
Tobacco	1.15	1.08	0.92	0.96	0.99	0.88	0.93	0.97	0.87	0.88	0.91	1.02	1.09
Cotton (lint)	3.34	3.30	3.25	2.08	1.62	2.24	2.18	2.22	2.28	2.98	2.83	2.51	1.81
Milk (total)	65.16	65.99	64.66	62.74	62.12	61.51	61.16	61.37	61.70	62.41	60.00	60.05	60.40
Meat [3]	19.81	21.06	20.92	21.90	22.93	23·32	23.61	24·61	25.47	25.39	24.35	25.83	25.14
Eggs	4.07	4.15	4.16	4.19	4.39	4.32	4.30	4.38	4.47	4.42	4.24	4.21	4.10
FISHERY PRODUCTS [4]	3.97	3.83	3.96	3.89	3.73	3.95	3.87	4.17	4.11	3.86	3.83	3.78	3.77
FOREST PRODUCTS													
Fuelwood [5]	36.0	37.0	37.0	35.0	27.0	26.0	25.0	19.0	18.0	17.0	18.0	18.0	18.0
Coniferous logs [5]	197.0	209·0	213.0	217.0	215.0	234.0	228.0	228.0	246.0	239.0	255.0	238.0	225.0
Broadleaved logs [5]	39.0	40.0	42.0	42.0	40.0	38.0	39.0	39.0	38.0	41.0	41.0	39.0	35.0
Other industrial roundwood [5]	120.0	127.0	135.0	145.0	143.0	145.0	161.0	163.0	151.0	156.0	166.0	181.0	153.0
Sawn softwood [5]	88.0	91.0	93.0	92.0	89.0	96.0	95.0	90.0	99.0	106.0	109.0	97.0	89.0
Sawn hardwood [5]	17.0	18.4	18.9	19.4	18.9	18.4	21.4	18.2	17.6	17.4	17.9	17.6	14.7
Plywood [5]	11.9	13.1	14.5	15.0	14.9	16.5	15.6	15.9	18.3	19.9	20.5	17.8	16.8
Particle board [5]	0.9	1.2	1.6	2.2	2.4	2.9	3.4	3.4	4.8	6.0	6.9	6.0	5.9
Fibreboard [5]	5.8	6.3	6.4	6.1	6.2	7.0	7.3	6.8	7.9	8.5	9.2	7.7	6.9
Mechanical wood pulp	10.1	10.8	11.1	11.8	11.4	12.1	13.1	13.1	13.3	13.8	14.0	15.1	12.7
Chemical wood pulp	24.4	26.7	28.3	31.2	31.5	35 0	37.1	37.7	37.7	40.4	42.3	42.6	36.8
Newsprint	8.0	8.7	9.0	9.9	9.8	10.1	11.1	11.0	10.7	11.2	11.4	11.6	10.2
Printing and writing paper	7.6	8.2	8.8	9.8	9.7	10.3	10.9	10.9	11.0	12.0	12.9	13.0	10.4
Other paper and paperboard	26.2	28.0	30.0	32.0	31.0	34.0	36.0	35.0	37.0	40.0	41.0	41.0	35.0

See notes at end of table.

ANNEX TABLE 1. — VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
Oceania													
AGRICULTURAL PRODUCTS													
Wheat	9.17	10.31	7.32	12.99	7.89	15.25	11.00	8.18	8.83	6.82	12.30	11.08	11.94
Sugar (centrifugal)	1.75	1.98	1.98	2.38	2.37	2.77	2.21	2.53	2.79	2.84	2.53	2.92	2.93
Wool (greasy)	1.04	1.09	1.12	1.08	1.13	1.13	1.21	1.26	1.22	1.20	1.04	0.99	1.08
Milk (total)	12.31	12.66	13.14	13.26	13.75	13.18	13.61	13.48	13.19	13.42	13.14	12.83	12.83
Meat[3]	2.53	2.63	2.64	2.61	2.62	2.82	2.92	3.10	3.23	3.55	3.63	3.16	3.48
FISHERY PRODUCTS[4]	0.11	0.12	0.13	0.14	0.15	0.16	0.14	0.16	0.18	0.18	0.19	0.20	0.20
FOREST PRODUCTS													
Fuelwood[5]	7.5	7.4	7.4	7.3	7.3	7.3	7.4	7.3	7.4	7.4	7.2	7.8	7.8
Industrial roundwood[5]	16.0	17.3	17.6	18.1	18.2	18.9	19.8	20.3	20.9	20.9	23.0	20.1	19.2
Sawn softwood[5]	2.2	2.5	2.5	2.5	2.3	2.4	2.5	2.6	2.4	2.6	2.9	2.9	3.0
Sawn hardwood[5]	2.5	2.6	2.7	2.7	2.6	2.8	2.6	2.7	2.8	2.7	2.7	2.8	2.7
Particle board[5]	0.04	0.06	0.10	0.15	0.18	0.23	0.27	0.32	0.34	0.32	0.46	0.54	0.50
Mechanical wood pulp	0.45	0.50	0.54	0.54	0.59	0.61	0.68	0.76	0.77	0.79	0.86	0.98	0.94
Chemical wood pulp	0.37	0.41	0.44	0.48	0.44	0.44	0.50	0.47	0.47	0.49	0.63	0.67	0.66
Newsprint	0.26	0.28	0.29	0.28	0.30	0.30	0.33	0.39	0.40	0.40	0.42	0.41	0.41
Paper and paperboard other than newsprint	0.64	0.70	0.81	0.85	0.91	0.92	1.03	1.13	1.14	1.15	1.27	1.32	1.28
Latin America													
AGRICULTURAL PRODUCTS													
Wheat	12.80	16.24	10.47	10.55	11.74	10.48	12.38	11.53	11.57	12.46	12.11	13.37	14.69
Maize	26.10	27.93	31.08	32.69	34.96	33.56	33.24	38.16	39.61	35.02	37.83	40.30	39.44
Rice (milled equivalent)[1]	5.48	6.07	7.00	5.90	6.72	6.58	6.63	7.65	6.95	7.06	7.65	7.58	8.85
Sugar (centrifugal)	15.70	16.85	20.04	17.89	19.97	18.56	18.43	23.48	21.74	21.01	23.15	24.72	23.14
Citrus fruit	6.22	6.36	6.77	7.40	7.80	8.16	8.60	8.60	9.53	9.84	10.82	12.93	13.12
Bananas	12.84	13.72	14.31	14.59	15.61	17.60	18.31	18.85	19.64	20.16	19.63	19.86	20.34
Groundnuts	1.11	1.02	1.37	1.52	1.29	1.23	1.18	1.39	1.57	1.45	1.25	0.97	1.06
Cottonseed	2.75	2.86	3.01	2.90	2.53	3.01	3.08	2.85	2.54	3.02	3.05	3.44	2.69
Sunflowerseed	0.59	0.57	0.84	0.94	1.23	1.03	0.97	1.22	0.90	0.91	0.97	1.03	0.80
Copra	0.25	0.25	0.25	0.24	0.26	0.28	0.23	0.23	0.25	0.24	0.21	0.23	0.22
Palm kernels	0.20	0.21	0.24	0.24	0.24	0.25	0.25	0.29	0.29	0.29	0.30	0.30	0.33
Total vegetable oils and oilseeds (oil equivalent)[7]	2.05	2.26	2.51	2.67	2.61	2.64	2.77	3.07	3.02	3.23	3.58	4.22	4.47
Coffee	2.96	2.33	3.62	2.54	2.88	2.41	2.68	2.20	3.02	2.88	2.37	3.15	2.94
Cocoa	0.32	0.32	0.33	0.33	0.37	0.36	0.37	0.38	0.39	0.44	0.40	0.42	0.52
Tobacco	0.53	0.50	0.53	0.50	0.52	0.55	0.54	0.55	0.53	0.57	0.57	0.68	0.65
Cotton (lint)	1.53	1.60	1.69	1.63	1.42	1.68	1.68	1.57	1.41	1.67	1.67	1.83	1.49
Sisal	0.24	0.24	0.26	0.26	0.25	0.24	0.27	0.27	0.34	0.36	0.33	0.37	0.40
Wool (greasy)	0.35	0.35	0.34	0.37	0.36	0.35	0.35	0.34	0.32	0.31	0.30	0.29	0.29
Milk (total)	19.33	20.43	21.22	22.12	22.17	23.18	23.94	24.05	25.80	26.08	26.12	28.03	28.99
Meat[3]	8.61	8.35	8.58	9.02	9.39	9.94	10.58	10.60	10.06	10.51	10.55	10.79	11.35
Eggs	1.02	1.06	1.13	1.23	1.28	1.33	1.43	1.51	1.56	1.65	1.71	1.79	1.80
FISHERY PRODUCTS[4]	8.90	11.67	9.64	11.64	12.82	13.66	11.96	15.44	13.92	7.62	5.34	7.53	6.53
FOREST PRODUCTS													
Fuelwood[5]	202.0	207.0	207.0	214.0	214.0	219.0	219.0	220.0	226.0	226.0	224.0	224.0	224.0
Industrial roundwood[5]	34.0	36.0	38.0	39.0	40.0	43.0	45.0	50.0	52.0	52.0	53.0	55.0	55.0
Sawn softwood[5]	5.0	5.6	5.8	6.3	6.3	6.7	7.0	7.4	7.4	7.7	7.8	7.2	6.7
Sawn hardwood[5]	6.4	6.8	6.7	7.1	7.2	7.4	7.9	8.0	8.3	8.0	8.3	10.3	10.9
Plywood[5]	0.38	0.43	0.48	0.52	0.60	0.63	0.67	0.74	0.85	1.05	1.12	1.14	1.15
Particle board[5]	0.10	0.14	0.16	0.20	0.23	0.29	0.36	0.40	0.49	0.64	0.72	0.75	0.75
All wood pulp	0.86	0.94	1.09	1.31	1.34	1.46	1.52	1.70	1.74	1.96	2.16	2.47	2.47
All paper and paperboard	2.01	2.28	2.56	2.75	2.90	3.12	3.41	3.79	4.08	4.25	4.67	5.28	4.84

See notes at end of table.

ANNEX TABLE 1. – VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
Far East[8]													
AGRICULTURAL PRODUCTS													
Wheat	15.44	14.60	17.43	14.96	16.37	23.67	26.04	28.20	31.04	33.97	32.84	30.07	32.64
Maize	10.86	12.51	11.39	13.01	13.60	14.00	13.56	16.24	13.90	13.68	16.12	16.04	16.10
Millet and sorghum	17.99	19.20	15.19	17.83	20.02	17.99	19.84	21.35	18.00	15.34	21.78	18.33	21.26
Rice (milled equivalent)[1]	82.39	85.66	76.29	76.25	84.40	90.94	95.28	98.31	98.39	91.73	103.36	98.63	111.08
Sugar (centrifugal)	5.05	5.63	6.51	6.71	5.37	5.31	7.10	8.54	8.30	7.18	8.59	9.87	10.82
Sugar (non-centrifugal)	8.24	8.58	9.46	9.49	8.79	8.74	9.93	10.06	9.94	9.57	9.50	10.64	9.67
Pulses[9]	13.36	12.12	13.96	11.57	10.59	13.79	12.43	13.92	13.27	12.74	12.76	11.96	12.74
Soybeans	0.57	0.61	0.62	0.64	0.70	0.74	0.70	0.81	0.83	0.85	0.99	1.20	1.15
Groundnuts	6.23	9.02	5.21	5.50	6.86	5.86	6.35	7.41	7.48	5.28	7.19	6.34	8.57
Copra	2.97	2.79	2.79	3.12	2.77	2.91	2.84	3.00	3.30	3.62	3.09	2.84	3.47
Total vegetable oils and oilseeds (oil equivalent)[10]	5.96	6.98	6.62	6.66	7.08	7.07	7.19	7.98	8.73	8.16	8.73	8.81	10.16
Tea	0.70	0.70	0.71	0.71	0.72	0.74	0.72	0.74	0.73	0.76	0.79	0.77	0.80
Tobacco	0.74	0.77	0.79	0.79	0.87	0.93	0.93	0.88	0.84	0.94	0.89	0.99	0.96
Cotton (lint)	1.60	1.50	1.46	1.52	1.73	1.66	1.63	1.55	2.00	1.91	1.89	1.97	1.77
Jute[2]	2.81	2.76	2.91	3.11	3.15	2.17	3.05	2.85	2.58	2.90	3.33	2.36	2.32
Rubber (natural)	2.01	2.03	2.15	2.23	2.23	2.48	2.77	2.70	2.77	2.74	3.17	3.13	2.99
Milk (total)	26.49	26.52	26.42	26.18	26.86	27.48	28.60	29.66	30.73	31.81	32.94	33.73	34.44
Meat[3]	2.87	3.03	3.13	3.27	3.33	3.41	3.51	3.68	3.79	3.91	4.03	4.14	4.26
Eggs	0.58	0.49	0.52	0.54	0.56	0.61	0.69	0.70	0.74	0.80	0.83	0.85	0.87
FISHERY PRODUCTS[4]	5.20	5.87	6.11	6.59	6.95	7.70	8.16	8.37	9.02	9.41	10.37	10.08	11.26
FOREST PRODUCTS													
Fuelwood[5]	254.0	261.0	267.0	274.0	281.0	289.0	295.0	302.0	319.0	327.0	337.0	348.0	350.0
Industrial roundwood[5]	43.0	45.0	49.0	50.0	54.0	61.0	65.0	69.0	71.0	78.0	94.0	87.0	76.0
Sawn softwood[5]	1.2	1.3	1.4	1.2	1.3	1.5	1.5	1.5	1.8	1.7	1.6	2.1	1.8
Sawn hardwood[5]	9.3	9.8	10.3	10.4	11.1	11.1	12.0	12.4	12.0	14.1	14.6	13.5	12.6
Plywood[5]	0.41	0.51	0.68	0.85	0.98	1.43	1.62	1.76	2.06	2.50	3.06	2.61	2.57
All wood pulp	0.11	0.12	0.15	0.16	0.16	0.20	0.22	0.24	0.30	0.38	0.56	0.63	0.59
All paper and paperboard	0.86	0.94	1.01	1.08	1.12	1.23	1.38	1.51	1.69	1.92	2.09	2.17	2.14
China and other Asian centrally planned countries													
AGRICULTURAL PRODUCTS													
Wheat	22.19	25.94	26.40	26.04	28.40	27.30	28.72	31.38	32.95	34.80	36.47	37.39	41.44
Maize	24.41	25.50	27.11	27.24	27.78	27.78	29.09	30.97	32.09	30.63	32.47	33.36	35.43
Millet and sorghum	17.54	18.16	19.37	19.38	19.69	19.70	20.62	22.42	23.44	22.96	23.48	24.00	24.50
Rice (milled equivalent)[1]	58.93	61.85	64.72	64.04	66.47	65.52	68.08	73.21	75.36	73.19	77.58	80.09	81.04
Sugar (centrifugal)	2.12	2.64	3.15	3.26	3.19	3.37	3.46	3.61	3.97	4.04	4.12	4.33	4.29
Sugar (non-centrifugal)	0.28	0.61	0.68	0.71	0.69	0.78	0.79	0.79	0.79	0.79	0.80	0.89	0.88
Pulses[9]	7.51	7.79	8.07	8.33	8.61	8.90	9.22	9.54	9.85	10.28	10.90	11.20	12.30
Soybeans	10.65	11.44	11.25	11.26	11.42	11.00	11.23	11.89	11.99	11.88	12.10	12.15	12.35
Groundnuts	2.03	2.45	2.47	2.52	2.48	2.30	2.50	2.82	2.72	2.54	2.75	2.84	2.84
Total vegetable oils and oilseeds (oil equivalent)[11]	3.70	4.14	4.18	4.29	4.33	4.11	4.13	4.46	4.49	4.30	4.59	4.65	4.70
Tea	0.18	0.18	0.18	0.19	0.20	0.22	0.23	0.25	0.26	0.29	0.31	0.32	0.34
Tobacco	0.78	0.83	0.84	0.85	0.91	0.91	0.84	0.85	0.85	0.90	1.01	1.01	1.01
Cotton (lint)	1.15	1.50	1.65	1.85	1.94	1.81	1.76	2.00	2.09	1.78	2.15	2.15	2.17
Jute[2]	0.38	0.43	0.48	0.50	0.52	0.53	0.56	0.59	0.62	0.92	1.22	1.42	1.42
Milk (total)	4.62	4.70	4.76	4.80	4.85	4.90	4.96	5.19	5.25	5.35	5.41	5.51	5.59
Meat[3]	12.55	12.82	13.17	13.49	13.88	14.15	14.37	14.68	14.90	15.29	15.67	15.90	16.20
Eggs	2.87	2.85	2.96	2.93	3.29	3.34	3.39	3.42	3.46	3.51	3.56	3.67	3.77
FISHERY PRODUCTS[4]	5.44	6.24	6.82	7.16	6.75	7.03	7.20	7.97	8.63	8.67	8.74	8.68	8.76
FOREST PRODUCTS													
Fuelwood[5]	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15
Industrial roundwood[5]	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05
All wood pulp	0.82	0.83	0.88	0.94	0.99	1.06	1.13	1.23	1.29	1.34	1.40	1.64	1.63
All paper and paperboard	3.07	3.15	3.25	3.40	3.60	3.81	4.04	4.26	4.49	4.77	4.98	6.09	6.07

See notes at end of table.

ANNEX TABLE 1. — VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
Near East [12]	..... *Million metric tons*												
AGRICULTURAL PRODUCTS													
Wheat	18.16	17.37	18.61	19.53	20.89	20.03	21.27	20.25	22.95	25.91	21.36	24.41	28.45
Barley	7.48	6.12	6.74	6.73	7.19	6.86	7.39	6.00	6.36	7.31	5.25	6.39	8.00
Maize	3.64	3.73	3.87	4.16	4.07	4.15	4.25	4.21	4.26	4.33	4.55	4.81	4.92
Rice (milled equivalent) [1]	2.45	2.40	2.34	2.28	2.80	3.08	2.97	3.10	2.84	3.07	2.89	2.80	3.11
Sugar (centrifugal)	1.09	1.41	1.24	1.45	1.73	1.81	1.79	1.94	2.38	2.22	2.22	2.29	2.44
Pulses [9]	1.46	1.69	1.69	1.55	1.54	1.50	1.61	1.43	1.57	1.81	1.49	1.70	1.65
Citrus fruit	1.32	1.48	1.66	1.89	2.06	2.18	2.28	2.34	2.65	2.76	2.90	3.13	3.00
Dates	1.49	1.40	1.47	1.49	1.43	1.41	1.70	1.47	1.65	1.52	1.66	1.58	1.62
Olive oil	0.15	0.18	0.11	0.22	0.16	0.21	0.12	0.18	0.11	0.28	0.10	0.24	0.16
Cottonseed	2.17	2.24	2.44	2.23	2.23	2.40	2.62	2.57	2.82	3.00	2.82	2.94	2.67
Total vegetable oils and oilseeds (oil equivalent) [6]	0.90	1.01	0.96	1.04	1.01	1.08	1.09	1.21	1.23	1.56	1.32	1.57	1.53
Tobacco	0.16	0.25	0.19	0.21	0.25	0.22	0.20	0.20	0.23	0.24	0.21	0.23	0.26
Cotton (lint)	1.19	1.27	1.37	1.28	1.30	1.41	1.52	1.49	1.64	1.71	1.61	1.70	1.47
Wool (greasy)	0.12	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.17
Milk (total)	10.17	10.44	10.62	10.98	11.15	11.73	11.74	11.67	11.74	12.20	12.50	12.93	13.26
Meat [3]	1.64	1.84	1.93	2.03	2.07	2.19	2.33	2.43	2.50	2.50	2.54	2.69	2.72
FISHERY PRODUCTS [4]	0.49	0.52	0.50	0.49	0.55	0.51	0.57	0.66	0.67	0.67	0.68	0.75	0.77
FOREST PRODUCTS													
Fuelwood [5]	33.0	35.0	38.0	38.0	38.0	39.0	40.0	39.0	39.0	40.0	36.0	42.0	42.0
Industrial roundwood [5]	10.0	11.0	11.0	11.0	12.0	12.0	13.0	13.0	13.0	13.0	14.0	14.0	14.0
Sawn softwood [5]	1.06	1.24	1.28	1.72	1.79	1.96	2.17	2.20	2.20	2.19	2.31	2.31	2.35
Sawn hardwood [5]	0.37	0.44	0.48	0.48	0.56	0.56	0.61	0.67	0.58	0.71	0.74	0.73	0.74
Plywood [5]	0.08	0.09	0.09	0.08	0.09	0.09	0.10	0.11	0.11	0.10	0.09	0.09	0.10
All wood pulp	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.10	0.18	0.24	0.34	0.31	0.29
All paper and paperboard	0.20	0.22	0.22	0.23	0.26	0.27	0.29	0.33	0.41	0.51	0.59	0.64	0.69
Africa [13]													
AGRICULTURAL PRODUCTS													
Wheat	4.61	4.04	4.61	3.28	4.07	5.98	4.50	5.02	5.49	6.08	4.65	4.68	4.22
Barley	4.05	3.18	3.38	2.82	3.39	5.64	4.26	4.23	4.67	4.97	3.38	3.52	2.81
Maize	8.87	9.22	9.27	9.96	10.44	10.48	11.09	10.70	11.15	12.67	10.56	13.47	13.63
Millet and sorghum	15.35	14.68	15.06	13.60	15.22	14.34	16.64	16.02	15.08	14.79	14.03	16.17	16.02
Rice (milled equivalent) [1]	2.39	2.51	2.48	2.63	2.83	2.84	2.95	3.01	3.15	2.83	2.98	3.21	3.45
Sugar (centrifugal)	1.87	1.74	2.02	2.09	2.16	2.29	2.47	2.53	2.75	2.79	2.89	2.92	2.70
Pulses [9]	3.45	3.41	3.54	3.51	3.62	3.90	4.20	4.41	4.09	4.16	4.25	4.73	4.58
Citrus fruit	1.44	1.65	1.54	1.63	1.78	1.93	1.97	2.19	2.14	2.22	2.35	2.42	2.28
Bananas	3.40	3.56	3.63	3.74	3.54	3.55	3.82	4.14	3.99	4.17	4.35	4.50	4.46
Olive oil	0.15	0.15	0.11	0.05	0.14	0.10	0.07	0.17	0.23	0.13	0.20	0.16	0.25
Groundnuts	4.86	4.70	5.10	4.63	4.72	4.78	4.85	4.38	4.96	3.91	3.20	3.75	3.63
Total vegetable oils and oilseeds (oil equivalent) [7]	3.44	3.69	3.76	3.54	3.47	3.50	3.61	3.80	4.04	3.51	3.35	3.60	3.69
Coffee	1.06	1.11	1.14	1.07	1.24	1.11	1.32	1.30	1.27	1.35	1.29	1.27	1.12
Cocoa	0.90	1.20	0.86	0.97	0.98	0.84	1.00	1.09	1.16	1.01	0.94	1.01	1.00
Wine	1.72	1.47	1.93	1.02	0.88	1.27	1.03	1.05	1.13	0.79	0.99	0.89	0.84
Tobacco	0.16	0.23	0.22	0.20	0.18	0.15	0.15	0.16	0.18	0.19	0.17	0.20	0.23
Cotton (lint)	0.31	0.34	0.36	0.41	0.42	0.42	0.54	0.58	0.52	0.54	0.53	0.51	0.48
Sisal	0.41	0.44	0.42	0.41	0.39	0.38	0.39	0.37	0.34	0.33	0.34	0.36	0.30
Rubber (natural)	0.16	0.17	0.16	0.18	0.16	0.18	0.18	0.20	0.23	0.24	0.24	0.24	0.25
Wool (greasy)	0.04	0.03	0.04	0.04	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.05
Milk (total)	5.24	5.17	5.25	5.62	5.79	5.99	6.21	6.36	6.29	6.08	5.88	5.99	6.22
Meat [3]	2.71	2.78	2.88	2.98	3.11	3.20	3.29	3.39	3.32	3.28	3.24	3.21	3.36
Eggs	0.29	0.31	0.32	0.34	0.36	0.37	0.38	0.39	0.41	0.42	0.43	0.44	0.46
FISHERY PRODUCTS [4]	1.50	1.80	1.81	2.03	2.08	2.08	2.33	2.79	2.88	3.44	3.40	3.43	3.39
FOREST PRODUCTS													
Fuelwood [5]	199.0	203.0	208.0	210.0	216.0	221.0	227.0	234.0	239.0	246.0	249.0	253.0	253.0
Industrial roundwood [5]	21.2	22.2	23.2	23.6	24.3	25.7	28.4	28.7	30.3	31.0	32.3	30.9	29.7
Sawn softwood [5]	0.23	0.25	0.27	0.27	0.32	0.32	0.34	0.38	0.41	0.41	0.40	0.39	0.39
Sawn hardwood [5]	1.73	1.79	1.99	2.03	1.86	2.18	2.53	2.62	2.72	2.59	3.05	3.19	2.93
Plywood [5]	0.17	0.18	0.20	0.17	0.18	0.19	0.24	0.25	0.29	0.34	0.37	0.38	0.39
Total wood pulp	0.13	0.15	0.15	0.15	0.15	0.17	0.18	0.19	0.20	0.21	0.24	0.25	0.25
Total paper and paperboard	0.09	0.09	0.10	0.10	0.13	0.14	0.16	0.17	0.18	0.19	0.22	0.23	0.22

[1] Paddy converted at 65%. — [2] Including allied fibres. — [3] Beef and veal, mutton and lamb, pork, poultry meat, horse meat, game meat, meat n.e.s. — [4] Nominal catch (live weight) excluding whales. — [5] Million cubic metres. — [6] Olive oil, soybeans, groundnuts, cottonseed, sesame seed, sunflowerseed, rapeseed, linseed, hempseed, castor beans. — [7] Olive oil, palm oil, soybeans, groundnuts, cottonseed, sesame seed, sunflowerseed, rapeseed, copra, palm kernels, linseed, hempseed, castor beans. — [8] Excluding China and other Asian centrally planned countries, and Japan. — [9] Dry beans, dry peas, broad beans, chick-peas, lentils. — [10] Palm oil, soybeans, groundnuts, cottonseed, sesame seed, rapeseed, copra, palm kernels, linseed, castor beans. — [11] Soybeans, groundnuts, coconuts, palm kernels, castor beans, sunflowerseed, rapeseed, tung nuts, sesame seed, cottonseed, linseed, palm oil. — [12] Excluding Israel. — [13] Excluding South Africa.

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... 1961-65 average = 100					Percent	..... 1961-65 average = 100					Percent
WESTERN EUROPE												
Food production												
EUROPEAN ECONOMIC COMMUNITY												
Belgium	128	121	124	129	118	— 9	123	116	118	123	112	— 9
Denmark	100	96	99	108	106	— 1	94	90	93	100	98	— 2
France	120	122	128	130	123	— 5	112	112	117	118	111	— 6
Germany, Fed. Rep. of	119	114	117	121	121	—	113	107	109	113	113	— 1
Ireland	128	121	122	138	133	— 3	122	114	115	127	121	— 5
Italy	119	113	122	125	124	—	113	107	114	115	114	— 1
Luxembourg	105	103	110	115	113	— 2	100	98	105	109	107	— 2
Netherlands	138	133	139	152	151	— 1	125	119	124	134	132	— 1
United Kingdom	120	122	124	130	121	— 6	116	117	119	124	116	— 1
OTHER WESTERN EUROPE												
Austria	112	109	114	119	119	—	108	104	109	113	113	—
Finland	119	118	109	112	114	+ 1	116	115	106	108	110	+ 1
Greece	138	144	143	154	161	+ 5	135	140	138	149	156	+ 4
Iceland	100	107	113	114	115	—	90	95	99	99	98	— 1
Malta	161	171	164	171	176	+ 3	161	175	166	171	174	+ 2
Norway	104	105	106	121	109	—10	98	98	98	111	99	—10
Portugal	103	102	108	109	108	— 1	109	108	114	115	113	— 2
Spain	129	132	142	155	158	+ 2	119	120	128	138	140	+ 1
Sweden	106	108	101	125	109	—12	100	101	95	117	102	—13
Switzerland	114	111	116	117	117	—	103	98	102	102	102	—
Yugoslavia	132	131	138	155	152	— 2	122	120	126	140	135	— 3
REGIONAL	121	119	124	130	127	— 2	114	112	116	121	117	— 3
Agricultural production												
EUROPEAN ECONOMIC COMMUNITY												
Belgium	126	119	122	127	116	— 9	122	114	116	121	110	— 9
Denmark	100	96	99	108	106	— 1	94	90	93	100	98	— 2
France	120	121	128	129	122	— 5	112	112	117	117	110	— 6
Germany, Fed. Rep. of	119	114	117	121	121	—	113	107	109	113	113	— 1
Ireland	127	121	121	137	132	— 4	122	114	114	126	120	— 5
Italy	119	113	122	125	124	—	113	107	114	115	114	— 1
Luxembourg	105	103	110	115	113	— 2	100	98	105	109	107	— 2
Netherlands	137	132	138	150	149	— 1	124	118	123	133	131	— 1
United Kingdom	120	121	123	129	121	— 6	115	116	118	123	115	— 6
OTHER WESTERN EUROPE												
Austria	112	109	114	119	119	—	108	104	109	113	113	—
Finland	119	118	109	112	114	+ 1	116	115	106	108	110	+ 1
Greece	132	137	136	145	154	+ 6	129	134	132	141	149	+ 6
Iceland	97	103	109	110	110	—	87	92	95	95	95	— 1
Malta	160	171	164	171	175	+ 3	160	174	165	171	173	+ 2
Norway	104	105	106	120	108	—10	98	98	98	110	99	—10
Portugal	102	101	108	109	108	— 1	108	107	113	114	112	— 2
Spain	127	129	139	151	154	+ 2	117	118	126	135	137	+ 1
Sweden	106	108	101	125	109	—12	100	101	95	117	101	—13
Switzerland	114	111	116	117	117	—	103	98	102	102	101	—
Yugoslavia	130	130	137	153	150	— 2	120	119	124	138	134	— 3
REGIONAL	120	119	124	129	126	— 2	114	111	115	120	117	— 3

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975 (*continued*)

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*	..... *1961-65 average = 100*					*Percent*
EASTERN EUROPE AND THE U.S.S.R.												
Food production												
Eastern Europe	124	133	138	141	143	+ 2	117	125	129	131	132	+ 1
U.S.S.R.	129	121	153	140	129	— 8	118	110	137	125	113	— 9
REGIONAL	127	125	148	140	133	— 5	118	114	135	127	119	— 6
Agricultural production												
Eastern Europe	123	132	137	140	142	+ 2	117	124	128	130	131	+ 1
U.S.S.R.	129	122	151	140	130	— 8	119	111	136	125	114	— 9
REGIONAL	127	125	147	140	134	— 5	118	115	134	127	120	— 6
NORTH AMERICA												
Food production												
Canada	122	113	115	107	122	+13	108	98	99	91	101	+12
United States	124	123	125	127	137	+ 8	114	111	112	113	121	+ 7
REGIONAL	124	122	124	125	135	+ 9	113	110	111	111	119	+ 7
Agricultural production												
Canada	122	113	115	108	122	+12	107	98	99	92	101	+11
United States	118	118	120	121	129	+ 6	108	107	108	108	114	+ 5
REGIONAL	119	118	120	120	128	+ 7	108	106	107	107	113	+ 6
OCEANIA												
Food production												
Australia	128	128	143	135	144	+ 6	110	108	119	111	116	+ 4
New Zealand	120	124	125	118	127	+ 7	107	108	107	99	104	+ 5
REGIONAL	126	127	138	131	140	+ 7	109	108	116	108	113	+ 5
Agricultural production												
Australia	125	124	129	122	131	+ 8	107	105	108	100	106	+ 6
New Zealand	119	120	119	112	119	+ 6	106	105	102	94	97	+ 4
REGIONAL	123	123	126	120	128	+ 7	107	105	106	99	104	+ 5

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975 (*continued*)

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*	..... *1961-65 average = 100*					*Percen*
LATIN AMERICA												
Food production												
CENTRAL AMERICA												
Costa Rica	169	177	180	183	197	+ 8	132	135	133	132	138	+ 5
El Salvador	138	130	139	158	154	— 3	105	96	100	110	104	— 6
Guatemala	138	141	147	148	168	+14	110	109	110	108	119	+11
Honduras	154	161	157	149	157	+ 5	121	122	115	106	107	+ 1
Mexico	141	139	140	140	145	+ 4	109	104	102	98	99	—
Nicaragua	146	139	144	147	158	+ 8	115	106	107	105	110	+ 4
Panama	154	154	155	160	165	+ 4	122	119	116	116	117	+ 1
CARIBBEAN												
Barbados	93	78	84	81	77	— 4	91	76	81	77	74	— 5
Cuba	115	98	112	120	117	— 2	98	82	92	97	92	— 4
Dominican Republic	133	141	140	144	150	+ 4	103	106	102	101	101	—
Haiti	114	117	119	120	122	+ 1	101	102	103	103	102	—
Jamaica	111	108	103	107	112	+ 4	99	94	89	91	94	+ 3
SOUTH AMERICA												
Argentina	108	107	111	118	119	+ 1	97	94	97	101	101	—
Bolivia	132	137	146	151	160	+ 6	109	111	115	116	120	+ 3
Brazil	134	141	140	153	153	—	107	109	106	112	109	— 3
Chile	122	116	100	119	118	— 1	104	97	82	96	94	— 2
Colombia	128	128	132	138	144	+ 4	98	96	95	97	98	+ 1
Ecuador	128	126	128	144	144	—	98	93	92	100	97	— 3
Guyana	119	110	102	116	119	+ 2	99	89	81	91	91	—
Paraguay	129	128	127	132	140	+ 6	104	101	97	98	102	+ 3
Peru	130	130	137	134	141	+ 5	103	101	102	98	100	+ 2
Uruguay	95	93	97	106	102	— 3	87	84	87	94	90	— 4
Venezuela	151	152	161	168	182	+ 8	118	116	119	121	127	+ 5
REGIONAL	125	126	128	136	138	+ 2	101	99	98	101	100	— 1
Agricultural production												
CENTRAL AMERICA												
Costa Rica	165	175	179	182	195	+ 8	131	133	132	131	137	+ 5
El Salvador	126	124	132	148	146	— 1	96	92	95	103	99	— 4
Guatemala	138	147	153	162	176	+ 9	110	114	115	118	125	+ 6
Honduras	149	157	154	147	155	+ 5	117	119	112	104	106	+ 2
Mexico	132	130	130	133	131	— 2	102	98	94	94	89	— 5
Nicaragua	134	138	143	160	160	—	107	106	107	115	112	— 3
Panama	154	154	155	159	165	+ 4	122	119	116	116	117	+ 1
CARIBBEAN												
Barbados	93	78	84	81	77	— 4	91	76	81	77	74	— 5
Cuba	113	97	111	119	117	— 2	96	82	92	96	92	— 4
Dominican Republic	130	139	141	143	144	—	101	104	102	101	98	— 3
Haiti	112	115	117	119	121	+ 1	100	101	101	101	101	—
Jamaica	110	107	103	107	111	+ 4	98	94	89	91	93	+ 3
SOUTH AMERICA												
Argentina	106	105	110	116	118	+ 2	95	93	96	100	100	—
Bolivia	133	141	153	157	164	+ 5	110	114	120	121	123	+ 2
Brazil	132	141	139	151	150	— 1	105	109	105	110	107	— 3
Chile	120	114	98	116	116	—	102	95	81	94	92	— 2
Colombia	130	130	134	140	146	+ 4	100	97	96	98	99	+ 1
Ecuador	128	126	129	146	145	— 1	98	93	93	101	98	— 4
Guyana	119	110	102	116	119	+ 2	99	90	81	91	91	—
Paraguay	126	127	133	136	148	+ 9	102	100	102	102	107	+ 6
Peru	121	120	126	123	129	+ 4	96	92	95	90	91	+ 1
Uruguay	96	88	90	96	94	— 2	88	80	81	86	83	— 3
Venezuela	150	152	161	169	184	+ 9	118	116	119	121	129	+ 6
REGIONAL	122	124	126	133	134	+ 1	99	97	96	99	97	— 2

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975 (*continued*)

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*	..... *1961-65 average = 100*					*Percent*
FAR EAST												
Food production												
SOUTH ASIA												
Bangladesh	106	105	120	115	124	+ 8	85	83	94	89	94	+ 5
India	124	118	129	121	134	+10	102	95	102	93	101	+ 8
Nepal	109	103	116	118	121	+ 3	92	85	93	93	94	—
Pakistan	143	149	156	158	161	+ 2	114	115	117	115	114	— 1
Sri Lanka	114	115	114	120	115	— 4	95	94	90	94	88	— 6
EAST AND SOUTHEAST ASIA												
Burma	110	102	115	116	124	+ 7	92	83	92	90	94	+ 4
Democratic Kampuchea	113	89	62	49	55	+12	91	69	47	36	39	+ 9
Indonesia	133	131	143	152	154	+ 2	108	104	110	114	113	— 1
Korea, Rep. of	131	130	131	138	145	+ 5	110	106	105	108	112	+ 3
Lao People's Dem. Rep.	140	142	150	154	157	+ 2	118	117	121	121	121	—
Malaysia												
Sabah	176	218	218	243	289	+19	132	158	152	163	190	+16
Sarawak	139	147	130	143	144	+ 1	107	109	93	98	96	— 2
Peninsular Malaysia	160	169	180	199	213	+ 7	129	132	138	148	153	+ 4
Philippines	128	127	142	147	159	+ 8	99	95	103	103	108	+ 5
Thailand	137	131	155	151	165	+ 9	107	99	113	107	113	+ 6
Viet Nam, Soc. Rep. of	121	122	133	128	143	+11	102	100	108	102	111	+ 9
Developing countries	125	121	132	129	140	+ 8	102	97	103	98	103	+ 5
China	126	125	131	133	137	+ 3	111	107	111	111	113	+ 1
Japan	115	123	125	127	131	+ 3	106	111	112	112	114	+ 2
Agricultural production												
SOUTH ASIA												
Bangladesh	103	105	117	111	120	+ 8	83	83	92	86	91	+ 5
India	123	118	128	121	133	+10	102	95	101	93	100	+ 7
Nepal	110	103	116	119	122	+ 3	93	85	94	94	94	—
Pakistan	147	151	156	157	157	—	117	117	117	114	110	— 3
Sri Lanka	115	116	113	117	114	— 2	95	94	90	91	87	— 5
EAST AND SOUTHEAST ASIA												
Burma	110	103	117	117	125	+ 6	92	84	93	91	95	+ 4
Democratic Kampuchea	106	86	61	49	53	+ 9	85	67	46	36	38	+ 6
Indonesia	131	130	141	149	150	+ 1	107	103	109	112	110	— 2
Korea, Rep. of	134	135	137	143	151	+ 5	112	110	109	112	116	+ 3
Lao People's Dem. Rep.	141	143	150	154	157	+ 2	119	117	121	121	121	—
Malaysia												
Sabah	152	174	188	197	226	+14	114	126	131	133	148	+12
Sarawak	91	96	115	109	106	— 4	70	71	82	75	70	— 7
Peninsular Malaysia	162	166	186	196	196	—	131	130	142	145	141	— 3
Philippines	126	126	141	145	156	+ 7	98	95	102	102	106	+ 4
Thailand	137	133	156	151	162	+ 7	108	100	115	108	111	+ 4
Viet Nam, Soc. Rep. of	118	117	128	124	138	+11	99	96	104	98	107	+ 9
Developing countries	125	122	133	130	138	+ 7	102	97	103	99	103	+ 4
China	127	126	132	135	139	+ 3	111	108	112	113	114	+ 1
Japan	114	121	123	124	129	+ 3	105	110	110	110	112	+ 2

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975 (*continued*)

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*	..... *1961-65 average = 100*					*Percent*
NEAR EAST												
Food production												
NEAR EAST IN AFRICA												
Egypt	130	132	133	135	139	+ 3	106	105	104	103	103	+ 1
Libya	97	177	203	192	215	+12	74	129	145	133	144	+ 8
Sudan	141	144	147	165	181	+10	112	111	110	119	127	+ 7
NEAR EAST IN ASIA												
Afghanistan	99	113	120	124	126	+ 2	82	92	95	96	95	— 1
Cyprus	202	191	157	186	145	—22	185	173	140	164	126	—23
Iran	131	148	150	155	165	+ 7	104	115	113	113	117	+ 4
Iraq	129	183	133	145	140	— 3	100	137	97	102	95	— 7
Jordan	66	79	39	89	55	—38	52	59	28	63	37	—30
Lebanon	142	160	151	170	157	— 7	113	125	114	124	112	—10
Saudi Arabia	131	130	136	152	154	+ 1	106	102	103	112	110	— 2
Syria	85	142	78	139	137	— 1	66	107	58	99	95	— 4
Turkey	135	138	129	142	155	+ 9	111	110	101	108	115	+ 7
Yemen Arab Republic	107	113	112	108	147	+36	86	88	85	79	105	+32
Yemen, People's Dem. Rep. of	123	117	132	139	138	— 1	99	92	100	103	99	— 4
Developing countries	128	138	131	143	151	+ 6	103	109	100	106	109	+ 3
Israel	163	178	178	188	177	— 6	129	138	132	136	124	— 8
Agricultural production												
NEAR EAST IN AFRICA												
Egypt	127	129	130	129	131	+ 2	104	103	101	99	98	— 1
Libya	100	174	201	189	210	+11	76	127	143	131	141	+ 8
Sudan	144	146	145	164	178	+ 9	114	112	108	118	125	+ 6
NEAR EAST IN ASIA												
Afghanistan	98	112	119	124	126	+ 2	82	91	95	96	95	— 1
Cyprus	199	188	153	183	142	—22	182	170	137	161	124	—23
Iran	129	148	149	154	162	+ 5	103	115	113	113	115	+ 2
Iraq	131	180	133	144	140	— 3	102	135	96	101	95	— 6
Jordan	68	81	41	91	58	—36	53	61	30	64	40	—38
Lebanon	142	161	152	170	158	— 7	114	125	115	125	112	—10
Saudi Arabia	131	130	136	152	154	+ 1	106	102	103	112	110	— 2
Syria	89	133	84	130	131	+ 1	69	101	62	93	91	— 2
Turkey	137	140	131	145	155	+ 7	112	112	103	110	115	+ 5
Yemen Arab Republic	108	116	114	110	150	+37	87	90	87	81	107	+33
Yemen, People's Dem. Rep. of	120	113	127	134	133	— 1	97	89	97	99	95	— 4
Developing countries	128	138	131	142	149	+ 5	103	109	100	106	108	+ 2
Israel	164	180	179	191	180	— 6	130	139	133	138	127	— 8

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975 (*continued*)

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*	.... *1961-65 average = 100*					*Percent*
AFRICA												
Food production												
NORTHWESTERN AFRICA												
Algeria	107	109	102	97	94	— 3	82	80	73	67	63	— 6
Morocco	141	143	122	147	130	—11	114	112	93	109	93	—14
Tunisia	149	144	154	161	189	+18	126	120	126	128	147	+15
WESTERN AFRICA												
Benin	129	122	130	142	145	+ 3	105	97	101	107	107	—
Gambia	114	110	113	140	124	—11	99	94	95	115	100	—13
Ghana	121	114	110	119	123	+ 3	101	93	87	92	92	—
Guinea	116	112	110	107	119	+12	97	92	88	83	91	+ 9
Ivory Coast	146	146	134	157	161	+ 2	122	119	106	122	121	—
Liberia	109	110	111	122	122	—	93	92	91	97	95	— 3
Mali	114	91	73	78	83	+ 7	96	75	58	61	64	+ 4
Mauritania	108	94	78	79	83	+ 5	92	78	64	64	65	+ 3
Niger	107	103	84	99	103	+ 4	85	80	63	72	73	+ 1
Nigeria	113	111	102	112	113	+ 1	93	89	79	84	83	— 2
Senegal	112	74	88	115	128	+11	93	60	69	89	96	+ 8
Sierra Leone	130	133	132	127	132	+ 4	109	109	106	99	101	+ 2
Togo	128	95	94	110	118	+ 7	101	73	71	80	84	+ 4
Upper Volta	110	104	95	104	109	+ 5	93	86	77	82	84	+ 2
CENTRAL AFRICA												
Angola	122	119	119	115	92	—20	105	100	98	92	72	—22
Cameroon	141	147	141	153	154	+ 1	123	126	118	126	124	— 1
Central African Empire	112	114	116	115	115	— 1	95	94	94	92	89	— 3
Chad	100	79	76	77	79	+ 2	85	66	62	62	62	—
Congo	95	98	98	100	101	+ 1	80	80	78	78	77	— 1
Gabon	128	131	132	132	135	+ 2	117	118	118	117	119	+ 1
Zaire	117	115	119	124	123	— 1	92	89	90	91	88	— 3
EASTERN AFRICA												
Burundi	166	210	215	239	237	— 1	151	186	186	202	195	— 3
Ethiopia	117	118	115	102	103	+ 1	98	96	92	79	79	— 1
Kenya	129	134	135	135	140	+ 4	99	100	97	94	95	—
Madagascar	118	116	117	126	128	+ 2	96	91	89	93	92	— 1
Malawi	149	158	155	160	151	— 6	124	129	123	124	114	— 8
Mauritius	110	120	124	122	88	—28	95	102	104	100	71	—29
Mozambique	130	134	137	133	118	—11	109	110	109	104	90	—13
Rhodesia	127	139	115	148	141	— 5	94	100	80	99	91	— 8
Rwanda	148	145	151	145	153	+ 5	117	112	113	106	109	+ 2
Somalia	121	132	128	132	136	+ 3	101	107	102	102	102	—
Tanzania	125	127	130	129	137	+ 7	100	99	98	94	97	+ 3
Uganda	120	125	128	127	126	—	97	98	98	94	91	— 3
Zambia	124	130	126	138	139	+ 1	98	100	93	99	97	— 2
SOUTHERN AFRICA												
Botswana	157	141	162	175	185	+ 6	133	117	131	139	143	+ 3
Lesotho	106	81	128	118	121	+ 3	92	69	107	97	97	+ 1
Swaziland	162	180	168	187	192	+ 3	133	144	130	141	141	—
Developing countries	122	121	118	124	124	—	100	97	91	93	91	— 2
South Africa	149	160	129	165	156	— 5	116	121	95	119	110	— 8

ANNEX TABLE 2. — INDICES OF FOOD AND AGRICULTURAL PRODUCTION, BY COUNTRIES, 1971 TO 1975 (*concluded*)

Region and country	Total						Per caput					
	1971	1972	1973	1974	1975	Change 1974 to 1975	1971	1972	1973	1974	1975	Change 1974 to 1975
	..... *1961-65 average = 100*					*Percent*	..... *1961-65 average = 100*					*Percent*
Agricultural production												
NORTHWESTERN AFRICA												
Algeria	109	110	103	98	96	— 3	83	81	74	68	65	— 6
Morocco	140	143	124	147	130	—11	113	112	94	109	94	—14
Tunisia	148	144	154	161	188	+17	126	120	126	128	146	+15
WESTERN AFRICA												
Benin	136	129	137	145	148	+ 2	111	103	106	109	109	—
Gambia	114	110	113	140	124	—11	99	94	95	115	100	—13
Ghana	121	115	110	120	123	+ 3	101	93	87	92	92	—
Guinea	116	112	110	107	119	+12	97	92	88	83	91	+ 9
Ivory Coast	148	150	138	161	165	+ 2	124	122	109	125	124	—
Liberia	134	133	136	144	140	— 3	114	111	111	115	109	— 5
Mali	118	95	76	82	87	+ 7	99	78	61	64	67	+ 4
Mauritania	108	94	78	79	83	+ 5	92	78	64	64	65	+ 3
Niger	107	103	83	99	103	+ 4	85	80	63	72	73	+ 1
Nigeria	113	111	102	112	113	+ 2	93	89	80	84	83	— 1
Senegal	114	75	90	118	131	+11	94	61	71	91	99	+ 8
Sierra Leone	129	133	132	126	132	+ 4	109	109	106	99	101	+ 2
Togo	128	96	96	111	119	+ 7	102	74	72	81	84	+ 4
Upper Volta	113	106	98	106	111	+ 5	96	88	80	84	86	+ 2
CENTRAL AFRICA												
Angola	123	120	120	118	93	—21	106	101	98	95	73	—23
Cameroon	140	146	140	152	153	+ 1	122	125	117	125	123	— 1
Central African Empire	114	117	118	118	117	— 1	97	97	96	94	91	— 3
Chad	103	82	81	84	88	+ 5	87	69	66	67	69	+ 3
Congo	95	98	99	101	102	+ 1	80	81	79	79	78	— 1
Gabon	128	131	132	132	135	+ 2	117	118	118	117	119	+ 1
Zaire	117	115	119	123	123	— 1	92	89	89	91	88	— 3
EASTERN AFRICA												
Burundi	166	209	214	238	236	— 1	151	186	186	201	194	— 3
Ethiopia	118	119	116	103	105	+ 1	99	97	93	80	80	— 1
Kenya	126	131	132	135	137	+ 2	97	97	95	94	92	— 2
Madagascar	119	116	118	127	129	+ 1	96	92	90	94	93	— 1
Malawi	150	161	156	160	155	— 3	125	131	124	124	117	— 5
Mauritius	110	120	124	122	88	—28	95	102	104	100	71	—29
Mozambique	127	133	134	129	115	—11	106	108	107	100	87	—13
Rhodesia	114	125	102	133	132	— 1	84	89	70	89	85	— 4
Rwanda	148	145	150	145	153	+ 5	117	112	113	106	109	+ 2
Somalia	121	131	128	132	135	+ 3	101	107	102	102	102	—
Tanzania	122	123	125	123	128	+ 4	97	96	94	90	91	+ 1
Uganda	120	124	128	124	123	— 1	97	98	97	92	88	— 4
Zambia	122	128	125	135	137	+ 1	96	98	92	97	95	— 2
SOUTHERN AFRICA												
Botswana	155	140	160	173	183	+ 6	132	116	130	137	142	+ 3
Lesotho	105	80	122	111	114	+ 3	91	69	102	91	92	+ 1
Swaziland	163	181	170	189	194	+ 3	133	144	132	143	143	—
Developing countries	122	122	118	124	124	—	100	97	92	93	91	— 3
South Africa	142	152	124	156	149	— 4	111	115	92	112	104	— 7

ANNEX TABLE 3. — VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
World [1]													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	49.67	59.18	56.39	62.72	52.91	53.30	48.61	57.14	58.50	64.93	81.57	65.33	79.75
Barley	5.70	7.99	8.09	6.41	7.21	6.39	7.11	10.47	11.00	13.82	12.34	11.60	12.60
Maize	21.10	22.32	25.03	25.86	27.58	28.90	27.47	29.42	30.96	37.39	48.06	49.64	51.66
Oats	1.26	1.37	1.75	1.40	1.26	1.05	1.01	1.51	1.62	2.13	1.67	1.31	1.22
Rye	1.53	0.67	0.47	0.76	0.81	0.66	0.64	0.62	1.03	0.68	2.01	1.20	0.56
Millet and sorghum	3.98	3.84	5.36	9.20	7.79	5.28	4.75	6.69	6.67	6.62	9.48	11.17	10.60
Rice (milled equivalent) [2]	7.99	8.35	8.38	8.34	8.19	7.94	8.43	8.82	9.30	9.06	9.37	8.89	8.80
Sugar (raw equivalent) [3]	17.69	17.14	19.06	18.62	20.15	20.31	19.38	21.81	21.36	22.12	23.11	23.29	21.66
Potatoes	2.94	3.63	3.78	3.56	3.37	3.40	3.58	3.78	3.02	5.12	3.91	3.87	3.93
Pulses (dry)	1.53	1.48	2.26	2.07	1.69	1.81	2.17	1.78	1.80	1.94	2.01	1.67	1.70
Apples	1.52	1.73	2.00	1.91	1.99	2.10	2.27	2.12	2.28	2.65	2.42	2.76	2.68
Bananas	4.27	4.33	4.75	5.20	5.21	5.66	5.66	5.80	6.53	6.75	6.76	6.57	6.64
Citrus fruit [4]	3.36	4.20	4.30	4.30	4.48	4.40	4.62	5.00	4.89	5.22	5.65	5.50	5.74
Grapes (fresh)	0.76	0.78	0.98	0.80	0.82	0.80	0.95	0.86	0.99	0.78	0.89	0.88	0.96
Dates	0.42	0.37	0.36	0.38	0.36	0.33	0.36	0.43	0.36	0.39	0.43	0.32	0.23
Vegetable oils and oilseeds (oil equivalent) [5]	6.97	7.50	7.60	8.18	8.34	8.71	9.07	9.82	10.67	11.68	11.74	11.98	12.10
Oilseed cake and meal	6.90	7.33	8.25	8.91	8.94	9.26	9.70	11.06	11.69	12.67	14.24	14.47	13.81
Cattle [6]	5.26	4.95	5.57	5.28	5.58	6.28	6.48	6.85	6.86	7.55	6.80	5.80	6.71
Sheep, lambs and goats [6]	8.41	8.13	8.76	9.39	8.96	9.69	9.89	10.08	10.57	10.96	10.58	10.13	11.15
Pigs [6]	2.38	2.96	3.80	3.40	3.19	3.40	3.93	4.52	5.40	5.96	5.78	6.02	6.26
Meat [7]	3.34	3.33	3.52	3.57	3.82	3.96	4.31	4.57	4.72	5.34	5.61	5.16	5.48
Milk (condensed, evaporated and powdered)	1.76	1.65	1.62	1.52	1.73	1.94	1.94	2.16	2.18	2.06	2.43	2.47	2.14
Eggs (in the shell)	0.41	0.37	0.35	0.33	0.33	0.37	0.37	0.41	0.45	0.46	0.46	0.51	0.52
Coffee (green)	3.40	2.87	2.77	3.11	3.18	3.39	3.43	3.27	3.31	3.56	3.80	3.38	3.55
Cocoa beans	1.05	1.05	1.31	1.13	1.09	1.06	1.02	1.13	1.19	1.24	1.12	1.19	1.17
Tea	0.62	0.64	0.66	0.64	0.69	0.73	0.69	0.75	0.75	0.76	0.78	0.81	0.81
Wine	2.39	2.68	2.57	2.80	2.41	2.52	3.23	3.69	3.40	4.11	4.52	4.09	4.43
Pepper and pimento	0.15	0.14	0.14	0.15	0.19	0.20	0.18	0.18	0.20	0.20	0.20	0.19	0.19
Tobacco (unmanufactured)	0.90	1.02	0.98	0.92	0.99	1.01	1.01	0.99	1.03	1.21	1.22	1.38	1.26
Wool (actual weight)	1.45	1.11	1.44	1.50	1.38	1.50	1.53	1.50	1.39	1.47	1.37	1.03	1.10
Cotton (lint)	3.76	3.95	3.77	4.01	3.85	3.85	3.72	3.94	4.02	4.08	4.71	3.77	3.87
Jute and kenaf	1.27	1.06	1.15	1.39	1.27	0.92	0.93	0.87	0.81	0.80	0.89	0.90	0.64
Rubber (natural) [8]	2.17	2.30	2.39	2.43	2.42	2.69	2.96	2.86	2.93	2.89	3.41	3.25	3.04
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	1.48	1.71	1.72	1.80	1.79	1.82	1.80	2.05	2.07	2.26	2.57	2.50	2.55
Dried, salted or smoked fish	0.54	0.50	0.50	0.50	0.50	0.49	0.50	0.52	0.49	0.52	0.49	0.43	0.43
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	0.27	0.30	0.30	0.30	0.32	0.34	0.38	0.44	0.52	0.65	0.66	0.68	0.70
Fish products and preparations, whether or not in airtight containers	0.51	0.58	0.52	0.57	0.55	0.61	0.59	0.61	0.63	0.67	0.74	0.73	0.68
Crustacean and mollusc products and preparations, whether or not in airtight containers	0.05	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.07	0.09	0.10	0.08	0.08
Oils and fats, crude or refined, of aquatic animal origin	0.74	0.63	0.72	0.68	0.81	0.83	0.70	0.64	0.71	0.75	0.55	0.55	0.61
Meals, solubles and similar animal feedstuffs of aquatic animal origin	1.78	2.44	2.47	2.48	3.02	3.55	3.03	3.02	3.03	3.01	1.63	1.95	2.19
FOREST PRODUCTS													
Pulpwood [9]	11.6	13.2	13.8	14.2	14.7	14.1	15.9	18.6	16.3	13.8	16.8	18.7	18.1
Coniferous logs [9]	8.7	9.9	11.6	13.5	16.8	21.0	20.4	24.7	22.0	25.8	29.1	26.5	23.8
Broadleaved logs [9]	18.0	20.0	21.2	23.8	25.2	30.2	35.0	38.9	40.7	42.9	52.3	46.0	35.2
Sawn softwood [9]	41.4	44.6	44.0	42.6	42.8	47.5	47.8	49.5	51.7	59.4	60.9	52.3	43.0
Sawn hardwood [9]	4.6	5.3	5.5	5.8	5.7	6.3	6.9	7.2	7.1	8.4	10.2	8.8	7.9
Plywood and veneers [9]	2.4	2.9	3.2	3.5	3.7	4.7	5.0	5.3	6.0	7.0	7.7	6.0	5.7

See notes at end of table.

ANNEX TABLE 3. — VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
FOREST PRODUCTS (*concluded*)													
Fibreboard	1.6	1.7	1.6	1.6	1.7	1.9	2.0	2.0	2.1	2.2	2.4	2.2	1.8
Mechanical wood pulp	1.3	1.4	1.4	1.4	1.2	1.3	1.3	1.3	1.0	1.1	1.3	1.5	0.9
Chemical wood pulp	8.4	9.2	9.2	10.3	10.5	11.8	12.9	13.5	11.9	13.3	15.3	15.6	12.4
Newsprint	7.8	8.5	9.0	9.7	9.4	9.7	10.6	10.6	10.3	10.8	11.1	11.5	9.5
Other paper and paperboard	5.9	6.9	7.5	8.4	8.8	10.2	11.9	12.7	13.2	14.5	16.4	18.5	12.8
Western Europe													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	5.08	5.29	7.00	6.45	6.16	8.42	10.91	9.39	7.13	10.14	12.71	12.39	14.41
Barley	2.29	3.16	2.63	3.37	4.08	4.21	4.32	4.39	3.78	5.31	5.59	5.97	5.68
Maize	0.94	1.27	1.90	2.11	2.78	2.54	3.24	3.88	5.30	4.59	5.61	6.01	5.66
Rye	0.16	0.05	0.05	0.06	0.05	0.09	0.14	0.20	0.39	0.39	0.54	0.40	0.21
Sugar (raw equivalent) [3]	1.60	1.45	1.54	1.28	1.15	1.66	1.45	1.98	2.02	2.82	2.83	2.64	2.25
Potatoes	1.65	1.70	2.26	1.98	1.86	1.85	2.42	2.22	1.90	2.76	2.49	2.36	2.58
Pulses (dry)	0.18	0.15	0.18	0.20	0.25	0.29	0.28	0.26	0.26	0.29	0.29	0.25	0.32
Apples	0.53	0.70	0.86	0.76	0.78	0.86	0.95	0.94	1.06	1.31	1.16	1.31	1.28
Citrus fruit [4]	1.22	2.00	1.91	1.98	1.94	1.80	1.92	2.29	1.98	2.26	2.32	2.37	2.45
Grapes (fresh)	0.29	0.38	0.41	0.41	0.42	0.41	0.41	0.44	0.48	0.41	0.44	0.44	0.53
Vegetable oils and oilseeds (oil equivalent) [10]	0.49	0.41	0.46	0.50	0.67	0.82	1.09	1.20	1.23	1.23	1.48	1.56	1.60
Oilseed cake and meal	0.89	1.03	1.07	1.17	1.27	1.19	1.34	1.56	1.79	2.14	2.70	2.87	2.25
Cattle [6]	1.85	1.88	1.75	1.44	2.00	2 34	2.48	2.60	2.74	3.09	2.57	2.31	3.42
Sheep, lambs and goats [6]	1.35	0.88	0.85	0.58	0.72	0.93	0.98	0.63	0.72	0.79	0.61	0.57	1.15
Pigs [6]	0.40	0.66	0.82	0.50	0.88	1.17	1.90	2.35	2.29	2.45	2.55	2.57	2.60
Meat (fresh, chilled and frozen) [7]	0.93	0.91	1.03	1.02	1.22	1.32	1.37	1.55	1.81	1.82	1.93	2.21	2.44
Bacon, ham and salted pork	0.35	0.36	0.37	0.36	0.36	0.36	0.35	0.35	0.35	0.34	0.31	0.30	0.29
Milk (condensed, evaporated and powdered)	0.93	0.75	0.90	1.02	1.17	1.38	1.35	1.44	1.51	1.45	1.85	1.81	1.60
Butter	0.24	0.23	0.27	0.27	0.31	0.35	0.33	0.49	0.45	0.36	0.77	0.69	0.64
Cheese	0.38	0.40	0.42	0.47	0.48	0.52	0.52	0.57	0.61	0.66	0.74	0.82	0.82
Eggs (in the shell)	0.24	0.20	0.15	0.14	0.13	0.19	0.19	0.23	0.25	0.26	0.26	0.30	0.34
Wine	1.14	1.13	1.20	1.30	1.28	1.32	1.46	1.76	2.24	2.86	2.70	2.66	3.00
Wool (actual weight)	0.14	0.11	0.12	0.12	0.10	0.12	0.11	0.10	0.10	0.12	0.11	0.09	0.11
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	849.9	877.0	907.7	876.5	861.2	905.8	971.7	1 098.4	1 035.4	1 061.0	1 092.2	1 019.9	1 052.5
Dried, salted or smoked fish	334.3	314.7	323.2	317.4	312.9	311.9	337.2	338.4	314.8	347.7	329.2	282.8	282.0
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	114.0	118.9	108.8	113.7	116.4	130.8	133.8	150.8	187.3	245.2	198.0	227.9	251.6
Fish products and preparations, whether or not in airtight containers	196.7	209.1	221.4	211.3	193.6	195.5	172.8	183.7	175.7	199.9	234.1	223.5	172.8
Crustacean and mollusc products and preparations, whether or not in airtight containers	9.0	13.0	13.0	13.0	12.6	13.3	15.4	19.2	20.4	25.1	27.9	24.4	24.4
Oils and fats, crude or refined, of aquatic animal origin	199.8	190.0	266.2	340.1	391.5	260.1	270.0	172.1	149.1	195.9	271.3	193.3	239.4
Meals, solubles and similar animal feedstuffs of aquatic animal origin	306.9	434.8	555.0	576.8	810.7	787.5	657.9	625.4	726.0	840.2	795.9	801 8	864.5
	Million metric tons												
FOREST PRODUCTS													
Pulpwood [9]	3.34	3.62	3.61	3.01	3.82	4.17	5.22	6.71	6.24	4.43	5.25	5.82	6.56
Coniferous logs [9]	1.05	1.06	1.02	1.35	1.55	1.37	1.23	1.46	1.35	1.38	2.24	2.78	1.70
Broadleaved logs [9]	0.91	0.97	1.02	1.10	1.17	1.20	1.23	1.35	1.47	1.55	1.85	1.29	1.58
Sawn softwood [9]	13.86	14.62	13.57	12.72	12.85	15.05	16.24	16.21	16.55	17.90	20.30	17.30	12.60

See notes at end of table.

ANNEX TABLE 3. — VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	..... *Million metric tons*												
FOREST PRODUCTS (*concluded*)													
Sawn hardwood [9]	0.98	1.14	1.21	1.26	1.23	1.34	1.44	1.51	1.52	1.77	2.27	1.85	1.29
Plywood and veneers [9]	0.73	0.82	0.86	0.88	0.92	1.06	1.16	1.21	1.23	1.36	1.52	1.19	1.09
Fibreboard	1.28	1.33	1.20	1.10	1.27	1.33	1.36	1.31	1.31	1.33	1.39	1·23	0.92
Particle board	0.48	0.56	0.80	0.89	1.02	1.17	1.45	1.70	2.06	2.56	3.41	3.40	3.23
Mechanical wood pulp	1.05	1.15	1.12	1.13	1.01	1.06	1.04	1.04	0.77	0.86	0.97	1.11	0.61
Chemical wood pulp	4.59	4.98	4.96	5.46	5.31	5.73	5.91	5.96	4.93	5.63	6.92	6.18	4.55
Newsprint	1.71	1.88	1.97	2.07	2.10	2.31	2.43	2.56	2.49	2.69	2.77	2.74	2.25
Other paper and paperboard	4.24	4.75	5.13	5.55	5.67	6.49	7.74	8.17	8.36	9.34	11.00	12.20	8.47
Eastern Europe and the U.S.S.R.													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	4.98	2.52	2.35	4.54	7.73	6.95	7.99	6.83	9.28	5.88	7.04	8.27	4.94
Barley	0.69	0.76	2.18	0.39	0.54	0.67	0.82	0.73	0.80	0.67	0.46	1.04	0.94
Maize	1.79	1.94	1.38	0.83	1.60	0.74	1.54	1.12	0.88	0.95	1.57	1.71	0.92
Rye	0.89	0.17	0.07	0.32	0.45	0.37	0.39	0.25	0.22	0.04	0.37	0.39	0.08
Sugar (raw equivalent) [8]	2.19	1.71	2.02	2.17	2.42	2.68	2.15	2.11	1.71	0.96	0.82	0.79	0.46
Potatoes	0.50	1.18	0.79	0.77	0.70	0.71	0.30	0.63	0.34	1.51	0.53	0.65	0.56
Sunflowerseed	0.16	0.27	0.20	0.35	0.49	0.47	0.57	0.31	0.20	0.23	0.13	0.10	0.09
Oilseed cake and meal	0.23	0.07	0.16	0.42	0.40	0.34	0.34	0.07	0.05	0.04	0.05	0.02	0.01
Meat (fresh, chilled and frozen) [7]	0.31	0.24	0.36	0.37	0.49	0.49	0.44	0.33	0.37	0.39	0.42	0.53	0.63
Butter	0.10	0.06	0.08	0.10	0.12	0.12	0.11	0.11	0.05	0.04	0.06	0.08	0.05
Eggs (in the shell)	0.08	0.08	0.11	0.09	0.11	0.10	0.09	0.10	0.11	0.11	0.10	0.11	0.11
Cotton	0.32	0.39	0.46	0.52	0.55	0.57	0.45	0.52	0.55	0.65	0.73	0.74	0.80
	..... *Thousand metric tons*												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	80.9	88.9	178.3	229.5	216.0	236.1	230.6	306.5	338.4	332.6	370.5	483.0	587.2
Dried, salted or smoked fish	44.4	35.3	39.9	28.6	36.0	25.4	23.1	21.6	16.7	16.0	14.6	13.3	19.3
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	0.6	1.1	1.2	1.3	1.3	0.6	0.9	1.2	1.4	1.2	0.8	1.2	2.5
Fish products and preparations, whether or not in airtight containers	19.3	18.9	19.6	22.7	24.2	27.1	28.8	27.4	28.1	28.6	30.9	32.2	42.9
Crustacean and mollusc products and preparations, whether or not in airtight containers	5.0	5.6	4.9	5.0	5.0	4.7	3.4	3.8	3.5	3.4	2.1	1.9	2.5
Oils and fats, crude or refined, of aquatic animal origin	32.2	40.0	57.1	71.9	58.3	59.6	64.0	34.5	14.6	17.1	5.3	5.5	4.2
Meals, solubles and similar animal feedstuffs of aquatic animal origin	3.8	4.2	7.2	14.2	38.3	30.6	32.6	13.5	12.2	18.3	12.4	10.7	18.5
	..... *Million metric tons*												
FOREST PRODUCTS													
Pulpwood [9]	5.13	6.00	6.38	7.32	7.49	6.88	7.57	8.68	7.57	7.28	9.78	10.90	9.92
Coniferous logs [9]	2.89	3.43	4.72	5.04	5.04	6.12	6.38	7.57	7.38	7.98	10.20	9.86	8.99
Sawn softwood [9]	9.49	10.96	11.17	11.44	10.88	10.93	10.74	11.01	10.76	11.07	11.07	9.86	10.20
Plywood and veneers [9]	0.28	0.34	0.38	0.39	0.40	0.45	0.44	0.47	0.46	0.46	0.52	0.45	0.47
Wood pulp	0.32	0.37	0.37	0.39	0.47	0.51	0.57	0.55	0.55	0.61	0.62	0.60	0.61
North America													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	31.89	38.26	32.38	40.23	29.11	27.84	21.10	30.59	31.17	37.25	51.36	36.73	49.94
Barley	1.62	2.48	2.11	2.04	2.02	1.03	0.80	4.15	5.16	5.75	5.17	3.55	4.02
Maize	11.15	12.19	15.20	15.56	12.94	14.96	13.97	14.41	12.92	22.41	33.22	29.87	33.51

See notes at end of table.

ANNEX TABLE 3. — VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
AGRICULTURAL PRODUCTS (*concluded*)						*Million metric tons*							
Millet and sorghum	2.95	2.56	4.41	7.44	5.84	3.61	2.77	3.81	2.89	3.90	5.65	5.74	5.87
Rye	0.48	0.29	0.18	0.35	0.31	0.18	0.09	0.15	0.41	0.24	1.00	0.30	0.27
Rice (milled equivalent) [2]	1.20	1.33	1.55	1.35	1.85	1.90	1.92	1.74	1.48	2.04	1.63	1.73	2.14
Citrus fruit [4]	0.26	0.30	0.33	0.37	0.42	0.27	0.39	0.39	0.39	0.46	0.49	0.53	0.66
Pulses (dry)	0.34	0.28	0.30	0.32	0.30	0.27	0.35	0.40	0.34	0.36	0.42	0.33	0.37
Vegetable oils and oilseeds (oil equivalent) [11]	1.78	2.29	2.40	2.23	2.31	2.37	2.49	3.56	3.95	4.17	4.24	4.39	3.73
Oilseed cake and meal	1.69	1.95	2.47	2.67	2.75	3.00	3.28	3.97	4.43	4.01	4.95	5.21	4.03
Milk (condensed, evaporated and powdered)	0.62	0.71	0.51	0.29	0.27	0.29	0.31	0.36	0.32	0.24	0.18	0.11	0.15
Tobacco (unmanufactured)	0.25	0.26	0.23	0.27	0.28	0.30	0.29	0.26	0.25	0.31	0.31	0.33	0.29
Cotton (lint)	0.99	1.19	0.86	0.82	0.91	0.88	0.54	0.68	0.94	0.70	1.25	1.17	0.87
						Thousand metric tons							
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	159.1	197.5	216.4	240.0	224.9	252.1	225.4	211.2	224.6	233.8	264.1	200.3	235.6
Dried, salted or smoked fish	70.0	61.4	54.3	53.6	56.2	56.7	51.9	54.1	60.2	57.9	57.8	55.4	52.9
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	22.8	24.5	25.6	23.7	24.2	26.9	34.0	36.1	38.4	36.2	47.3	38.7	41.5
Fish products and preparations, whether or not in airtight containers	31.2	42.8	36.0	37.1	42.4	34.6	36.4	31.3	31.6	38.0	45.2	32.8	32.7
Crustacean and mollusc products and preparations, whether or not in airtight containers	7.2	7.7	10.4	10.6	11.5	9.7	9.5	8.5	9.8	9.4	10.1	8.4	7.8
Oils and fats, crude or refined, of aquatic animal origin	129.8	87.4	58.7	41.1	46.7	37.6	103.8	94.8	118.1	95.1	120.7	100.6	92.5
Meals, solubles and similar animal feedstuffs of aquatic animal origin	54.3	60.4	57.5	51.7	51.3	66.0	73.0	77.4	71.8	42.3	62.9	85.1	34.9
						Million metric tons							
FOREST PRODUCTS													
Pulpwood [9]	2.88	3.14	3.44	3.52	3.07	2.64	2.66	2.84	2.10	1.70	1.46	1.65	1.35
Coniferous logs [9]	4.33	4.85	5.25	6.42	9.25	11.84	10.93	13.39	10.85	14.10	14.25	12.10	12.20
Broadleaved logs [9]	1.34	1.37	1.48	1.64	1.70	1.73	1.68	1.74	1.83	2.06	2.62	2.58	1.93
Sawn softwood [9]	16.68	17.36	17.43	16.51	17.25	19.16	18.27	20.06	22.02	25.71	27.30	22.87	18.50
Sawn hardwood [9]	0.59	0.69	0.74	0.91	0.81	0.70	0.75	0.67	0.79	1.01	1.07	0.70	0.80
Plywood and veneers [9]	0.32	0.45	0.46	0.51	0.62	0.67	0.72	0.67	0.71	0.86	1.09	1.03	1.11
Mechanical wood pulp	0.23	0.26	0.29	0.24	0.21	0.21	0.25	0.28	0.23	0.26	0.27	0.28	0.23
Chemical wood pulp	3.27	3.58	3.64	4.03	4.35	5.09	5.90	6.50	5.86	6.32	6.90	7.73	6.30
Newsprint	5.74	6.29	6.60	7.19	6.85	6.90	7.60	7.48	7.24	7.49	7.71	8.07	6.50
Other paper and paperboard	1.22	1.57	1.76	2.02	2.22	2.63	2.84	3.03	3.34	3.48	3.55	4.19	2.29
Oceania													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	4.82	7.81	6.47	5.68	6.97	6.99	5.37	7.38	9.48	8.71	5.66	5.33	8.20
Barley	0.23	0.40	0.37	0.23	0.43	0.13	0.45	0.63	1.12	1.83	0.84	0.81	1.80
Oats	0.32	0.30	0.37	0.25	0.40	0.18	0.33	0.22	0.56	0.33	1.11	0.18	0.30
Sugar (raw equivalent) [3]	1.17	1.13	1.29	1.27	1.67	1.63	2.07	1.39	1.57	2.01	2.09	1.78	2.00
Beef and veal	0.39	0.41	0.44	0.38	0.37	0.39	0.39	0.51	0.52	0.59	0.79	0.68	0.61
Mutton and lamb	0.45	0.46	0.47	0.47	0.46	0.53	0.58	0.59	0.60	0.69	0.63	0.44	0.49
Butter	0.25	0.28	0.29	0.28	0.31	0.28	0.27	0.30	0.28	0.25	0.25	0.22	0.20
Cheese	0.12	0.12	0.12	0.12	0.13	0.13	0.11	0.13	0.13	0.12	0.12	0.11	0.10
Wool (actual weight)	0.89	0.92	0.89	0.92	0.88	0.94	1.01	1.06	0.98	1.04	0.99	0.73	0.71
						Thousand metric tons							
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	3.0	4.0	4.4	5.0	3.0	3.8	4.1	7.8	10.0	14.4	13.7	12.9	11.9
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	6.0	7.0	8.0	8.0	10.1	13.0	12.9	13.8	16.1	17.5	16.7	16.2	15.0

See notes at end of table.

ANNEX TABLE 3. — VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Thousand metric tons												
FISHERY PRODUCTS (*concluded*)													
Fish products and preparations, whether or not in airtight containers	0.1	0.1	0.1	—	0.4	0.5	0.6	0.4	0.7	0.4	1.8	0.4	0.5
Crustacean and mollusc products and preparations, whether or not in airtight containers	—	—	1.0	1.0	1.2	2.0	2.0	1.8	3.3	3.6	3.0	2.4	2.2
Oils and fats, crude or refined, of aquatic animal origin	4.0	5.3	9.0	6.0	3.9	6.5	5.6	4.2	6.4	5.8	7.7	7.9	4.0
Meals, solubles and similar animal feedstuffs of aquatic animal origin	—	—	—	—	—	0.3	0.1	—	0.1	—	—	—	—
	Million cubic metres												
FOREST PRODUCTS													
Coniferous logs	0.28	0.36	0.45	0.54	0.80	1.44	1.68	1.83	1.81	1.86	1.93	1.32	0.47
	Million metric tons												
Latin America													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	1.98	4.32	7.45	5.27	2.37	2.45	2.79	2.47	1.16	1.81	3.14	1.93	2.00
Maize	3.18	3.75	4.79	5.29	6.05	5.08	5.52	6.78	7.76	3.64	4.11	6.66	5.23
Millet and sorghum	0.64	0.89	0.34	1.18	1.17	0.88	1.54	2.19	2.51	0.75	2.30	3.34	2.34
Rye	—	0.11	0.10	—	—	0.02	0.01	0.03	—	—	0.09	0.11	—
Rice (milled equivalent) [2]	0.16	0.15	0.44	0.60	0.33	0.47	0.36	0.41	0.42	0.19	0.32	0.34	0.50
Sugar (raw equivalent) [3, 12]	7.69	7.63	9.27	8.60	10.25	9.52	9.24	11.65	10.71	10.89	11.94	12.14	11.16
Bananas	3.45	3.37	3.67	4.10	4.18	4.71	4.69	4.75	5.20	5.33	5.34	5.02	5.05
Vegetable oils and oilseeds (oil equivalent) [13]	0.54	0.44	0.63	0.55	0.66	0.49	0.60	0.72	0.65	0.78	1.03	1.12	1.07
Oilseed cake and meal	1.42	1.29	1.66	1.72	1.55	1.51	1.71	2.18	2.36	2.64	2.85	3.07	3.98
Cattle	1.20	0.88	1.04	1.07	1.06	1.20	1.36	1.44	1.20	1.41	0.97	0.88	0.74
Beef and veal	0.68	0.62	0.51	0.55	0.52	0.49	0.70	0.71	0.55	0.84	0.66	0.36	0.29
Coffee (green)	2.07	1.82	1.69	1.91	1.94	2.12	2.10	1.94	2.03	2.16	2.22	1.80	2.03
Cocoa beans	0.18	0.16	0.19	0.21	0.22	0.20	0.21	0.23	0.23	0.23	0.17	0.26	0.27
Tobacco (unmanufactured)	0.16	0.15	0.13	0.11	0.12	0.12	0.14	0.15	0.16	0.18	0.18	0.24	0.24
Wool (actual weight)	0.19	0.14	0.20	0.22	0.19	0.22	0.17	0.17	0.15	0.11	0.11	0.08	0.14
Cotton (lint)	0.97	0.91	1.03	1.05	0.80	0.89	1.17	0.92	0.68	0.87	0.84	0.67	0.74
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	35.9	24.3	30.6	32.0	39.5	40.2	47.4	56.1	59.5	63.9	97.5	110.5	113.0
Dried, salted or smoked fish	—	1.6	1.6	0.4	0.8	0.8	1.0	1.5	1.5	1.6	7.0	8.0	8.5
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	62.2	64.5	68.5	65.3	70.3	68.3	73.7	86.3	91.3	94.1	93.5	85.9	90.3
Fish products and preparations, whether or not in airtight containers	17.8	18.2	14.0	14.1	8.2	9.8	8.2	8.7	16.1	21.1	26.7	21.8	20.0
Crustacean and mollusc products and preparations, whether or not in airtight containers	4.7	3.5	5.0	3.4	3.2	3.8	4.8	4.7	2.6	3.7	2.7	3.7	4.1
Oils and fats, crude or refined, of aquatic animal origin	154.2	137.6	171.3	114.9	210.6	344.9	178.1	217.5	308.1	317.9	12.6	92.9	150.3
Meals, solubles and similar animal feedstuffs of aquatic animal origin	1 139.4	1 590.6	1 500.3	1 506.6	1 727.4	2 269.5	1 860.0	2 011.8	1 957.3	1 712.2	401.2	760.9	901.3
	Million cubic metres												
FOREST PRODUCTS													
Pulpwood	0.24	0.41	0.34	0.36	0.33	0.36	0.42	0.38	0.37	0.38	0.28	0.18	0.10
Broadleaved logs	0.36	0.41	0.54	0.55	0.40	0.39	0.38	0.36	0.30	0.22	0.52	0.22	0.22
Sawn softwood	1.05	1.39	1.49	1.66	1.52	1.93	1.60	1.52	1.72	1.72	1.53	1.11	0.98

See notes at end of table.

ANNEX TABLE 3. — VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
						Million metric tons							
Far East [14]													
AGRICULTURAL PRODUCTS													
Maize	0.94	1.32	0.95	1.52	1.39	1.73	1.79	1.75	2.15	1.95	1.63	2.55	2.60
Rice (milled equivalent) [2]	4.65	4.65	4.39	3.74	3.00	2.31	2.33	2.72	2.94	3.20	2.20	2.02	1.98
Sugar (raw equivalent) [3]	1.98	1.75	1.62	1.64	1.22	1.17	1.20	1.62	2.23	1.86	2.05	2.63	2.95
Pulses (dry)	0.24	0.20	0.26	0.25	0.20	0.18	0.24	0.23	0.27	0.23	0.23	0.16	0.16
Vegetable oils and oilseeds (oil equivalent) [5,15]	1.65	1.66	1.51	1.76	1.48	1.81	1.69	1.78	2.22	2.71	2.56	2.38	3.29
Oilseed cake and meal	1.57	1.66	1.49	1.44	1.36	1.47	1.30	1.55	1.58	1.84	2.09	1.82	1.86
Coffee (green)	0.18	0.12	0.17	0.18	0.27	0.19	0.26	0.22	0.20	0.20	0.21	0.21	0.23
Tea	0.48	0.48	0.49	0.45	0.49	0.49	0.44	0.48	0.47	0.47	0.46	0.46	0.51
Pepper and pimento	0.11	0.09	0.09	0.10	0.14	0.14	0.11	0.11	0.13	0.13	0.12	0.12	0.12
Cotton (lint)	0.27	0.26	0.22	0.21	0.21	0.20	0.24	0.15	0.23	0.34	0.25	0.10	0.24
Jute and kenaf	1.22	1.00	1.08	1.33	1.21	0.87	0.87	0.81	0.76	0.76	0.85	0.86	0.61
Rubber (natural) [8]	1.91	2.05	2.12	2.14	2.14	2.43	2.71	2.60	2.67	2.63	3.14	2.97	2.81
						Thousand metric tons							
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	84.2	99.5	93.3	107.9	214.0	140.9	130.4	127.9	128.9	163.0	231.2	175.3	186.4
Dried, salted or smoked fish	40.7	37.6	33.9	46.0	44.0	44.8	44.9	50.7	35.8	39.0	45.3	31.5	32.6
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	39.2	53.8	56.9	58.5	64.7	67.3	83.8	100.3	126.6	168.1	209.7	222.1	213.2
Fish products and preparations, whether or not in airtight containers	4.3	5.6	9.0	8.1	6.0	7.1	10.5	6.3	5.9	6.7	12.4	14.4	15.7
Crustacean and mollusc products and preparations, whether or not in airtight containers	9.2	9.6	10.7	11.3	12.5	12.7	12.0	16.6	15.0	23.5	33.0	23.3	29.1
Oils and fats, crude or refined, of aquatic animal origin	0.1	—	0.4	0.3	0.5	0.6	0.9	0.5	0.1	1.1	—	0.4	0.8
Meals, solubles and similar animal feedstuffs of aquatic animal origin	12.4	14.8	21.9	29.2	25.8	23.7	25.7	41.2	42.7	62.6	80.3	58.7	54.2
						Million cubic metres							
FOREST PRODUCTS													
Broadleaved logs	10.91	11.89	13.34	15.76	17.13	21.04	24.57	29.07	30.77	32.22	39.60	34.80	25.90
Sawn hardwood	1.08	1.45	1.48	1.50	1.59	2.08	2.33	2.52	2.51	3.09	4.17	3.49	3.22
Plywood	0.18	0.27	0.34	0.50	0.57	1.01	1.14	1.37	1.70	2.09	2.56	1.61	1.52
						Million metric tons							
China and other Asian centrally planned countries													
AGRICULTURAL PRODUCTS													
Maize	0.15	0.19	0.24	0.16	0.08	0.06	0.02	0.01	0.10	0.11	0.06	0.33	0.31
Rice (milled equivalent) [2]	1.21	1.33	1.24	1.92	2.04	2.06	2.17	1.94	2.27	2.11	3.65	3.42	3.25
Sugar (raw equivalent) [3]	0.90	1.18	1.21	1.38	0.96	0.93	0.70	0.50	0.66	0.66	0.65	0.61	0.47
Tea	0.04	0.05	0.05	0.06	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.07
Near East [16]													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	0.24	0.26	0.09	0.10	0.12	0.24	0.07	0.04	0.03	0.63	0.60	0.03	0.03
Barley	0.54	0.29	0.47	0.19	0.07	0.15	0.36	0.23	0.02	0.14	0.02	0.02	0.12
Rice (milled equivalent) [2]	0.40	0.55	0.39	0.38	0.45	0.59	0.79	0.68	0.55	0.49	0.33	0.15	0.11
Potatoes	0.20	0.19	0.18	0.23	0.24	0.21	0.25	0.29	0.25	0.28	0.32	0.30	0.19
Pulses (dry)	0.18	0.20	0.31	0.14	0.18	0.13	0.14	0.11	0.12	0.14	0.17	0.10	0.10
Citrus fruit [4]	0.18	0.19	0.23	0.23	0.27	0.34	0.41	0.43	0.60	0.51	0.78	0.66	0.62
Dates	0.38	0.32	0.31	0.33	0.32	0.28	0.34	0.41	0.32	0.35	0.39	0.29	0.19
Oilseed cake and meal	0.50	0.54	0.59	0.61	0.60	0.70	0.70	0.70	0.58	0.75	0.55	0.46	0.49
Sheep, lambs and goats [6]	1.55	1.59	1.90	1.61	1.23	1.36	1.20	1.23	1.15	0.93	1.00	0.98	0.67
Cotton (lint)	0.84	0.80	0.84	1.00	0.90	0.87	0.86	1.09	1.10	1.05	1.10	0.70	0.81

See notes at end of table.

ANNEX TABLE 3. – VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
FISHERY PRODUCTS						*Thousand metric tons*							
Fresh, chilled or frozen fish	9.5	10.9	14.7	13.5	9.8	9.8	9.7	11.0	8.4	13.9	20.0	14.2	14.2
Dried, salted or smoked fish	6.2	6.7	8.3	9.9	5.3	6.7	6.5	9.0	10.6	10.6	3.5	4.2	4.2
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	4.0	3.5	3.6	2.8	4.6	4.9	4.8	4.6	6.1	12.6	14.2	12.1	12.1
Fish products and preparations, whether or not in airtight containers	0.6	0.3	0.4	0.7	0.8	0.8	0.5	0.9	0.9	0.6	1.1	1.0	1.0
Crustacean and mollusc products and preparations, whether or not in airtight containers	—	—	—	0.9	0.5	0.1	0.1	—	—	—	1.3	2.0	2.0
Oils and fats, crude or refined, of aquatic animal origin	0.1	0.3	0.3	0.1	0.1	—	0.5	0.1	—	1.0	0.9	0.5	0.5
						Million metric tons							
Africa [17]													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent) [18]	0.25	0.25	0.21	0.17	0.08	0.09	0.09	0.14	0.06	0.08	0.08	0.05	0.02
Barley	0.28	0.35	0.03	0.07	0.01	—	0.13	0.24	0.01	—	0.07	—	—
Maize	0.45	0.23	0.24	0.34	0.73	0.84	0.62	0.27	0.35	0.54	0.51	0.32	0.20
Sugar (raw equivalent) [3]	1.20	1.23	1.31	1.30	1.28	1.40	1.40	1.43	1.26	1.45	1.57	1.43	1.09
Bananas	0.47	0.45	0.44	0.40	0.38	0.38	0.38	0.39	0.39	0.44	0.43	0.45	0.35
Citrus fruit [4]	0.68	0.74	0.68	0.69	0.70	0.74	0.78	0.78	0.70	0.76	0.88	0.69	0.58
Pulses (dry)	0.33	0.38	0.35	0.28	0.26	0.40	0.36	0.40	0.30	0.46	0.46	0.39	0.31
Groundnuts and oil (oil equivalent)	0.69	0.70	0.70	0.81	0.75	0.88	0.66	0.55	0.33	0.48	0.40	0.25	0.33
Palm kernels and oil (oil equivalent)	0.33	0.34	0.34	0.34	0.24	0.26	0.27	0.28	0.29	0.25	0.22	0.26	0.21
Palm oil	0.31	0.31	0.28	0.26	0.17	0.13	0.18	0.18	0.20	0.16	0.13	0.21	0.23
Oilseed cake and meal	0.53	0.65	0.67	0.71	0.81	0.84	0.82	0.81	0.66	0.90	0.71	0.62	0.66
Cattle [6]	1.33	1.23	1.24	1.19	1.20	1.26	1.14	1.26	1.33	1.41	1.41	1.28	1.30
Sheep, lambs and goats [6]	3.04	3.18	2.93	3.15	3.20	3.58	3.73	3.41	3.38	3.72	3.21	3.01	3.12
Coffee (green)	0.79	0.85	0.84	0.94	0.90	0.99	0.99	1.01	1.00	1.08	1.19	1.17	1.11
Cocoa beans	0.83	0.84	1.08	0.88	0.84	0.82	0.76	0.87	0.92	0.98	0.90	0.87	0.82
Wine	1.04	1.29	1.08	1.17	0.77	0.79	1.33	1.47	0.65	0.71	1.26	0.79	0.75
Tobacco (unmanufactured)	0.11	0.14	0.16	0.09	0.08	0.07	0.07	0.08	0.09	0.11	0.13	0.13	0.13
Cotton (lint)	0.28	0.29	0.29	0.32	0.34	0.33	0.36	0.45	0.41	0.39	0.41	0.29	0.28
Sisal	0.40	0.39	0.38	0.37	0.34	0.34	0.31	0.37	0.30	0.29	0.26	0.26	0.22
Rubber (natural)	0.15	0.16	0.16	0.18	0.16	0.18	0.19	0.21	0.21	0.20	0.20	0.21	0.16
						Thousand metric tons							
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	33.5	17.8	17.2	19.2	17.1	19.4	18.6	33.4	39.3	59.0	93.2	96.1	100.2
Dried, salted or smoked fish	36.8	33.7	42.3	38.7	35.0	36.6	34.4	39.1	37.0	34.4	27.7	19.6	19.8
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	2.9	3.5	3.8	3.3	5.2	6.6	7.8	9.8	15.5	19.0	22.3	26.0	26.9
Fish products and preparations, whether or not in airtight containers	56.3	63.0	37.6	56.7	52.7	61.8	62.3	60.1	68.9	60.4	83.2	79.4	60.9
Crustacean and mollusc products and preparations, whether or not in airtight containers	0.7	0.6	0.5	0.3	0.2	0.1	0.2	0.2	—	0.1	—	—	—
Oils and fats, crude or refined, of aquatic animal origin	8.3	12.7	6.5	11.1	13.1	14.9	16.6	16.9	12.5	25.7	32.0	17.8	16.5
Meals, solubles and similar animal feedstuffs of aquatic animal origin	49.0	77.1	77.2	92.8	63.5	83.6	121.1	93.2	80.5	150.8	143.2	96.3	98.0
						Million cubic metres							
FOREST PRODUCTS													
Broadleaved logs	5.17	6.06	5.64	5.60	5.61	6.46	7.84	6.85	6.80	7.38	8.50	7.01	5.89
Sawn hardwood	0.58	0.71	0.73	0.77	0.71	0.75	0.74	0.76	0.66	0.66	0.72	0.81	0.73

[1] Including the U.S.S.R. and eastern Europe, China and other Asian centrally planned countries. — [2] Including paddy converted at 65%. — [3] Including refined sugar converted at 108.7%. — [4] Oranges, mandarins and lemons. — [5] Excluding re-exports of copra from Malaysia, but including unrecorded shipment of copra from Indonesia and the Philippines to Malaysia. — [6] Million head. — [7] Beef and veal, mutton and lamb, pork, poultry meat. — [8] Excluding imports into Malaysia for re-export and exports from Hong Kong, but including unrecorded shipments from Indonesia to Malaysia. — [9] Million cubic metres. — [10] Linseed, sunflowerseed, olive oil, groundnut oil, coconut oil, palm oil, palm-kernel oil, soybean oil, sunflowerseed oil, castor oil, cottonseed oil, linseed oil. — [11] Groundnuts, soybeans, sunflowerseed, linseed, cottonseed, groundnut oil, coconut oil, soybean oil, linseed oil, castor oil, cottonseed oil. — [12] Excluding trade between the United States and its territories. — [13] Groundnuts, copra, palm kernels, soybeans, sunflowerseed, linseed, castor beans, cottonseed, olive oil, groundnut oil, coconut oil, palm oil, palm-kernel oil, sunflowerseed oil, linseed oil, castor oil, cottonseed oil. — [14] Excluding Japan, and China and other Asian centrally planned countries. — [15] Groundnuts, copra, palm kernels, soybeans, cottonseed, groundnut oil, coconut oil, palm oil, palm-kernel oil, soybean oil, cottonseed oil. — [16] Excluding Israel. — [17] Excluding South Africa. — [18] Including coarse ground flour.

ANNEX TABLE 4. — WORLD AVERAGE EXPORT UNIT VALUES OF SELECTED AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	U.S. dollars per metric ton												
Agricultural products													
Wheat	66	66	61	63	68	64	65	62	65	69	106	171	153
Wheat flour	85	86	86	89	86	85	85	86	92	93	135	211	236
Barley	57	57	63	69	67	64	58	53	60	58	94	135	140
Maize	55	56	58	58	56	52	55	60	63	63	91	128	135
Rice (milled)	124	124	125	134	157	173	158	129	127	140	228	386	361
Sugar (raw)	133	142	106	103	100	101	107	118	128	148	186	393	554
Apples	148	133	142	153	152	147	156	156	168	186	250	238	307
Bananas	75	83	92	91	92	86	88	86	85	90	94	99	122
Oranges	136	118	118	129	126	123	131	126	149	148	163	182	214
Raisins	277	332	340	337	326	322	327	334	301	362	712	905	716
Dates	105	109	106	104	110	125	120	108	123	150	163	211	303
Cottonseed	62	63	68	74	76	72	62	65	79	75	100	143	150
Copra	157	164	189	162	160	189	161	185	167	122	212	511	243
Palm kernels	134	136	165	147	126	159	136	150	139	112	179	363	177
Soybeans	101	101	107	114	109	103	98	103	115	126	216	246	224
Groundnuts (shelled)	168	175	192	186	172	157	189	208	230	245	262	500	578
Olive oil	798	548	622	625	660	694	637	670	686	787	1 117	1 726	1 747
Cottonseed oil	258	258	298	298	289	280	265	289	357	316	355	602	666
Coconut oil	255	278	307	262	262	316	273	306	288	211	357	925	418
Palm oil	189	202	237	203	193	146	144	222	227	189	254	531	479
Palm-kernel oil	217	240	296	261	241	321	267	308	303	243	337	827	473
Soybean oil	239	243	293	313	272	221	227	278	315	287	357	700	696
Groundnut oil	306	323	330	314	321	272	316	340	391	377	444	932	859
Cattle[1]	124	140	143	133	136	131	147	154	171	230	268	268	296
Pigs[1]	38	36	36	38	36	40	45	50	49	58	80	84	94
Beef and veal	561	680	756	761	755	782	814	910	1 070	1 260	1 638	1 702	1 545
Mutton and lamb	422	442	529	503	493	464	483	551	556	588	873	1 214	1 072
Poultry meat	660	669	683	704	640	642	679	673	669	754	1 059	1 035	1 139
Bacon, ham, salted pork	712	761	752	867	827	740	806	864	855	1 025	1 505	1 619	1 759
Meat (prepared or preserved)	900	953	973	1 042	1 022	1 025	1 060	1 098	1 190	1 265	1 644	1 772	1 955
Milk (condensed and evaporated)	311	343	342	338	325	305	310	312	358	435	487	563	687
Milk (skimmed dry)	276	280	373	385	398	336	367	353	481	606	666	836	973
Butter	826	879	914	848	791	739	752	729	980	1 223	994	1 317	1 739
Cheese, whole milk (cow)	698	745	816	835	849	831	894	936	1 070	1 247	1 450	1 707	2 026
Potatoes	60	50	62	68	64	54	69	74	67	71	114	110	147
Coffee (green)	645	834	803	772	715	756	723	942	834	911	1 141	1 275	1 183
Cocoa	483	499	381	406	542	604	781	764	620	567	843	1 339	1 400
Tea	1 127	1 106	1 073	1 047	1 036	944	883	933	927	954	923	1 082	1 280
Wine	219	219	231	232	262	273	256	262	313	366	479	509	507
Tobacco (unmanufactured)	1 251	1 191	1 195	1 267	1 280	1 266	1 308	1 289	1 276	1 377	1 494	1 810	2 047
Linseed	125	125	121	114	120	127	122	111	105	120	259	424	343
Linseed oil	200	208	201	188	176	210	213	213	197	194	315	899	781
Castor beans	111	116	107	107	117	145	126	117	121	156	384	327	240
Castor oil	256	249	210	245	321	333	259	265	325	453	968	843	582
Cotton	622	617	628	603	597	631	617	630	692	770	876	1 300	1 138
Jute	158	193	222	206	205	229	224	215	222	256	226	231	258
Sisal	297	287	182	163	136	121	129	125	124	156	323	714	528
Wool (greasy)	1 235	1 455	1 219	1 199	1 170	989	1 055	964	801	925	2 056	2 786	1 889
Rubber (natural)	494	455	443	435	364	331	422	394	331	310	559	712	523

See notes at end of table.

ANNEX TABLE 4. — WORLD AVERAGE EXPORT UNIT VALUES OF SELECTED AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	U.S. dollars per metric ton												
Fishery products													
Fresh, chilled or frozen fish	297	289	329	353	325	347	396	425	486	560	682	725	742
Dried, salted or smoked fish	361	391	427	455	470	456	468	517	630	735	1 014	1 335	1 365
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	846	796	892	989	1 033	1 127	1 248	1 217	1 326	1 418	1 800	1 875	1 959
Fish products and preparations, whether or not in airtight containers	649	639	703	682	733	706	725	782	812	937	1 122	1 300	1 278
Crustacean and mollusc products and preparations, whether or not in airtight containers	1 211	1 283	1 319	1 469	1 453	1 486	1 579	1 650	1 891	1 907	2 304	2 809	2 813
Oils and fats, crude or refined, of aquatic animal origin	137	183	194	182	129	93	122	201	211	158	275	482	323
Meals, solubles and similar animal feedstuffs of aquatic animal origin	108	110	125	145	119	109	129	163	166	166	403	378	246
Forest products													
Fuelwood [2]	9	9	9	10	8	8	9	9	10	11	16	26	24
Charcoal	39	45	46	46	47	46	39	49	54	61	68	85	100
Coniferous logs [2]	16	17	18	18	19	21	22	24	24	27	45	52	55
Broadleaved logs [2]	25	24	24	23	24	25	25	23	24	25	40	49	49
Pulpwood [2]	11	11	12	11	11	11	11	12	14	13	15	22	25
Sawn softwood [2]	36	37	39	39	38	39	43	44	47	50	74	94	88
Sawn hardwood [2]	61	61	63	63	62	64	65	67	68	80	106	130	120
Veneer sheets [2]	249	247	255	247	242	233	256	265	233	247	361	372	356
Plywood [2]	146	142	141	144	144	140	146	145	151	166	216	255	258
Particle board	55	56	58	59	59	58	63	67	66	76	90	106	110
Fibreboard, compressed	85	90	94	98	89	88	91	97	100	113	130	180	177
Mechanical wood pulp	65	65	69	69	68	69	70	77	79	78	97	169	226
Chemical wood pulp	117	126	129	123	123	120	127	149	155	154	181	297	367
Newsprint	126	127	125	127	130	132	135	141	147	151	169	234	289
Other printing and writing paper	227	235	236	243	246	245	243	255	266	277	305	419	535

[1] U.S. dollars per head. — [2] U.S. dollars per cubic metre.

ANNEX TABLE 5. — VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
Western Europe													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	12.07	10.59	12.66	12.43	10.45	10.96	13.57	13.57	13.34	13.49	13.59	12.57	12.45
Barley	3.63	4.51	4.84	5.02	4.95	4.10	4.62	6.40	6.68	5.69	5.36	6.35	5.48
Maize	13.87	14.48	16.95	18.69	19.37	18.76	16.62	17.47	19.60	20.17	22.64	24.34	25.26
Oats	1.07	0.97	1.32	1.28	1.06	1.02	0.96	1.23	1.24	1.05	1.17	0.80	0.64
Rye	0.74	0.46	0.36	0.41	0.41	0.27	0.24	0.22	0.27	0.27	0.38	0.31	0.24
Millet and sorghum	2.04	2.19	2.74	3.21	2.43	1.49	0.84	1.36	1.93	0.89	1.53	3.10	2.96
Rice (milled equivalent) [1]	0.58	0.59	0.61	0.72	0.58	0.71	0.70	0.63	0.71	0.76	0.76	0.80	0.81
Sugar (raw equivalent) [2]	5.32	4.97	4.52	4.94	4.84	4.67	4.42	4.49	4.66	4.97	4.95	5.35	5.27
Potatoes	1.72	1.54	2.38	2.06	1.94	1.85	2.36	2.32	2.05	2.55	2.39	2.24	2.34
Pulses (dry)	0.68	0.66	1.03	1.00	0.83	0.97	1.17	0.94	0.89	1.10	1.10	0.78	0.79
Apples	0.95	1.13	1.35	1.28	1.24	1.30	1.34	1.27	1.41	1.64	1.46	1.59	1.59
Bananas	1.73	1.74	2.13	2.28	2.28	2.23	2.22	2.12	2.31	2.55	2.56	2.43	2.32
Citrus fruit [3]	2.71	3.30	3.22	3.31	3.19	3.14	3.43	3.61	3.43	3.68	3.82	3.59	3.60
Grapes (fresh)	0.37	0.44	0.49	0.48	0.49	0.48	0.51	0.51	0.55	0.46	0.50	0.53	0.57
Vegetable oils and oilseeds (oil equivalent) [4]	4.04	4.13	4.24	4.53	4.54	4.74	4.95	5.29	5.94	6.31	6.13	5.41	6.16
Oilseed cake and meal	5.90	6.17	7.00	8.08	7.48	7.44	8.15	9.10	9.82	10.38	11.04	9.92	10.08
Cattle [5]	2.02	2.03	2.03	2.04	2.56	2.99	3.33	3.29	3.53	3.93	3.31	2.69	3.44
Sheep, lambs and goats [5]	1.32	1.37	1.93	1.79	1.74	2.16	2.50	2.54	2.82	3.01	2.53	1.97	2.57
Pigs [5]	0.74	0.91	1.24	1.26	1.14	1.30	1.83	2.13	2.37	3.00	2.82	3.01	3.31
Meat (fresh, chilled and frozen) [6]	2.00	2.16	2.27	2.28	2.43	2.43	2.68	2.72	2.86	3.35	3.45	2.87	3.12
Butter	0.51	0.56	0.53	0.53	0.57	0.54	0.52	0.59	0.55	0.51	0.59	0.71	0.74
Cheese	0.42	0.43	0.46	0.47	0.48	0.50	0.50	0.54	0.58	0.60	0.63	0.64	0.68
Coffee (green)	1.12	1.19	1.18	1.25	1.28	1.39	1.48	1.50	1.51	1.61	1.67	1.64	1.74
Cocoa beans	0.56	0.54	0.59	0.60	0.55	0.54	0.55	0.53	0.55	0.60	0.58	0.57	0.56
Tea	0.29	0.29	0.30	0.28	0.32	0.34	0.28	0.32	0.31	0.29	0.30	0.31	0.29
Wine	1.95	2.11	1.93	2.17	1.66	1.68	1.99	2.48	2.05	2.62	3.00	2.42	2.84
Tobacco (unmanufactured)	0.52	0.54	0.53	0.52	0.56	0.54	0.57	0.58	0.63	0.65	0.68	0.66	0.67
Wool (actual weight)	0.87	0.81	0.80	0.80	0.73	0.79	0.83	0.78	0.73	0.77	0.57	0.50	0.54
Cotton (lint)	1.44	1.54	1.39	1.57	1.45	1.42	1.44	1.35	1.26	1.28	1.54	1.14	1.19
Sisal	0.40	0.38	0.38	0.39	0.34	0.37	0.36	0.34	0.33	0.31	0.33	0.30	0.18
Rubber (natural)	0.75	0.77	0.76	0.76	0.76	0.82	0.90	0.94	0.94	0.93	0.98	0.99	0.90
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	727.2	747.3	820.9	792.5	816.9	869.7	814.3	839.5	916.4	938.3	1 068.1	1 153.4	1 106.0
Dried, salted or smoked fish	200.6	188.9	196.9	202.3	211.8	198.0	195.4	211.5	221.0	232.1	184.6	182.9	167.1
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	109.0	136.8	138.1	132.0	143.1	151.3	160.3	176.4	195.6	248.3	237.3	259.0	298.5
Fish products and preparations, whether or not in airtight containers	254.3	269.4	272.8	256.6	255.8	269.0	244.9	245.5	254.4	279.2	307.9	282.7	274.4
Crustacean and mollusc products and preparations, whether or not in airtight containers	21.8	28.1	31.6	34.0	31.7	34.5	35.7	42.5	43.8	43.7	54.3	52.7	58.0
Oils and fats, crude or refined, of aquatic animal origin	640.9	593.6	623.9	568.3	742.4	766.6	662.7	599.5	619.5	663.0	567.6	552.3	601.4
Meals, solubles and similar animal feedstuffs of aquatic animal origin	1 195.5	1 496.2	1 564.7	1 469.5	1 723.0	1 997.1	2 082.9	1 893.2	1 733.0	1 860.3	1 113.9	1 090.6	1 232.1
	Million metric tons												
FOREST PRODUCTS													
Pulpwood [7]	6.92	8.78	9.42	8.99	9.14	9.78	11.00	14.53	12.08	9.24	11.57	14.40	14.30
Coniferous logs [7]	2.44	2.23	2.25	2.52	2.51	2.53	2.38	2.52	2.25	2.77	4.32	4.76	3.27
Broadleaved logs [7]	6.08	6.76	6.21	6.41	6.30	7.00	8.34	7.78	8.18	9.07	10.90	8.67	6.77
Sawn softwood [7]	21.68	24.25	23.57	21.85	22.09	23.66	23.88	24.40	23.60	25.40	28.20	23.70	17.90
Sawn hardwood [7]	2.20	2.48	2.60	2.67	2.65	3.10	3.36	3.54	3.43	3.99	5.70	4.04	3.70
Plywood and veneers [7]	0.98	1.19	1.24	1.20	1.48	1.68	1.74	1.95	1.86	2.18	2·75	2.07	1.97

See notes at end of table.

ANNEX TABLE 5. — VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
FOREST PRODUCTS (*concluded*)						*Million metric tons*							
Fibreboard	1.04	1.22	1.15	1.04	1.21	1.26	1.26	1.29	1.24	1.31	1.42	1.20	0.98
Mechanical wood pulp	1.04	1.16	1.21	1.14	1.00	1.07	1.08	1.07	0.79	0.84	0.92	1.02	0.64
Chemical wood pulp	5.07	5.45	5.26	5.70	5.87	6.54	7.25	7.84	6.26	7.42	8.22	8.42	6.64
Newsprint	1.56	1.69	1.70	1.84	1.72	1.90	2.29	2.42	2.35	2.80	2.96	3.15	2.50
Other paper and paperboard	3.74	4.31	4.65	4.99	5.23	6.14	7.11	7.43	7.86	8.51	9.56	10.30	7.42
Eastern Europe and the U.S.S.R.													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	8.21	15.09	10.82	12.58	6.17	5.85	4.92	6.87	8.75	13.12	20.06	7.13	13.63
Barley	0.89	1.17	1.93	0.44	0.78	0.97	0.83	2.16	1.32	5.49	3.42	2.18	2.76
Maize	0.97	1.21	1.24	1.10	1.10	1.34	1.35	1.06	2.51	6.09	7.82	6.73	9.02
Rye	0.78	0.15	0.06	0.23	0.28	0.19	0.21	0.26	0.39	0.31	1.44	0.77	0.25
Rice (milled equivalent) [1]	0.50	0.63	0.50	0.59	0.65	0.51	0.57	0.55	0.61	0.50	0.42	0.44	0.55
Sugar (raw equivalent) [2]	1.91	2.18	2.95	2.53	3.21	2.74	2.13	4.34	2.87	2.84	3.58	2.91	4.06
Citrus fruit [3]	0.27	0.37	0.45	0.55	0.59	0.61	0.69	0.70	0.79	0.95	0.98	1.07	1.07
Vegetable oils and oilseeds (oil equivalent) [8]	0.42	0.57	0.54	0.55	0.55	0.57	0.51	0.56	0.60	0.70	0.68	0.59	0.64
Sheep, lambs and goats [5]	1.25	1.15	1.41	1.93	1.67	1.09	0.95	1.00	1.02	1.21	1.21	1.22	1.02
Meat (fresh, chilled and frozen) [6]	0.32	0.33	0.41	0.34	0.32	0.29	0.28	0.47	0.54	0.29	0.32	0.60	0.53
Coffee (green)	0.09	0.10	0.11	0.11	0.12	0.14	0.16	0.17	0.16	0.18	0.17	0.18	0.20
Cocoa beans	0.11	0.13	0.16	0.12	0.16	0.19	0.17	0.18	0.22	0.24	0.21	0.25	0.28
Wine	0.22	0.25	0.27	0.32	0.41	0.47	0.90	0.94	0.99	1.03	0.93	1.01	1.14
Tobacco (unmanufactured)	0.16	0.20	0.17	0.13	0.13	0.13	0.11	0.12	0.13	0.16	0.15	0.14	0.15
Cotton (lint)	0.71	0.68	0.71	0.74	0.68	0.70	0.67	0.87	0.80	0.74	0.71	0.75	0.76
Rubber (natural)	0.45	0.35	0.43	0.48	0.44	0.50	0.48	0.52	0.44	0.45	0.50	0.55	0.46
						Thousand metric tons							
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	153.7	146.1	145.6	159.4	138.4	126.0	131.8	187.6	131.0	130.4	121.5	133.3	130.5
Dried, salted or smoked fish	56.4	45.8	26.8	19.7	20.9	24.0	15.9	9.4	28.6	16.5	15.6	15.4	14.9
Fish products and preparations, whether or not in airtight containers	26.0	27.6	23.8	21.4	26.4	38.0	31.0	29.8	30.3	26.6	27.3	24.9	29.2
Oils and fats, crude or refined, of aquatic animal origin	84.9	75.2	65.4	52.7	31.0	21.0	24.0	15.5	13.8	17.8	11.5	24.9	22.9
Meals, solubles and similar animal feedstuffs of aquatic animal origin	163.0	197.7	292.3	292.5	314.7	366.0	344.0	460.9	567.0	452.7	287.4	363.9	361.7
						Million metric tons							
FOREST PRODUCTS													
Sawn softwood [7]	2.32	2.41	2.65	2.55	2.65	2.86	2.81	3.10	3.30	3.01	2.84	3.45	4.04
Sawn hardwood [7]	0.36	0.43	0.43	0.44	0.48	0.46	0.42	0.40	0.39	0.37	0.35	0.43	0.42
Pulp and pulp products	0.80	0.96	1.16	1.30	1.54	1.74	1.95	2.35	2.32	2.37	2.42	2.50	2.66
North America													
AGRICULTURAL PRODUCTS													
Maize	0.61	0.55	0.49	0.54	0.76	0.81	0.69	0.55	0.25	0.45	0.82	1.32	0.31
Sugar (raw equivalent) [2,9]	4.83	3.98	4.37	4.62	5.18	5.39	5.29	5.72	5.73	5.66	5.71	6.14	4.48
Bananas	1.53	1.60	1.73	1.79	1.82	1.86	1.82	2.05	2.13	2.15	2.17	2.27	2.19
Citrus fruit [3]	0.22	0.25	0.23	0.23	0.24	0.26	0.26	0.26	0.26	0.28	0.28	0.28	0.28
Vegetable oils and oilseeds (oil equivalent) [8]	0.61	0.69	0.71	0.82	0.75	0.79	0.84	0.80	0.84	1.03	0.89	0.89	1.26
Cattle [5]	0.86	0.58	1.13	1.11	0.78	1.05	1.05	1.22	1.08	1.26	1.26	0.72	0.52
Meat (fresh, chilled and frozen) [6]	0.60	0.42	0.35	0.46	0.49	0.56	0.66	0.71	0.67	0.80	0.79	0.64	0.72
Coffee (green)	1.51	1.45	1.36	1.40	1.36	1.61	1.30	1.27	1.40	1.34	1.40	1.25	1.32
Cocoa beans	0.30	0.29	0.38	0.34	0.30	0.25	0.24	0.30	0.34	0.31	0.27	0.24	0.25
Wool (actual weight)	0.13	0.11	0.14	0.14	0.09	0.12	0.09	0.07	0.06	0.05	0.03	0.02	0.02
Rubber (natural)	0.43	0.50	0.51	0.49	0.52	0.60	0.65	0.62	0.68	0.68	0.73	0.76	0.75

See notes at end of table.

ANNEX TABLE 5. — VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	322.1	340.2	361.1	432.7	394.3	502.7	492.0	526.7	530.9	726.7	792.3	688.8	611.2
Dried, salted or smoked fish	36.5	36.0	35.8	38.4	32.8	33.2	30.3	38.0	33.8	32.1	32.6	30.8	30.2
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	110.7	100.6	104.8	113.5	114.2	122.4	128.6	137.4	129.2	148.1	135.9	145.7	138.6
Fish products and preparations, whether or not in airtight containers	63.1	68.2	67.7	88.9	82.4	88.4	82.5	101.3	86.8	108.3	104.4	131.3	81.6
Crustacean and mollusc products and preparations, whether or not in airtight containers	15.5	22.3	23.2	21.5	24.9	26.2	26.3	27.8	23.9	31.0	31.9	32.7	26.6
Oils and fats, crude or refined, of aquatic animal origin	49.8	35.7	43.3	38.5	31.3	32.0	26.5	31.0	28.4	10.0	5.7	8.2	7.3
Meals, solubles, and similar animal feedstuffs of aquatic animal origin	350.6	406.9	250.3	410.1	595.3	779.9	326.8	227.8	257.0	356.8	62.6	62.3	107.7
	Million metric tons												
FOREST PRODUCTS													
Pulpwood [7]	3.08	1.84	1.84	1.98	1.86	1.65	1.41	1.37	1.06	1.10	0.90	1.39	1.50
Coniferous logs [7]	1.23	1.20	1.56	1.24	1.30	1.58	1.50	1.79	1.79	2.39	1.95	1.74	1.74
Broadleaved logs [7]	0.24	0.51	0.50	0.53	0.59	0.53	0.47	0.48	0.41	0.46	0.46	0.49	0.32
Sawn softwood [7]	12.11	11.73	11.73	11.39	11.69	13.98	14.06	13.86	17.38	21.52	21.80	16.60	14.90
Sawn hardwood [7]	0.97	1.00	1.08	1.26	1.20	1.09	1.36	1.01	1.12	1.43	1.73	1.41	0.96
Plywood [7]	0.73	0.90	0.97	1.16	1.19	1.75	2.04	1.90	2.42	3.12	2.55	1.89	2.47
Wood pulp	2.58	2.73	2.92	3.08	2.88	3.22	3.68	3.21	3.24	3.45	3.67	3.75	2.85
Newsprint	4.91	5.40	5.74	6.34	5.99	5.86	6.16	6.02	6.24	6.44	6.72	6.71	5.31
Other paper and paperboard	0.28	0.31	0.33	0.42	0.41	0.42	0.48	0.53	0.62	0.70	0.82	0.89	0.84
Oceania													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	0.18	0.18	0.17	0.15	0.10	0.05	0.01	0.02	0.08	0.05	—	0.05	0.13
Sugar (raw equivalent) [3]	0.13	0.13	0.11	0.13	0.13	0.15	0.15	0.14	0.16	0.18	0.14	0.11	0.19
Rubber (natural)	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.07	0.05
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	5.1	19.1	21.0	24.5	20.3	20.9	23.7	21.9	29.3	22.4	17.8	22.2	22.2
Dried, salted or smoked fish	5.0	4.9	4.0	5.0	3.0	4.0	5.0	3.5	4.3	4.3	2.9	5.2	5.2
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	0.5	1.0	1.2	1.0	1.0	1.0	1.0	0.9	1.0	1.1	1.5	1.1	1.1
Fish products and preparations, whether or not in airtight containers	18.8	27.4	24.5	25.1	27.0	27.0	27.0	13.2	14.4	14.7	24.6	26.4	26.4
Crustacean and mollusc products and preparations, whether or not in airtight containers	0.3	0.6	0.7	2.0	2.0	2.0	2.0	2.6	2.6	2.9	4.2	5.2	5.2
Oils and fats, crude or refined, of aquatic animal origin	2.9	3.9	7.3	8.0	4.0	5.0	4.0	4.3	4.7	1.1	1.2	1.3	1.3
Meals, solubles and similar animal feedstuffs of aquatic animal origin	5.7	8.5	11.0	11.0	14.0	28.0	30.0	26.6	31.8	27.4	14.1	13.9	10.5
	Million metric tons												
FOREST PRODUCTS													
Sawn softwood [7]	0.58	0.73	0.69	0.72	0.70	0.69	0.77	0.72	0.73	0.73	0.85	0.93	0.71
Newsprint	0.22	0.26	0.29	0.28	0.28	0.30	0.30	0.28	0.29	0.22	0.26	0.29	0.33
Other paper and paperboard	0.17	0.17	0.19	0.17	0.19	0.20	0.22	0.26	0.28	0.32	0.38	0.39	0.40

See notes at end of table.

ANNEX TABLE 5. — VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Million metric tons												
Latin America													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	5.15	5.73	5.14	6.08	6.39	6.78	6.70	5.67	6.28	6.99	8.72	8.62	7.65
Maize	0.65	0.67	0.40	0.42	0.37	0.64	0.67	1.42	0.67	0.91	2.50	2.82	4.13
Rice (milled equivalent) [1]	0.34	0.50	0.56	0.35	0.36	0.39	0.39	0.38	0.47	0.42	0.38	0.65	0.67
Sugar (raw equivalent) [2]	0.28	0.22	0.27	0.31	0.26	0.18	0.41	0.18	0.25	0.36	0.43	0.25	0.18
Bananas	0.24	0.24	0.25	0.25	0.23	0.24	0.29	0.30	0.25	0.23	0.22	0.25	0.21
Pulses (dry)	0.16	0.19	0.16	0.19	0.21	0.21	0.21	0.23	0.21	0.22	0.24	0.26	0.32
Cattle [5]	0.66	0.57	0.53	0.56	0.61	0.54	0.57	0.55	0.57	0.58	0.49	0.46	0.46
Sheep, lambs and goats [5]	0.28	0.15	0.07	0.09	0.11	0.14	0.13	0.14	0.18	0.11	0.07	0.23	0.26
Milk (condensed, evaporated and powdered)	0.30	0.28	0.26	0.25	0.28	0.30	0.28	0.33	0.32	0.33	0.34	0.40	0.30
Rubber (natural)	0.08	0.09	0.08	0.09	0.08	0.09	0.10	0.11	0.12	0.15	0.13	0.17	0.16
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	16.4	16.4	20.0	16.3	22.7	28.3	31.0	36.5	41.9	43.3	59.9	60.6	62.2
Dried, salted or smoked fish	78.2	81.1	59.6	81.6	90.2	90.8	102.0	90.8	76.0	74.3	74.2	71.3	71.6
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	0.9	1.0	1.4	3.5	4.8	6.5	8.0	8.7	5.9	5.3	12.1	12.4	12.3
Fish products and preparations, whether or not in airtight containers	20.7	25.9	22.8	28.1	24.6	22.6	25.4	31.1	34.7	40.9	37.2	33.0	32.6
Crustacean and mollusc products and preparations, whether or not in airtight containers	0.5	0.6	1.4	1.5	1.1	0.8	0.7	0.4	1.4	1.4	1.6	1.6	1.6
Oils and fats, crude or refined, of aquatic animal origin	7.5	13.5	18.3	32.5	19.7	37.3	41.9	26.9	26.4	29.2	23.6	23.6	23.1
Meals, solubles and similar animal feedstuffs of aquatic animal origin	53.8	72.7	77.1	91.9	104.7	137.1	134.2	160.1	221.5	185.5	47.6	66.2	82.4
	Million metric tons												
FOREST PRODUCTS													
Broadleaved logs [7]	0.22	0.25	0.37	0.35	0.31	0.23	0.21	0.22	0.23	0.18	0.14	0.13	0.13
Sawn softwood [7]	0.99	1.23	1.43	1.51	1.35	1.60	1.60	1.57	1.63	1.50	1.46	1.65	1.65
Wood pulp	0.41	0.48	0.50	0.54	0.49	0.62	0.63	0.70	0.64	0.71	0.70	0.76	0.76
Newsprint	0.54	0.56	0.60	0.66	0.67	0.75	0.86	0.87	0.74	0.70	0.75	0.88	0.88
Other paper and paperboard	0.29	0.43	0.43	0.57	0.63	0.82	0.79	1.06	0.98	1.08	1.04	1.08	1.08
Far East [10]													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	8.21	9.22	10.75	11.53	11.34	10.77	8.35	8.90	7.78	6.99	11.21	11.76	15.28
Barley	0.21	0.20	0.11	0.01	0.01	0.16	0.12	0.04	0.08	0.36	0.50	0.50	0.59
Maize	0.54	0.51	0.51	0.51	0.75	0.60	0.85	0.88	1.04	1.28	1.42	1.28	1.42
Millet and sorghum	—	0.02	0.07	1.59	2.16	0.43	0.41	0.07	0.10	0.19	1.31	0.87	0.33
Rice (milled equivalent) [1]	4.52	4.40	3.93	3.78	4.26	4.03	3.84	5.04	4.30	4.77	5.02	3.55	3.06
Sugar (raw equivalent) [2]	0.99	0.95	1.03	1.26	1.24	1.55	1.80	1.47	1.65	1.33	1.87	1.21	1.33
Dates	0.08	0.08	0.08	0.08	0.09	0.10	0.09	0.11	0.07	0.06	0.08	0.04	0.05
Vegetable oils and oilseeds (oil equivalent) [8]	0.47	0.57	0.49	0.49	0.46	0.46	0.59	0.68	0.83	0.74	0.88	0.84	0.69
Milk (condensed, evaporated and powdered)	0.43	0.42	0.40	0.41	0.36	0.40	0.43	0.39	0.37	0.34	0.34	0.35	0.30
Cotton (lint)	0.40	0.44	0.45	0.45	0.52	0.57	0.50	0.59	0.62	0.57	0.66	0.62	0.75
Jute and kenaf	0.06	0.07	0.16	0.10	0.03	0.08	0.03	0.01	0.11	0.07	0.12	0.07	0.13
Rubber (natural) [11]	0.12	0.10	0.10	0.10	0.12	0.11	0.13	0.09	0.09	0.09	0.12	0.13	0.13

See notes at end of table.

ANNEX TABLE 5. — VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*continued*)

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	97.8	107.7	109.4	115.6	113.9	110.9	102.0	115.8	118.6	121.2	141.9	126.5	129.6
Dried, salted or smoked fish	64.4	62.0	55.8	72.0	57.8	62.7	60.9	59.7	55.9	24.6	26.1	34.3	36.2
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	43.3	42.0	39.5	42.5	40.3	36.6	35.9	38.3	48.0	59.9	61.8	66.4	63.2
Fish products and preparations, whether or not in airtight containers	67.8	67.1	64.2	73.8	82.4	92.9	102.2	85.6	93.7	94.6	90.5	91.0	96.4
Crustacean and mollusc products and preparations, whether or not in airtight containers	20.1	17.2	17.1	12.6	21.8	23.9	22.6	19.5	15.1	18.2	15.5	15.9	15.1
Oils and fats, crude or refined, of aquatic animal origin	1.8	1.6	1.6	2.1	5.2	5.9	6.9	8.6	7.4	4.6	6.8	2.0	2.0
Meals, solubles and similar animal feedstuffs of aquatic animal origin	42.7	49.2	52.8	55.8	70.9	86.2	112.0	77.7	78.3	85.5	65.8	58.6	77.0
	Million metric tons												
FOREST PRODUCTS													
Coniferous logs [7]	0.19	0.23	0.09	0.25	0,30	0.47	0.23	0.29	0.44	0.57	0.83	0.86	0.80
Broadleaved logs [7]	0.93	1.74	2.05	2.82	3.10	4.28	4.46	5.16	5.74	5.85	5.98	5.30	5.66
Sawn hardwood [7]	0.12	0.35	0.30	0.36	0.39	0.63	0.47	0.47	0.48	0.66	1.20	1.05	0.79
Wood pulp	0.25	0.22	0.19	0.23	0.22	0.30	0.37	0.36	0.38	0.53	0.52	0.51	0.47
Newsprint	0.26	0.26	0.27	0.33	0.31	0.40	0.46	0.43	0.56	0.45	0.44	0.43	0.43
Other paper and paperboard	0.39	0.47	0.45	0.54	0.60	0.67	0.72	0.79	0.91	0.88	0.97	0.90	0.88
China and other Asian centrally planned countries													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	4.92	6.02	5.86	7.13	4.22	6.14	4.52	6.62	4.66	6.28	7.41	7.66	4.68
Barley	0.03	0.58	0.03	—	0.03	0.05	0.09	0.24	0.32	0.45	0.27	0.32	0.22
Maize	0.05	0.41	0.23	0.09	0.27	0.38	0.41	0.62	0.66	1.99	3.00	2.77	1.54
Millet and sorghum	0.01	0.03	—	—	—	—	0.01	0.01	0.03	0.01	0.05	0.08	0.15
Rice (milled equivalent) [1]	0.55	0.53	0.33	0.52	0.68	1.08	1.31	0.90	1.26	1.11	1.41	1.23	1.33
Sugar (raw equivalent) [2]	0.56	0.46	0.53	0.68	0.74	0.65	0.73	0.79	0.79	0.99	1.00	0.62	0.47
Dates	0.07	0.06	0.04	0.06	0.06	0.06	0.06	0.07	0.06	0.09	0.08	0.09	0.04
Vegetable oils and oilseeds (oil equivalent) [4]	0.06	0.09	0.07	0.05	0.10	0.12	0.14	0.15	0.14	0.22	0.30	0.28	0.24
Milk (condensed, evaporated and powdered)	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03
Cotton (lint)	0.22	0.17	0.25	0.19	0.19	0.17	0.20	0.23	0.28	0.39	0.59	0.60	0.37
Jute and kenaf	0.03	0.06	0.06	0.06	0.07	0.06	0.05	0.05	0.06	0.06	0.06	0.04	0.02
Rubber (natural, dry)	0.13	0.15	0.16	0.18	0.16	0.24	0.30	0.21	0.20	0.22	0.30	0.24	0.27
Near East [12]													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	4.24	3.45	4.45	4.42	4.65	4.60	3.43	4.94	7.84	4.84	5.34	7.86	8.33
Maize	0.28	0.53	0.25	0.31	0.34	0.35	0.20	0.26	0.32	0.46	0.42	0.81	0.73
Rice (milled equivalent) [1]	0.28	0.36	0.38	0.39	0.33	0.35	0.39	0.47	0.65	0.52	0.47	0.85	1.02
Sugar (raw equivalent) [2]	0.88	1.28	1.83	1.55	1.37	1.10	1.01	1.06	1.29	1.19	1.65	1.73	1.98
Dates	0.07	0.08	0.06	0.05	0.07	0.06	0.06	0.07	0.11	0.07	0.10	0.07	0.05
Vegetable oils and oilseeds (oil equivalent) [8]	0.30	0.32	0.26	0.26	0.36	0.38	0.39	0.40	0.49	0.56	0.40	0.56	0.81
Sheep, lambs and goats [5]	2.68	2.93	3.01	3.41	2.23	4.00	3.82	3.77	3.94	4.31	4.21	4.25	4.44

See notes at end of table.

ANNEX TABLE 5. — VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	6.9	8.5	13.7	23.8	21.5	13.6	9.0	8.0	8.7	8.6	23.1	30.4	30.4
Dried, salted or smoked fish	2.1	2.9	2.9	8.8	2.8	3.5	2.4	2.3	2.1	4.0	2.5	2.7	2.7
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	0.2	0.1	0.2	0.2	0.4	0.4	0.3	0.4	0.5	0.7	0.6	0.7	0.7
Fish products and preparations, whether or not in airtight containers	9.1	9.0	6.9	5.5	7.7	8.6	9.2	14.0	13.5	14.1	19.8	19.5	19.5
Oils and fats, crude or refined, of aquatic animal origin	0.6	0.4	0.8	0.9	0.5	0.3	1.8	1.1	1.6	1.7	2.0	2.0	2.0
Meals, solubles and similar animal feedstuffs of aquatic animal origin	—	—	—	2.5	5.2	4.5	7.8	5.4	6.8	12.9	11.0	22.6	37.2
	Million metric tons												
FOREST PRODUCTS													
Sawn softwood [7]	0.84	1.02	1.05	1.24	1.04	0.90	0.93	1.22	1.20	1.64	1.48	1.62	1.59
All paper and paperboard	0.27	0.27	0.31	0.37	0.45	0.45	0.53	0.49	0.62	0.59	0.54	0.56	0.56
Africa [13]													
AGRICULTURAL PRODUCTS													
Wheat and wheat flour (wheat equivalent)	1.56	1.57	1.74	2.79	3.08	2.78	2.18	2.85	3.48	3.74	4.57	4.50	6.21
Barley	0.01	0.02	0.08	0.09	0.12	0.05	0.07	0.02	0.03	0.08	0.11	0.12	0.18
Rice (milled equivalent) [1]	0.52	0.62	0.74	0.71	0.59	0.60	0.62	0.70	0.85	0.79	0.97	0.95	0.72
Sugar (raw equivalent) [2]	1.11	1.17	1.24	1.33	1.30	1.24	0.98	1.29	1.38	1.39	1.42	1.48	1.30
Potatoes	0.21	0.20	0.17	0.16	0.13	0.16	0.14	0.16	0.15	0.13	0.20	0.21	0.20
Cattle [5]	0.91	0.87	0.89	0.86	0.86	0.86	1.01	0.99	0.94	0.89	0.86	0.74	0.79
Sheep, lambs and goats [5]	2.64	2.30	2.20	2.40	2.39	2.40	2.46	2.43	2.48	2.27	2.01	1.98	2.10
Wine	0.23	0.25	0.25	0.27	0.25	0.26	0.24	0.22	0.19	0.19	0.17	0.17	0.16
	Thousand metric tons												
FISHERY PRODUCTS													
Fresh, chilled or frozen fish	72.8	62.8	65.9	81.6	58.1	56.8	62.0	121.8	151.1	183.4	212.6	208.3	213.9
Dried, salted or smoked fish	101.0	91.8	85.8	97.3	85.9	71.6	62.1	64.4	62.2	53.7	51.0	53.5	51.8
Crustaceans and molluscs, fresh, frozen, dried, salted, etc.	1.2	2.1	0.7	0.8	0.7	0.6	1.5	4.7	1.8	1.7	2.1	2.6	2.5
Fish products and preparations, whether or not in airtight containers	31.1	29.6	33.8	32.8	26.7	29.9	30.8	54.6	49.4	56.8	64.7	60.6	59.7
Crustacean and mollusc products and preparations, whether or not in airtight containers	—	0.1	0.1	—	0.8	0.8	0.4	—	—	1.0	—	—	—
Oils and fats, crude or refined, of aquatic animal origin	1.7	2.3	1.7	0.8	0.8	1.7	3.6	2.9	2.7	3.6	3.7	3.2	2.3
Meals, solubles and similar animal feedstuffs of aquatic animal origin	8.7	6.2	9.4	10.1	11.5	11.0	15.0	15.6	15.9	18.3	14.1	13.4	13.6
	Million metric tons												
FOREST PRODUCTS													
Sawn softwood [7]	0.44	0.55	0.48	0.54	0.57	0.63	0.71	0.91	0.94	0.65	0.67	0.75	0.75
Sawn hardwood [7]	0.13	0.12	0.17	0.18	0.17	0.18	0.17	0.19	0.13	0.21	0.19	0.20	0.20
Other paper and paperboard	0.22	0.24	0.27	0.29	0.30	0.31	0.37	0.46	0.49	0.46	0.53	0.58	0.58

[1] Including paddy converted at 65%. — [2] Including refined sugar converted at 108.7%. — [3] Oranges, mandarins and lemons. — [4] Groundnuts, copra, palm kernels, soybeans, sunflowerseed, castor beans, cottonseed, olive oil, groundnut oil, coconut oil, palm oil, palm-kernel oil, soybean oil, sunflowerseed oil, castor oil, cottonseed oil. — [5] Million head. — [6] Beef and veal, mutton and lamb, pork, poultry meat. — [7] Million cubic metres. — [8] Groundnuts, copra, palm kernels, soybeans, sunflowerseed, castor beans, linseed, cottonseed, olive oil, groundnut oil, coconut oil, palm oil, palm-kernel oil, soybean oil, sunflowerseed oil, castor oil, linseed oil, cottonseed oil. — [9] Excluding trade between the United States and its territories. — [10] Excluding Japan, and China and other Asian centrally planned countries. — [11] Excluding imports into Malaysia for re-export. — [12] Excluding Israel. — [13] Excluding South Africa.

ANNEX TABLE 6. — INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Western Europe													
Agricultural products	100	109	119	122	131	135	155	179	207	259	369	436	496
Food	99	109	121	124	133	139	162	186	216	266	374	452	527
Feed	96	109	119	136	141	136	153	189	226	289	699	721	518
Raw materials	111	108	104	105	104	93	93	99	94	119	169	212	199
Fishery products	94	105	127	133	131	127	143	172	199	245	344	378	365
Forest products	96	109	114	118	119	129	149	169	176	205	303	427	368
Eastern Europe and the U.S.S.R.													
Agricultural products	106	94	101	113	138	133	137	128	142	155	204	264	250
Food	109	90	98	110	141	132	144	130	147	152	208	273	244
Feed	110	31	59	130	130	108	117	23	29	16	37	13	71
Raw materials	95	108	112	117	121	127	105	113	115	145	170	222	237
Fishery products	104	105	126	148	156	175	179	194	200	215	284	356	437
Forest products	94	112	125	132	131	139	150	170	176	196	274	368	374
North America													
Agricultural products	98	115	110	123	110	105	97	123	135	160	299	380	376
Food	100	117	114	128	110	104	95	125	135	165	319	405	422
Feed	104	118	160	185	186	203	227	275	312	337	735	721	525
Raw materials	93	109	93	96	98	99	87	94	113	121	170	246	190
Fishery products	98	116	122	130	137	140	164	179	202	239	375	332	358
Forest products	97	110	116	124	131	151	169	186	189	227	299	381	357
Oceania													
Agricultural products	95	120	110	106	110	100	105	118	118	144	213	253	252
Food	93	117	119	110	121	114	114	138	158	199	246	306	356
Feed	116	136	88	49	103	105	142	198	152	154	420	376	427
Raw materials	97	122	101	101	96	83	95	93	72	82	174	192	132
Fishery products	92	101	133	166	174	237	286	296	412	535	617	588	546
Forest products	105	116	117	119	146	181	210	242	290	360	563	743	672
DEVELOPED COUNTRIES[1]													
Agricultural products	100	111	111	118	120	118	123	141	157	189	293	360	376
Food	100	110	114	121	124	122	129	150	169	205	314	392	428
Feed	102	108	135	159	163	170	190	220	253	288	643	641	480
Raw materials	98	112	99	102	100	96	92	95	94	109	169	212	173
Fishery products	95	107	121	130	129	133	145	165	187	230	318	339	330
Latin America													
Agricultural products	99	106	111	113	108	113	121	137	132	158	224	286	314
Food	98	109	113	116	114	118	124	147	142	168	234	313	346
Feed	108	97	118	124	119	118	128	162	191	234	528	402	508
Raw materials	104	97	102	99	82	90	105	92	83	102	140	159	150
Fishery products	98	115	125	145	142	161	169	227	250	238	206	273	253
Forest products	82	108	129	144	139	173	209	214	232	261	385	493	453

See notes at end of table.

ANNEX TABLE 6. — INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Far East [2]													
Agricultural products	104	104	101	100	94	94	100	102	105	110	159	238	230
Food	107	108	103	100	99	97	90	102	112	114	145	268	287
Feed	114	118	110	109	92	96	80	110	108	119	271	240	218
Raw materials	99	98	99	100	88	89	115	102	94	102	170	194	150
Fishery products	101	118	123	146	166	184	231	257	314	474	768	799	839
Forest products	105	112	126	149	168	228	257	293	329	392	788	746	605
Near East [3]													
Agricultural products	103	105	112	115	112	117	125	134	146	165	220	241	206
Food	102	107	114	105	110	122	146	128	134	166	238	246	220
Feed	105	117	130	136	140	138	138	158	136	184	205	212	164
Raw materials	104	103	109	118	112	113	114	135	152	162	210	238	199
Fishery products	92	103	122	129	139	144	114	153	167	235	334	375	...
Forest products	92	94	141	169	171	207	227	270	275	359	502	751	328
Africa [4]													
Agricultural products	99	109	106	106	101	110	115	128	118	133	172	221	204
Food	100	110	108	112	110	122	125	138	129	147	184	244	228
Feed	90	112	128	125	145	153	139	154	121	162	237	196	190
Raw materials	106	108	103	86	79	77	85	96	97	103	140	176	145
Fishery products	96	106	95	117	111	120	137	160	178	197	373	392	371
Forest products	101	120	114	113	114	128	156	145	140	176	316	350	311
DEVELOPING COUNTRIES [5]													
Agricultural products	101	107	108	110	106	110	116	125	125	142	199	262	264
Food	101	110	111	114	112	117	120	133	133	152	205	291	305
Feed	107	108	118	120	116	118	115	143	146	178	360	294	322
Raw materials	102	100	103	103	91	94	110	107	105	118	172	193	163
Fishery products [6]	98	114	121	141	143	158	177	221	251	281	353	406	397
World													
Agricultural products	100	109	110	115	114	115	120	134	143	168	251	316	327
Food	100	110	112	118	119	120	125	143	154	182	268	350	376
Feed	104	108	127	139	139	143	151	180	198	231	496	461	398
Raw materials	100	106	101	102	96	95	101	101	99	114	170	203	168
Fishery products [6]	96	109	121	131	131	137	151	179	204	244	328	357	348
Forest products	97	110	117	124	128	144	163	182	189	224	325	421	379

[1] Including eastern Europe and the U.S.S.R. — [2] Excluding Japan, and China and other Asian centrally planned countries. — [3] Excluding Israel. — [4] Excluding South Africa. — [5] Including Asian centrally planned countries except for fishery products. — [6] Excluding China and other Asian centrally planned countries.

ANNEX TABLE 7. — INDICES OF VOLUME OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Western Europe													
Agricultural products	99	103	112	114	124	136	145	161	170	185	203	211	216
Food	98	104	113	114	127	141	151	167	175	187	209	217	222
Feed	93	108	111	120	130	128	144	170	194	231	294	318	258
Raw materials	105	99	104	105	109	107	103	105	103	120	117	127	125
Fishery products	97	103	112	113	119	116	116	119	117	131	135	126	127
Forest products	99	108	110	114	116	129	143	149	146	160	188	187	139
Eastern Europe and the U.S.S.R.													
Agricultural products	98	89	105	117	142	141	141	125	133	126	133	144	129
Food	101	84	102	114	146	143	149	125	134	120	125	139	114
Feed	102	29	52	122	116	99	97	22	21	14	21	7	39
Raw materials	92	105	114	124	128	131	109	116	117	134	143	144	154
Fishery products	100	106	158	191	187	197	195	224	231	229	244	303	375
Forest products	98	113	122	130	132	140	147	158	154	160	176	170	168
North America													
Agricultural products	99	115	109	117	105	104	94	118	122	139	173	153	164
Food	100	116	112	122	104	102	92	121	122	146	183	157	178
Feed	101	116	156	165	165	186	208	247	270	256	313	313	269
Raw materials	95	111	91	95	100	102	84	88	101	102	121	121	97
Fishery products	103	114	113	116	116	122	130	122	131	129	152	123	129
Forest products	99	110	114	123	128	141	151	160	160	175	183	187	146
Oceania													
Agricultural products	98	108	106	103	108	111	114	124	128	136	131	107	114
Food	96	112	112	104	115	115	113	128	143	152	146	128	140
Feed	124	138	80	38	88	91	121	186	111	132	214	105	189
Raw materials	100	104	99	103	99	106	114	120	111	118	113	83	83
Fishery products	84	101	134	136	153	205	207	222	285	316	305	279	255
Forest products	104	121	116	122	157	201	230	252	259	265	289	258	221
DEVELOPED COUNTRIES [1]													
Agricultural products	99	106	108	113	116	120	118	132	138	151	168	160	165
Food	99	107	110	115	118	123	122	137	144	157	177	169	178
Feed	99	107	129	142	146	157	174	198	218	223	274	278	244
Raw materials	98	105	99	102	103	106	99	104	105	112	118	108	101
Fishery products	99	109	109	114	115	119	118	122	119	136	129	136	138
Latin America													
Agricultural products	100	96	107	110	109	111	117	121	114	119	125	117	120
Food	100	97	107	110	113	114	117	125	120	124	132	124	125
Feed	101	96	111	117	110	107	121	145	153	161	171	179	225
Raw materials	101	93	108	107	92	97	116	100	84	90	87	76	82
Fishery products	105	125	79	119	139	174	146	163	171	164	83	103	117
Forest products	84	107	123	138	135	163	170	173	180	211	259	234	227

See notes at end of table.

ANNEX TABLE 7. — INDICES OF VOLUME OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Far East [2]													
Agricultural products	105	104	101	102	99	102	105	107	115	120	124	122	128
Food	105	103	100	100	94	94	92	101	111	116	111	114	130
Feed	111	117	103	101	94	106	94	113	115	124	151	140	143
Raw materials	103	104	103	106	106	113	124	116	121	124	141	131	124
Fishery products	95	112	116	129	170	144	154	175	186	245	323	292	298
Forest products	100	118	129	154	169	222	253	293	319	361	457	379	314
Near East [3]													
Agricultural products	104	103	108	116	110	111	116	128	131	137	140	99	98
Food	103	104	110	93	94	103	123	110	113	126	133	96	85
Feed	103	115	122	122	128	143	143	152	126	152	109	95	90
Raw materials	104	102	106	127	118	113	111	136	139	141	144	101	105
Fishery products	95	90	109	121	99	95	94	119	129	206	252	223	223
Forest products	116	92	122	154	149	181	232	268	297	292	330	400	230
Africa [4]													
Agricultural products	98	104	106	105	98	104	104	109	101	111	113	103	96
Food	100	103	107	108	101	110	106	108	103	115	115	108	99
Feed	91	112	113	117	131	136	131	136	105	143	117	97	101
Raw materials	98	107	111	98	95	93	95	114	109	107	113	102	94
Fishery products	101	106	88	105	98	115	129	133	151	181	221	210	199
Forest products	98	116	112	112	111	124	143	132	129	139	158	137	120
DEVELOPING COUNTRIES [5]													
Agricultural products	101	102	107	110	106	109	113	116	115	121	127	118	119
Food	101	102	108	111	108	111	112	116	117	123	128	122	123
Feed	103	107	109	112	110	115	117	134	130	146	149	144	165
Raw materials	102	102	107	110	104	107	117	115	112	117	124	107	107
Fishery products	97	112	111	112	131	146	138	154	168	186	172	177	177
World													
Agricultural products	100	104	107	111	111	115	116	124	127	137	148	140	143
Food	100	105	109	113	114	117	117	128	132	142	155	148	153
Feed	101	107	119	127	128	137	146	167	175	188	214	215	213
Raw materials	100	103	103	105	103	106	108	109	109	114	121	107	104
Fishery products [6]	98	110	109	110	118	125	122	130	135	149	148	146	148
Forest products	99	110	115	122	126	142	154	163	164	180	201	196	158

[1] Including eastern Europe and the U.S.S.R. — [2] Excluding Japan, and China and other Asian centrally planned countries. — [3] Excluding Israel. — [4] Excluding South Africa. — [5] Including centrally planned countries, except for fishery products. — [6] Excluding China and other Asian centrally planned countries.

ANNEX TABLE 8. — INDICES OF VALUE OF IMPORTS OF AGRICULTURAL AND FOREST PRODUCTS, 1963 TO 1975

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Western Europe													
Agricultural products	100	107	111	116	113	109	120	131	144	169	237	278	293
Food	100	108	116	120	120	116	128	143	161	188	257	313	344
Feed	103	108	123	143	134	130	140	165	186	207	404	361	314
Raw materials	101	105	95	98	90	88	96	91	87	102	144	165	138
Forest products	96	113	118	120	128	130	151	172	174	202	300	421	351
Eastern Europe and the U.S.S.R.													
Agricultural products	94	115	116	114	102	104	105	132	137	167	246	292	400
Food	92	126	120	116	103	100	99	130	137	179	264	306	506
Feed	92	147	163	183	192	210	219	292	361	509	1 136	1 137	1 011
Raw materials	98	97	104	104	91	95	97	114	109	112	160	210	178
Forest products	92	104	118	122	141	157	171	199	216	226	278	379	455
North America													
Agricultural products	102	105	102	111	110	122	121	139	139	155	208	261	242
Food	103	105	102	113	114	128	127	151	153	168	222	283	261
Feed	113	100	103	108	103	105	123	145	132	158	264	273	278
Raw materials	99	103	99	98	88	88	90	77	68	77	113	145	128
Forest products	97	106	112	122	118	136	151	139	163	203	248	270	261
Oceania													
Agricultural products	99	114	108	106	99	92	101	112	114	117	135	228	249
Food	99	120	108	114	106	100	105	120	128	131	145	220	322
Feed	66	161	239	532	491	687	453	630	676	515	343	972	444
Raw materials	99	105	108	90	87	74	90	95	86	91	112	198	135
Forest products	96	101	115	107	111	118	130	148	155	144	210	294	330
DEVELOPED COUNTRIES[1]													
Agricultural products	100	109	111	116	112	113	120	136	145	170	243	292	314
Food	100	111	115	121	119	120	127	148	161	189	263	328	372
Feed	102	111	128	143	134	133	142	179	190	213	382	346	317
Raw materials	100	103	99	101	92	92	98	98	94	109	158	182	153
Latin America													
Agricultural products	101	114	107	113	116	123	124	131	144	165	249	394	363
Food	102	115	106	112	118	125	125	132	143	168	257	411	382
Feed	90	137	100	107	113	123	153	169	331	290	661	713	702
Raw materials	97	110	113	114	101	106	110	112	128	129	160	268	220
Forest products	87	105	113	127	124	153	168	192	192	201	238	301	301
Far East[2]													
Agricultural products	101	111	112	121	131	129	124	130	135	140	224	305	335
Food	102	114	113	126	136	129	124	130	129	134	230	315	348
Feed	110	94	108	86	90	101	132	158	183	203	252	422	454
Raw materials	94	97	109	102	116	128	128	133	155	162	197	257	279
Forest products	96	110	106	134	143	172	192	220	258	250	435	511	463

See notes at end of table.

ANNEX TABLE 8. — INDICES OF VALUE OF IMPORTS OF AGRICULTURAL AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Near East [3]													
Agricultural products	99	112	115	120	116	115	111	132	182	181	250	556	643
Food	99	112	115	120	116	116	110	132	186	182	256	581	673
Feed	90	104	136	186	174	160	192	345	524	505	649	1 033	1 104
Raw materials	96	106	114	110	114	105	120	122	132	160	179	313	361
Forest products	84	99	117	132	125	128	142	164	191	236	295	405	411
Africa [4]													
Agricultural products	92	104	110	112	112	108	110	129	147	163	230	365	425
Food	92	103	110	111	111	106	108	127	147	163	234	374	437
Feed	83	124	181	180	195	199	235	323	399	344	536	904	752
Raw materials	82	124	131	131	143	148	142	162	190	223	278	485	486
Forest products	96	104	119	126	136	142	173	219	235	221	284	401	401
DEVELOPING COUNTRIES [5]													
Agricultural products	99	111	110	117	119	122	120	131	145	160	246	392	400
Food	99	113	110	119	120	123	118	131	144	159	250	407	421
Feed	100	109	111	108	116	123	154	191	271	267	428	596	607
Raw materials	98	105	115	108	112	116	125	128	147	166	226	322	293
World													
Agricultural products	100	109	111	116	114	115	120	135	145	168	244	312	331
Food	100	111	114	120	120	120	125	144	157	182	260	347	383
Feed	102	111	127	143	135	135	146	177	202	232	468	437	381
Raw materials	100	103	101	102	95	95	101	102	100	116	166	199	170
Forest products	96	110	117	125	132	145	164	182	190	218	319	412	362

[1] Including eastern Europe and the U.S.S.R. — [2] Excluding Japan, and China and other Asian centrally planned countries. — [3] Excluding Israel. — [4] Excluding South Africa. — [5] Including centrally planned countries.

ANNEX TABLE 9. — INDICES OF VOLUME OF IMPORTS OF AGRICULTURAL AND FOREST PRODUCTS, 1963 TO 1975

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Western Europe													
Agricultural products	100	102	106	111	110	111	116	121	124	131	134	129	132
Food	100	102	109	113	114	116	121	126	132	139	143	142	145
Feed	101	106	116	130	125	126	138	153	164	174	185	168	167
Raw materials	100	101	98	101	97	99	103	101	97	101	99	88	87
Forest products	99	111	112	114	117	131	144	152	146	161	187	179	140
Eastern Europe and the U.S.S.R.													
Agricultural products	94	113	114	112	100	103	104	128	132	156	174	146	170
Food	90	121	118	113	96	95	90	117	125	163	195	141	181
Feed	94	142	160	187	186	211	221	282	334	428	471	512	490
Raw materials	101	99	104	105	97	104	101	117	111	111	110	114	113
Forest products	91	105	119	129	150	166	181	205	208	206	212	227	241
North America													
Agricultural products	102	97	100	106	107	117	111	115	112	124	129	124	119
Food	104	96	98	106	108	119	112	118	120	125	130	124	117
Feed	108	103	96	92	87	87	108	114	104	111	113	119	129
Raw materials	95	100	104	102	99	109	101	91	89	100	99	97	99
Forest products	98	105	111	120	117	128	138	130	145	167	169	154	132
Oceania													
Agricultural products	99	104	107	108	103	100	107	113	114	121	116	137	131
Food	99	106	104	114	108	105	106	115	118	123	120	136	148
Feed	71	157	243	500	400	600	400	529	557	414	200	343	186
Raw materials	99	100	110	96	93	90	103	106	103	113	106	131	100
Forest products	93	100	112	106	109	114	120	130	134	133	161	181	168
DEVELOPED COUNTRIES[1]													
Agricultural products	99	103	107	112	109	113	116	124	127	137	143	134	138
Food	99	104	109	114	113	117	119	128	133	145	153	145	150
Feed	101	109	119	133	126	131	144	164	175	191	209	194	189
Raw materials	100	101	101	103	100	104	105	107	103	109	108	98	96
Latin America													
Agricultural products	102	110	103	110	113	122	124	127	134	141	158	185	176
Food	102	110	102	110	114	122	124	127	130	140	161	189	179
Feed	83	131	102	101	107	117	148	172	307	264	241	280	300
Raw materials	97	110	110	115	109	124	118	121	140	138	128	150	147
Forest products	86	107	113	130	130	161	167	194	180	186	182	197	197
Far East[2]													
Agricultural products	101	106	111	118	124	124	120	125	123	120	146	136	147
Food	103	109	112	122	125	120	116	122	117	115	145	133	141
Feed	110	97	102	76	83	97	134	150	174	187	145	200	244
Raw materials	94	96	106	104	124	144	138	136	144	139	149	147	169
Forest products	96	117	112	141	148	183	190	203	236	241	280	264	257

See notes at end of table.

ANNEX TABLE 9. — INDICES OF VOLUME OF IMPORTS OF AGRICULTURAL AND FOREST PRODUCTS, 1963 TO 1975 (*concluded*)

Region / Product	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975 (preliminary)
	1961-65 average = 100												
Near East[3]													
Agricultural products	97	102	115	120	119	121	118	137	172	153	157	206	231
Food	98	101	115	120	117	119	116	136	174	149	157	207	231
Feed	92	105	119	154	143	151	184	305	430	408	316	384	405
Raw materials	97	106	116	118	132	135	135	142	149	183	150	192	235
Forest products	92	103	118	130	132	131	153	155	176	196	194	203	207
Africa[4]													
Agricultural products	93	98	105	112	114	113	110	126	136	138	147	157	168
Food	94	96	104	113	114	112	110	127	138	140	149	157	168
Feed	82	119	176	167	176	186	210	281	338	290	262	371	324
Raw materials	83	132	125	126	143	162	144	157	177	190	201	253	261
Forest products	96	105	115	122	127	136	157	194	202	179	201	222	222
DEVELOPING COUNTRIES[5]													
Agricultural products	99	106	108	116	117	122	120	129	135	139	159	168	168
Food	99	106	107	117	116	120	117	128	133	136	157	166	166
Feed	98	108	107	97	107	117	153	182	243	239	197	253	283
Raw materials	98	106	114	111	122	135	137	136	147	159	176	183	182
World													
Agricultural products	99	104	107	112	111	115	117	125	128	137	147	141	144
Food	99	105	109	115	114	117	118	128	133	142	154	149	153
Feed	101	109	119	131	125	130	144	165	178	193	208	196	193
Raw materials	100	101	103	104	103	108	109	110	109	115	117	109	107
Forest products	98	110	114	122	126	143	154	164	165	181	202	196	164

[1] Including eastern Europe and the U.S.S.R. — [2] Excluding Japan, and China and other Asian centrally planned countries. — [3] Excluding Israel. — [4] Excluding South Africa. — [5] Including centrally planned countries.

ANNEX TABLE 10. — STOCKS OF SELECTED AGRICULTURAL PRODUCTS, 1961-65 AVERAGE AND 1967 TO 1976

Product / Country	Date	1961-65 average	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 (estimated)
		Million metric tons										
Wheat												
EXPORTING COUNTRIES												
United States	[1] 1 June	30.7	11.6	14.7	22.2	26.8	22.4	26.8	16.3	9.2	11.7	18.1
Canada	1 Aug.	13.3	15.7	18.1	23.2	27.5	20.0	16.0	9.9	10.1	8.0	8.4
Argentina	1 Dec.	1.5	0.2	1.0	0.3	0.8	0.7	0.5	0.1	1.0	0.8	1.0
Australia	1 Dec.	0.6	2.2	1.4	7.3	7.2	3.5	1.4	0.5	1.9	1.6	...
European Economic Community (1961-67, original members; 1968-74, nine member states)	1 Aug.	6.5	[2]5.4	9.2	9.1	5.5	5.8	7.5	[3]6.1	[3]7.3	10.3	7.0
TOTAL OF ABOVE		52.6	35.1	44.4	62.1	67.8	52.4	52.2	32.9	29.5	32.4	...
IMPORTING COUNTRIES												
India [4]	31 Dec.	...	0.8	2.1	2.3	3.1	5.0	1.9	1.0	...	...	...
Coarse grains [5]												
EXPORTING COUNTRIES												
United States [6]	1 July	62.7	34.2	44.4	46.0	44.6	32.2	46.6	31.7	21.8	15.4	15.3
Canada	1 Aug.	4.3	4.9	4.4	6.7	6.9	5.4	6.2	5.8	6.2	5.5	5.5
Argentina [7]	1 Dec.	0.4	0.6	1.8	1.7	0.1	—	[8]0.2	[8]0.1	[8]0.5	0.2	0.2
Australia	1 Dec.	0.2	0.9	0.8	1.2	1.2	1.6	1.0	0.5	0.5	0.5	0.5
TOTAL OF ABOVE		67.6	40.6	51.4	55.6	52.8	39.2	54.0	38.1	29.0	21.6	21.5
Rice (milled equivalent)												
EXPORTING COUNTRIES												
Pakistan [4]	31 Dec.	...	[9]0.02	0.19	0.24	[10]0.38	[10]0.26	[10]0.38	[10]0.10	0.37	0.63	...
Thailand [11]	31 Dec.	...	—	[9]0.06	[12]0.30	[13]1.10	0.89	...	...	...	...	...
United States [14]	31 July	0.25	0.28	0.22	0.54	0.55	0.62	0.38	0.17	0.26	0.23	1.16
Japan [8]	31 Oct.	—	—	—	9.36	9.50	7.03	5.22	3.71	3.09	4.45	...
TOTAL OF ABOVE		0.25	0.30	0.47	10.44	11.53	8.80	...	...	...	...	...
IMPORTING COUNTRIES												
India [4]	31 Dec.	...	...	1.03	1.64	1.83	2.31	1.36	1.42	1.05	2.80	...
Japan [8]	31 Oct.	3.19	5.85	7.03	—	—	—	—	—	...	...	...
TOTAL OF ABOVE		3.19	5.85	8.06	1.64	1.83	2.31	1.36	1.42	...	...	...
Butter												
Canada and United States		0.13	0.11	0.08	0.08	0.09	0.07	0.06	0.05	0.04	0.04	...
European Economic Community:												
original members [15]		0.09	0.20	0.33	0.34	0.16	0.13	0.34	} 0.29	0.21	0.26	...
new members		0.04	0.06	0·08	0.05	0.03	0.04	0.09				
Other western Europe [16]		0.01	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.01	0.02	...
Australia and New Zealand		0.07	0.06	0.07	0.09	0.07	0.05	0.05	0.08	0.08	0.09	...
TOTAL OF ABOVE	31 Dec.	0.34	0.45	0.58	0.59	0.37	0.31	0.55	0.44	0.34	0.41	...
Dried skim milk												
United States		0.18	0.12	0.13	0.10	0.06	0.04	0.02	0.03	0.14	0.23	...
European Economic Community:												
original members [17]		...	0.20	0.31	0.39	0.18	0.10	0.19	} 0.33	0.50	1.19	...
new members		0·03	...	0.04	0.02	0.02	0.02	0.10				
TOTAL OF ABOVE	31 Dec.	0.21	0.32	0.48	0.51	0.26	0.16	0.31	0.36	0.64	1.42	...
Sugar (raw value)												
WORLD TOTAL	1 Sept.	14.1	19.1	20.6	19.3	21.4	19.1	17.0	16.1	15.9	18.0	20.3
Coffee												
EXPORTING COUNTRIES [18]	End of crop season, mainly between 31 March and 30 Sept.	[19]4.30	5.00	4.73	4.15	3.92	3.28	3.29	3.35	2.46	2.96	...

[1] 1961-69, 1 July. — [2] July until 1967 included (except Federal Republic of Germany, 1 June). — [3] Commercial stocks. — [4] Government (or official agency) stocks only. — [5] Barley, oats, maize, sorghum and rye. — [6] Maize and sorghum, 1 October. — [7] Maize, 1 April. — [8] Government stocks only. — [9] November. — [10] 31 October. — [11] Old crop for export. — [12] September. — [13] 31 January 1971. — [14] Including paddy converted to milled rice at 69.5%. — [15] Excluding Italy and Luxembourg. — [16] Finland, Norway, Sweden, Switzerland. — [17] Excluding Italy. — [18] 1961-69; excludes privately held stocks in Brazil. — [19] 1963-65.

ANNEX TABLE 11. — ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD, 1960-65 AND 1965-70 AVERAGES AND 1971-72 TO 1974-75

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1971 to 1972	1972 to 1973	1973 to 1974	1974 to 1975	1960 to 1965	1965 to 1970	1971 to 1972	1972 to 1973	1973 to 1974	1974 to 1975
	Percent per year											
Developed countries												
WESTERN EUROPE												
Austria	3.9	[1] 3.3	6.3	7.5	9.5	8.5	4.4	[1] 2.1	5.8	7.8	8.4	6.3
Belgium	2.5	3.5	5.4	7.0	12.7	12.7	2.9	3.5	6.9	8.0	9.4	11.2
Denmark	5.5	7.5	6.6	9.3	15.3	9.6	4.2	7.5	9.3	13.0	11.9	11.1
Finland	5.3	[2] 4.6	7.1	11.7	17.4	17.8	5.9	[2] 5.2	9.3	12.5	16.0	20.6
France	3.8	4.3	5.9	7.3	13.7	11.3	4.3	3.8	6.7	9.4	12.6	10.1
Germany, Fed. Rep. of	2.8	2.4	5.8	6.9	7.0	6.0	2.6	1.3	6.2	7.6	4.7	5.3
Greece	1.6	2.5	4.3	15.4	26.9	13.7	2.5	2.6	3.8	21.3	27.6	12.5
Iceland	11.0	12.8	10.3	22.2	43.0	48.9	15.2	13.3	16.6	27.9	46.8	11.8
Ireland	4.2	5.3	8.7	11.3	17.0	20.9	3.9	4.3	11.8	16.4	14.7	21.5
Italy	4.9	3.0	5.7	10.8	19.1	17.0	4.6	2.2	6.3	12.0	17.8	18.7
Netherlands	3.5	4.8	7.8	7.9	9.7	10.2	4.0	4.3	6.6	7.9	7.2	8.1
Norway	4.1	5.0	7.2	7.5	9.4	11.7	4.5	5.3	7.2	7.0	8.3	15.0
Portugal	2.6	6.4	10.7	12.9	25.1	15.3	2.8	5.2	9.9	9.2	32.6	23.6
Spain	7.0	5.1	8.3	11.4	15.7	17.0	7.7	3.7	9.1	12.6	14.3	17.0
Sweden	3.6	4.5	6.0	6.8	9.9	9.8	5.3	4.5	9.1	5.8	6.2	11.7
Switzerland	3.2	3.4	6.7	8.7	9.8	6.7	2.9	0.9	6.5	6.0	10.8	5.8
United Kingdom	3.6	4.6	7.1	9.2	15.9	24.3	3.6	4.6	8.8	15.1	18.0	25.6
Yugoslavia	13.6	10.5	18.4	21.4	21.1	26.2	17.3	9.0	23.1	25.9	15.8	28.6
NORTH AMERICA												
Canada	1.6	3.8	4.8	7.6	10.9	10.8	2.2	3.4	7.6	14.5	16.3	13.0
United States	1.3	4.2	3.3	6.2	11.0	9.1	1.4	4.0	1.3	14.5	14.3	8.5
OCEANIA												
Australia	1.8	3.1	5.9	9.4	15.1	15.1	2.0	2.1	3.8	15.2	15.3	8.2
New Zealand	2.7	4.1	6.9	8.2	11.1	14.6	2.4	4.1	4.8	11.3	11.6	12.2
OTHER DEVELOPED COUNTRIES												
Israel	7.1	4.0	8.7	19.9	39.8	39.3	5.6	3.1	12.9	20.7	44.4	46.1
Japan	6.0	5.4	4.5	11.7	24.5	11.8	7.2	6.1	3.8	13.0	27.7	13.0
South Africa	2.1	3.4	6.5	9.5	11.6	13.5	2.6	3.0	7.1	15.2	15.0	14.9
Developing countries												
LATIN AMERICA												
Argentina	23.0	19.4	58.5	60.3	24.2	182.8	23.0	18.3	63.1	55.1	15.1	187.6
Bolivia	5.1	5.9	6.5	31.5	62.9	7.9	2.1	7.8	6.3	35.0	81.6	5.3
Brazil	60.0	28.0	...	15.5	24.9	[3] 30.2	60.0	26.0	...	20.1	27.9	[3] 29.4
Chile	27.0	26.0	77.8	333.0	353.0	375.0	30.0	26.0	115.2	376.0	376.0	46.0
Colombia	12.4	10.1	14.3	22.8	24.5	25.7	13.4	9.2	19.2	31.9	27.1	31.1
Costa Rica	2.3	2.5	4.7	15.2	30.1	17.3	2.2	3.8	1.2	21.6	29.3	16.3
Dominican Republic	2.7	1.0	7.8	15.1	13.1	14.5	2.5	0.1	6.0	18.4	17.8	17.7
Ecuador	4.0	4.6	7.9	12.9	23.4	15.3	4.9	6.0	11.1	20.3	32.4	18.6
El Salvador	0.2	1.1	1.8	6.4	16.8	19.2	1.1	2.2	1.1	7.5	17.2	20.6
Guatemala	0.1	1.5	0.7	14.4	16.0	[4] 16.2	0.1	1.7	−0.3	19.2	15.9	[4] 19.4
Guyana	1.9	1.5	4.5	8.9	15.3	8.0	2.3	2.8	6.0	18.4	25.9	8.4
Haiti	3.7	1.7	3.2	22.7	15.0	[4] 16.7	4.1	1.8	10.2	27.4	12.0	[4] 17.0
Honduras	2.7	1.6	5.2	3.2	12.6	6.2	3.2	1.8	8.1	2.0	15.4	7.9
Jamaica	2.9	4.3	5.4	17.6	27.2	17.5	2.4	4.7	4.8	24.7	29.1	17.7
Mexico	1.9	3.5	6.4	16.4	32.1	15.0	1.6	3.8	6.3	18.7	35.2	12.6
Panama	[5] 1.1	1.6	5.6	6.9	16.8	5.5	[5] 1.4	1.7	4.6	9.9	22.9	6.8
Paraguay	...	1.2	9.2	12.8	25.2	6.7	...	0.3	11.1	21.6	24.8	4.6
Peru	9.4	[6] 7.8	7.2	9.5	16.8	23.4	10.5	[6] 7.1	7.4	10.1	18.8	32.8

See notes at end of table.

ANNEX TABLE 11. — ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD 1960-65 AND 1965-70 AVERAGES AND 1971-72 TO 1974-75 (*concluded*)

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1971 to 1972	1972 to 1973	1973 to 1974	1974 to 1975	1960 to 1965	1965 to 1970	1971 to 1972	1972 to 1973	1973 to 1974	1974 to 1975
	Percent per year											
LATIN AMERICA (*concluded*)												
Puerto Rico	2.2	3.2	3.2	7.3	19.8	8.6	3.0	4.1	3.6	12.6	29.9	8.9
Trinidad and Tobago	2.2	3.8	9.3	14.9	22.0	17.0	2.1	3.7	11.5	19.0	30.0	6.9
Uruguay	[7] 16.2	60.0	76.5	97.0	77.2	[3] 83.3	[7] 13.1	60.0	93.8	102.8	72.4	[3] 73.2
Venezuela	[5] 1.7	1.6	3.0	4.3	8.5	10.0	[5] 1.7	0.9	5.9	9.2	14.0	13.6
FAR EAST												
Dem. Kampuchea	4.3	4.5	25.4	157.9	[4] 284.8	...	2.7	6.7	28.4	186.4	[4] 369.4	...
India	6.1	[8] 8.9	6.3	16.8	28.8	5.6	6.5	[8] 9.8	6.4	21.3	30.5	4.4
Indonesia	...	100.0	6.4	31.1	40.7	19.0	...	100.0	10.4	43.4	41.3	20.5
Korea, Rep. of	15.4	12.3	11.9	3.2	24.3	25.3	18.3	12.5	3.5	2.6	27.6	31.9
Lao People's Dem. Rep.	38.0	6.0	25.2	30.7	49.7	[3] 53.3	39.0	4.0	34.9	40.4	51.9	[3] 66.8
Malaysia (peninsular)	0.5	[2] 0.4	2.6	10.6	17.3	4.6	0.6	[2] 0.4	3.0	15.3	26.7	3.3
Nepal	...	6.2	8.4	11.4	19.8	[9] 16.4	...	7.2	9.0	11.7	19.6	[9] 14.4
Pakistan	2.6	5.6	8.0	22.6	29.2	21.0	3.8	6.0	10.8	28.8	30.2	22.6
Philippines	4.8	[1] 3.6	15.7	7.1	40.5	9.2	6.8	[1] 5.2	18.0	4.6	44.3	6.8
Sri Lanka	1.7	4.2	6.4	9.6	12.3	6.8	1.3	4.9	6.0	12.7	14.1	7.7
Thailand	1.5	2.5	4.0	11.7	23.3	4.1	2.0	4.2	6.4	14.4	28.5	4.1
NEAR EAST												
Cyprus	0.3	[3] 2.9	4.9	7.8	14.0	4.6	0.2	[3] 3.2	6.8	8.5	15.8	4.6
Egypt	3.2	[10] 3.2	...	4.3	10.8	9.7	6.5	[10] 6.2	...	6.7	17.0	12.1
Iran	2.0	1.4	6.5	9.8	14.0	13.0	3.1	0.9	8.6	6.8	15.9	12.2
Iraq	...	3.5	5.2	4.9	8.3	9.6	...	3.1	5.2	4.9	11.3	13.7
Jordan	...	[3] 2.8	8.2	10.5	20.0	21.0	...	[2] 5.1	11.1	18.9	34.8	22.6
Lebanon	...	[6] 1.8	4.9	6.0	11.1	[9] 5.1	...	[6] 2.0	8.7	9.7	16.7	[9] 5.2
Libya	...	[1] 6.1	–1.4	7.7	...	[11] 8.7	...	[1] 8.3	–4.4	—9.1	17.0	[11] 8.2
Sudan	3.3	[1] 3.4	11.8	17.0	26.1	24.0	4.2	[1] 2.8	8.1	16.3	25.5	28.1
Syria	[5] 1.3	4.2	0.8	20.0	15.4	16.1	[5] 1.3	4.7	—	22.1	15.1	18.9
Turkey	3.6	[10] 7.1	13.0	16.0	18.6	20.1	4.8	[10] 8.7	11.0	20.0	19.1	30.0
AFRICA												
Ethiopia	...	[6] 3.0	–6.1	8.9	8.7	6.5	...	[6] 3.5	–12.0	12.9	8.6	4.4
Gabon	[5] 4.4	3.0	4.8	5.0	11.8	27.3	[5] 3.3	2.1	6.1	6.8	7.5	33.4
Ghana	11.8	3.7	14.0	11.9	27.1	41.1	14.0	2.1	17.7	19.3	30.1	36.6
Ivory Coast	2.6	4.9	0.4	10.8	17.6	11.4	2.8	5.9	–1.1	17.7	18.1	10.4
Kenya	2.0	1.7	...	8.2	14.9	18.4	1.9	2.0	...	4.8	17.9	21.0
Liberia	...	4.4	4.0	19.6	19.5	[12] 18.4	...	3.4	—	30.2	26.4	[12] 20.3
Madagascar	...	2.3	6.7	6.1	22.0	8.2	...	2.2	6.2	9 3	30.0	6.8
Malawi	...	[10] 2.0	3.9	5.1	15.4	15.5	...	[10] 3.4	4.3	6.8	16.5	19.1
Mauritius	[5] 1.0	3.0	5.4	13.5	29.1	14.8	[5] 0.6	3.0	6.2	15.7	32.5	16.2
Morocco	4.0	0.6	3.7	4.5	14.4	7.9	4.6	0.1	5.1	5.4	19.7	7.6
Mozambique	[13] 1.9	3.7	7.1	5.4	21.7	[9] 7.1	[13] 0.7	4.7	14.0	–1.7	22.0	[9] 14.9
Niger	...	3.8	9.7	11.7	3.4	9.1	...	4.4	16.3	17.2	2.8	8.2
Nigeria	3.2	5.6	2.9	3.6	17.1	31.8	2.0	8.8	1.5	–2.4	20.5	42.9
Senegal	...	...	6.0	12.2	16.8	30.5	...	...	6.5	20.1	13.2	40.1
Sierra Leone	[13] 3.9	4.3	3.9	5.6	14.4	19.7	[13] 0.6	4.8	7.5	9.0	18.6	23.2
Somalia	7.4	[6] 2.5	–2.9	6.4	17.7	19.0	7.5	[6] 2.8	–2.4	10.6	22.5	23.2
Tanzania	1.2	[8] 3.7	9.9	5.1	24.7	26.0	1.2	[8] 2.5	10.7	5.0	28.9	30.6
Togo	...	[6] 2.1	4.3	5.0	12.5	18.3	...	[6] 2.6	7.8	2.0	11.7	24.6
Tunisia	4.5	2.9	2.2	4.4	4.4	9.5	4.8	3.1	2.4	6.6	8.2	9.5
Uganda	5.4	4.0	–3.0	24.4	67.2	[11] 18.3	7.3	3.5	–5.5	18.6	75.5	[11] 21.5
Zaire	[14] 15.6	23.0	15.1	15.7	29.6	[11] 25.1	[14] 19.0	22.0	17.6	16.6	30.8	[11] 21.6
Zambia	2.4	[8] 8.7	5.2	5.8	8.8	[15] 8.7	2.4	[8] 8.8	4.6	5.7	9.2	[15] 9.6

SOURCE: International Labour Office, *Bulletin of Labour Statistics*, Geneva, third quarter, 1976 and preceding issues.

[1] 1965-69. — [2] 1967-70. — [3] January-November. — [4] January-October. — [5] 1962-65. — [6] 1966-70. — [7] 1960-62. — [8] 1965-68. — [9] January-July. — [10] 1968-70. — [11] January-September. — [12] January-June. — [13] 1961-65. — [14] 1963-65. — [15] January-August.

ANNEX TABLE 12. — PER CAPUT DIETARY ENERGY SUPPLIES IN RELATION TO NUTRITIONAL REQUIREMENTS, SELECTED DEVELOPING COUNTRIES AND AREAS, 1969-71 AND 1972-74 AVERAGES AND 1970 TO 1974

	Average 1969-71	Average 1972-74	1970	1971	1972	1973	1974	Requirements
	Percent of requirements							*Kilocalories per caput per day*
AFRICA	92	91	92	92	91	90	91	2 340
Algeria	78	83	77	79	84	86	88	2 400
Angola	85	85	85	86	85	84	86	2 360
Benin	96	89	97	95	92	87	87	2 300
Botswana	91	87	90	94	89	87	85	2 320
Burundi	99	101	99	99	101	102	99	2 340
Cameroon	104	103	103	105	104	102	102	2 320
Central African Empire	96	103	96	99	102	104	102	2 260
Chad	88	74	89	83	76	72	75	2 380
Congo	98	101	97	101	106	103	98	2 220
Ethiopia	93	88	94	93	92	89	82	2 340
Gabon	97	97	95	97	97	96	98	2 350
Gambia	97	97	98	97	96	96	98	2 380
Ghana	99	100	99	99	100	99	101	2 300
Guinea	90	86	90	90	88	87	84	2 310
Ivory Coast	113	114	114	113	113	113	115	2 310
Kenya	97	92	98	99	93	92	91	2 320
Lesotho	96	97	95	97	90	99	100	2 280
Liberia	84	86	84	85	84	86	87	2 310
Madagascar	108	104	108	107	105	102	105	2 270
Malawi	101	104	103	104	104	105	103	2 320
Mali	87	75	88	88	75	75	75	2 350
Mauritania	86	81	87	85	79	81	82	2 310
Mauritius	105	107	106	108	109	105	108	2 270
Morocco	103	107	102	105	107	107	108	2 420
Mozambique	86	85	86	85	84	87	84	2 340
Niger	85	79	83	82	79	81	78	2 350
Nigeria	89	88	89	91	90	85	88	2 360
Rhodesia	100	104	96	102	103	99	108	2 390
Rwanda	94	91	96	95	91	91	90	2 320
Senegal	94	92	91	94	84	94	97	2 380
Sierra Leone	100	98	101	100	99	98	97	2 300
Somalia	81	83	80	83	86	84	79	2 310
Swaziland	89	91	90	94	93	92	89	2 320
Tanzania	85	84	88	83	82	85	86	2 320
Togo	94	94	94	96	95	92	96	2 300
Tunisia	93	99	93	96	99	98	102	2 390
Uganda	96	92	96	96	95	91	90	2 330
Upper Volta	78	73	80	73	71	70	78	2 370
Zaire	91	83	92	87	82	83	85	2 220
Zambia	86	87	84	87	87	85	89	2 310
FAR EAST	94	92	94	95	93	90	93	2 220
Bangladesh	84	84	85	82	82	83	88	2 310
Bhutan	89	90	89	89	90	90	90	2 300
Brunei	108	113	108	110	113	113	114	2 240
Burma	101	99	101	101	93	100	103	2 160
Democratic Kampuchea	99	94	97	99	99	98	85	2 220
Hong Kong	114	113	113	118	114	116	111	2 290
India	92	89	92	94	93	85	89	2 210
Indonesia	91	94	92	91	88	95	99	2 160
Korea, Rep. of	115	117	114	121	119	117	115	2 350
Lao People's Dem. Rep.	95	93	96	93	92	94	94	2 220
Malaysia								
Sabah	121	125	119	120	124	125	127	2 240
Sarawak	114	113	115	113	113	113	113	2 240
Peninsular Malaysia	111	113	113	110	111	114	115	2 250
Nepal	93	92	94	90	87	93	95	2 200
Pakistan	93	92	93	93	93	91	92	2 310

ANNEX TABLE 12. — PER CAPUT DIETARY ENERGY SUPPLIES IN RELATION TO NUTRITIONAL REQUIREMENTS, SELECTED DEVELOPING COUNTRIES AND AREAS, 1969-71 AND 1972-74 AVERAGES AND 1970 TO 1974 (*concluded*)

	Average 1969-71	Average 1972-74	1970	1971	1972	1973	1974	Requirements
	Percent of requirements							*Kilocalories per caput per day*
FAR EAST (*concluded*)								
Philippines	86	86	85	85	85	87	87	2 260
Singapore	118	122	119	122	122	124	123	2 300
Sri Lanka	104	94	105	100	95	94	91	2 220
Thailand	103	104	103	104	102	104	107	2 220
Viet Nam, Socialist Rep. of	105	106	106	106	105	107	105	2 160
LATIN AMERICA	105	107	106	105	106	106	107	2 380
Argentina	126	125	129	124	122	121	128	2 650
Bolivia	76	78	76	77	79	77	77	2 390
Brazil	105	106	104	105	106	107	105	2 390
Chile	115	112	113	117	115	106	116	2 450
Colombia	93	97	92	94	93	92	94	2 320
Costa Rica	110	112	111	112	112	111	113	2 250
Cuba	115	118	115	119	119	119	117	2 310
Dominican Republic	90	95	88	90	94	95	98	2 260
Ecuador	90	91	91	88	90	91	93	2 290
El Salvador	80	82	79	82	82	81	84	2 290
Guatemala	92	91	92	91	91	91	91	2 190
Guyana	104	103	104	103	100	106	104	2 270
Haiti	87	90	87	87	90	90	90	2 260
Honduras	96	91	99	94	92	90	90	2 260
Jamaica	111	118	112	116	122	113	119	2 240
Mexico	114	116	114	114	114	116	117	2 330
Nicaragua	107	106	107	106	107	104	106	2 250
Panama	111	101	109	111	99	99	105	2 310
Paraguay	120	118	121	120	119	117	118	2 310
Peru	98	99	99	99	98	99	100	2 350
Uruguay	113	111	114	109	108	112	115	2 670
Venezuela	97	97	97	97	96	97	98	2 470
NEAR EAST	98	99	98	98	99	99	100	2 460
Afghanistan	80	82	78	77	80	83	83	2 440
Cyprus	118	119	116	120	122	122	113	2 480
Egypt	107	107	106	106	106	104	105	2 510
Iran	90	96	90	88	95	97	98	2 410
Iraq	95	99	95	97	98	98	101	2 410
Jordan	94	90	92	93	93	87	90	2 460
Lebanon	100	101	100	101	101	101	101	2 480
Libya	108	114	108	108	111	115	117	2 360
Saudi Arabia	97	100	97	98	96	100	102	2 420
Sudan	89	88	90	91	89	87	88	2 350
Syria	99	102	98	101	101	101	104	2 480
Turkey	112	112	112	114	112	112	113	2 520
Yemen Arab Republic	76	83	71	81	82	83	82	2 420
Yemen, People's Dem. Rep. of	92	85	94	88	84	85	84	2 410

SOURCE: FAO food balance sheets.

ANNEX TABLE 13. — MAIN FEATURES OF CURRENT DEVELOPMENT PLANS

Region and country	Annual growth rate (from UN/FAO reference data)		Duration and scope [1] of plan		Targets indicated in national development plan												
					Planned growth rate of:							Planned investment [2]					
							Agricultural production			Export earnings				Share of agriculture in:			
	Population	Domestic demand for food			GDP	Total employment	Total	Cereals	Fertilizer consumption	Total	Agriculture	Share of total investment in GDP	Share of public investment in total investment	Total investment	Public investment	Share of expenditure in land and water development in total investment [3]	Share of external resource in total plan outlay
	Percent per year				..... *Percent per year*							..... *Percent*					
LATIN AMERICA																	
Argentina	1.3	2.0	1974-77	PS	7.5	2.8	6.5	...	...	19.6	...	[4] 9.8	42.0	...	...	...	...
Barbados	0.5	...	1973-77	C	5.0	3.1	5.5	[5] 4.0	...	7.7	7.0	20.5	30.4	...	...	4.0	52.0
Bolivia	2.5	5.0	1976-80	C	[6] 7.7	2.9	7.4	6.8	9.2	...	17.9	[7] 28.0	70.0	9.6	10.1	...	31.0
Brazil	2.9	4.7	1975-79	C	10.0	3.5	7.0	8.4	14.1	20.0	8.5	[8] 25.0	[8] 19.0	6.0	3.5	...	...
Chile	1.8	0.9	1975-80	AS	[6] 6.6	[9] 4.0	[10] 4.8	7.5	...	...	11.8	[7] 13.0	47.0	...	...	...	...
Costa Rica	2.8	4.1	1974-78	C	7.5	5.3	4.7	...	...	9.6	9.1	[11] 27.0	27.9	15.0	...	...	24.8
Dominican Rep.	3.3	5.6	1976-86	AS	...	...	5.2	...	...	...	4.2	...	...	...	...	...	...
Ecuador	3.3	4.7	1973-77	C	10.1	6.5	[12] 5.3	5.5	...	16.4	3.9	23.0	40.2	18.9	17.3	5.0	16.0
El Salvador	3.2	3.2	1973-77	AS	[6] 6.9	[9] 2.0	5.3	4.5	6.9	...	4.1	...	...	...	13.0	...	47.9
Guatemala	3.0	4.6	1975-79	C	[6] 6.9	3.1	5.0	4.7	13.2	7.0	3.7	[7] 13.6	44.0	...	13.2	...	28.1
Haiti	1.5	2.6	1976-81	C/AS	[6] 5.0	...	3.0	4.7	...	9.3	8.0	[7] 19.9	67.0	15.0	18.8	29.0	50.0
Honduras	3.5	3.2	1974-78	C	[6] 6.0	[9] 6.1	8.1	5.7	...	...	7.9	...	33.6	13.8	...	...	25.8
Nicaragua	3.3	3.6	1975-79	PS	[6] 6.5	1.7	6.5	...	...	...	...	...	...	...	...	...	...
Panama	2.9	4.1	1976-80	PS	[6] 6.7	2.5	5.7	3.7	[13] 14.0	7.2	9.5	[7] 28.4	54.4	4.9	7.6	...	28.0
Peru	3.0	4.9	1975-78	C	[6] 6.5	2.5	[14] 4.5	...	...	15.6	...	[7] 18.5	50.0	6.4	12.8	7.1	...
Surinam	2.6	3.0	1972-76	C	8.3	...	7.1	...	...	...	...	...	...	...	19.4	...	83.0
Uruguay	1.0	1.1	1973-77	PS	[15] 4.0/5.0	[9] 1.9	[15] 3.8/4.6	...	...	10.0	...	...	...	...	...	...	...
Venezuela	3.0	2.7	1976-80	PS	[6] 8.2	0.5	9.6	10.6	18.0	25.4	11.0	[7] 20.2	53.0	9.0	7.0	3.0	16.0
FAR EAST																	
Bangladesh	1.7	2.5	1973-78	C	5.5	...	4.6	6.4	...	7.5	...	12.8	87.5	23.8	26.3	...	40.0
Fiji	2.1	...	1975-80	C	[6] 7.0	3.0	4.6	[16] 13.4	6.0	8.3	8.6	[7] 22.7	54.0	...	21.8	16.8	...
India	2.5	1.9	1974-79	C	4.4	...	3.9	3.6	...	8.5	...	18.2	61.0	...	12.0	...	8.4
Indonesia	2.6	5.0	1974-79	C	7.5	...	4.6	4.4	...	23.5	...	21.1	44.0	...	19.1	...	22.0
Korea, Rep. of	2.0	4.5	1977-81	C	[6] 9.0	3.1	4.0	3.3	...	16.0	...	[7] 25.4	...	11.2	...	...	...
Malaysia	[17] 2.8	3.0	1976-80	C	8.5	3.3	7.3	...	...	13.4	...	27.8	40.3	10.7	25.5	5.9	12.8
Philippines	3.4	4.3	1974-77	C	[6] 7.0	4.5	5.0	6.1	10.0	10.0	7.7	[7] 20.9	18.8	...	20.0	5.5	11.7
Thailand	3.3	4.8	1977-81	C	7.0	2.3	5.0	...	...	14.0	...	11.1	41.9	15.5	36.9	10.5	12.8
NEAR EAST																	
Afghanistan	2.6	3.3	1973-77	C	5.0	...	4.2	4.6	...	4.6	...	...	90.0	35.0	39.0	...	...
Iran	3.0	4.7	1973-78	C	25.9	3.0	7.0	9.0	22.6	...	...	26.0	66.0	11.4	12.8	...	0.0
Jordan	3.2	2.6	1976-80	C	11.5	...	7.0	7.5	...	24.0	13.0	35.0	50.0	18.0	30.0	13.0	36.0
Libya	4.1	4.8	1976-80	C	10.7	6.5	15.8	9.0	...	7.9	...	30.5	87.0	12.0	12.0	...	0.0
Saudi Arabia	3.0	5.5	1975-80	C	10.2	7.8	4.0	...	...	...	...	30.0	...	8.0	...	...	0.0
Somalia	2.6	2.3	1974-78	PS	...	...	...	...	...	...	...	...	...	...	40.0	22.0	66.0
Sudan	3.1	3.5	1977-83	C	7.5	...	6.5	...	...	11.0	11.0	22.0	58.0	26.0	30.0	...	52.0
Turkey	2.5	3.5	1973-77	C	7.9	6.2	4.6	3.4	15.6	9.4	2.8	24.2	56.3	11.7	52.7	5.0	3.6
Yemen, People's Dem. Rep. of	2.9	1.8	1975-79	C	13.4	7.2	10.8	8.6	...	20.0	...	21.4	99.0	36.8	37.0	29.4	55.0
AFRICA																	
Algeria	3.1	3.4	1974-77	C	11.2	8.3	4.2	4.7	...	10.2	...	[4] 48.0	...	...	10.9	6.6	...
Burundi	2.4	2.1	1973-77	C	...	...	...	...	...	...	...	...	...	39.0	...	...	80.5

See notes at end of table.

ANNEX TABLE 13. — MAIN FEATURES OF CURRENT DEVELOPMENT PLANS (*concluded*)

Region and country	Annual growth rate (from UN/FAO reference data)		Duration and scope [1] of plan		Targets indicated in national development plan												
					Planned growth rate of:							Planned investment [2]					
							Agricultural production			Export earnings				Share of agriculture in:			
	Population	Domestic demand for food			GDP	Total employment	Total	Cereals	Fertilizer consumption	Total	Agriculture	Share of total investment in GDP	Share of public investment in total investment	Total investment	Public investment	Share of expenditure in land and water development in total investment [3]	Share of external resources in total plan outlay
	Percent per year				..... *Percent per year*							..... *Percent*					
Cameroon . . .	1.9	2.6	1976-81	C	7.1	6.2	...	...	...	...	...	19.5	70.7	17.3	16.6	...	...
Congo	2.5	3.3	1975-77	C	...	...	...	...	...	...	...	29.0	100.0	15.0	...	...	0.0
Gabon	1.0	4.3	1976-80	C	5.5	6.7	3.5	...	...	3.7	...	49.0	68.0	3.5	4.5	...	...
Gambia	1.9	4.3	1975-80	C	...	...	4.7	7.0	...	...	...	...	...	14.9	...	...	...
Ghana	2.7	5.1	1975-80	C	5.5	...	...	...	...	2.0	...	...	...	...	...	...	...
Guinea	2.4	2.5	1973-78	C	...	...	...	...	...	...	...	...	34.4	3.6	9.4	...	...
Ivory Coast . . .	2.5	3.6	1976-80	C	8.7	...	6.9	10.7	...	8.3	5.6	32.0	51.9	13.6	26.2	...	...
Kenya	3.3	1.8	1974-78	C	8.0	3.2	5.2	7.0	...	7.0	2.2	26.3	31.6	...	22.3	...	15.2
Lesotho	1.9	...	1976-80	C	7.9	2.1	6.5	2.3	...	22.0	...	13.5	...	...	32.6	5.0	...
Liberia	2.3	2.8	1976-80	C	6.8	3.0/3.5	...	...	...	13.0	...	[4] 9.0	...	19.3	19.3	...	60.5
Madagascar . . .	3.0	2.3	1973-77	C	3.2	...	3.0	...	...	6.0	...	15.0	61.5	23.2	31.1	...	30.0
Malawi	2.4	6.3	1971-80	C	8.2	...	5.4	...	...	10.0	9.0	23.8	36.7	8.2	19.3	...	...
Mali	2.5	5.4	1974-78	C	7.1	...	4.5	...	...	8.1	...	36.0	...	33.7	...	...	85.0
Mauritius	1.8	2.8	1975-80	C	6.9	4.7	...	...	...	...	...	28.0	...	...	...	...	32.0
Morocco	3.0	3.6	1973-77	C	7.5	4.0	3.6	3.5	...	10.0	4.7	19.5	42.5	15.8	26.2	...	19.8
Niger	2.7	-1.2	1976-78	C	...	...	...	...	...	...	...	...	64.7	21.7	33.6	...	60.0
Nigeria	2.7	2.9	1975-80	C	9.5	2.6	5.0	5.0	...	5.0	0.6	26.6	66.7	8.3	6.5	...	0.0
Senegal	2.6	0.5	1973-77	C	5.0	...	3.0	...	...	...	...	...	29.0	23.3	14.5	...	54.8
Sierra Leone . .	2.4	1.4	1975-79	C	6.2	2.0	4.6	6.5	...	8.2	9.1	22.9	45.6	15.5	25.6	5.9	33.1
Swaziland	2.7	...	1973-77	C	5.0										19.0		83.6
Togo	2.8	0.4	1976-80	C	8.0	...	5.2	...	...	...	...	33.0	88.4	21.8	...	...	35.1
Tunisia	2.3	7.1	[18]1977-81	C	7.5	4.0	3.6	3.5	...	10.0	4.7	25.0	43.0	15.8	26.2	...	10.0
Uganda	3.0	1.2	1972-76	C	5.0	7.7	4.8	...	...	4.8	4.5	...	51.0	...	...	...	...
Upper Volta . .	2.3	1.7	1972-76	C	3.7	3.5	2.9	1.4	25.0	9.1	...	12.2	21.0	19.9	26.3	...	74.0
Zambia	3.2	1.8	1972-76	C	6.8	4.5	5.4	...	...	7.0	...	29.0	65.0	7.8	9.6	...	17.8

[1] C = comprehensive; PS = public sector; AS = agricultural sector. — [2] Where possible, data refer to net investment. In many cases, however, no distinction is made in the plan, and data may refer to gross investment or may include some elements of recurrent expenditure. The agricultural sector includes animal production, fisheries, forestry, irrigation, land reclamation, community development and agricultural extension. — [3] Land and water includes land reclamation and land clearance, irrigation, drainage and flood control projects and dams and dikes which are part of these projects; establishment of perennial pastures; preparation and initial stocking of fish ponds. However, the country data available do not always correspond entirely to this definition. — [4] Share of public investment in GDP. — [5] Total food production. — [6] GNP. — [7] Share of total investment in GNP. — [8] Total investment does not include private investment in agriculture and technology development. Data on investment refer to 1979 only. — [9] Employment in agriculture only. — [10] Not including fisheries, which is planned to grow at an annual rate of 16.9%. — [11] 27% of GDP in 1978. — [12] Not including fisheries, which is planned to grow at an annual rate of 9.6%. — [13] Average annual rate 1973-85. — [14] 1975-76. — [15] Low and high hypotheses. — [16] The planned annual growth rate of total food production is 2.7%. — [17] Peninsular Malaysia only. — [18] Provisional information.

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