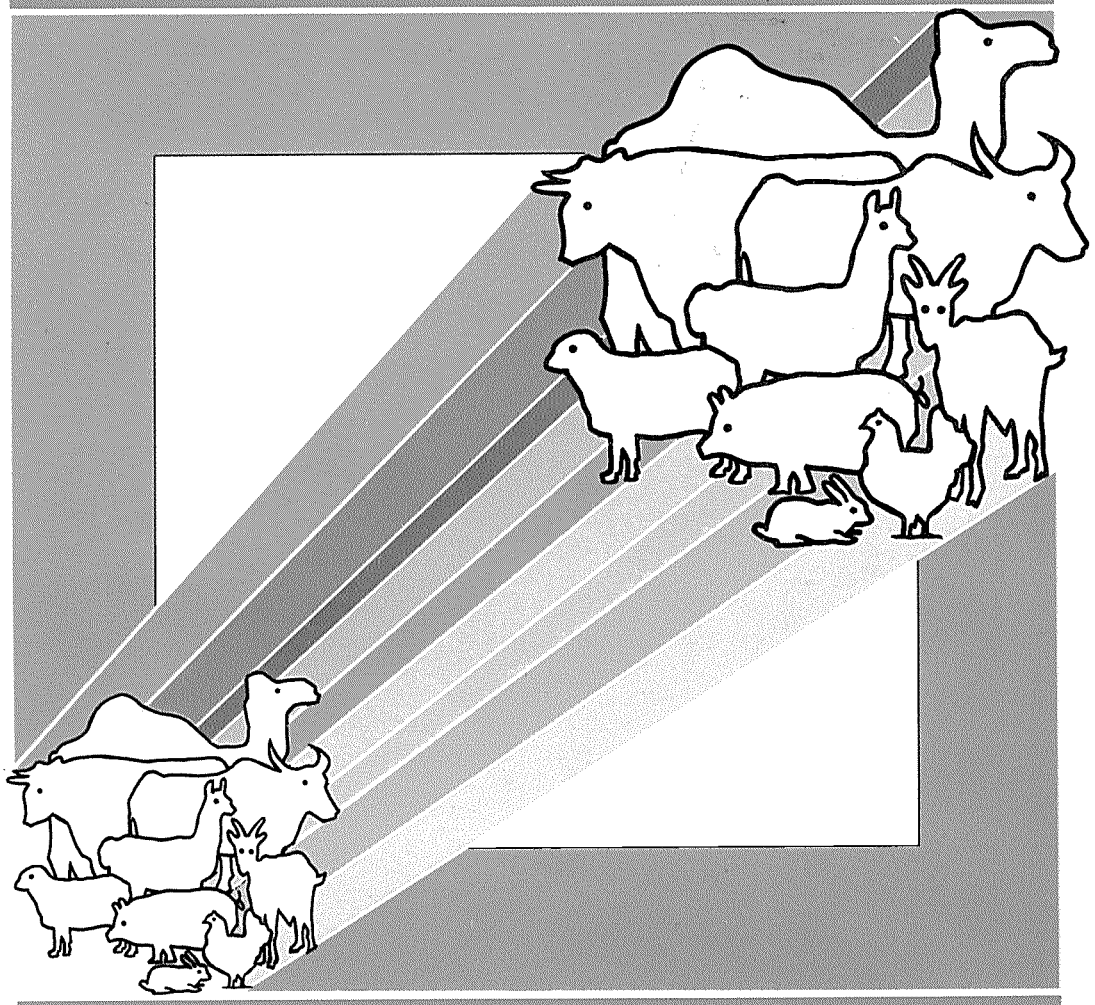
THE STATE OF FOOD AND AGRICULTURE



World Review
Livestock production:
a world perspective

1982

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

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1977 The state of natural resources and the human environment for food and agriculture

1978 Problems and strategies in developing regions

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1980 Marine fisheries in the new era of national jurisdiction

1981 Rural poverty in developing countries and means of poverty alleviation

THE STATE OF FOOD AND AGRICULTURE 1982

FAO Agriculture Series *No. 15*

the state of food and agriculture 1982

WORLD REVIEW
LIVESTOCK PRODUCTION: A WORLD PERSPECTIVE

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME 1983

The statistical material in this publication has been prepared from the information available to FAO up to June 1983.

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 designations "developed" and "developing" economies are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country or area in the development process.

Chapter 2, Livestock Production: A World Perspective *was prepared by the Animal Production and Health Division and the Policy Analysis Division of FAO from the work of J. Rendel and B. Nestel, consultants.*

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Foreword

The prolonged economic recession has imposed stress and distress on hundreds of millions of people in agriculture in different parts of the world. It is now over three years that the world economy has been plagued with recession; unemployment; declining demand, investment and income; and rising trade protectionism; accompanied by an alarming rise in the burden of external debt of the developing world, currently estimated at about $700 billion. International assistance programmes, including those of multilateral aid agencies, have been curtailed. On the other hand, military expenditures have still steadily grown and are now estimated to be about 4.5% of world GNP.

Although there are now signs of economic recovery, the effects of recession in the poorer nations could hinder their socio-economic progress for some time to come.

The recession has had direct effects on farmers and others who serve agriculture. Declines in industrial country demands have been important factors in the low prices experienced for a long list of export commodities that are mainstays of earnings by developing countries. International monetary and credit problems have made it difficult for many farmers to acquire fertilizer, feed supplements and other inputs needed for increased production. For the first time in 30 years, world fertilizer production and consumption have both declined.

Immediate economic pressures have postponed improvement of farming, marketing and input supply systems. It has been difficult to introduce better natural resource-use practices. Even in the agricultural heartlands of developed nations, income declines and rising debt burdens have put farmers in one of the worst financial squeezes since the Thirties. Many of the people on small farms who have depended on earnings from part-time work have suffered from loss of employment and income.

These economic difficulties have created pressures on governments to protect and subsidize domestic agriculture. The political response has frequently been attuned to the immediate concerns of certain groups within agriculture. Such preoccupations have pre-empted implementation of cohesive, forward-looking policies and development plans related to food, agriculture and rural people. Programmes that help the poor have been among the first to be cut back.

The economic disarray has placed added burdens on many developing countries, particularly those with low incomes, especially in Africa. Since food production increases have often failed to match population growth in these countries, there has been a rising dependence on food imports. Countries facing food shortages and emergencies are disturbingly numerous and their number has increased. Overall agricultural commodity prices have fallen to their lowest real level of the last three decades. It is not, therefore, surprising that many developing countries are facing severe debt servicing and balance of payment problems.

This adverse economic climate has impeded efforts at international levels to strengthen multilateral arrangements related to agricultural trade, food security and development assistance. Nevertheless, FAO has vigorously pursued the objectives of negotiation of international commodity and food security arrangements, as well as food aid flows, to help ensure adequacy of emergency assistance and secure access to food by all people in every country. FAO has energetically sought relaxation of agricultural trade restraints that reduce earnings of poor countries, pleaded strongly for the fulfilment of development assistance targets, and promoted effective programmes for helping the rural poor and the malnourished and for strengthening world agricultural scientific endeavours.

Some progress has been achieved in this past year. And, as borne out in responses to the FAO World Food Day activities, the second of which was on 16 October 1982, many people in the developed nations have demonstrated genuine concern for the plight of the less advantaged. Even so, funds for international development have been among the first victims of budgetary economies in some donor countries.

Until 1981, multilateral aid to agriculture showed considerable resilience. Since then, reductions in donor contributions to important multilateral agencies such as IDA, IFAD and UNDP have caused setbacks in aid and generally in multilateral cooperation, ironically at a time when food-deficit countries are making increased efforts to improve their food production performance.

The World Review Chapter of SOFA 1982 gives considerable attention to the overall economic setting in which agriculture finds itself. Agricultural productivity, access to food and rural wellbeing are closely linked with changes in the economy as a whole. The uncertainties to be faced will include not only the familiar elements of weather, pest outbreaks, prices and political stability, but also new questions about future policies of exporter and importer nations, handling of enormous debts, adequacy of existing monetary systems and attitudes towards investment in and assistance to developing country agriculture.

Along with these broader economic issues, FAO is also concerned about how world economic changes have affected the landless tenant in remote villages or hungry families in urban slums. This concern has been reflected in the reappraisal that I have made of the concept of and approaches to food security. My proposals, which have been welcomed by the Committee on World Food Security and the FAO Council, focus on three pivotal elements - food production, its supply stability and its access by the needy.

The world has emerged from 1982 with a new form of the age-old paradox of hunger persisting in the midst of apparent plenty. Cereal production was abundant and stocks reached new highs - about 21% of apparent consumption - as we entered 1983. But most of these stocks are concentrated in North America and much is in the form of grain normally used for livestock feeding. Despite a fall in dollar prices, the strengthening of the dollar exchange rate meant that many needy nations and people within their borders would not be able to pay for these supplies at times of need.

We did not see in 1982 the continent-wide hunger that attracts world attention. But the FAO Global Information and Early Warning System reported 26 or more countries with abnormal food shortages in early 1983. The haunting reality is that an estimated 450 million people in the world are regularly hungry. There are no indications of a decline in the incidence of hunger.

This would not be so terrible if weather and other elements beyond human control were the only cause of hunger. But, unfortunately, much of it derives also from political disturbance and reluctance to cooperate across national borders.

Moreover, national economic and agricultural policies are sometimes in conflict with the objectives of improved food self-reliance and accessibility. The results of well designed food production undertakings can easily be negated by lack of economic incentives and stability. Hence my decision in November 1982 to initiate a high-priority FAO study of price policies and other incentives conducive to increased food production and improved nutrition in developing countries.

I feel that it is important for people who are concerned about world food and agriculture to view the immediate situation in the longer-run, with a forward-looking perspective. Rapid population changes and urbanization trends in many countries are generating new challenges related to food systems; human services; land, water and forest use; and political balance. The need to find renewable fuel substitutes for petroleum will increasingly be with us. The land clearing and intensive cropping of recent years is already causing new problems of soil erosion, water pollution and ecological imbalance that must be addressed. And it seems clear that a 'new generation' of creative and effectively handled scientific research is needed if future food and agriculture needs are to be met.

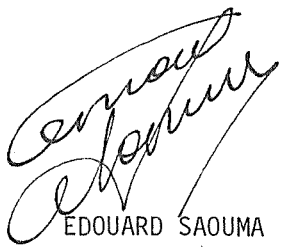
The food and agricultural development policies for the future must be formulated on the basis of a sound understanding of farming and husbandry systems; the human and ecological setting associated with these systems; and the economic, political and administrative feasibility of the proposed changes.

Policies related to livestock production are one of the areas which, in my view, deserve more cohesive attention. All too often there has been well intended but fragmented discussion of questions related to the desirability of encouraging livestock production and of using land to grow feed for livestock. This has prompted me to present in this edition of SOFA a special chapter that gives a world perspective to livestock production.

This special chapter brings out that - in many of the world's situations - the production of livestock products does not necessarily have to be at the expense of food crops. Ruminants, especially, can make use of pasture land and by-products that might otherwise not be utilized. The chapter reminds us that livestock are not only a source of protein foods, but also at the very heart of rural family livelihood in many developing country situations as sources of draught power, clothing and materials for cottage industry. It makes the additional point that livestock sectors can be expanded and modernized in a manner that does not make a country heavily dependent on imported feeds, breeding stock and other high-technology inputs.

The renewed concern about the recent outbreaks of rinderpest and other infestations in Africa bears out how important it is for economists, planners and policy makers to have some technical understanding of livestock husbandry and its local settings. Such emergencies demonstrate how critical it is for livestock specialists and programme administrators to employ sound socio-economic judgements when deciding how best to resolve problems and build improved livestock systems in a manner that is in keeping with human needs, capabilities and resource constraints.

The current signs of economic recovery are surrounded by many uncertainties. But even with these uncertainties, one senses a new mood. The people who have had to endure unemployment, inflation and low rewards from farming are looking to the future with new hope and this is a challenge to those in positions of leadership to agree on national and international policies that will reach new heights of agricultural development with due regard for the disadvantaged. To meet this challenge will require, among other things, advances in cooperation in activities related to food, agriculture, and economic development, including trade. This must surely include reversing the recent decline in multilateralism. FAO stands ready to play its part in this and to give priority to providing full technical and other support of all initiatives to enable food and agricultural development to play its full part at the centre of economic recovery.



EDOUARD SAOUMA

DIRECTOR-GENERAL

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Glossary of abbreviations and terms

1. Chapter 1 - World Review

ACPE - Asian Centrally Planned Economies
AT 2000 - Agriculture: Toward 2000 (FAO)
CCC - Commodity Credit Corporation
CFA - Committee on Food Aid Policies and Programmes
CFS - Committee on Food Security
CILSS - Comité Permanent Inter-Etats de Lutte contre la Sécheresse du Sahel
ECU - European Currency Units
EEC - European Economic Community
EEZ - Exclusive Economic Zone
FAC - Food Aid Convention
FFA - South Pacific Forum Fisheries Agency
FMD - Foot-and-Mouth Disease
GATT - General Agreement on Tariffs and Trade
IARC - International Agricultural Research Centres
IFDC - International Fertilizer Development Centre
IFS - International Fertilizer Supply Scheme (FAO)
IMF - International Monetary Fund
LDCs - Least Developed Countries
ODA - Official Development Assistance
OECD - Organization for Economic Cooperation and Development
OPEC - Organization of Petroleum Exporting Countries
SADCC - South African Development Coordination Conference
SELA - Sistema Econômico Latino Americano
SIDP - Seed Improvement and Development Programme (FAO)
TCP - Technical Cooperation Programme (FAO)
UNCTAD - United Nations Conference on Trade and Development
UNFPA - United Nations Fund for Population Activities
USDA - United States Department of Agriculture
WFP - World Food Programme
WHO - World Health Organization

2. Chapter 2 - Livestock Production: A World Perspective (additional to Chapter 1)

ACP - Africa, Caribbean and Pacific Countries
ASF - African Swine Fever
CBPP - Contagious Bovine Pleuropneumonia
CLSU - Central Luzon State University (Philippines)
CRED - Centre of Research on Economic Development (University of Michigan)
CSF - Classical Swine Fever
DCS - Dairy Cooperative Society
ECF - East Coast Fever
EMASAR - Ecological Management of Arid and Semi-Arid Rangelands

2. Chapter 2 - Livestock Production: A World Perspective (continued)

GDP	-	Gross Domestic Product
IAEA	-	International Atomic Energy Agency
IDRC	-	International Development Research Centre
JP 15	-	Joint Project 15 (FAO rinderpest project)
KCC	-	Kenya Cooperative Creameries
KNAIS	-	Kenya National Artificial Insemination Service
ND	-	Newcastle Disease
OIE	-	International Office of Epizootics
SEDES	-	Société d'Etudes pour le Développement Economique et Sociale
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environment Programme
UNESCO	-	United Nations Education, Scientific and Cultural Organization
USAID	-	United States Agency for International Development

3. Glossary of Terms

Epidemiology	-	Science dealing with the incidence, distribution and control of a disease in a population; the sum of the factors controlling the presence or absence of a disease or pathogen.
Feed unit	-	Equivalent to 1 kg of barley in terms of energy value.
Herbivore	-	A grass or roughage-eating animal
Polyvalent (vaccine)	-	Conferring immunity against more than one infectious agent.
Rumen	-	The largest of the four compartments of the stomach of ruminant animals in which food is stored and subsequently returned to the mouth for chewing (rumination).
Semi-feral	-	Domesticated animal reverting to the wild state.
Transhumance/ transhumant	-	A livestock production system involving the seasonal movement of stock between well-recognized grazing areas, sometimes known as semi-nomadism.
Tsetse challenge	-	The degree of risk to infection with trypanosomiasis to which an animal may be liable when exposed to the presence of tsetse.

4. International Agricultural Research Centres of the Consultative Group on International Agricultural Research

CIAT	-	Centro Internacional de Agricultura Tropical
CIMMYT	-	International Maize and Wheat Improvement Centre
CIP	-	International Potato Centre
IBPGR	-	International Board for Plant Genetic Resources
ICARDA	-	International Centre for Agricultural Research in the Dry Areas
ICRISAT	-	International Crops Research Institute for the Semi-Arid Tropics
IFPRI	-	International Food Policy Research Institute
IITA	-	International Institute of Tropical Agriculture

4. International Agricultural Research Centres of the Consultative Group on International Agricultural Research (continued)

ILCA - International Livestock Centre for Africa
ILRAD - International Laboratory for Research on Animal Diseases
IRRI - International Rice Research Institute
ISNAR - International Service on National Agricultural Research
WARDA - West Africa Rice Development Association

5. International Financial Institutions

World Bank	-	International Bank for Reconstruction and Development	(IBRD)
		International Development Association	(IDA)
Regional Development Banks	-	Asian Development Bank	(ASDB)
		African Development Bank	(AFDB)
		African Development Fund	(ADF)
		Inter-American Development Bank	(IDB)
OPEC Multilateral	-	Arab Fund for Economic and Social Development	(AFESD)
		Arab Bank for Economic Development in Africa	(ABEDA)
		OPEC Fund for International Development	(OFID)
		Islamic Development Bank	(ISDB)
OPEC Bilateral	-	Kuwait Fund for Arab Economic Development	(KFAED)
		Abu Dhabi Fund for Arab Economic Development	(ADFAED)
		Saudi Fund for Development	(SFD)
		Iraqi Fund for Economic Development	(IFED)
Multilateral	-	International Fund for Agricultural Development	(IFAD)
Multilateral	-	Consultative Group on International Agricultural Research	(CGIAR)
Multilateral	-	FAO (Trust Funds/Technical Cooperation Programme)	(FAO(TF/TCP))
Multilateral	-	United Nations Development Programme	(UNDP)

6. Organizational Divisions of FAO

AGL - Land and Water Development Division
AGP - Plant Production and Protection Division
ESC - Commodities and Trade Division
ESP - Policy Analysis Division
ESS - Statistics Division

Explanatory note

The following symbols are used in statistical tables:

- none, or negligible
... not available

"1980/81" signifies a crop, marketing or fiscal year running from one calendar year to the next; "1979-81" signifies the average for three calendar years.

Figures in statistical tables may not add up because of rounding. Annual changes and rates of change and, where applicable, exponential trends have been calculated from unrounded figures. Unless otherwise indicated, the metric system is used throughout. The dollar sign ($) refers to United States dollars.

PRODUCTION INDEX NUMBERS [1/]

In 1978, the FAO index numbers were substantially revised. Since then, with very few exceptions, the production data refer to primary commodities (for example, sugar cane and sugar beet instead of sugar). The base period was updated from 1961-65 to 1969-71 and national average producer prices were used as weights instead of regional wheat-based price relatives (1961-65). The indices for food products exclude tobacco, coffee, tea, inedible oilseeds, animal and vegetable fibres, and rubber. They are based on production data presented on a calendar-year basis.

TRADE INDEX NUMBERS [2/]

In 1978, the indices of trade in agricultural products were updated to a new base period (1969-71). They include all the commodities and countries shown in the 1981 issue of the FAO Trade Yearbook. Indices of total food products include those edible products generally classified as "food".

All indices represent the changes in the current values of export (f.o.b.) and imports (c.i.f.), all expressed in US 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 a discrepancy whenever the trend of insurance and freight diverges from that of the commodity unit values.

Volumes and unit value indices represent the changes in the price-weighted sum of quantities and of the quantity-weighted unit values of products traded between countries. The weights are respectively the price and quantity averages of 1969-71, which is the new base reference period used for all the index number series currently computed by FAO. The Laspeyres formula is used in the construction of the index numbers.

1/ For full details, see FAO Production Yearbook 1980, Rome, 1981.
2/ For full details, see FAO Trade Yearbook 1980, Rome, 1981.

REGIONAL COVERAGE

The regional grouping used in this publication follows the "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 USSR, and "developing countries" to cover both the developing market economies and the Asian centrally planned economies. Israel, Japan and South Africa are included in the totals for "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 the Sudan. Totals for developed and developing market economies include countries not elsewhere specified by region.

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. World Review

INTRODUCTION

The tenacious recession which has plagued the world economy for the past two years provides a sombre background to an assessment of the state of food and agriculture for 1982. It has underlined the inescapable economic interdependence of developed and developing nations and the links between agriculture and the rest of the economy. Fortunately, the prospects for 1983 are for a resumption of economic growth.

The recession - the worst since the Great Depression of the early 1930s - has seriously cut back the pace of development of developing countries. Countries in Latin America, particularly dependent on external trade and exposed to market forces, have been especially set back (regional per caput GNP declined by 2.5% in 1981), as have some middle-income countries in Asia. Africa already had suffered a drop in real per caput growth in 1981: the drop in 1982 is likely to have been still worse. Even the Near East has not been immune to these problems and growth has slowed.

Following a growth of less than 1% in 1981, it is estimated that there will be absolute declines in economic activity in 1982 in member countries of the OECD. Unemployment is also at very high levels in these countries, around 9% of their labour force in 1982. It is undoubtedly worse in many developing countries where employment data are sketchy.

Inflation had reached high levels in the early periods of the recession. It is now coming down in industrialized countries under the impact of tight monetary policies and declining commodity prices. It has left its legacy in the form of high real rates of interest which hamper investment and jeopardize the financial health of the typically capital-intensive agriculture in industrialized countries.

The high rates of interest have created serious difficulties also for several developing countries, particularly those that have incurred large debts to commercial lending institutions. Debt servicing in 1982 represented about 22% of the export proceeds from goods and services of non-oil exporting developing countries.

This situation has been made yet more unstable by exchange rate fluctuations that have been remarkably large, even by the standards of the 1970s. The US dollar has generally strengthened in relation to other currencies. Between the end of 1981 and 1982, according to IMF, the trade weighted value of the US dollar had appreciated by 12%, and over shorter periods by even more.

The widespread worsening in the balance of payment situation, declining real incomes and high unemployment have led to an inevitable contraction in trade in 1982, the first in about 25 years. In terms of US dollars, the decline was nearly 2% compared to the annual rate of increase approaching 20% from 1970 to 1981.

The contraction in demand and its consequent effect on trade was not uniform across all commodities. Indeed, agricultural trade was relatively unaffected by the deepening recession in 1980, but the 2% decline in value in 1981 matched that of merchandise trade overall. Raw materials including forest products and commodities such as the tropical beverages were hit hard. These products are of crucial importance to the export earnings of many non-oil exporting developing countries. Basic foods such as cereals were less affected, as the value of their trade continued to increase, although slowly. Trade in fishery products also expanded. As a result, the experience of countries, whether developed or developing, in their agricultural exports, varied widely depending on the composition of their agricultural trade.

One of the most pernicious developments in the conduct of world trade in the past few years has been the increased incidence of protectionism. In contrast with the 1930s when high tariffs were put in place to protect industries and employment, contemporary protectionism relies much more on a wide variety of non-tariff barriers. Agriculture in the majority of developed countries has been highly protected for many years and the fall in international prices of agricultural commodities rendered the degree of protectionism even more pronounced. This problem has been compounded by production surpluses partly generated by high levels of protection and disposed of on world markets with the help of contentious export subsidies.

The GATT Ministerial Session failed to produce any substantive solutions to the long-term problems of agricultural trade, which had been made worse by the recession. However, it did set up a Committee on Trade in Agriculture within GATT to undertake a comprehensive study of measures affecting market access and supply of agricultural products. On the other hand, the Common Fund for Commodities, the major international effort to stabilize commodity prices, did not enter into force in March 1982 as envisaged. This deadline had to be extended as insufficient signatories had ratified the agreement.

In these troubled times, the view of the world's agricultural sector depends on the time focus. The short-term perspective has some positive features in that world food production of the past two years has been fully up to average performance of the past decade, food stocks (particularly cereals) have increased, and lower international prices have afforded importing countries with easier access to food commodities. Global food availability can be said to have recovered from the setbacks of 1979-80.

However, several disquieting features remain that make it uncertain how enduring and widespread the benefits of the recovery will be:

- Progress in improving dietary energy supplies has been regionally uneven, with Africa and the Least Developed Countries standing out as failing to make much progress even over the past decade or more.

- There is a trend towards greater dependency on food imports, not only in the fast-growing countries in the Near East, but also and more disturbingly in Africa, where economic growth has been erratic and uneven, and in low income countries in other regions.

- Food emergency situations still persist, particularly in Africa. No tangible progress has been made to place emergency food aid on a reliable, adequate, multilateral basis, or to enable it to respond rapidly and effectively to emergency needs without discrimination.

- Although international prices of many agricultural commodities have declined in terms of the US dollar, demand has not responded because the dollar has strengthened against most currencies. Many importing countries are facing severe payments problems and per caput incomes have stagnated or fallen in real terms. It does not appear that the relatively ample global supplies of food are equitably accessible.

- The imbalance in supply and effective demand has had serious repercussions on agricultural trade and hence on those deriving their incomes from it. Overall agricultural commodity prices have fallen to their lowest level in real terms since the early 1950s. The effects are spread over a wide range of countries, of types of farmers and producers. Farm incomes are depressed in many countries.

- Development assistance, hit by budgetary cutbacks in some major donor countries, has failed to maintain the momentum achieved up to the late 1970s. Until 1981, multilateral aid proved fairly resilient and flows to Africa, particularly, were maintained. But this was before the reductions in donor contributions to some important multilateral agencies such as IDA and IFAD. The situation in 1982 and 1983 appears less favourable.

- The farm input supply industry also has been severely depressed, particularly in developed countries. Ex-factory prices of fertilizers have been declining during the past two years. Yet world fertilizer consumption declined in 1981/82, for only the second time in 30 years. Production also declined and there are now fears that insufficient production capacity will be in place to prevent sharp rises in prices should demand recover by the mid 1980s.

- Though carry-over stocks of agricultural commodities are relatively ample, particularly for some cereals, they are highly unevenly distributed, being concentrated in North America. As a consequence of the concentration of these stocks and low prices, strong incentives to reduce the acreages of cereals and cotton have been introduced in the United States. It is anticipated that these will cause sharp cutbacks in 1983 United States' production and, in turn, supplies in world markets. If and when these policies are changed, the extent to which world cereal production and stocks would once again expand is one of the major uncertainties facing food deficit countries.

Turning briefly to the two sectors associated with agriculture, fisheries and forestry, neither has escaped the effects of the recession in demand. Fisheries has been less affected because trade in edible fish products was reasonably well maintained, although with some difficulties. The sector has been recently grappling with two major changes. The first, posing challenges and opportunities, is the implementation of the extension of national jurisdiction over the seas. The second is the adjustment needed to the rise in the price of fuel. For some countries, the combination of these has had serious implications for fishing fleets.

Forestry has been more seriously affected, especially in exporting countries. Plans of some developing countries to promote their forest industries suffered a setback because of the declines in international prices of some traded forest products.

The second part of this chapter is devoted to a survey of the patterns and trends in the use of agricultural resources and inputs since the beginning of the 1970s. The section draws at times on the findings of Agriculture: Toward 2000. The opportunity is taken to discuss selected policy issues raised by the changes in resource and input use, past and potential, in particular those relating to the environment.

The discussion is structured around three clusters of resources and inputs or combinations of them: the land-labour, the labour-power (animal and tractor) and the input (improved seed, fertilizer, pesticide and - not to exclude livestock - animal feed) relationships. Agricultural research is the means to develop new technologies to economize on the basic resources of land and labour and also to permit the substitution of inputs depending on their cost and availability. Although much progress has been made, there must be greater emphasis on achieving technological breakthroughs in developing country agriculture, to increase output, raise incomes but husband resources.

CURRENT SITUATION

RECENT TRENDS IN FOOD AVAILABILITY

Dietary Energy Supplies During the Past Decade

According to FAO World Food Balance Sheets, improvement in the world nutrition situation in terms of dietary energy supplies during the 1970s has been both slow and regionally uneven (Table 1-1). However, despite this overall disappointing picture, there have been some successes. Notable among these is the recovery since 1974-76 of some 5% in per caput supplies in the developing market economies of the Far East and the steady improvement during the decade amounting to 15% in the Asian centrally planned economies (ACPE). The latter reflects progress in China mainly: dietary energy supplies in Kampuchea, another country in this group, fell by nearly 20% on a per caput basis.

TABLE 1-1. DAILY PER CAPUT CALORIE SUPPLY AS PERCENT OF REQUIREMENTS

	1969-71	1974-76	1978-80	1977	1978	1979	1980
	..... %						
Developing market economies	95.5	95.5	99.2	96.3	99.2	99.8	98.6
Africa	93.5	93.1	93.7	94.3	13.9	93.3	94.0
Far East	92.8	90.8	95.7	91.1	96.0	96.9	94.1
Latin America	105.8	106.7	108.9	107.5	108.4	108.7	109.4
Near East	97.2	106.2	111.0	108.5	109.7	111.3	112.1
Other dev'ing market economies	100.0	101.5	105.7	102.8	105.7	106.3	105.3
Asian centrally planned economies	90.7	97.7	104.3	99.1	101.3	105.0	106.6
Total developing countries	93.9	96.3	100.9	97.2	99.9	101.5	101.2
Least Developed Countries	88.3	84.1	84.1	82.9	84.3	83.1	85.0
Total developed countries	128.4	130.8	133.1	131.2	132.2	133.7	133.4
World	104.8	106.5	109.8	107.0	109.1	110.4	110.0

Source: FAO, ESS.

The situation in Africa remained extremely precarious, particularly among the Least Developed Countries (LDCs), most of which are in this region. Out of 46 countries of the region for which data are available, per caput dietary energy supplies as a percentage of requirements actually fell in 18 of them between 1969-71 and 1978-80.

These developments are influenced not only by per caput domestic food production but also by net trade movements in food products. For example, the 14% improvement in per caput dietary energy supplies in the Near East was achieved not so much by a rise in per caput food production (only 5%) as by a doubling in the volume of per caput food imports. China also depended to some extent on increased food imports to raise dietary energy supplies. However, it is Africa which shows the most alarming trends. Per caput food production declined by fully 10% and an increase in the per caput volume of food imports of

over 50% combined with a decline in the volume of food exports sufficed only to maintain the average and inadequate level of per caput dietary energy. The reason why the situation deteriorated by nearly 5% during the 1970s in the LDCs was because they could not afford to increase their food imports sufficiently to offset their declining food production.

Dietary supplies since 1980

Data since 1980 on daily per caput dietary energy supplies are not yet available. Calculations based on estimates of per caput food production and net imports have to be used, therefore, to assess the likely situation (Table 1-2).

TABLE 1-2. DAILY PER CAPUT ENERGY SUPPLY, FOOD PRODUCTION AND FOOD IMPORTS AND EXPORTS, DEVELOPING COUNTRIES, 1980-81

	1980 daily per caput energy supply as % of requirement	Change in per caput Food production 1980 to 1981	Food production 1981 to 1982	Volume of food imports 1980 to 1981	Volume of food exports 1980 to 1981
		%			
Africa	94.0	-1.0	0.4	5.2	-6.7
Far East	94.1	4.0	-2.2	-2.3	3.5
Latin America	109.4	1.7	0.7	-3.3	13.8
Near East	112.1	-1.7	0.2	8.5	21.2
Asian centrally planned econ.	106.1	1.7	2.9	-	-13.4
Total developing countries	101.2	1.8	0.4	1.8	6.7

Source: FAO, ESS.

During the period 1980-82, per caput food production improved significantly in the ACPE and Latin America and more moderately in the developing market economies of the Far East. However, it declined slightly in Africa but perhaps by 1% in the Near East. In all regions, the volume of food imports did not increase as rapidly as during the 1970s and this situation seems to have continued into 1982. The slowing down in food imports was particularly marked in those regions that recorded improved domestic food production. Nevertheless some increase in dietary energy supplies can be expected in Latin America, the ACPE and the Far East in 1980-82. In the Near East, the increase in volume of imported food seems to have improved the dietary energy situation only marginally because per caput food production declined at the same time. The conclusion for Africa is still more pessimistic. Food imports did not expand at previous rates and per caput food production failed to increase in 1980-82. The average dietary situation there, at best, remained stagnant.

Food Prices

Changes in consumer food prices in absolute terms and in relation to prices of other consumer goods are an alternative, if indirect, way of assessing the accessibility of food, particularly to low-income populations who spend a large proportion of their incomes on food. A disturbing feature of the 1970s has been the acceleration in food price inflation in developing countries. In 1971 the average rate of increase in consumer prices of food in developing market economies was 4%. By 1974 it had climbed to 25% and, although the rate slowed subsequently, it had returned to high levels by 1979 (Table 1-3). Looking at this situation in another way, at the beginning of the 1970s, out of the developing countries for which data are available 94% had inflation rates below 10%. By 1981 this proportion had fallen to only one-quarter and one-third encountered rates of more than 20%.

TABLE 1-3. CHANGES IN RATES OF INFLATION AND CONSUMER PRICES OF FOOD IN DEVELOPING[1/] AND ALL DEVELOPED MARKET ECONOMY COUNTRIES, 1979-81

	1979	1980	1981
Average rate of inflation in developing market economies, % 2/	18.9	26.4	27.9
Average rate of change in consumer prices of food in developing market economies, % 2/	21.0	27.8	29.1
No. of developing countries with inflation rates			
a) below 10%	20	13	15
b) between 10% and 20%	30	27	26
c) 20.1% or more	12	22	21
Total	62	62	62
Average rate of inflation in developed market economies, % 2/	10.1	13.4	10.5
Average rate of change in consumer prices of food in developed market economies, % 2/	8.9	10.2	8.6

1/ These are the countries consistently included in the quoted sources.

2/ Weights are proportional to GDP or GNP of the preceding year in US$.

Source: International Labour Organization Bulletin of Labour Statistics and FAO, ESP.

Earlier expectations of a substantial decline in inflation rates in developing countries in 1981 did not materialize, despite the onset of falling prices on world markets for a wide range of commodities. There were wide differences in national rates of inflation. These may have been partly caused by more flexible exchange rates. However, the changes in consumer prices of food in a majority of developing countries appear to be more directly linked to local inflation conditions and short-term changes in domestic supply.

The highest increases in food prices among the regions were again found in Latin America, where three among the largest countries - Argentina, Brazil and Peru - showed

hyperinflation rates, while nearly all other countries recorded food prices increases of over 10%. Preliminary estimates for 1982 by the UN Economic Commission for Latin America point to a further deterioration in the regional rate of inflation, which may have reached 80%.

In Africa, about one-third of the countries for which information is available showed moderate rates of below 10% in 1981, although the regional average was slightly higher than in 1980. The Far East as a whole achieved a slight reduction in overall inflation rates, although food prices in India rose by 14.5%, the largest yearly increase since 1974, and those in the Republic of Korea and Pakistan also rose significantly. Most countries in the Near East showed decelerating inflation rates, in particular Egypt and Turkey, although increases in food prices remained high in both countries.

In contrast, the weighted average rate of increase in food prices in developed market economy countries was 8.6% in 1981, the lowest since 1978. Unlike developing countries, where food prices tended to rise faster than other consumer prices during 1977-81, food prices in these countries restrained overall inflation during this period. This trend was expected to continue as a result of large supplies of a number of basic food commodities, sluggish consumer demand and a slowing down in food marketing cost inflation. The rate of inflation in OECD countries was likely to decline further to about 7.5% in 1982 and food prices to still lower rates of increase in several major industrial countries. For instance, the 1982 rise in food prices in the United States - about 3.4% - was the smallest since 1976 and compares to an increase of 4.8% in non-food items.

International food prices have continued to weaken in dollar terms - in some cases quite substantially (Fig. 1-1). However, because of the strengthening of the dollar during 1981-82, unit pieces of food imports in terms of domestic currencies will not have fallen correspondingly. Furthermore, food imports have been constrained in many instances because of foreign exchange problems. Therefore, in many importing and low income developing countries, it is unlikely that consumers will have benefited greatly despite ample supplies of most food products on world markets.

Food Emergency Situations

In early 1983 the number of countries reported to suffer from abnormal food shortages shows a disturbing increase. According to FAO's Global Information and Early Warning System on Food and Agriculture, 30 countries reported such emergencies in January and February 1983, compared to 19 in the comparable 1982 period. While in 1981 and 1982 there was a temporary improvement, particularly in Africa, reflecting some degree of recovery from the severe shortages of 1980, the situation has worsened again largely due to drought in late 1982 and early 1983 in parts of the Sahel and southern Africa (Fig. 1-2).

A declining proportion of these situations can be attributed to what may be termed man-made disasters, although many of the chronic food supply difficulties have been created by the disturbances arising from past wars or civil strife.

Conclusion

The overall conclusion from this analysis is that, despite some successes, the improvement in food availability in developing countries during the 1970s has been insufficient and not uniform. Improvements that have occurred in many instances have been accompanied

by a greater dependence on food imports with the negative implications this holds for the security of food supplies and their equitable distribution among the population.

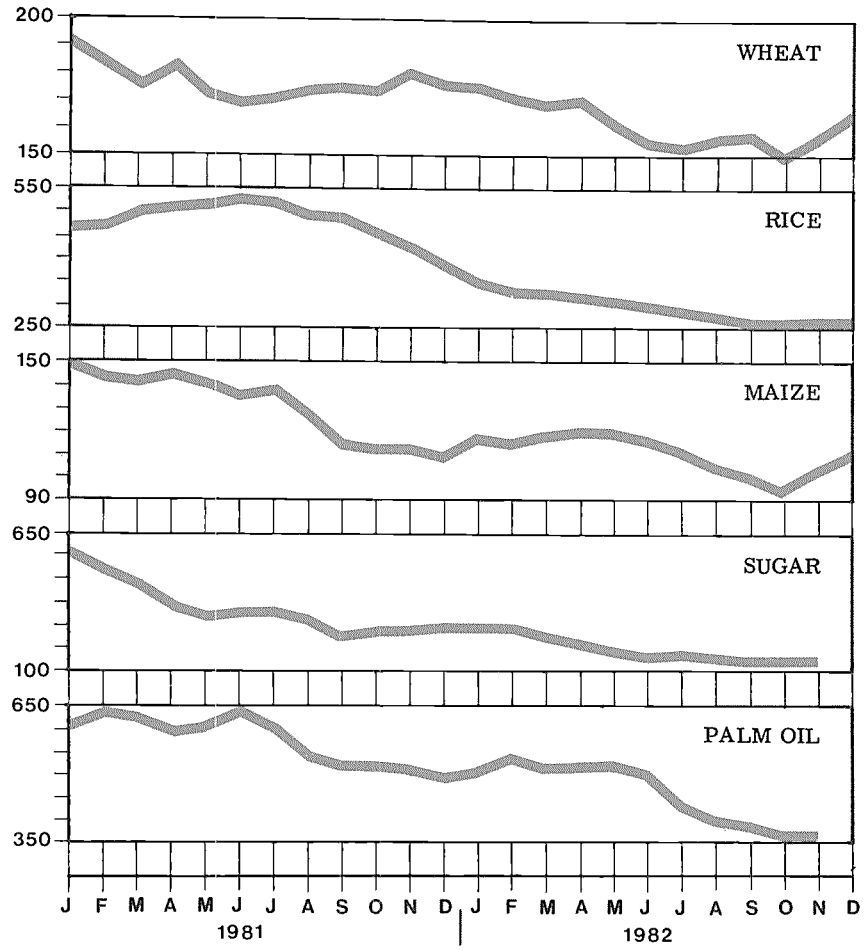

Figure 1-1
INTERNATIONAL PRICES OF SELECTED COMMODITIES, 1981 AND 1982 BY MONTH

Source: FAO, Monthly Bulletin of Statistics (various issues)

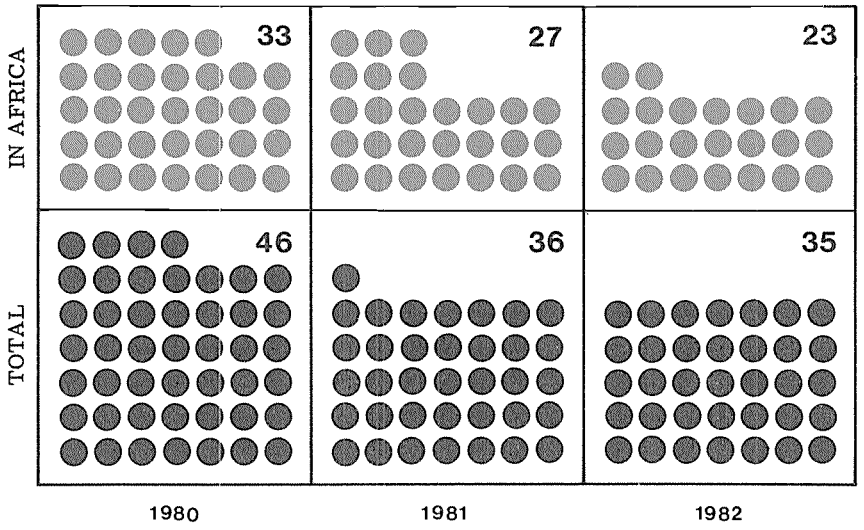

Figure 1-2
NUMBER OF COUNTRIES AFFECTED BY ABNORMAL FOOD SHORTAGES, 1980, 1981 and 1982

Source: FAO, ESC

Despite record world production of food and declining world market prices, 1982 has not brought widespread tangible improvements from the point of view of food consumers in many developing countries. Such a conclusion applies particularly to people with low incomes, most notably those living in Africa, although some low-income countries such as China have made significant progress. To better understand these problems, the location of gains in food production and stocks, as well as the changing patterns of food trade and aid are examined in further detail in the following sections.

THE IEFR

The International Emergency Food Reserve (IEFR) was established by the Seventh Special Session of the UN General Assembly in 1975 to deal with emergency food situations. It has a minimum annual replenishment target of 500 thousand tons of cereals. This level was exceeded in 1981 when contributions amounted to over 608 thousand tons of cereals and more than 23 thousand tons of other foods, but over half was donated specifically to refugees from Kampuchea and Afghanistan. Contributions to the IEFR for 1982 were 454 thousand tons of cereals and 51 thousand tons of non-cereal foods.

An attempt is being made to put the resources available to the IEFR on a more reliable and predictable basis through advance pledging at a joint WFP/IEFR biennial pledging conference. As of late March 1983, pledges amounted to 339 thousand tons of cereals and 16 thousand tons of other foods for 1983 and 177 thousand tons of cereals for 1984, quantities well below the target replenishment level. It remains to be seen whether the next joint pledging conference will produce better results.

During 1982, FAO/WFP approved 68 emergency operations at a cost of $191.5 million compared to 54 such operations costing $178.3 million in 1981. Nearly half (33) of these operations were to meet the needs of refugees but they accounted for 69% in terms of costs. The balance of the assistance was to victims of natural disasters. Twenty-eight of the total emergency operations in 1982 were in Africa.

FOOD AND AGRICULTURAL PRODUCTION IN 1982

Global View

World food production is estimated to have increased by 2.2% in 1982 (Table 1-4). This was a deceleration compared to 1981, when the increase was 2.7%, but that had followed two years of very low growth in food production. The growth achieved in 1982 was nearly a third greater than the average for the previous 5 years but was a little lower than the 15 year average. Food and agricultural production, therefore, by-and-large was a sustaining influence during this period of recession in other sectors.

Agricultural production, including non-food products, followed a broadly similar course although the deceleration in 1982 was more marked than that for food alone. This was due to sharp declines in the production of some non-food commodities discussed below. Most of these declines are probably due more to cyclical factors than to the effects of the recession.

TABLE 1-4. FAO INDEX NUMBERS OF WORLD AND REGIONAL FOOD AND AGRICULTURAL (CROPS AND LIVESTOCK) PRODUCTION

	1980	1981	1982 1/	Change 1980 to 1981	Change 1981 to 1982	Annual rate of change 1967 to 1982	Annual rate of change 1978 to 1982
	...1969-71=100...			.....		%	.....
FOOD PRODUCTION							
Developing market economies	133	139	141	4.3	1.7	3.1	2.6
Africa	119	122	126	2.0	3.6	1.9	2.8
Far East	134	142	142	6.2	-0.2	3.3	2.4
Latin America	138	144	149	4.2	3.2	3.4	3.0
Near East	138	140	144	1.1	3.1	3.1	2.2
Asian centrally planned economies	136	141	147	3.1	4.3	3.3	2.7
Total developing countries	134	139	143	3.9	2.5	3.1	2.6
Least Developed Countries	120	122	125	1.8	2.5	1.7	2.4
Developed market economies	121	125	126	3.3	1.4	1.9	1.7
North America	123	134	134	8.8	0.3	2.4	2.7
Oceania	123	132	120	7.1	-8.9	2.6	-3.6
Western Europe	123	121	125	-1.5	3.8	1.8	1.9
Eastern Europe and the USSR	115	113	117	-1.4	3.1	1.4	-1.6
Total developed countries	119	121	123	1.8	2.0	1.8	0.6
World	125	129	131	2.7	2.2	2.4	1.5
AGRICULTURAL PRODUCTION							
Developing market economies	131	136	138	4.2	1.2	2.9	2.3
Africa	118	120	125	1.9	3.3	1.9	2.7
Far East	133	140	140	5.7	-	3.2	2.2
Latin America	135	142	144	5.3	1.2	3.1	2.6
Near East	134	134	139	0.5	3.1	2.8	1.8
Asian centrally planned economies	136	141	148	3.6	4.4	3.3	3.0
Total developing countries	133	138	141	4.1	2.2	3.0	2.5
Least Developed Countries	116	118	121	1.8	2.8	1.5	2.0
Developed market economies	120	124	125	3.7	1.0	1.8	1.6
North America	122	134	133	9.8	-0.7	2.3	2.6
Oceania	116	123	114	6.2	-7.1	2.0	-2.6
Western Europe	123	121	125	-1.4	3.8	1.8	1.9
Eastern Europe and the USSR	115	113	117	-1.3	3.1	1.4	-1.5
Total developed countries	118	120	122	2.1	1.7	1.7	0.6
World	124	128	130	3.0	1.9	2.3	1.5

1/ Preliminary.
Source: FAO, Production Yearbooks.

Regional Patterns

For the developing countries the expansion in food production in 1982 at 2.5% was much less than that achieved in the previous year. The per caput increase was correspondingly modest at 0.4%, only half of the rate of the late 1970s (Table 1-5). Yet the Asian centrally planned economies, dominated in size by China, increased their per caput food production by nearly 3%, which was above the increase achieved in the previous year. There was some slowing down in the rate of expansion of food production in Latin America. The estimated per caput increases recorded in Africa and the Near East were only slight at 0.4% and 0.2% respectively, but at least this is better than the declines recorded in these two regions in 1981. However, neither region recovered the 1980 level of per caput food production.

The developing market economies of the Far East suffered a setback compared to 1981, particulary India. But 1981 had been generally an excellent year for food production in the region so per caput food production in 1982 was still 1% or 2% greater than in 1980.

TABLE 1-5. FAO INDEX NUMBERS OF WORLD AND REGIONAL PER CAPUT FOOD (CROPS AND LIVESTOCK) PRODUCTION

	1980	1981	1982 1/	Change 1980 to 1981	Change 1980 to 1982	Annual rate of change 1967 to 1982	Annual rate of change 1978 to 1982
	...1969-71=100...			..... %			
Developing market economies	104	106	105	1.8	-0.7	0.6	0.2
Africa	90	89	89	-1.0	0.4	-0.9	-0.2
Far East	107	111	109	4.0	-2.2	1.0	0.2
Latin America	108	110	111	1.7	0.7	0.9	0.6
Near East	104	103	103	-1.7	0.2	0.3	-0.6
Asian centrally planned economies	115	117	120	1.7	2.9	1.5	1.3
Total developing countries	108	110	110	1.8	0.4	0.9	0.5
Least Developed Countries	93	92	91	-1.0	-0.3	-0.9	-0.4
Total developed countries	109	110	112	1.0	1.2	0.9	-0.2
World	104	105	106	1.0	0.5	0.5	-0.2

1/ Preliminary.

Source: FAO, Production Yearbooks.

The fragile situation in Africa requires closer examination. Although, as stated above, food production in Africa may have recovered some of the loss incurred in 1981, this improvement was not uniform throughout the region. Indeed, of the 42 countries in Africa for which data are available, per caput food production declined in 23 of them. The sub-region worst affected was southern Africa, particularly Zimbabwe, Swaziland, Botswana and Zambia. Some countries in east-central areas, such as Burundi and Rwanda, were also affected, albeit less drastically.

For most countries of the Sahel also, 1982 was not a good year for food production. Conversely, other West African countries recorded increases. Nigeria, which has about a quarter of of the population of Sub-Saharan Africa, achieved an increase in per caput food production of nearly 2%. This accounts for a significant part of the modest gain achieved in the Africa region in 1982.

Food production growth in 1982 also varied among the developed countries. The overall increase of the previous year, which had been substantial, was not continued. Food production did not expand in North America largely because of problems of over supply carried over from the previous year. In Oceania it suffered severely from drought. On the other hand, production recovered in Western Europe, as well as in Eastern Europe and the USSR. This was the first increase in two years for the latter region.

Production of non-food commodities was most adversely affected in Latin America of the developing country regions and North America of the developed. This was due mainly to declines in production of coffee and cotton in these two regions respectively.

Major Commodities[1/]

Behind these growth rates in aggregate food production lies a diverse commodity-by-commodity picture. The latest information is that in developing countries output of cereals, at 688 million tons (including rice in its milled form), increased slightly in 1982. A small increase in wheat was more or less offset by an overall decline in production of coarse grains. Rice production was unchanged. Production of pulses, rootcrops (which had declined in 1981) and edible oil crops expanded moderately, by 3 to 5%, but sugar production increased by nearly 16%. In some cases this increased output has met with weak demand on domestic and export markets and led to an accumulation of stocks and declining prices. Production of livestock products also increased in 1982 but at rather lower rates than in recent years.

Although data on catches of food fish in 1982 are not yet available, in 1981 the food fish catch of 53.5 million tons, out of a total fish catch of nearly 75 million tons, had increased by between 5-6%. Most of this increase had been in developing countries, particularly in Latin America and Asia.

In developed countries, cereal production continued to expand in 1982, although at a rate lower than in 1981. It reached 865 million tons and so exceeded the previous record quantity achieved in 1978. Output of other major food crops also expanded in most cases: root crops by 2%, pulses by over 8% and oil crops by nearly 11%. Sugar was the exception as its output declined a little. Of the livestock food products, meat output declined slightly but milk output increased.

Turning to the main non-food commodities, production of green coffee was significantly lower in 1982, falling by over 15% to a level slightly lower than that achieved in 1979. Coffee production in Latin America, the largest producing region,declined by 25% and was also somewhat reduced in Africa. Production of cotton was reduced by 2-3%, a sizeable

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1/ The data are presented on a calendar year basis. For a detailed survey of the agricultural commodity production in 1982, see FAO, Commodity Review and Outlook 1982-83, Rome, 1983.

decline in North America being partially offset by increases in producing countries in other regions, except Latin America. Production of tobacco and natural rubber expanded by small amounts: about 0.5% and between 2-3% respectively.

As will be seen in the sections on fishery and forestry, these sectors were also affected by the economic recession in 1981 and 1982. While the catch of food fish had increased in 1981, the non-food component of the catch, roughly 20 million tons, remained unchanged mainly because of the reduced demand for fish meal, in turn due to weak world demand for livestock products. Not much change is expected to have taken place in 1982.

Production and trade in forest products have been hit particularly hard by the recession in the housing sector in some developed countries. Production of all forest products was reduced in 1981 except fuelwood and charcoal.

INCIDENCE OF PESTS AND DISEASES IN 1982

Pests and diseases continue to pose serious problems for food production and preservation.

The rinderpest situation in Africa and the Near East worsened in 1982. In Africa, the disease broke out in several countries, including Tanzania, Chad and Egypt which had been free from the disease for many years. Outbreaks were also reported in Iran, Lebanon and most countries of the Arabian Peninsula.

Some infestations of Desert Locust and African Migratory Locusts were reported in parts of the Near East and Africa but control measures were taken, in some cases with the assistance of FAO's Technical Cooperation Programme (TCP) and bilateral donors, and major problems were averted. African armyworm also affected some localities in eastern Africa early in 1982 but widespread damage was not reported.

In Europe, several foot-and-mouth disease (FMD) outbreaks occurred during 1982. Those which occurred in Denmark and the German Democratic Republic caused serious economic losses especially in Denmark where international trade in meat products was disrupted. Sporadic outbreaks also occurred in the Federal Republic of Germany and in Spain.

Insect pests and diseases do not affect only food crops and livestock. For example, an extensive area of pine and spruce forests in northern Poland, covering 20% of the country's forest area, is being infested by the nun moth Lymantria monacha. Although control measures in 1981 exceeded all pest control activities in these forests over the past 35 years, mass occurrence of pest has not been controlled and the forests are further threatened by the entry of secondary pests.

Outlook for Food Supplies in 1983

Overall the outlook appears to be reasonably favourable in the opening months of the year but some compositional, geographical and policy aspects are disquieting. As will be noted below, while world cereal stocks are adequate, they are concentrated in major exporting developed countries and are predominantly coarse grains.

The effects of Government policies (including farmer participation in the United States' acreage reduction programmes), developments in export markets and hence prices, input costs and subsidies as well as weather conditions until harvest in the main growing areas around the world, will have an important influence on the final outcome and size of world food production in 1983. For example, the objective of the Administration of the United States is to reduce the wheat and coarse grain acreages by 10% and rice by 15%, through the acreage reduction programmes introduced for 1982 and the payment-in-kind programme to apply as well in 1983. The total reduction from the 1982 level could be 12 million tons for wheat (76.5 million tons produced in 1982) and 41 million tons of coarse grains (256 million tons in 1982). The timely and adequate development of the monsoon in Asia, as usual, will be an important factor in determining global food supplies.

AGRICULTURAL TRADE

Overview of Trade in a Period of Recession

The current world recession has manifested itself in the area of trade by a slowing down or even decline in the volume and value of traded goods, and deteriorating terms of trade for a majority of developing countries. It has been accompanied by fluctuating exchange rates, increased levels of debt and debt servicing charges and increased protectionism. These factors have combined to render the economic difficulties that the poorer countries already face yet more intractable. The welfare of the large numbers of people who directly or indirectly derive their livelihood from the production of agricultural commodities for export will have deteriorated.

As a result of aggregate world demand, the volume of total merchandise trade in 1981 stagnated at the 1980 level, after having barely increased by 1.5% in the previous year. On a value basis world trade in 1981 actually declined for the first time since 1958, by about 1%. Preliminary estimates for 1982 point to a 2% decline in the volume of exports. Exports by industrial countries, which had declined by 1% in 1981 suffered a further 5% drop the following year. For the group of oil importing developing countries, preliminary estimates indicate a 5% fall in the value of exports in 1982, creating further pressure on their balance of payments. The deficit in their current account balances in 1982 is expected to reach US $99 thousand million, 15% more than in the previous year. The problems associated with indebtedness have become alsmost unmanageable, particularly in Latin American countries, and are threatening the stability of the world financial system as a whole. Debt servicing alone represents now about one-fifth of the total export receipts of non-oil exporting developing countries.

Exports of major commodity groups were adversely affected by the recession, more particularly minerals and fuels, resulting in a substantial reduction in the overall trade surplus of oil-exporting countries. Exports of manufactures rose by barely over 4% in 1981 in volume terms, the lowest year-to-year increase since 1975. As regards agricultural products, the volume of world exports were estimated to have risen by 3 to 5% in 1981. The rates of increase were lower than the average for the previous two decades but in excess of the 2% increase in the volume of agricultural production. On a value basis, however, world exports of agricultural, fishery and forestry products in 1981 were estimated at

US $299 thousand million, over 1% less than the previous year (Table 1-6). It was the first time since 1967 that the value of world agricultural trade failed to expand. The decline contrasted markedly with the average annual increase of more than 12% during 1977-81 and the 17% annual average achieved over the past decade.

TABLE 1-6. VALUE AT CURRENT PRICES OF WORLD EXPORTS OF AGRICULTURAL (CROPS AND LIVESTOCK), FISHERY AND FOREST PRODUCTS

	1979	1980	1981 1/	Change 1979 to 1980	Change 1980 to 1981	Annual rate of change 1977 to 1981
	... 000 million $ ...			..... %		
AGRICULTURAL PRODUCTS	203.8	232.5	230.8	14.1	-0.7	11.9
Developing market economies	61.6	68.1	65.5	10.6	-3.8	7.0
Asian centrally planned economies	3.8	4.0	3.5	5.3	-12.5	7.7
Total developing countries	65.5	72.1	69.0	10.1	-4.3	7.1
Developed market economies	128.8	150.6	152.2	16.9	1.1	15.2
Eastern Europe and USSR	9.6	9.9	9.7	3.1	-2.0	11.0
Total developed countries	138.4	160.4	161.8	15.9	0.9	14.4
FISHERY PRODUCTS	14.2	15.0	15.6	5.6	4.0	13.4
Developing market economies	4.9	5.0	5.3	2.0	6.0	13.9
Asian centrally planned economies	0.8	0.9	0.9	12.5	-	19.3
Total developing countries	5.7	5.9	6.2	1.8	5.1	14.6
Developed market economies	8.1	8.8	9.0	8.6	2.3	12.8
Eastern Europe and USSR	0.4	0.4	0.4	-	-	9.7
Total developed countries	8.5	9.2	9.4	8.2	2.2	12.6
FOREST PRODUCTS	48.9	54.8	52.4	12.1	-4.4	13.2
Developing market economies	8.0	8.2	8.1	2.5	-1.2	17.1
Asian centrally planned economies	0.6	0.6	0.6	-	-	10.4
Total developing countries	8.6	8.8	8.7	2.3	-1.1	16.6
Developed market economies	36.8	42.5	40.3	15.5	-5.2	13.8
Eastern Europe and USSR	3.6	3.5	3.4	-2.8	-2.9	1.4
Total developed countries	40.4	46.0	43.7	13.9	-5.0	12.6
TOTAL	267.0	302.3	298.8	13.2	-1.2	12.2
Developing market economies	74.5	81.3	78.9	9.1	-3.0	8.3
Asian centrally planned economies	5.2	5.5	5.0	5.8	-9.1	9.6
Total developing countries	79.7	86.7	83.9	8.8	-3.2	8.4
Developed market economies	173.7	201.8	201.6	16.2	-0.1	14.8
Eastern Europe and USSR	13.6	13.7	13.4	0.7	-2.2	3.5
Total developed countries	187.3	215.6	215.0	15.1	-0.3	13.9
	..... %					
Share of developing countries	30	29	28			

1/ Preliminary.

Source: FAO, Trade Yearbooks.

As the value of total merchandise trade in 1981 showed a year-to-year decline of 1%, the share of agriculture in total merchandise trade declined further to less than 15%. The decline in the value of agricultural exports, expressed in US dollars, resulted from a number of concurrent factors: abundant supplies of most agricultural products, which tended to lower prices; depressed aggregate demand, especially in industrialized countries, that affected non-food products; measures to protect domestic producers in the major trading countries; high interest rates, which led to lower inventories in importing countries; and the appreciation of the US dollar against most other currencies.

While the value of exports by developed countries as a whole in 1981 remained practically at the previous years' levels, developing countries' exports declined by over 3%. The share of developing countries in total world agricultural exports continued therefore to decline to 28% - as recently as 1977 their share had been 36%.

TABLE 1-7. FAO INDEX NUMBERS OF VOLUME, VALUE AND UNIT VALUE OF WORLD EXPORTS OF CROP AND LIVESTOCK PRODUCTS BY MAJOR COMMODITY GROUPS

	1979	1980	1981 1/	Change 1979 to 1980	Change 1980 to 1981	Annual rate of change 1977 to 1981
	....1969-71=100			..... %		
VOLUME						
Crops and livestock, total	147	156	162	5.7	3.8	5.4
Food	158	169	177	7.3	4.6	6.1
Cereals	176	198	208	12.4	5.1	8.4
Feed	187	207	220	10.7	6.4	8.7
Raw materials	108	109	108	1.5	-1.6	0.8
Beverages 2/	139	137	141	-1.5	3.2	5.4
VALUE						
Crops and livestock, total	386	447	443	15.7	-0.8	11.7
Food	405	482	493	19.0	2.3	14.6
Cereals	407	537	581	31.9	8.3	19.8
Feed	479	550	615	14.8	11.8	13.0
Raw materials	277	302	290	9.1	-3.9	7.3
Beverages 2/	421	438	342	3.9	-21.9	-1.0
UNIT VALUE						
Crops and livestock, total	271	294	274	8.6	-6.8	4.8
Food	265	292	280	10.1	-4.0	7.6
Cereals	250	286	289	14.2	1.2	9.6
Feed	222	236	235	6.3	-0.7	2.4
Raw materials	260	278	267	6.9	-3.8	5.7
Beverages 2/	332	345	256	3.9	-25.8	-7.7

1/ Preliminary. 2/ Excluding cocoa, which is included under food.

Source: FAO, Trade Yearbooks.

The main agricultural export commodities of developing countries were particularly hard hit in 1981, notably raw materials, forest products, tropical beverages and sugar. By contrast, the value of exports of food, particularly cereals, exported mainly by developed countries, rose although at lower rates than in the previous five years 2/.

World exports of agricultural products (crops and livestock only) in 1981 were estimated at about US $231 thousand million, 1% less than the previous year. This decline was largely price-based since, with the exception of agricultural raw materials, export volumes of the major groups of crop and livestock commodities continued to expand in 1981 (Table 1-7). Poor export performances were shared by all developing regions, but were particularly unfavourable for Asian centrally planned economies and Africa, where exports were about one-fifth smaller than in 1980 (Table 1-8). While agricultural exports continued to account for a large proportion of the total export earnings of developing countries - in 1981 about 38% in Africa, 22% in the Far East and 45% in Latin America - they contributed to finance a smaller share of their total imports - 13% for developing countries as a whole in 1981, two percentage points less than in 1980. There was a moderate increase, however, in the exports of developed countries.

The situation also differed markedly between developed and developing countries with regard to agricultural imports. Imports of crops and livestock by developed countries as a whole declined by about 4% in 1981, despite a substantial increase in import demand from Eastern European countries and the USSR. Developed countries' imports of food remained at about the previous years' levels with large purchases of cereals offsetting declines in other food products.

In contrast, imports by developing countries continued to expand, although at much lower rates than in previous years. Their imports of crops and livestock products in 1981 reached US $73 thousand million, about 7% more than in 1980. While the share of cereals, which account for about one-third of the value of total imports, remained fairly stable over the past ten years, sugar accounted for 9% of the total in 1981 compared to 5.5% in 1969-71. The share of meat products had risen from 2.8% to 5.2% of the total during the same period, and that of oilseeds and oils from 7.5% to 8.5%. On the other hand, the share of dairy products and fibres declined.

The combined effect of declining agricultural exports and rising imports resulted in an important shift in the trade balance of developing countries in 1981 when for the first time as a group they became net importers of crop and livestock products. Their overall trade deficit in these products was about US $4.2 thousand million compared to a surplus of similar magnitude in the preceding year. This shift worsened the pronounced deterioration in their overall surplus on merchandise trade which (excluding crops and livestock products) declined from $97.7 thousand million to $16.7 thousand million. The main cause of this deterioration was the decline in petroleum export earnings. However, an important factor in the growing imbalance of developing countries' agricultural trade has been the expanding import demand for food products by oil exporters and the newly industrializing countries. Another important single factor was the steep increase in food imports by the People's Republic of China, this country alone accounting for 11% of total agricultural imports of developing countries in 1981. But a large majority of low-income countries also faced deteriorating agricultural trade balances. While 66 developing countries out of a total of 90 showed a surplus on this trade balance in

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2/ For details of individual commodity markets, see FAO, Commodity Review and Outlook, 1982-83, Rome, 1983.

TABLE 1-8. VALUE AT CURRENT PRICES OF WORLD AGRICULTURAL TRADE (CROPS AND LIVESTOCK) BY REGION

	1970-72	1979	1980	1981	Change 1979 to 1980	Change 1980 to 1981	Annual rate of change 1970 to 1981 current	Annual rate of change 1970 to 1981 constant 1/
	..... thousand million $				..... %			
Developing market econ.								
Export	18.67	61.69	68.04	65.65	10.3	-3.5	14.5	2.4
Import	10.37	46.00	59.55	64.06	29.5	7.6	19.8	8.6
Africa								
Export	4.00	10.63	10.55	8.59	-0.8	-18.5	10.4	-2.0
Import	1.77	8.09	10.21	10.94	26.2	7.1	20.2	8.6
Far East								
Export	4.39	16.95	19.46	19.41	14.8	-0.3	16.7	5.6
Import	3.79	13.20	16.01	17.67	21.2	10.4	16.1	5.6
Latin America								
Export	8.03	28.79	32.22	31.64	11.9	-1.8	15.8	3.1
Import	2.58	10.22	14.08	14.20	37.8	0.8	18.2	7.6
Near East								
Export	2.10	4.64	5.12	5.49	10.4	7.2	9.9	-0.2
Import	2.04	13.86	18.57	20.55	33.9	10.7	26.5	13.8
Asian centrally planned economies								
Export	1.31	3.76	4.01	3.17	6.7	-21.1	10.7	0.7
Import	1.38	6.85	8.61	9.00	25.8	4.5	19.8	9.0
Total developing countries								
Export	19.97	65.45	72.05	68.82	10.1	-4.5	14.2	2.3
Import	11.77	52.84	68.16	73.06	29.0	7.2	19.8	8.6
Developed market economies								
Export	33.77	128.79	150.67	152.29	17.0	1.1	16.6	5.9
Import	45.04	147.08	157.73	147.28	7.2	-6.6	13.8	2.4
Eastern Europe and USSR								
Export	4.02	9.61	9.89	9.71	2.9	-1.8	9.9	0.2
Import	6.14	23.91	28.83	31.68	20.6	9.9	17.7	5.5
Total developed countries								
Export	37.79	138.40	160.55	162.00	16.0	0.9	16.0	5.4
Import	51.18	171.00	186.56	178.96	9.1	-4.1	14.3	2.9
World								
Export	57.77	203.85	232.61	230.82	14.1	-0.8	15.4	4.2
Import	62.95	223.84	254.72	252.02	13.8	-1.1	15.5	4.1
Share of developing countries in world agric.trade	..... %							
Export	35	32	31	30				
Import	19	24	27	29				

1/ Constant values obtained by deflating current values of trade with the indices (1969-71 = 100) of export and import unit values of agricultural products.

Source: FAO, Trade Yearbooks.

1969-71, the number had dropped to 49 countries by 1981. The problem was particularly acute in Africa as the region's imports of agricultural commodities which represented about 44% of its agricultural exports in the early 1970s, were 27% greater than exports in 1981.

Comprehensive information on world agricultural trade in 1982 is not yet available. However, preliminary estimates point to a further reduction in the value of agricultural trade resulting from lower income growth in both industrial and developing countries, widespread payment problems and increasing supplies of some important trade products continuing to exert downward pressure on export prices. Even if some forecasts point to a slight economic recovery during 1983, it is unlikely that it will give a sufficient stimulus to demand to solve the inherent problems of agricultural commodities currently in over-supply.

Available information for individual commodities tends to confirm these negative prospects. The value of world grain trade in 1982 was estimated at US $31-33 thousand million, or about 15% lower than the previous year. Sharp trade losses were also recorded for tropical beverages, cotton, rubber, forestry products and, more particularly, sugar and rice. Overall, the volume of agricultural exports in 1982 is estimated to have increased only marginally, while a decline of as much as 10% may be expected in their total value. This would be the largest year-to-year decline in the value of world agricultural trade in the past two decades.

Terms of Trade

The main single factor behind the deteriorating agricultural export situation has been the steep decline in the prices of most agricultural products since the third quarter of 1980. The decline in food prices followed a period of strong quotations in which a major element had been the then buoyant price of sugar. Price declines for vegetable oilseeds and oils and tropical beverages represented an accentuation of the trends initiated in 1980. The steep drop in prices of agricultural raw materials since early 1981 followed a year of price stagnation. On the whole, the UN price index for food commodities by the third quarter of 1982 had declined by 15% below the average for 1981 and that of agricultural non-food products by 19%.

Among products of trade importance for developing countries, nominal prices of tropical beverages as a whole declined by 10% during the same period (coffee 7%, cocoa 25% and tea 5%); those of oilseeds, oils and fats declined by 22%; the reduction in prices of fruits, meat, hides and skins and textile fibres ranged from 7% to 13%. The most significant decline took place, however, in the case of free market sugar (60%). Cereals were also affected, the overall decline being 12%. But the price decline for rice was particularly severe being 36%.

The decline in agricultural prices, however, has to be assessed in the light of the strengthening of the effective exchange rate of the US dollar in which many commodity market prices are quoted. From the point of view of individual importing countries the actual impact will obviously depend on the movements of their national currencies against the US dollar. The US dollar effective exchange rate, as calculated by the IMF, rose by about 12% during 1982 against currencies weighted by their importance in US trade. This implies that US dollar prices of, for instance, tropical beverages which, as a whole, declined by 10%, actually increased somewhat in terms of most other currencies, this partially accounting for slack demand.

On the whole, however, there has been a clear decline in the prices of agricultural commodities in relation to other major commodities and products. There had been an increase of 1.5% in the weighted price index of manufactures and crude petroleum in 1981, while in the year ending September 1982 the export unit values of these goods had declined by only 5-6% in comparison to declines of 15-19% for agricultural commodities. By deflating agricultural prices by the weighted price index of these two groups of products, which represent the bulk of developing countries' total value of imports, it appears that the real prices of agricultural exports in 1981 declined by 3% in developed market economies and by as much as 16% in developing ones (Table 1-9).

TABLE 1-9. NET BARTER AND INCOME TERMS OF TRADE OF AGRICULTURAL EXPORTS FOR MANUFACTURED GOODS AND CRUDE PETROLEUM

	1977	1978	1979	1980	1981
	..... 1969-71 = 100				
NET BARTER TERMS OF TRADE					
Developed market economies	96	94	86	71	69
Developing market economies	127	108	99	80	67
Africa	136	116	107	81	64
Far East	101	91	86	70	61
Latin America	141	116	105	88	73
Near East	108	95	85	70	64
INCOME TERMS OF TRADE					
Developed market economies	143	155	152	138	137
Developing market economies	143	124	116	93	84
Africa	116	99	91	67	52
Far East	137	119	122	105	96
Latin America	168	143	132	107	99
Near East	100	102	76	60	62

Source: UN Monthly Bulletin of Statistics (various issues) and FAO, ESP.

The increase in the volume of agricultural exports in 1981 - about 3% in developed countries and 7% in developing ones - was insufficient to compensate for declining prices. The purchasing power of agricultural exports (income terms of trade) against manufactured products continued to decline in both countries. While the loss was marginal in developed countries, for developing ones it was the fourth consecutive year of significant deterioration. The purchasing power of their exports fell thus to the lowest levels since the early 1970s.

All developing regions - except the Near East, which depends relatively less on agriculture for its export earnings - experienced heavy losses. The situation was particularly serious in Africa where, after having declined by 1.4% per annum during the 1970s, the purchasing power of the region's agricultural exports dropped by 22% in 1981 alone.

Expressed in current US dollars, the recent losses experienced by developing countries in the purchasing power of their agricultural exports appear even more alarming (Table 1-10). Until 1979 the balance of excess and deficits in real agricultural export earnings of developing market economies had been on the whole positive, with a peak gain of about US $22 thousand million in 1977, a year of export boom. Gains were reduced by nearly half the following year and continued to shrink in 1979. By 1980 there was a shift in the income balance, with developing market economies suffering an aggregate loss of US $1 600 million, the first since 1971. The year 1981 witnessed a further sharp deterioration. Of all developing regions Africa was, again, the worst affected as the losses in the purchasing power of its agricultural exports - US $4 000 million - represented over 60% of the developing market economies' total losses.

TABLE 1-10. EXCESS AND DEFICITS IN REAL AGRICULTURAL (CROPS AND LIVESTOCK) EXPORT EARNINGS, 1979-81 1/

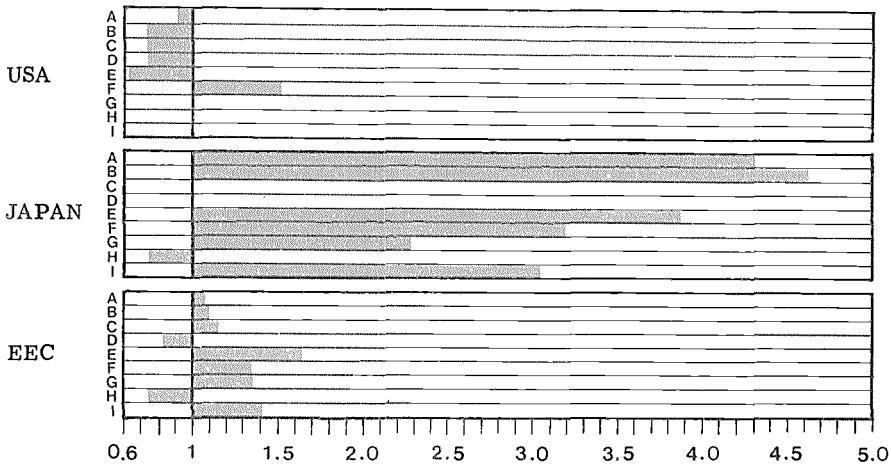
	1979	1980	1981
	..... current million $		
Developed market economies	66 969	58 715	59 353
Developing market economies	11 121	-1 584	-6 572
Africa	- 957	-3 378	-4 040
Far East	3 728	1 168	- 389
Latin America	9 190	2 578	-
Near East	-1 114	-2 000	-2 024

1/ Calculated by multiplying the current value of total agricultural exports by the index of income terms of trade in each year and deducting from the product the current value of agricultural exports. For instance, the 1979 figure for developed market economies - US $66 969 million - is obtained by multiplying the value of agricultural exports in 1979 - US $128.79 thousand million - by the index (1969-71 = 100) of income terms of trade of agricultural products against manufactures and crude petroleum in that year - 152 - and deducting from the result of this product - US $195.76 thousand million - the value of US $128.79 thousand million.

Source: FAO, ESP estimates.

Agricultural Protectionism in Some Major Industrial Countries

This section reviews some recent developments in national policies affecting supply and trade of selected food products in the EEC, Japan and the United States 3/. Price support measures in this group of countries 4/ are considered in relation to world prices as a broad indicator of the levels of protection granted to the different products (ad valorem tariff equivalent). The divergence between domestic prices and world prices may be broadly assumed to reflect the cumulative effect of the various tariff and non-tariff barriers, production and export support and stabilization measures (Fig. 1-3).



Source: USDA; Monthly statistics of agriculture, forestry and fisheries, Government of Japan (various issues); Eurostat and FAO

Figure 1-3
RATIOS OF DOMESTIC PRODUCER PRICES AND INTERNATIONAL PRICES, 1977 - 82

A = WHEAT
B = BARLEY
C = MAIZE
D = RICE
E = SOYBEANS
F = BUTTER
G = BEEF
H = PORK
I = SUGAR

There are wide differences in the prices paid to farmers in the EEC, Japan and the United States, partly reflecting the entirely different agricultural environment and cost structures in these countries 5/. Prices for cereals in the US in 1980 and 1981 were on average 50% to 75% lower than those paid in the EEC and about one-seventh of those paid in Japan. Unlike the EEC and Japan, the US farm support prices for cereals and soybeans were also well below world export prices. In addition there are fundamental differences

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3/ For more in-depth discussions of agricultural protectionism, see the following publications. UNCTAD: Agricultural Protection and the Food Economy, Research Memo No. 46, Geneva, March 1972. FAO, Commodity Review and Outlook: 1979-80, Rome 1980, pp.109-122. Also see Valdés, Alberto and Joachim Zietz: Agricultural Protection in OECD Countries: Its Cost to Less-developed Countries, IFPRI, Research Report 21, December 1980.

4/ Price support measures are obviously not specific to these countries as many other developed and developing countries, both agricultural importers and exporters, are at least as aggressive in supporting their production.

5/ For example, the cost of mechanization per metric ton of rice in 1978 was about US $225 in Japan compared to US $22 in the US. The Japanese farmer paid US $75.63 for fertilizer for each ton of rice he produced against US $13.30 for the US farmer at comparable yield levels.

in the techniques of supporting farm incomes. In the United States direct intervention in cereal market prices is comparatively minimal and, in periods of tight supply, its producer support has been restricted to sporadic deficiency and disaster payments. Recently, however, considerable government resources have been allocated in the form of farm lending through the Commodity Credit Corporation (CCC). Farm income spending by the CCC amounted to US $15 400 million in the year ending September 1982, 69% more than in 1981 and 127% more than in 1980. Between 1981/82 and 1982/83, the levels of price support for wheat rose by 25%, for maize by 15% and for rice by 14%. While such price increases were insufficient to offset the declining trend in farm incomes as will be discussed later, they contributed to the building up of stocks of cereals and dairy products.

As regards sugar, the US Government has periodically operated price support measures through loan or purchase programmes. Such measures were introduced in late 1977, temporarily discontinued in 1980 when international prices were high, and reintroduced again later. The market stabilization price effectively insulated domestic prices from international prices which were much lower. The differential between the world price and the domestic price (New York basis) for raw sugar averaged 15 cents per pound in the third quarter of 1982. With the fall in world sugar prices the United States government increased import fees in April 1982. When this proved insufficient to raise internal prices to the market stabilization level, it resorted to import quotas. Quotas were set at 2.5 million tons, raw value, compared with 4.4 million tons imported annually on average during the five years before their imposition.

Farm support operations in the EEC are carried out through a system of guaranteed prices covering a large proportion - about three-quarters in recent years - of the Community's total agricultural production, and a system of variable import levies. By incorporating a variable charge into the delivered price of imports from third countries, the levies maintain foreign prices at or above those received by domestic producers. It has been estimated that for nine main agricultural products of the Community, the additional nominal protection from levies is 45%, over three times the average tariff rate of 14% 6/.

By January 1983, import levies for wheat represented about 55% of the support (intervention) price for bread wheat and levies for coarse grain about 55 to 60% of the intervention price. Levies for cereals, in particular wheat and barley, rose sharply in 1982 reflecting the decline in international prices. The effects of these mechanisms, insulating farmers from international competition, are reflected by the high levels of support prices granted by the Community in relation to international prices (Fig. 1-3).

High prices and relatively stable domestic demand have resulted in increasing overproduction of a number of commodities including wheat, sugar, dairy products, beef and veal. While the Community remains a net agricultural importer, it has also become the second largest agricultural exporter after the United States.

In Japan, farm support is provided through payments from tax and government bond revenues, through public corporations and through income transfers from consumers who pay prices often several times higher than world market prices. Direct and indirect agricultural subsidies during the year ending April 1981 totalled an estimated 2 455 billion yen a year (about US $11.05 billion). This figure represents over half of the total farm

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6/ Yeats, A.J. Trade Barriers Facing Developing Countries, St. Martin's Press, New York, 1979.

income in 1980. About half of the subsidy expenditure is related to the rice programme, under which about half of the country's rice crop is purchased at supported prices and then resold to wholesalers at a loss.

However, other agricultural products, including soybeans and wheat, benefit from the government's efforts to move away from overdependence on rice. For livestock products, the profits from the sale of imported beef - for which a quota system is applied - provide subsidies and low interest loans to livestock producers. They also subsidize the storage of surplus production. A similar system is operated on the sales of imported wheat, barley and rice, the benefits of which are being used to help finance cereal subsidy programmes.

When added together the effects of the different programmes on domestic prices are considerable. Japan supports its food production at higher levels than any other major importing country, while still leaving scope for imports. However, some levelling off in support prices has recently taken place, reflecting budgetary strains, supply/demand adjustments and the decline in international prices.

Trade Negotiations[7/]

With the problems besetting world trade and particularly the apparent inability of the system of multilateral negotiations to deal with them, attention naturally was focused on the Thirty-Eighth Session of the GATT Contracting Parties held in November 1982 at ministerial level for the first time in 9 years. The concluding Declaration approved an examination of agricultural trade problems by a new GATT Committee on Trade in Agriculture. This study, designed to provide policy recommendations for the 1984 Session of the Contracting Parties, will cover all measures affecting agricultural market access and supplies. The Contracting parties also decided to carry out consultations and negotiations aimed at further liberalization of trade in tropical products including their processed and semi-processed forms and to examine factors affecting trade in forestry, fish and fisheries products.

Agreement on the Common Fund for Commodities which was reached in June 1980 and which was regarded as the cornerstone of international action to stabilize commodity prices, did not come into force on 31 March 1982 as planned because insufficient countries had ratified it. The 25 countries that had ratified extended the deadline to 30 September 1983.

FOOD STOCKS AND WORLD FOOD SECURITY

Food Stocks

The coincidence of relatively high levels of world production for several food commodities and rather weak effective demand has resulted in the accumulation of stocks, not only of cereals but other food commodities as well. World carry-over stocks of cereals amounted to 275 million tons by the end of the 1981/82 year, equivalent to 18% of apparent

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7/ For a fuller discussion of the GATT Session and the negotiations relevant to agricultural trade, see FAO, Commodity Review and Outlook, 1983/83, Rome, 1983.

consumption and an increase of about 20% over the previous year (Table 1-11). A further increase of similar magnitude is foreseen for 1982/83. For dairy products, the government-intervention agencies in the EEC and the United States held over 1.1 million tons of skim milk powder in December 1982, double the quantity of two years previously. Stocks of butter and cheese were also higher.

TABLE 1-11. WORLD STOCKS: ESTIMATED TOTAL CARRYOVERS OF CEREALS 1/

	Crop year ending in:			
	1980	1981	1982 2/	1983 3/
	million metric tons			
BY REGION				
Developed countries of which:	156.2	133.8	177.1	230.6
USA	78.1	62.2	104.4	156.7
Canada	14.3	12.9	14.9	18.8
EEC 4/	15.8	15.7	14.7	18.3
USSR	16.0	14.0	14.0	14.0
Japan	10.6	8.8	7.4	6.0
Australia	5.0	2.7	3.1	1.1
Developing countries of which:	99.8	98.5	97.9	98.1
Africa	2.9	3.6	4.7	4.4
Far East	82.0	74.7	74.6	74.9
China	53.0	45.5	43.0	44.0
India	10.8	7.1	7.4	10.2
Korea, Republic of	2.1	2.4	2.2	2.1
Latin America	6.4	11.1	9.2	9.8
Argentina	1.1	0.5	0.8	1.4
Brazil	1.3	3.8	2.6	3.5
Near East	9.4	10.1	10.3	9.2
Turkey	0.8	0.6	0.6	0.6
BY CEREAL				
World total cereals of which:	256.0	232.4	275.0	328.7
Wheat	104.8	97.1	101.9	118.5
Coarse grains	109.3	94.1	131.7	171.4
Rice (milled basis)	42.0	41.1	41.4	38.9
	%			
World stocks as % of consumption	18	16	18	21

1/ Stock data are based on an aggregate of national carryover levels at the end of national crop years and should not be construed as representing world stock levels at a fixed point of time.

2/ Estimate. 3/ Forecast. 4/ Ten member countries.

Note: Based on official and unofficial estimates. Total computed from unrounded data.

Source: FAO, ESC.

World stocks of sugar also rose by some 8 million tons in 1981/82 to 32 million tons (annual consumption is about 91 million tons), but a new record level of 37-39 million tons is expected by the end of the 1982/83 season. An increase in the stocks of edible oils and fats is also forecast for 1983.

Although the presence of large stocks of food commodities (especially cereals) has improved world food security, this situation holds several undesirable features.

Accumulating stocks underline the current imbalance in world food supply and demand. Several developed countries are producing food in excess of domestic and export market demand. Some of them have programmes that divert food commodities to animal feed or industrial uses. Currently in at least one of them, the United States, programmes have been legislated that aim to reduce cereal production. Yet in developing countries there exists a large unsatisfied demand.

Stocks, and particularly those of cereals, and dairy products are concentrated in developed countries. For example developed countries are expected to hold 70% of world cereal stocks by the end of their 1982/83 season, an increase of 30% over 4 years. Cereal stocks in developing countries have not increased since 1976/77.

The Seventh Session of the Committee on Food Security (CFS) in April 1982 stressed the need for a better distribution of stocks. Stocks in many developing countries remain below target levels mainly because of lack of storage facilities and the means to purchase stocks. Yet FAO's Food Security Assistance Scheme, aimed to improve the capacity of developing countries to maintain their food security, remains short of funds.

Coarse grains constitute over half of world cereal stocks. On the other hand, stocks of rice and wheat by the end of 1982/83 are not forecast to be much higher than the levels of 1978/79.

Efforts to Improve World Food Security

The importance of food security as a priority objective of the world community has been reiterated at recent summit meetings such as the Western Summit in Ottawa and the North-South Summit in Cancún in 1981. Yet there has been only limited progress these past two years in improving it.

Partly as a reflection of the lack of progress at the global level, governments of developing countries have, however, shown increasing interest in regional food security arrangements. For example, a Regional Commission on Food Security for Asia and the Pacific was established by the FAO Council in 1982 on the recommendation of the 16th FAO Regional Conference for Asia and the Pacific. Its purpose is to foster collective self-reliance in food supplies among member nations at regional or sub-regional levels. The first session will be held in 1983.

In Africa, countries of the Southern African Development Coordination Conference (SADCC) are in the process of carrying out feasibility studies for a number of specific projects identified for strengthening food security in the region. An important initial component would be the establishment of an early warning system against impending food shortages. Steps have been examined by the Comité Permanent Inter-Etats de Lutte contre la Sécheresse du Sahel (CILSS), individual governments and potential donor nations towards establishing a system of national and regional food reserves in the Sahel, and a training programme is being initiated under the Technical Cooperation Programme (TCP).

In Latin America, an Action Committee on Food Security has been set up within the framework of the Sistema Econômico Latinoamericano (SELA). It has been entrusted with the responsibility of developing the actions necessary for the establishment of a regional food security system, in line with the recommendation of a meeting of high level national experts held in Mexico in August 1981.

There has been some increase in capacities to store food grains in developing countries. This has been assisted in part by FAO's Food Security Assistance Scheme. However, relative to storage needs in these countries, progress has been slow.

Negotiations toward a new International Wheat Agreement reached an impasse in 1979 and are not expected to be resumed in the foreseeable future. The Food Aid Convention (FAC), strengthened in 1980, as well as the existing Wheat Trade Convention (1971), was extended to June 1986 by the Food Aid Committee meeting in December 1982. Yet many observers have remarked that it is disappointing that the opportunity created by abundant stocks of cereals and freedom from widespread food shortages has not been taken to build a more durable system to ensure access to essential food supplies for low-income countries.

Early consideration should be given to a possible liberalization of access to the IMF cereal import financing facility which was set up in May 1981 for an initial four-year period. There are limitations on drawings at present because they are linked to the compensatory financing covering shortfalls in export earnings and are limited to cereal imports. Given the current trade situation, by December 1982 10 countries had already drawn on their quota to compensate for export shortfalls and hence would be limited to only 25% of their quota to cover cereal imports. The facility is due for a mid-term review by the IMF Executive Board in 1983.

As has been emphasized, the present world food security situation presents a mixed picture: ample world food supplies contrasting with persistent food problems in many places amidst a discouraging economic and international cooperation climate. The basic causes of food insecurity remain. With this situation in mind, the Director-General of FAO has proposed a new concept of food security, new approaches towards solving world food security problems and proposals which have been supported by the FAO Council and the World Food Council. The recommendations in his 1983 report to the Committee on World Food Security may thus lead to more concerted international efforts to establish a comprehensive and effective world food security system for the future.

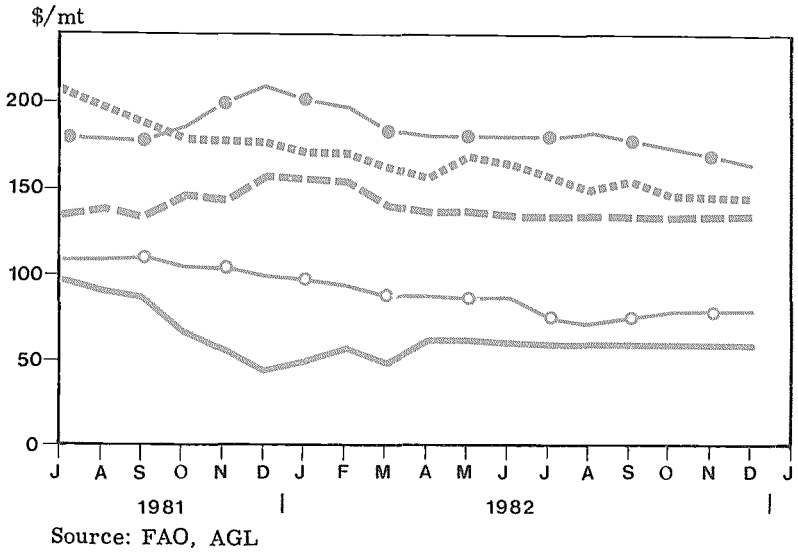
DEVELOPMENTS IN THE MEANS OF PRODUCTION

An issue of concern to agricultural policy makers particularly in developed countries, has been the price-cost squeeze in which many agricultural producers have been placed, especially in countries where agriculture is more exposed to market forces such as the United States. In particular, the high levels of interest rates that have prevailed in the early 1980s placed a severe burden on many farmers and led to an abnormally large number of bankruptcies. Since mid-1982, important components of agricultural producers' costs have tended to stabilize or decline thus providing some relief to that sector. Nominal interest rates have declined although in real terms they remain at high levels (See Box). However, at the same time, commodity prices also have been depressed although for producers in many developed countries, measures are taken to support prices well above international levels.

Fertilizer Prices, Consumption and Availability

Fertilizer prices have declined in the United States in line with weakening export prices (Fig. 1-4). Elsewhere they are determined more by domestic supply and demand and, if imported, by variations in exchange rates. However, except in those countries where fertilizer subsidies were removed for budgetary reasons, fertilizer prices in real terms should have eased.

The FAO Commission on Fertilizers meeting at the end of January 1983, noted with concern that current low realization prices 8/ for fertilizers could lead to inadequate investment in fertilizer production capacity and hence higher fertilizer prices in the future. In 1981/82 fertilizer production declined for the first time since the Second World War. The overall decline was 4% but it was much more in North America (16.5%). Production also declined by over 7% in Latin America. However, it expanded in Asia by over 4%.



Source: FAO, AGL

Figure 1-4
FERTILIZER PRICES

Urea (bagged), f.o.b. Western Europe
Diammonium Phosphate, f.o.b. U.S. Gulf
Triple Superphosphate, f.o.b. U.S. Gulf
Potassium Chloride, (standard) f.o.b. Western Europe
Ammonium sulphate, f.o.b. Western Europe

Fertilizer consumption also declined in 1981/82, for the second time in the last 30 years, by just over 1% (Table 1-12). Thereby production and consumption were brought more nearly into balance in 1981/82 after allowing for losses in storage and distribution and non-agricultural use. This decline in consumption was not confined to the developed market economies. Consumption also declined in Latin America and China but remained virtually unchanged in Africa. However, consumption did expand a little in the other developing regions and for all developing countries together there was almost no change. This was a disquieting reversal from the average annual increase of about 10% in the 1970s and in comparison with the required annual increase projected by AT 2000 at over 8% over the period 1980-2000.

8/ The price required to encourage investment in new fertilizer production capacity.

Recessionary conditions in the agricultural sector and low prices for coffee in Latin America and, in particular, high interest rates in North America clearly affected uptake. In many developing countries foreign exchange problems were curtailing the normal flow of imported fertilizers: developing market economy countries import about half their nitrogenous and phosphatic fertilizers and nearly all of their potassic fertilizers.

TABLE 1-12. FERTILIZER CONSUMPTION

				Change		Annual rate of change	
	1979/80	1980/81	1981/82	1979/80 to 1980/81	1980/81 to 1981/82	1977/78 to 1981/82	1971/72 to 1981/82
	.. million metric tons ..			..... %			
Total developed countries							
Nitrogen	34.68	35.73	35.36	3.0	-1.0	2.9	4.1
Phosphate	22.94	22.05	21.69	-3.9	-1.6	0.1	2.0
Potash	20.36	20.24	20.10	-0.6	-0.7	-0.4	2.6
Total nutrients	77.98	78.02	77.15	0.1	-1.1	1.2	3.1
Total developing countries							
Nitrogen	22.57	24.87	25.08	10.2	0.8	8.8	11.7
Phosphate	8.22	9.40	9.22	14.4	-1.9	6.5	9.1
Potash	3.58	4.03	3.84	12.6	-4.7	7.6	10.0
Total nutrients	34.37	38.30	38.14	11.4	-0.4	8.5	10.8
Africa	1.15	1.43	1.47	24.3	2.8	9.4	5.8
Far East	9.47	10.09	10.84	6.5	7.4	9.3	9.9
Latin America	6.70	7.52	6.36	12.2	-15.4	2.7	8.4
Near East	3.00	2.95	3.22	-1.7	9.2	5.7	9.8
Asian centrally planned economies	14.03	16.30	16.21	16.2	-0.6	11.4	13.8
World							
Nitrogen	57.26	60.60	60.44	5.8	-0.3	5.2	6.6
Phosphate	31.15	31.46	30.92	1.0	-1.7	2.1	3.5
Potash	23.95	24.27	23.93	1.3	-1.4	0.8	3.5
Total nutrients	112.36	116.33	115.29	3.5	-0.9	3.4	5.0

Source: FAO, Fertilizer Yearbooks.

The FAO Commission on Fertilizers suggested that there may be possibilities for assistance by appropriate agencies such as the IMF, to be given to countries with balance of payments problems to enable them to maintain fertilizer imports.

Agricultural Producers' Incomes and Support Measures

Agricultural producers faced unusually difficult economic conditions during the past two years. Sluggish demand confronted ample supplies of most agricultural commodities and depressed prices. While the slowing down in general inflation rates also reduced the increase in production costs, some cost elements, in particular interest rates, rose sharply (see Box). Real agricultural incomes in 1981 and 1982 tended to decline in most industrial countries although, in the EEC as a whole, a moderate recovery was recorded in 1982.

Partial data also indicate an overall unfavourable situation in farm prices and incomes in developing countries. On the positive side, lower prices for food products and agricultural raw materials have been an important element in the recent slowing down in consumer price inflation in industrial countries.

The average increase in common farm prices in European Currency Units (ECU) for the EEC was 9.5% in 1981/82, nearly double the percentage increase of the previous marketing year, and it rose further by 10.5% in 1982/83. Expressed in national currencies and taking account of all the agri-monetary adjustments adopted since the previous price decisions, the average increase in 1982/83 was 12.2%. An important factor in deciding such large price increases was the objective to compensate farmers for a sharp decline in income between 1978 and 1981. During this period agricultural producer prices had risen by 8.7% per annum, retail food prices by 10.1% and consumer prices in general by 12.2%.

The impact of the 1982/83 price decisions on consumer food prices (in national currencies) is estimated at between 4.5% and 5% for the Community as a whole, which corresponds to an increase of about 1% in the cost of living.

For the 1983/84 marketing year, the European Commission proposed an average increase of 4.4% in agricultural prices. This restrained proposal was largely based on the need to continue the fight against inflation and limit the volume of production for certain products which are currently in surplus, particularly cereals, sugar, milk and rapeseed. For these products the Commission proposed below-average price rises. While merely maintaining farm incomes at current levels, the 1983/84 farm price proposals would have only a moderate impact on food prices.

In the United States, prices paid for production inputs, interest, taxes and wage rates in 1982 are expected to rise by only 3%, after having risen by an average 11% over the past three years. The 1982 increase would be the smallest since 1968 when the index rose by 2%. However, the easing in production costs did not compensate for low farm revenues. Prices received by farmers for all farm products, which had risen by only 1.5% and 3.0% in 1980 and 1981 respectively, actually tended to decline in 1982, particularly in the second half of the year. Farmers' overall net income was estimated to have fallen to US $19 billion in 1982, from US $25 billion in the previous year.

In Canada net farm income in 1982 was also expected to decline by about 9% below the previous years' levels, reflecting a stagnation of farm cash receipts and a 3% increase in total farm operating expenses and depreciation charges. Net farm income in 1983 is likely to show a further slight decline from the 1982 level. Average farm wage rates by mid-1982 were about 7% higher than a year ealier, a substantially lower rate of increase than that of consumer prices (12.5% in 1981) and wages in other sectors. As a consequence, the gap between Canadian farm and non-farm wage rates continued to widen.

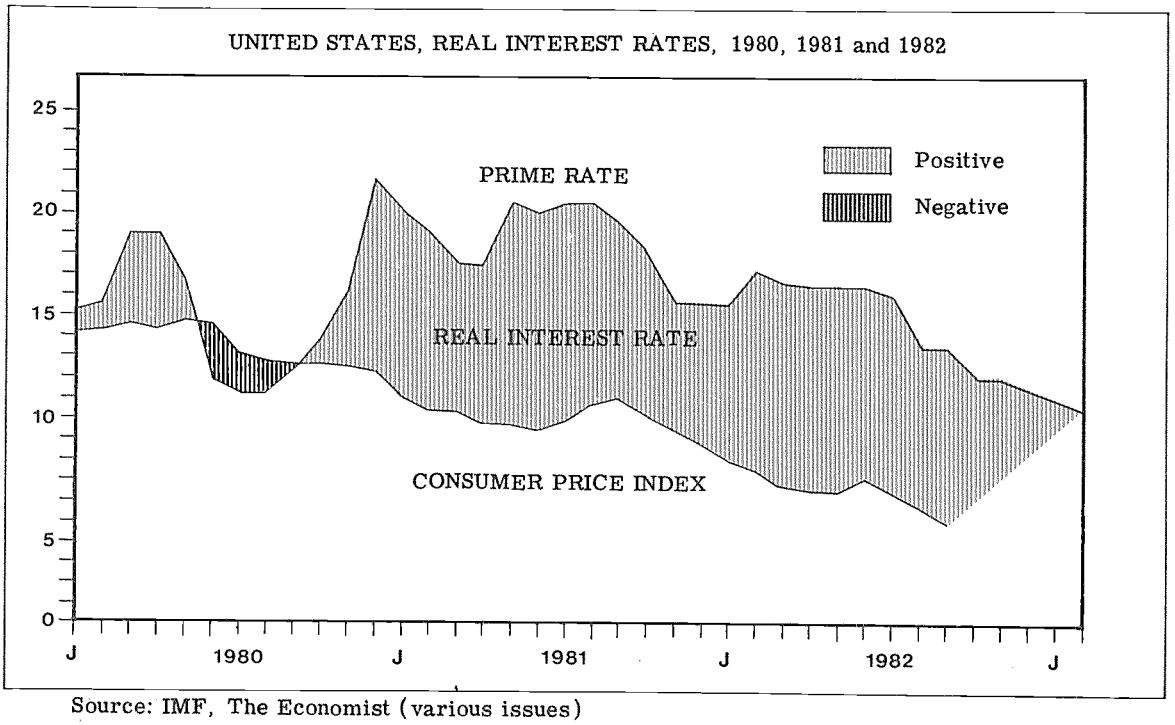
NOMINAL AND REAL INTEREST RATES

The combined effect of monetary stringency and continued rapid inflation led to a sharp increase in interest rates, which by 1980 and 1981 had surpassed previous historical levels in several major industrial countries. An important factor behind the generalized increase in interest rates was the action of the United States Federal Reserve System to limit the growth in US money and credit. Despite parallel movements in other countries, however, interest rate differentials in favour of the US dollar tended to widen. From September 1981, a sharp decline in the US rates of interest took place, pari passu, with the easing in inflationary pressures. By January 1983 interest rates of prime lending in the United States were 11 percentage points lower than by mid-1981.

An approximate indication of the restrictiveness of interest rates or their deflationary impact may be derived from the difference between the nominal interest rate and the rate of inflation. Such comparison provides a measurement of "real" interest rates. The figure shows the evolution of the United States prime rates vis-à-vis the consumer price index in 1980-82. Real interest rates were relatively low in 1980 and, during four consecutive months, were actually negative. Since the last quarter of 1980, widely diverging trends in prime rates and consumer prices resulted in a sharp increase in real interest rates which reached peaks of 10.50% to 10.70% by mid-1981.

Real interest rates of 10% and more are without doubt a major issue in the continued recession. Although the prime rate is a basic indicator of the whole structure of commercial interest rates in the US, it applies only to first-class risk corporate borrowers, with other borrowers paying generally higher rates. Therefore interest rates paid by farmers on short-term loans were even higher than those shown.

UNITED STATES, REAL INTEREST RATES, 1980, 1981 and 1982



Source: IMF, The Economist (various issues)

Recent developments in farm incomes are much less known in developing countries. The ratio of prices received by farmers to prices paid for production requisites in twelve developing countries for which information is available showed a deteriorating trend during 1978-1981 in all but two countries. Rising costs affected more severely net farm incomes in Argentina, Uruguay, Jordan, the Republic of Korea, Botswana and Mali.

In many African countries there is evidence of a persisting urban bias in agricultural and food pricing to the detriment of farm incomes. This is frequently apparent in the area of foreign trade. Overvalued exchange rates and erratic import policies for food products have contributed to reducing the incentives for domestic producers to increase food production.

Farmers in Latin America appear to have been particularly vulnerable to the slow-down in demand. Producer profits were expected to decline in 1982 as a result of low prices, high interest and inflation rates as well as higher levels of indebtedness. Some relief may be provided by the currency devaluations of several countries in the region, including Argentina, Brazil, Costa Rica, Mexico and Peru. This action should encourage exports and indirectly favour producer incomes. Producer subsidies have been important elements in the farm support policies of some major agricultural countries in the region including Brazil and Mexico. However, countries like Argentina have been forced to lower some agricultural subsidies to check the inflationary effects of the devaluation. By late 1982 also the Mexican government has drastically reduced agricultural subsidies and price controls.

Partial information for the Far East also suggests generally unfavourable farm price and cost developments requiring in many cases active support measures by government. Subsidies were granted either directly to farmers as was the case in Malaysia, or more often through the subsidized distribution of inputs. The high budgetary cost involved, however, caused some countries to reduce the scale of farm subsidization. For example, grain growers in Bangladesh suffered from a sharp reduction in input subsidies allocated in the 1982/83 budget which resulted in increases of 11% and 20% respectively in prices of fertilizers and irrigation equipment. Minimum prices for paddy and rice were increased by 9% and 11% respectively, but these were considered to be insufficient to compensate for higher production costs.

DEVELOPMENT ASSISTANCE AND FOOD AID

Total net disbursements of Official Development Assistance (ODA) to developing countries, for all sectors including agriculture, have been increasing steadily in current terms from 1970 to 1980. For the first time, these disbursements have decreased in 1981 to $35.5 billion from $36.4 billion in 1980. This confirms the fears expressed in earlier issues of SOFA that the budgetary constraints faced by donor countries will affect negatively the flows of aid to developing countries. At the time ODA is declining, the debt of developing countries is soaring and is estimated to have reached $626 billion in 1982. Moreover, their export earnings have been dwindling as already discussed.

The situation is therefore alarming, especially if one considers the importance and role of ODA in the development efforts of low-income developing countries. The fall in ODA in 1981 was due to the decrease in OPEC bilateral aid. An increase in aid from this source in the near future is difficult to foresee since many OPEC countries are themselves facing financial difficulties as a consequence of declining oil prices. The reversal of the present trend of ODA could be achieved only if other donors and the capital surplus

OPEC countries step up substantially their aid to developing countries. This would require stronger political support of aid in the donor countries than has been shown over the past few years.

External Assistance to Agriculture in 1981 in Comparison with Recent Years

The analysis of external assistance to agriculture is based on commitment data; statistics on disbursements are still missing and efforts are currently being made to collect them (see Box). According to preliminary data, official commitments of external assistance to agriculture "narrow definition" - that is, activities "directly" in support of the agricultural sector - decreased in 1981 by 7.5% to $7 300 million at current prices, corresponding to $4 900 million at 1975 prices (Table 1-13). The decline appears to have been particularly marked in the case of bilateral commitments, which went down for the second consecutive year, this time by 15%.

TABLE 1-13. OFFICIAL COMMITMENTS OF EXTERNAL ASSISTANCE TO AGRICULTURE (NARROW DEFINITION)

	1976	1977	1978	1979	1980	1981 1/
	..... million $					
TOTAL COMMITMENTS						
Multilateral 2/	1 934	2 764	3 851	3 634	4 732	4 616
Bilateral 3/	1 582	1 940	2 626	3 323	3 188	2 710
Total at current prices	3 516	4 704	6 477	6 957	7 920	7 326
Total at 1975 prices 4/	3 516	4 316	5 182	4 865	5 013	4 884
Total at 1980 prices 4/	5 555	6 819	8 188	7 687	7 920	7 717
CONCESSIONAL COMMITMENTS						
Multilateral	1 132	1 374	2 040	2 028	2 638	2 247
Bilateral	1 449	1 926	2 590	3 220	3 159	2 420
Total at current prices	2 581	3 300	4 630	5 248	5 797	4 667
Total at 1975 prices	2 581	3 028	3 704	3 670	3 669	3 111
NON-CONCESSIONAL COMMITMENTS						
Multilateral	802	1 390	1 811	1 606	2 094	2 369
Bilateral	(133)	(14)	(36)	(103)	(29)	(290)
Total at current prices	935	1 404	1 847	1 709	2 123	2 659
Total at 1975 prices	935	1 288	1 478	1 195	1 344	1 773

1/ Preliminary, including partial estimates.

2/ Including World Bank, IDB, AFDB/ADF, ASDB, IFAD, OFID, AFESD, ABEDA, ISDB, UNDP, FAO (TF/TCP) and commitments to CGIAR.

3/ DAC bilateral, EEC and OPEC bilateral.

4/ Deflated by the UN unit value index for the export of manufactured goods.

( ) Based on partial information.

Source: FAO and OECD.

This recent picture regarding assistance to agriculture "narrow definition" is similar to that for the "broad definition" (Table 1-14). However, there was a small increase in total Official Commitments of External Assistance to Agriculture (OCA) of less than 2% in terms of current dollars, but 7% in terms of constant dollars, gains in multilateral assistance making up for the apparent decline in bilateral assistance. As with assistance to "narrow definition", reductions have occurred particularly with concessional commitments, the decline being about 7% in 1981.

TABLE 1-14. OFFICIAL COMMITMENTS OF EXTERNAL ASSISTANCE TO AGRICULTURE (BROAD DEFINITION)

	1976	1977	1978	1979	1980	1981
	..... million $					
TOTAL OCA						
Multilateral 1/	3 016	4 014	5 238	5 129	6 689	7 069
Bilateral	2 237	3 113	3 837	4 949	4 598	4 396
Total at current prices	5 253	7 127	9 075	10 071	11 287	11 465
Total at 1975 prices 2/	5 253	6 538	7 260	7 043	7 144	7 643
Total at 1980 prices 2/	8 300	10 330	11 471	11 128	11 287	12 076
CONCESSIONAL OCA						
Multilateral	1 665	1 704	2 487	2 730	3 603	3 432
Bilateral	1 833	2 933	3 443	4 578	4 300	3 926
Total at current prices	3 498	4 637	5 930	7 308	7 903	7 358
Total at 1975 prices 2/	3 498	4 254	4 744	5 111	5 002	4 905
NON-CONCESSIONAL OCA						
Multilateral	1 351	2 310	2 751	2 399	3 086	3 637
Bilateral	404	180	394	364	298	470
Total at current prices	1 755	2 490	3 145	2 763	3 384	4 107
Total at 1975 prices 2/	1 755	2 284	2 516	1 932	2 142	2 738

1/ Including World Bank (IBRD/IDA), IFAD, IDB, ASDB, AFDB/ADF, OFID, AFESD, ABEDA, ISDB, UNDP, FAO (TCP/Trust Funds) and commitments to CGIAR.

2/ Deflated by the UN unit value index of the export of manufactured goods.

Source: FAO and OECD.

The recent record of external assistance to agriculture raises some important issues:

- In real terms, commitments to agriculture "narrow definition" in 1981 were barely at the same level as in 1979, while they increased by 48% during the preceding three years (1976-1978).

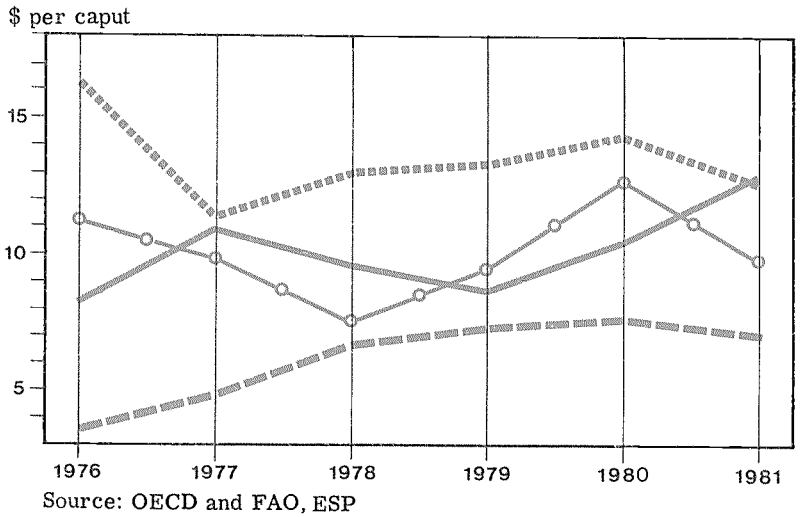
- The volume of assistance to agriculture "narrow definition" is still 40% short of the internationally agreed estimate of annual requirements of $8 300 million at 1975 prices for the period 1975-1980 ($13 100 million at 1980 prices). It is also far below the estimated requirements of $12 500 million (at 1975 prices) for 1990, projected in the FAO study "Agriculture: Towards 2000" and mentioned in the UN General Assembly Resolution 36/185.

- External assistance to agriculture from bilateral sources is provided mostly on concessional terms. Not only has the amount of total bilateral assistance to agriculure declined but its concessional component has also tended to decrease. This indicates a hardening in the terms of external flows to developing countries' agricultural sectors. Coinciding with the stagnation in the volume of assistance, this hardening puts further strains on their balance of payments.

- In times of even modest cutbacks in aid overall there may be serious interruptions of aid flows at the level of individual countries. In addition, delays in project mobilization and other problems may create large differences between aid commitments and actual disbursements.

The regional picture

The regional impact of the changing flows of development assistance since 1976 have been of some consequence (Fig.1-5). In terms of real capital commitments per head of the agricultural labour force, aid to African agriculture (broadly defined) fell back from 1977 to 1979 but subsequently recovered quite strongly even in 1981. By that year each member of the agricultural labour force was receiving 55% more capital commitments in real terms



Source: OECD and FAO, ESP

Figure 1-5
ODA CAPITAL COMMITMENTS TO AGRICULTURE (BROAD DEFINITION) PER CAPUT OF AGRICULTURE LABOUR FORCE, AT 1975 DOLLARS

than 6 years previously. Africa received greater bilateral assistance in particular. There has been no clear trend in the Near East although the overall level of commitments is relatively high. Aid to the region's agricultural sector suffered a sharp setback in 1981. The Far East and Pacific region has shown the most consistent increase with capital commitments per head of the agricultural labour force being more than 100% greater in 1980 than in 1976 but still well below the other developing regions. The greater part of

DISBURSEMENTS OF EXTERNAL ASSISTANCE TO AGRICULTURE

As part of its efforts to improve the reporting on official external assistance to agriculture, FAO has developed a data bank on loans and grants provided by bilateral and multilateral donors to developing countries for the development of their agricultural sectors.

The data stored are the amount, terms and purpose of all loans and grants committed from 1974 onwards. Technical assistance grants are the exception because data on individual transactions are not available.

The FAO data bank is up-dated annually. Moreover, an attempt has been made, in cooperation with OECD and multilateral agencies concerned, to collect data on annual disbursements of the loans and grants committed to agriculture since 1974. Some preliminary figures on disbursements made by multilateral lending agencies in the years 1979 to 1981 on loans committed from 1974 onwards are shown below.

Although these disbursement figures may be slightly underestimated because the disbursements on loans committed before 1974 are not included, the amounts actually disbursed in a year are far below the amounts committed in the same year. The volume of disbursements in a given year of course depends on the volume of commitments made earlier and how rapidly the commitments are disbursed.

A more detailed analysis of disbursements in relation to commitments of external assistance will be presented in the next issue of SOFA. It is hoped that data on bilateral disbursements will be available for their inclusion in this analysis.

Disbursement of total multilateral external assistance in 1979-1981 1/

	1979	1980	1981
	million $		
Agriculture "broad" definition	2 500	2 900	3 200
(as % of commitments made in same year)	(53%)	(47%)	(50%)
Agriculture "narrow" definition	1 600	1 900	2 200
(as % of commitments made in same year)	(49%)	(45%)	(54%)

1/ Excluding technical assistance grants. The figures on commitments used to compute the ratios shown in the table refer to capital commitment only. Therefore, they are lower than those reported in Tables 1-13 and 1-14.

Source: FAO estimates.

the increase in commitments to agriculture in this region was from multilateral sources, but not by a large amount. The region suffered a moderate reduction in 1981. The surprising feature of the flows of aid to Latin America - as measured in Fig. 1-5 - is their level relative to other regions: in every year but one out of the period 1976-81, they received the greatest amount. But typically these countries have relatively low percentages of their populations employed in agriculture. Nevertheless during the 1970s, for example, Brazil received significantly more aid to agriculture per head of agricultural population than India.

ODA capital commitments to the 36 least developed countries (LDCs)[9/] fell by 4% in current prices in 1981 according to preliminary estimates. This was a sharp reversal from the preceding 3 years when commitments had nearly doubled.

Assistance to Africa

Despite the overall worsening climate for development assistance, aid to agriculture "broad definition" in Africa [10/] has increased apart from a setback in 1978. About one-half of these commitments has usually gone into activities directly related to crops and livestock. There has been a move away from land and water development perhaps because of the problems and rising costs of implementing irrigation schemes (Fig. 1-6). Commitments

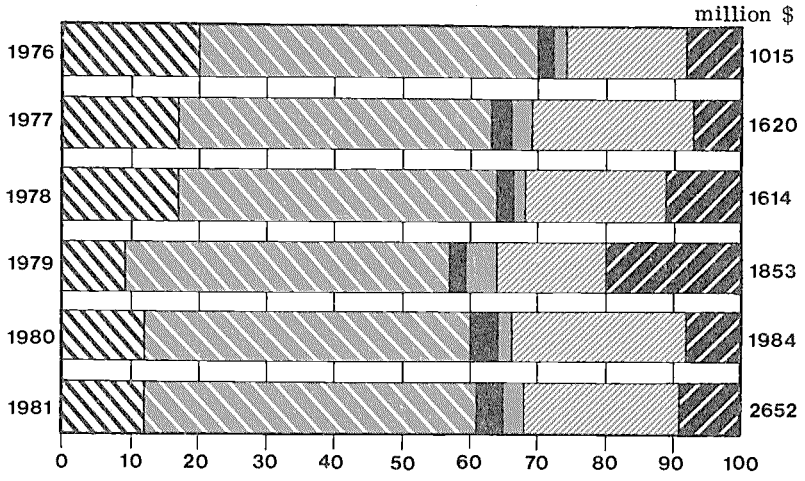


Figure 1-6
OFFICIAL CAPITAL COMMITMENTS TO AFRICA, BY MAJOR PURPOSE

Source: OECD and FAO, ESP

to agro-industries including the manufacture of fertilizers have been irregular because of the lumpy nature of capital investments. The share of concessional commitments in the total to Africa has tended to decline in line with what has happened in other regions, but the decline has been only marginal. It should be recalled that most of the Least Developed Countries are in Africa and that most of the donors agreed at the UN Conference on the LDCs held in Paris in 1981 to make special efforts to increase the flows of ODA to them [11/].

9/ As revised by UN General Assembly, 37th Session, December 1982.

10/ Excluding Egypt, Libya and Sudan.

11/ Given the change in the list of LDCs, since the Conference, no up-dated estimates of requirements of assistance to LDCs' agriculture are available.

Assistance in 1982

Available information on official external assistance to agriculture in 1982 does not indicate a major change from the pattern for 1981. World recession and budgetary constraints which have limited the expansion in the volume of assistance in the last few years still underlie the lack of any major increase in the commitments of the major donor countries.

This situation is affecting not only bilateral but also multilateral development assistance. The World Bank's International Development Association (IDA) has had to reduce its commitments to all sectors to $2.7 billion in fiscal 1982 from $3.5 billion in the preceding year. It seems likely that IDA may also have to reduce its budgeted lending programme of $3.3 billion for fiscal year 1983, the last year of its sixth replenishment period.

The International Fund for Agricultural Development (IFAD) is also facing problems in financing its first 3 year replenishment period ending in December 1983. For this period, $630 million and $450 million had been pledged from OECD and OPEC sources respectively, but disbursements by donors have been delayed. If this situation continues, IFAD will have less than $250 million of uncommitted resources by the end of 1983, enough for only the first part of 1984, the beginning of its second replenishment period.

External Assistance for Agricultural Inputs

The provision of fertilizers and other inputs accounted for US $502 million of ODA commitments in 1981 (Table 1-15). This amounted to 4.4% of total OCA (broad definition) and showed a decline of over 11% compared to 1980 12/. The Far East region is the main recipient of fertilizer aid. It has received between 70%-90% of this aid but Africa increased its share in 1981.

Fertilizers are the major inputs provided under external assistance to agriculture, the largest share being provided by bilateral sources.

The operation of FAO's International Fertilizer Supply Scheme (IFS) has seriously diminished since it was established in 1975 in response to the then prevailing crisis in fertilizer supplies. The quantity handled by the IFS in 1981/82 was only 15 000 tons. The Commission on Fertilizers called on donors to replenish its resources so that it may continue to assist low-income countries expand their fertilizer use even in times of financial constraints.

The Far East region receives substantial assistance also for the development of its capacity to manufacture fertilizers. Total official commitments for assistance in the manufacture of inputs amounted to $806 million in 1981, a sharp increase over the previous year. However, commitments for this purpose as investments in fertilizer manufacture are very lumpy and large loans to a few projects can inflate the yearly figure.

12/ Alternative estimates quoted at the Fertilizer Commission put the volume of fertilizer aid at 2.0 million tons in 1981, virtually all from bilateral sources, equivalent to 5% of fertilizer consumed by developing countries in that year.

TABLE 1-15. ODA COMMITMENTS FOR SUPPLY OF INPUTS

	1976	1977	1978	1979	1980	1981 1/
	..... million $					
ODA COMMITMENTS FOR						
Supply of fertilizers 2/	172	236	295	230	473	390
Supply of other inputs 3/	56	18	35	40	93	112
Total at current prices	228	254	330	270	566	502
Total at 1975 prices 4/	228	233	264	189	358	335
Total at 1980 prices 4/	362	368	418	300	566	528
ODA COMMITMENTS BY						
Bilateral sources	186	233	291	208	394	338
Multilateral sources	42	21	39	62	172	164
	..... %					
Supply of inputs as share of total ODA commitments (broad definition)	7	5	6	4	7	7
Supply of inputs as share of total ODA commitments (narrow definition)	9	8	7	5	10	11

1/ Preliminary. 2/ Excluding International Fertilizer Scheme commitments.

3/ Pesticides, agricultural equipment and machinery, seeds.

4/ Deflated by the UN unit value index for export of manufactured goods.

Source: FAO and OECD.

Food Aid

Food aid allocations of cereals for 1982/83 stood at nearly 9.2 million tons by March 1983, a little more than was allocated at the same time in 1982 and also slightly above the quantity actually shipped in 1981/82 (Table 1-16). The past year saw a sligtly smaller proportion of food aid being shipped to low-income food deficit countries (76% compared to 79% in 1980-81). The proportion of cereal imports of these countries covered by food aid is at a low figure of 17%, having steadily declined in recent years. Food aid has basically stagnated since 1976/77 while cereal imports of low-income countries have increased by over 60%.

Food aid had become slightly less concentrated in the traditional largest donors, the United States, EEC and Canada, although this trend has been recently reversed mainly because of increased contributions from the EEC.

As a means to ensure the level, predictability and continuity of emergency food aid, the Committee on Food Aid Policies and Programmes (CFA) agreed on having regular joint pledging conferences to identify resources for the World Food Programme (WFP) that comprises about 20% of all food aid, and the IEFR that the WFP administers. The first joint pledging conference was held in March 1982 when pledges made amounted to only a little

over half of the pledging target for the WFP 1983-84 biennium of $1 200 million. Subsequently, pledges picked up and by the end of January 1983 they amounted to $993 million, 83% of the target. Pledges for 1981-82 amounted to US $840 compared with a target of $1 000 million. An insufficiency of contributions in cash and in services can also be noted for 1981-82. They amounted to only 25% of the total compared with the target of 33%. The Programme is thereby rendered less flexible and some development projects are threatened if food cannot be purchased locally and its transport assured.

TABLE 1-16. SHIPMENTS OF FOOD AID IN CEREALS, JULY/JUNE

	1977/78	1978/79	1979/80	1980/81 1/	1981/82 1/	1982/83 1/2/
	thousand tons grain equivalent					
Total	9 216 3/	9 502 3/	8 886 3/	8 908	9 026	9 361
	%					
Proportions of shipments made by the 3 largest donors: USA, Canada & EEC	90	86	82	79	82	83
Share of the total to low income food-deficit countries 4/	78	79	81	79	76	79 5/
Proportion of cereal imports of low income food deficit countries represented by food aid	25	23	21	19	18	17

1/ Partly estimated. 2/ Allocations.

3/ In addition, according to unofficial reports, the USSR provided emergency aid to several countries in Asia amounting to 200 thousand tons each in 1977/78 and 1979/80 and 400 thousand tons in 1978/79.

4/ Includes all food deficit countries with per caput income below the level used by the World Bank to determine eligibility for IDA assistance (i.e. with a per caput income of US $795 and below in 1981) which, in accordance with the guidelines and criteria agreed by the CFA, should be given priority in the allocation of food aid.

5/ Estimated.

Source: FAO, ESC.

The value of net commitments of food aid under FAO/WFP in 1982 was estimated to be $576 million compared to $488 million in 1981 when it had represented about 10% of concessional commitments to agriculture "narrow definition". About 80% of these commitments were to low-income food deficit countries and nearly the same proportion, about 77%, for agricultural and rural development projects.

In reviewing food aid, the Thirteenth Session of the Committee on Food Aid Policies and Programmes (CFA), held in April 1982, concluded that:

- Cereal food aid shipments in 1980/81 declined for the second year in a row, and allocations by donors again fell substantially short of the 10 million ton level agreed by the World Food conference.

- While the bulk of food aid continued to be directed to low-income food deficit countries, they have had to resort increasingly to commercial food imports.

- An encouraging development has been the relatively rapid increase in project-oriented food aid, particularly for the promotion of agricultural production and employment in rural areas. However, while cereal food aid for the establishment of national security reserves rose appreciably in 1980/81, it still represents only a fraction of identified needs.

- Multilateral food aid rose substantially in 1980 and, with larger contributions to the IEFR, the trend was likely to continue in 1981. However, contributions to WFP's regular resources are lagging behind the 1981-82 pledging target, and WFP shipments for development projects may have to be curtailed.

- Triangular transactions declined in 1981, mainly because of lower rice requirements for the emergency operation in Kampuchea. On the other hand, substantial purchases of maize were made by WFP in Zimbabwe for shipment to other African countries.

FISHERIES

The Situation in 1981

Commercial catches of fish, crustaceans and molluscs reached in 1981 the record level of 74.8 million tons, an increase of 2.5 million tons over the previous year (Table 1-17). There are some indications that rehabilitation of some stocks has contributed to the increase. This increase is the fourth consecutive and the most substantial after the fluctuations which marked world catches between 1972 when the anchoveta fishery in Peru collapsed, and 1977 when the extensions of national jurisdiction over marine resources became generalized.

With extended jurisdictions, the pattern of production has changed in the last few years. Less and less effort has been devoted to long-distance fisheries, where, according to preliminary estimates, the catch decreased by a further 4% in 1981. The shift to local fishing, both coastal and offshore, is also stimulated by increasing costs of fuel - though the increase of this moderated in 1981 - as well as by the uncertainty of the outcome of fishing agreements which must be renegotiated yearly. In many instances the return to local fishing by vessels once engaged in long-distance fishing has resulted in over-capacity and in excessive pressure on nearby fish stocks already intensively fished. At the same time, many countries are experiencing conflict among the various sub-sectors of their own fishing industries.

The largest part of the increase which took place in 1981 occurred in developing countries in South America and Asia. In Chile the 20% increase in landings was mainly for fish utilized by fish meal industries. Mexico's production was 26% higher than the previous year, following a major expansion in its catching capacity. Colombia (+43%) and Uruguay (+20%) also increased their output, the former to supply mainly its domestic market and the latter the export sector. Argentina's production has continued its down-

ward trend in the face of marketing problems and it is back to the level of output prevailing before the extension of national jurisdiction.

TABLE 1-17. WORLD AND REGIONAL CATCH OF FISH, CRUSTACEANS AND MOLLUSCS INCLUDING ALL AQUATIC ORGANISMS EXCEPT WHALES AND SEA WEEDS

	1979	1980	1981	Change 1979 to 1980	Change 1980 to 1981	Annual rate of change 1977 to 1981	Annual rate of change 1971 to 1980
	.. million m.t. ..			..... %			
Developing market economies	26.7	26.6	28.0	-0.1	5.6	4.2	1.7
Africa	3.3	3.2	3.3	-3.0	1.0	-1.3	-1.2
Far East	12.1	12.4	12.8	2.7	3.3	1.4	4.0
Latin America	10.0	9.6	10.5	-4.2	9.0	10.0	-0.2
Near East	0.9	1.0	1.0	11.0	3.8	12.1	4.1
Other	0.4	0.4	0.4	1.9	0.5	3.4	7.2
Asian centrally planned economies	7.4	7.6	8.0	3.5	4.8	1.0	2.8
Total developing countries	34.1	34.2	36.1	0.6	5.5	3.5	2.0
Developed market economies	26.9	27.5	27.8	1.9	1.5	0.6	0.9
North America	4.9	5.0	5.1	0.9	3.2	4.4	3.0
Oceania	0.2	0.2	0.2	-4.6	2.6	2.9	3.4
Western Europe	11.2	11.2	11.2	0.2	-	-1.7	0.3
Other	10.6	11.1	11.3	4.2	2.3	1.4	0.7
Eastern Europe and USSR	10.3	10.6	10.8	3.7	1.5	1.1	1.8
Total developed countries	37.2	38.1	38.7	2.4	1.5	0.7	1.2
World	71.3	72.3	74.8	1.6	3.4	2.0	1.5

Source: FAO, Fisheries Department.

Increased fishery production was a feature for almost all Asian countries in 1981 with Thailand being the most noticeable exception. Its fishing industry is suffering both because of problems of readjustment to the new ocean regime and because of excessive exploitation of many domestic stocks. In India a 10% expansion of the freshwater fisheries was barely enough to outweigh decreased yields from marine waters along its coasts bordering the West Indian Ocean.

Readjustment is also constraining the physical expansion of fishing by many West African countries, even though abundant resources are still to be found off their shores. Some coastal countries have opted for the development of their own industrial fleets and have concentrated mainly on the production of high-value species demanded by international markets. But they have had only limited success.

The developed countries, considered as a group, have not shown any significant change in their catches, and their fishing output in 1981 was only marginally higher than in 1980. However, production in Japan and the USSR rose. While global catches of both the EEC and Eastern European countries showed no change, catches of northern European countries as a group moderately recovered from the 1980 level which had been the lowest in the last six years. Coastal countries fishing in the North East Atlantic have shown marginally increased landings of food fish and the declines by and large were confined to the fishmeal and oil industry.

The catch of food fish of about 53.5 million tons was significantly (5%-6%) higher in 1981 than in the previous year, following a period of stagnation. There is evidence that at the world level the increase of fishery production accrued entirely to the direct food sector. A contribution to this increase came also from inland water fisheries which in 1981 yielded 500 thousand tons, a gain of 6.5%.

The declines in catches of fish for reduction to meal and oil were due, in part, to a decline in the demand for fishmeal. This was affected by the general stagnation in the protein meals market, which coincided with weakened economic conditions and had particularly unfavourable consequences in some large markets such as Eastern Europe. While the developing countries as a group utilized almost the same amount of fish as in the previous year for industrial purposes, the decline occurred in the developed nations as a whole. This, in some instances, was due to resource limitations on certain fisheries widely used for that purpose such as the capelin fishery in Iceland. The total for developing countries was unchanged. However, Chile expanded further its fish reduction industry and, to a lesser extent, Mexico also utilized part of its increased catch as raw material for fish meal.

In the absence of major developments in the exploitation of unconventional resources, it seems unlikely that the annual rates of increase in world fishery production will depart from those recently prevailing.

Estimates for 1982

The indication for the first part of 1982 is that seafood supplies have generally been adequate to meet demand. Current demand levels have been depressed by the unfavourable economic conditions prevailing in many large markets and the more competitive prices of meat products. A particular example is the tuna fishery which is currently going through dramatic changes with world-wide ramifications. A severe decline in consumer demand for canned tuna in 1981 and 1982 in the United States,one of the biggest markets, is leading to a major restructuring of its industry. This, in turn, has been affecting tuna producing industries in several developing countries.

The output of the fishmeal industry is expected to have increased moderately compared to 1981 although catches of some major species, such as Chilean and Japanese pilchard, cannot have sustained their most recent growth rates. Statistics for the first nine months of 1982 point to a further expansion of fishmeal production in Chile and Peru.

The Norwegian fishmeal industry also increased output with catches 7% higher in the first 11 months of 1982 than in the same period of 1981, mainly as a result of more abundant landings of capelin. In Iceland and South Africa, which also rank among the largest fishmeal producers, the downward trend continued through 1982. For the medium-term, although there is still a potential for the growth of protein meal consumption in many developing countries, the demand for it will be very dependent upon trends in the soybean meal market.

Trade in Fishery Products

The expansion of fishery trade forecast, following the change in the ocean fishery regime, has been hampered partly by the slowness in the restructuring of the production sector in those countries which acquired control over abundant resources. Also relatively large increases in prices, coinciding in some instances with reduced real incomes, have shifted consumers' demand toward non-fishery foods in some major importing countries.

However, in 1981 world trade in fishery products - especially exports from developing countries - has proved to be more resilient to the effects of the economic recession than most other groups of agricultural commodities. Based on evidence that is still preliminary for many developing countries, the current value of exports of fishery products in 1981 was above US $15 000 million, an increase of 3% over 1980, but below the world inflation rate (Table 1-18). Much of the increase accrued to the developing countries taken as a group for which fishery products accounts for 7% of total agricultural exports. However, recent annual increases in percentage terms are well below those in the years of the expansion in the 1960s and the first part of the 1970s. In 1981 developing countries specializing in exports of selected fishery commodities were adversely affected by the conditions prevailing in their main markets. Tuna, crustacean and cephalopod products, which account for a large share of their sectoral export trade, fetched on average lower prices than a year before.

TABLE 1-18. INDEX NUMBERS OF VALUE, VOLUME AND UNIT VALUE OF EXPORTS OF FISHERY PRODUCTS: WORLD, DEVELOPING AND DEVELOPED COUNTRIES

				Change		Annual rate of change	
	1979	1980	1981	1979 to 1980	1980 to 1981	1977 to 1981	1971 to 1980
	... 1969-71 = 100 ...			..... %			
VALUE	479.6	513.0	520.1	7.0	1.4	13.2	17.9
Developing countries	597.7	627.3	643.0	5.0	2.5	14.5	21.0
Developed countries	425.2	460.3	463.5	8.3	0.7	12.4	16.2
VOLUME	169.6	169.9	173.7	0.2	2.2	6.1	5.5
Developing countries	220.2	209.4	215.1	-0.5	2.7	5.6	8.2
Developed countries	148.6	152.4	156.0	2.6	2.4	6.1	4.0
UNIT VALUE	285.9	310.2	306.8	8.5	-0.1	6.4	11.9
Developing countries	271.3	310.4	306.4	14.4	-1.3	7.2	11.7
Developed countries	290.8	310.0	307.3	6.6	-0.9	6.4	12.0

Source: FAO, Fisheries Department.

COOPERATIVE MANAGEMENT OF FISHERY RESOURCES IN THE SOUTH PACIFIC OCEAN

With the establishment of the new regime for the oceans, a vast area of the western Pacific has now come under the jurisdiction of a relatively few countries, most of which are small developing and newly-independent island states. Abundant resources of highly-valued tuna pass through this area, fished largely by the fleets of Japan, the United States and a few other countries from outside the region. For the small island states the exclusive economic zones (EEZs) of 200-mile exclusive fishing zones provide a new and important source of wealth. In 1981 fish worth over US $400 million were taken from the zones of the member and observer states of the South Pacific Forum Fisheries Agency (FFA).

In order the realize fully the opportunities provided by this new wealth, the island states need to achieve a high degree of cooperation in the management of the stocks they share. The harmonization of their regimes is necessary for the collection of appropriate levels of fees from the distant-water fleets and for ensuring effective compliance with the arrangements worked out with foreign countries.

The countries of the region have taken major steps towards establishing effective cooperation. The South Pacific Forum Fisheries Agency, established in 1979, now includes 14 member countries (Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Western Samoa) and two observer countries (Marshall Islands and Palau).

These countries have recently agreed on a number of measures for harmonized control over foreign fishing fleets. They have agreed to establish a regional register of foreign fishing vessels and to grant fishing licences only to those vessels accorded "good standing" status on the register. Information on illegal activities of fishing vessels will be passed on to the FFA for recording.

The states have also agreed on certain minimum standards for foreign fishing vessels access. These include the requirement that foreign fishing vessels provide notification of their entry into or departure from any zone or port; that they regularly report their position; and that they complete standard log sheets giving their regional tuna catch and fishing effort.

Although there is still a long way to go, the achievement of these steps in the brief period since the establishment of the FFA provides a remarkable example of economic cooperation among developing island states.

However, the overall increase in the value of fishery trade in 1981 was due entirely to increased prices because its volume, in absolute terms, contracted for the second consecutive year. This was almost entirely attributable to decreased overseas sales of fishmeal since all the major food product groups, with the exception of canned seafoods, showed some increase in quantity. In 1981 both Japan and the USA, which together account for some 45% of total fishery imports, increased their receipts from abroad, while in the same year imports decreased in several large importers in the EEC. Among developing countries, which as a group are net exporters of fishery products, increased earnings accrued to traditional large exporters in Asia such as the Republic of Korea, Thailand and India and to some of the new entrants, such as the Philippines. Exports from Latin America reflected the decreased exports of fishmeal, while in Africa the expansion of Moroccan trade was offset by decreased overseas sales by Senegal.

In 1982 prices remained at high levels. However, in the last months of the year, following the condition of over-supply of certain food fishery products, some price decreases apparently took place. Some further substitution within seafood commodities also is likely to have continued. Although a moderate expansion of fishery trade is believed to have taken place in 1982, developments in the short-run depend mainly upon the evolution of the world economic situation.

Management Issues

With many of the largest stocks of easily-accessible fishery resources reaching the level of maximum sustainable exploitation, more and more attention is being paid to management issues. Several fisheries in the most productive marine areas are already subject to quota regulations. Resource management problems are receiving more attention as it is felt that additional amounts of fish will be available through improvement in the management of the resources rather than in adding to catching capacity. A World Conference on Fisheries Management and Development sponsored by the FAO is being held in two sessions in 1983 and 1984. It will address itself to basic issues of management and development of the world fisheries, and to aspects of exploitation of the resources brought about by the changed regime of the oceans.

FORESTRY

Production and Trade

World production of major forest products was strongly influenced by the economic recession that developed in 1980 and 1981, when a sharp decline took place in housing construction in developed countries and consequently in the demand for some processed wood products. Production of sawnwood in North America is estimated to have dropped 11% in 1980 and a further 8% in 1981. In 1981 there was also a decline of 6% in sawnwood production in Western Europe, and one of 20% in the production of similar wood products in Japan following a 15% decline in 1980 (Table 1-19).

International trade in forest products was also adversely affected by the recession (Table 1-20). Imports of tropical timber in 1981 were down by over one-fifth in both Western Europe and Japan. Trade in tropical logs was reduced by 23% and that of tropical sawnwood by 21%. As a consequence a number of developing countries experienced sharp declines in their exports of forest products. Shipments of sawnwood declined by 31% in the Ivory Coast, by 19% in western Malaysia, and by 13% in the Philippines. On the other hand, trade in tropical plywood increased by 12% because an expansion in exports from Indonesia and other countries in Asia more than offset a further decrease in the Republic of Korea.

With the continuing depressed state in 1982 of the construction industry in North America, Japan and some European countries, there has been no appreciable recovery of the export of tropical timber. This has compounded the difficulties faced by exporting developing countries attempting to establish new industries based on this product.

TABLE 1-19. WORLD OUTPUT OF MAIN FOREST PRODUCTS

	1979	1980	1981	Change 1979 to 1980	Change 1980 to 1981	Annual rate of change 1971 to 1980	Annual rate of change 1977 to 1981
	.... million c.m.			..... %			
TOTAL ROUNDWOOD	3 094	3 160	3 142	2.1	-0.6	1.9	1.8
Developed countries	1 341	1 349	1 314	0.6	-2.6	0.7	1.1
Developing countries	1 753	1 812	1 828	3.4	0.9	2.8	2.4
Fuelwood and charcoal	1 650	1 718	1 759	4.1	1.0	2.4	3.1
Developed countries	205	232	245	13.2	5.6	2.3	9.5
Developing countries	1 444	1 486	1 513	2.9	1.8	2.4	2.2
Industrial roundwood	1 445	1 442	1 384	-0.2	-0.4	1.2	0.3
Developed countries	1 136	1 116	1 069	-1.8	-4.2	0.4	-0.4
Developing countries	309	326	315	5.5	-3.4	4.7	3.0
PROCESSED WOOD PRODUCTS							
Sawnwood and sleepers	451	439	419	-2.7	-4.6	0.4	-1.4
Developed countries	368	352	337	-4.3	-4.3	-0.5	-2.3
Developing countries	82	87	82	6.1	-5.7	5.4	2.4
Wood-based panels	106	101	97	-4.7	-4.0	3.0	-1.3
Developed countries	93	87	83	-6.5	-4.6	2.3	-2.0
Developing countries	14	14	14	-	-	7.6	3.9
	.... million m.t.						
Woodpulp	127	130	129	2.4	-0.8	2.2	3.6
Developed countries	113	115	114	1.8	-0.9	1.7	1.4
Developing countries	14	16	16	14.3	-	8.7	9.0
Paper and paperboard	173	175	175	1.2	-	3.0	3.4
Developed countries	153	153	153	-	-	2.4	3.0
Developing countries	21	22	22	4.8	-	8.0	6.8

Source: FAO, Forestry Department.

However, this reduction in international trade was due not only to the economic recession in industrial countries but also to a deliberate policy adopted by a number of exporting developing countries of expanding local processing by curtailing the direct export of unprocessed logs. For example, Indonesia's log exports have been reduced drastically but its share of tropical plywood production and exports has risen substantially. This issue is discussed further below.

The recession in the developed countries affected the pulp and paper industry much less. In most of the major producing countries production in 1981 was maintained at 1980 levels, and in Finland, New Zealand and the United States production of some grades reached record levels. Japan experienced the sharpest reduction, pulp production going down by 9% and paper production by 6% as active measures were taken to reduce high levels of inventories. In the latter part of 1981 and 1982 production of pulp and paper also fell sharply in North America and Europe to a level some 5% below the average for 1980.

TABLE 1-20. VOLUME OF EXPORTS OF MAIN FOREST PRODUCTS, WORLD, DEVELOPING AND DEVELOPED COUNTRIES

				Change		Annual rate of change	
	1979	1980	1981	1979 to 1980	1980 to 1981	1971 to 1980	1977 to 1981
	.... million c.m.			.....%			
INDUSTRIAL ROUNDWOOD	118.4	115.1	102.0	-2.8	-11.4	2.6	-2.5
Developed countries	71.8	73.0	69.1	1.7	-5.3	3.7	1.2
Developing countries	46.6	42.1	32.9	-9.7	-21.9	1.0	-8.5
PROCESSED WOOD PRODUCTS							
Sawnwood and sleepers	83.3	79.8	72.8	-4.2	-8.8	3.3	-0.2
Developed countries	71.3	68.7	63.5	-3.6	-7.6	2.9	-0.4
Developing countries	12.1	11.0	9.2	-9.1	-16.4	6.7	1.0
Wood-based panels	16.3	15.7	15.9	-3.7	1.3	3.7	1.3
Developed countries	11.2	11.0	10.8	-1.8	-1.8	4.8	2.0
Developing countries	5.1	4.7	5.1	-7.8	8.5	3.7	-0.2
	.... million m.t.						
Pulp	18.7	19.9	19.0	6.4	-4.5	3.3	5.4
Developed countries	17.4	18.3	17.3	5.2	-5.5	2.7	4.1
Developing countries	1.3	1.6	1.7	23.1	6.2	14.6	25.2
Paper and paperboard	33.3	35.1	35.6	5.4	1.4	3.7	6.2
Developed countries	32.7	34.2	34.5	4.6	0.9	3.6	5.9
Developing countries	0.6	0.9	1.1	50.0	22.2	10.1	21.9

Source: FAO, Forestry Department.

Among developing countries, Brazil suffered a decline in pulp and paper production after many years of sustained growth. However, in 1982 Brazil's exports were up 60% on 1981 - the exception among exporters. In Argentina a combination of industrial recession and high rates of inflation resulted in pulp and paper production falling in 1981 to a level below that of 1974, with only 65% utilization of established capacity. The economic recession also led several countries to postpone announced plans to expand capacity.

Current dollar prices of forest products have increased dramatically in the decade to 1980 but there has been very wide variation in the magnitude of the increase between products. In real terms the prices of some products such as tropical logs and sawnwood and charcoal have increased substantially but the real prices of some others such as pulpwood and particleboard have tended to decline.

The trend in the terms of trade for major forest products of developing countries has thus been generally upward. However, in 1981 international market prices of most of these products reflected the depressed state of the market, and they declined 5%-10% in current dollar prices in early 1982.

The increase in fuelwood production occurring in the developing countries reflects the growth in population. It is, however, estimated that in 1980 more than 100 million people lived in areas where the population could not obtain sufficient fuelwood even through overcutting. In a much larger area production is resulting in overcutting of existing resources. The 1981 increase of real prices of fuelwood and charcoal is a clear warning signal of increasing scarcities in the fuelwood supply situation and further confirmation of the energy crisis occurring in the developing countries.

Up until the mid-1970s fuelwood consumption in the developed world was steadily decreasing. However, the oil shock led to a reversal of this trend and most developed countries are now reporting increases in their relatively low consumption levels. A new survey just completed in the United States indicates a sixfold increase in fuelwood production in that country since 1973 to a total of some 90 million m^3 in 1980.

Increasing Benefit from Forest Resources

Forests make up 4 200 million ha, or 30% of the world's land area; just over half this area is in developing countries. Some 11 million ha of forests are cleared for agriculture or destroyed or degraded by shifting cultivation, fuelwood gathering, overgrazing or burning each year.

Forest land is widely perceived as a source of agricultural land and forest products as goods freely available for collection. The pressure of population is such that in many areas the supply of forest products, particularly fuelwood, is being depleted and the land being taken for agriculture is of poor quality. The resulting destruction of the forest is harmful to soil and water conservation as well as to the future supply of forest products. International organizations have signalled the risks of forest depletion and some Governments have announced policies and regulations to control it. In some cases also local people, as in the 'Chipco' movement in India, have risen in protest against tree cutting 13/. Yet tangible action to reverse the trend to forest depletion has not emerged and the pressure from people to meet their immediate needs for food and fuel continues.

Total tree planting of 1 million ha per year in tropical countries is only one tenth the rate of forest clearing and destruction. However, the programme in 1982 is double the average programme during 1976-80. Major forestry projects are being instituted in several countries to mobilize local communities to conserve the forest and to plant trees for their own use.

13/ Chipco is a Hindu word meaning 'to hug' in a protective sense.

An important complement of the operational programme is forestry research. Its design to meet the needs of developing countries has been the subject of reconsideration by the international community. This review has pointed out the need to give greater emphasis to research into farming systems incorporating trees, to increasing the productivity of trees in the supply of biomass and energy, to conserving wood through greater efficiency of conversion to energy by improved stove design, and research into effective management and conservation of tropical forest.

The selection of species and provenances and the collection and distribution of seed and plant material to allow their propagation, is a fundamentally important component in increasing the production of wood and other products through tree planting. International collaboration is directed to the identification of priority species, the establishment of seed collection programmes to secure and to establish research trials and seed stands. The FAO seed programme coordinates the collection of seed for international use carried out by some 15 national institutions. As a result of this programme, international provenance trials and seedstands have been established for tropical, subtropical and Mediterranean species in a large number of developing countries. A recent initiative has been the establishment of a cooperative genetic resource programme between 8 developing countries in the arid and semi-arid zones on species for fuelwood production of the genera Acacia, Eucalyptus and Prosopis. As an illustration of the potential, earlier trials in 21 countries on provenances of the species Eucalyptus camaldulensis have demonstrated that selection of the best provenance may result in an increase of 600% in yield of fuelwood compared with the least suited provenance.

Policy and Investment in Forest Industries

The forestry sector can make a valuable contribution through the value added in the manufacture of wood products either for domestic consumption or for export. In developing countries over the decade to 1981 expansion of the sawnwood and wood-based panels industries has been at the relatively rapid rates of 5.5% and 7.5% respectively per annum, although it has slowed somewhat with recessionary conditions in the last few years, as has been noted. The feature of the current period is the effort by a number of countries to develop processing industries so that they may replace exports of roundwood with exports of higher value manufactured wood products and to meet domestic requirements for them.

As has been mentioned earlier, Indonesia has combined a programme to restrict export of unprocessed roundwood with incentives and regulations to encourage investment in manufacturing. Roundwood exports have been brought down from a peak of 21 million m^3 in 1978 to about 3 million m^3 in 1982. By 1981 production of sawnwood had increased to 3.5 million m^3 with exports increasing to 1.2 million m^3 from a nominal level at the beginning of the decade. Output of plywood has risen from 25 000 m^3 in 1974 to over 1 million m^3 in 1981 and exports of this product have increased to more than 0.5 million m^3 from zero during this period. Malaysia (particualrly the State of Sabah) and Paraguay are further examples of countries which have recently built up a sawmilling industry for production for export rather than exporting roundwood. However, this policy, which aims to increase domestic value added through the unprocessed product, may have lost some momentum in view of depressed demand, falling prices and a low utilization of the processing capacity installed.

Investment in Brazil and Nigeria has been directed to increase production on the basis of indigenous raw materials in order to meet rapidly increasing domestic demand. Some investment in the Near East countries has been designed to meet domestic demand using imported raw materials. An investment programme based on the production of veneer, plywood and sawnwood has been instituted in Bhutan with the objective of rapid acquisition of industry experience for the planned utilization of rich indigenous forest resources.

TRENDS IN RESOURCE AND INPUT USE FOR AGRICULTURAL PRODUCTION AND SOME SELECTED ISSUES

INTRODUCTION

The main challenge facing world agriculture is to ensure a regular supply of food and agricultural output to match rising demands by the world's population, which is currently increasing at an overall rate of 1.7%. This has to be achieved with resources that are either finite (such as land) or growing at slow rates (such as the agricultural labour force).

The following discussion focuses on the developing countries and their prime need to mobilize their resources to meet the challenge posed by rising demand for agricultural products and to raise incomes. Such mobilization essentially can be one or a combination of the following approaches:

- land expansion or intensification including irrigation;
- intensified use of sources of animal or machine power to increase productivity of labour;
- wider use of modern inputs - seeds, fertilizers, pesticides, animal feeds.

The changing pattern of resource and input use can be viewed from many different perspectives. Output gains may not be the only consideration. Other issues not directly linked to growth in output and incomes may also be to the fore, such as inequities of access to farming resources, the creation of employment in rural areas and environmental protection so that the natural resource base is not destroyed or human health endangered.

The section provides an overview of the broad pattern of actual and potential resource and input use in developing countries. Some reference to developed countries is made for comparison. No systematic attempt is made in this brief survey to relate the use of different resources and inputs to output. However, selected issues related to individual resources or inputs are raised, in particular the impact of their greater use on the environment.

OVERALL PATTERNS OF RESOURCE AND INPUT USE

By 1980 the developing countries were producing over half of the world's crop output but only a quarter of its livestock output. In so doing they used a widely differing combination of resources and inputs compared to developed countries (Fig. 1-7). They had about half of the total area of arable land and land under permanent crops but nearly three-quarters of the irrigated land. Their agricultural labour force was over 90% of the world's total. On the other hand they used less than a third of the total fertilizers consumed, one-sixth of the world's tractors and a quarter of the animal feeds.

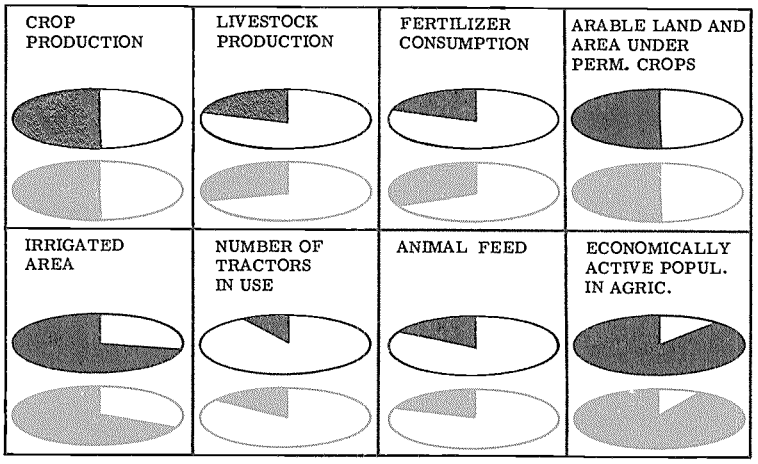


Figure 1-7
SHARES OF DEVELOPED AND DEVELOPING COUNTRIES IN WORLD TOTALS OF AGRICULTURAL OUTPUT AND SELECTED INPUT USES

Source: FAO, ESS

The rates of growth of output and input use have also differed quite widely between these two groups of countries during the 1970s (Fig. 1-8). Crop production in developing

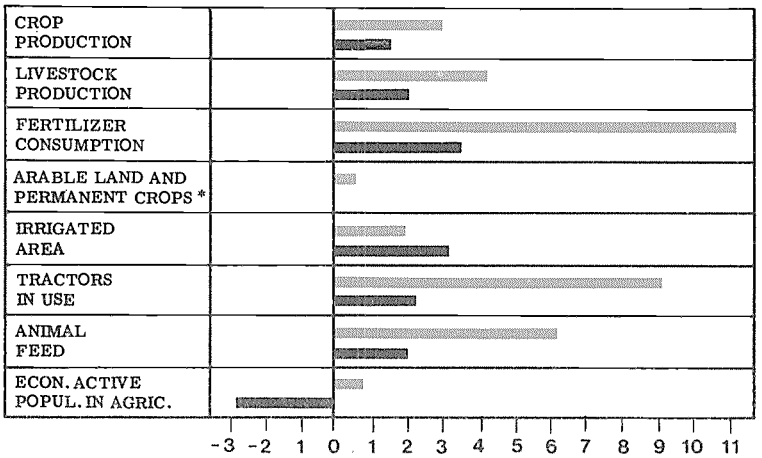


Figure 1-8
ANNUAL RATE OF CHANGE IN AGRICULTURAL OUTPUT AND SELECTED INPUTS BY REGION
1970 to 1980

Source: FAO, ESS

countries has increased by 2.9% per annum, double the rate of increase of developed countries. But land use increased by less than 1% per annum in the former and not at all in the latter, implying that purchased inputs have been an important element in productivity increases. Thus the developing countries' consumption of fertilizer has increased at over 11% per annum and their use of tractors as a source of power has increased at over 9% per annum. These increases in fertilizer and tractors are, however,

less striking when viewed in absolute amounts. Livestock production in developing countries has increased faster than crop production, and more than twice as fast as in developed countries. But consumption of animal feed has also increased particularly rapidly in developing countries.

EMERGING PRESSURES FOR MORE AGRICULTURAL RESOURCES

The developing and developed countries differ with respect to likely future pressures on agricultural resources. Scenario B of AT 2000 14/ projects that total demand for agricultural products of the 90 developing countries covered by the study will increase by 3.2% per annum over the period 1980-2000. This rate of increase in demand is a little higher than the past two decades (3.1%) and significantly higher than the growth achieved in agricultural production (2.8%).

In their bid to increase agricultural output more rapidly, developing countries will face issues that complicate decision making. Increasingly they will have to use modern inputs to supplement their natural resource base. Increasingly, therefore, they will face the problems of how to make these inputs available and at what cost. There will be need for emphasis on technologies and farming systems that not only are successful in increasing output, but also are efficient in the use of inputs. Policy decisions on whether or not to subsidize agricultural inputs will gain added importance.

As for the developed countries, Scenario B implies a slowing down in rate of growth of their agricultural output. Domestic demand in 1980-2000 is projected to increase at an annual rate of only 1.1% for the market economies and 1.5% for the centrally planned economies of the developed world. That is, rates of increase would be only one-third to one-half than those of developing countries. This compares with past rates of growth in production of 2.1% and 1.4% during the 1970s for the market and centrally planned economies respectively.

THE BASIC RESOURCES: LAND AND LABOUR

The Distribution of Land in Relation to Population

Striking differences among regions are apparent when use of arable land is expressed in relation to total population or agricultural labour force (Table 1-21). For instance, the average density of agricultural labour per hectare of crop land in China and other centrally planned economies of Asia is 200 times as great as North America or Oceania.

14/ Agriculture: Toward 2000 (AT 2000), FAO, Rome, 1981. Two scenarios were developed: Scenario A is based on the doubling of agricultural production in the developing countries between 1980 and 2000. This would involve a growth rate of 3.7% per year. The less ambitious Scenario B is built around an 80% rise in output between 1980 and 2000, implying a 3.1% increase per year. The use of inputs and resources would have to increase more than proportionally under Scenario A, which involves more than doubling annual investments and no less than tripling current inputs alone.

TABLE 1-21. DISTRIBUTION OF ARABLE AND PERMANENT CROP LAND IN RELATION TO TOTAL POPULATION AND AGRICULTURAL LABOUR FORCE, 1980 1/

	Arable and permanent crop land	Arable and Permanent crop land per person: of total population	Arable and Permanent crop land per person: of agricultural labour force 1/
	... million ha ...	..... ha	
Africa	150.2	0.4	1.5
Asia	268.1	0.2	0.9
Latin America	162.1	0.4	4.2
Near East	87.3	0.4	2.5
Other developing countries	1.1	0.2	0.7
Asian centrally planned economies	111.7	0.1	0.4
Total developing countries	780.6	0.2	1.0
North America	235.0	0.9	87.0
Western Europe	95.1	0.3	5.7
Oceania	44.9	2.6	89.8
Others	18.9	0.1	1.9
Eastern Europe and USSR	277.8	0.7	7.2
Total developed countries	671.6	0.6	9.9

1/ Economically active population in agriculture.

Source: FAO, Production Yearbook.

There are also wide regional differences in the percentage of land in permanent grassland but, unless livestock are raised mainly on forage feeds, the carrying capacity of this land, in terms of livestock units, does not differ so widely. In the Far East, where there are over 800 livestock units per Km^2, ruminant livestock are fed mainly on crop residues and by-products. In Western Europe, which also raises ruminant livestock relatively intensively, they are fed on a variety of concentrate feeds or forages from cropped land 15/.

During the 1970s, the world arable land and land under permanent crops increased by only 0.3% per annum, while crop production grew by 2.2% per annum and world population by 1.8% per annum.

15/ For more details and wider discussion, see Chapter 2, Table 2-9.

An analysis of data from 86 developing countries shows a strong positive association between land use in relation to the agricultural population and output and agricultural incomes. What is the potential in this regard?

According to data assembled for AT 2000, arable land 16/ and land under permanent crops constituted by 1980 much less than half (42%) of the total of potentially cultivable land in the 90 developing countries (excluding China) analysed in the study. However, less than one-sixth of their population in 1980 lived in countries estimated as being "land abundant", with up to 40% of their potentially cultivable land being utilized. About 50% of their total population lived in 18 countries (seven in Africa, seven in the Near East and four in the Far East) which have extremely scarce land resources and already use over 90% of their potentially cultivable land (Table 1-22).

TABLE 1-22. ARABLE LAND IN RELATION TO POTENTIAL LAND AREA AND POPULATION, 90 DEVELOPING COUNTRIES, 1980

Category of country	Number of countries	Share of arable land in potential land area	Population
		%	
Land abundant 1/	27	17	14
Land moderately abundant 2/	24	57	20
Land scarce 3/	21	83	16
Extremely land scarce 4/	18	96	50
Total	90	42	100

1/ Land-abundant: cultivating up to 40% of potential arable land.

2/ Land moderately abundant: cultivating from 41 to 70% of potential arable land.

3/ Land-scarce: cultivating from 71 to 90% of potential arable land.

4/ Extreme land scarcity: cultivating over 90% of potential arable land.

Source: FAO, AT 2000.

16/ Land under temporary crops, temporary meadows, land under market or kitchen gardens and land temporarily fallow or lying idle. See explanatory notes to FAO Production Yearbooks.

According to these criteria the 37 countries of Africa and the 24 countries of Latin America included in AT 2000 would be regarded as land abundant. In 1980 they used respectively 32% and 27% of their potential arable land. However, they accounted for only 30% of the population. The 14 countries of the Near East covered in the study may be termed moderately land abundant using about 64% of their potential arable land but accounting for less than 9% of the population. Over 60% of the remaining population were in the 15 countries of Asia which are land scarce, cultivating on average 80% of their potential arable land. Including China, which was not covered by the AT 2000 study but which is also a land scarce country, then about 70% of the population of developing countries are living in countries that may be regarded already as land-scarce. The distribution of potential arable land is thus very uneven in relation to the distribution of population in developing countries.

Those countries which have been able to expand crop production by bringing more land into cultivation have tended not to show significant increases in average yields. For example, Brazil increased its production of paddy by nearly 175% between 1950 and 1980. The area under the crop increased by over 200% but average yields actually declined by 12%. Conversely, during the same period India increased paddy output by 132%, but the area under the crop increased by less than a third while average yields increased by over 70%.

Increasing land productivity

As cultivable land becomes scarcer in relation to population, the pressure grows to increase its productivity. In the 1970s land productivity improved more rapidly in developing than in developed countries. In the former, cropped areas expanded only by 0.6% per annum, population by 2.2% and crop production by 2.9%. In the developed countries cropped area did not expand, population increased by less than 1% per year and crop production by only 1.5%.

Land productivity growth was highest (3.3%) in China and the other centrally planned economies of Asia, where land is scarcer in relation to population. Other countries in the Near and Far East were not far behind with an average increase in land productivity of 2.6% per annum. Latin America, which has a relatively large potential of unexploited new land, followed with 2.0%. The increase in the productivity of land was lowest (0.5% per annum) in Africa, where in general terms land is still relatively abundant.

The conventional path leading to the modernization of agriculture and increasing the productivity of land is the use of more inputs associated with improved technology, such as improved seeds, fertilizers and better water management through irrigation. Frequently, of course, the means of increasing output per unit of land go together as a package: for example, irrigation makes it feasible to use the improved technology. The response in yield to the package as a whole is greater than the sum of the responses of the inputs used individually. This has been the basis of the Green Revolution in Asia. For example, in 1975 average yields of paddy were over 150% as great in the Republic of Korea, which had an irrigation rate of 90% 17/, as in Bangladesh with an irrigation rate of 5%.

17/ Irrigation rate = (Harvested irrigated area/Total harvested area) x 100.

But the Republic of Korea was also using fertilizer much more intensively than Bangladesh: in 1975 their average usage of fertilizer was 202 kg and 24kg per ha respectively. Therefore irrigation can be key factor underlying improved agriculture productivity. Its use is very unevenly distributed among the regions. Africa and Latin America have the lowest shares of their cropped land irrigated - 2% and 9% respectively in 1980 - but they achieved an annual increase in irrigated area of about 3.5% in the 1970s. By contrast, countries in the Near East (22% irrigated in 1980) and the Asian centrally planned economies (44%) increased their irrigated areas by only 1.3% - 1.4% per annum during the same period. The Far East region has about 25% of its cropped land irrigated, with an annual rate of increase of over 2%.

The World Bank estimates that there are now 160 million hectares of irrigated land in the developing world, more than half of it in China and India. Twenty percent of all harvested land is irrigated and receives 60% of all fertilizer and produces 40% of all crops. As demographic pressures increase on the limited land resource, irrigation will continue to play an important role in supporting both an increase in and an improvement of reliability of crop output.

Scenario A of AT 2000 estimates that expansions in irrigated area from about 105 million ha to 148 million ha in the 90 developing countries studied could provide almost one-half of the 1980-2000 increase in crop production. The irrigated area in Africa is expected to increase most during this period, by 62%, but from a very small base. Important increases of over 40% are foreseen also for the Far East (where three quarters of the increase would be located) and Latin America. Yet the overall rate of expansion in irrigated area, at 1.7% a year, is slightly lower than the recent past. This is because the opportunities for further expansion are limited in some countries and greater emphasis has to be placed on improving and repairing existing irrigation works whose maintenance has been neglected and efficiency impaired.

It is estimated that salinity and waterlogging have damaged about half of all the world's irrigated lands. In Pakistan, out of a total of 15 million ha of irrigated land, about 11 million ha produce crops at reduced yields due to one of the above problems or a combination of both. In Syria about half of the irrigated land in the Euphrates valley is seriously affected and the proportions of affected land in Egypt and Iran are estimated to be 30% and 15% respectively.

Increasing the intensity of land use under traditional rainfed agricultural systems implies reducing the period of fallow or introducing double cropping. Without irrigation, double cropping may be difficult if not impossible unless more modern and faster methods of cultivation and quicker maturing varieties of crops are introduced.

The intensity of use of rainfed land is higher in the Far East than in the other developing regions as would be expected from its low land-person ratios. But intensifying land use by only reducing the fallow period without changing the technology used will cause yields to fall. This seems to be occurring in Africa. For example, the average yields of millet, a cereal typically grown under traditional farming systems, have declined (by 4%) during the past decade (see Box on shifting cultivation/bush fallow).

Land use and environmental issues

Bringing more land into use or intensifying its use can rapidly lead to environmental problems, as some countries have learnt to their cost.

The extent of soil degradation caused by water or wind erosion and by salinization and waterlogging arising from incorrect land practices is clearly of vital concern. The damage caused by salinization and waterlogging of irrigated land has been mentioned earlier in discussing irrigation.

As regards erosion, it is estimated that in Africa north of the Equator, for example, some 36% of the soils are affected by some degree of water erosion and 17% by wind erosion 18/. Some degree of erosion may take place without man's influence but it is often greatly accelerated when his activities cause the disappearance of protective vegetation.

Shifting cultivation is one of these possible damaging activities. Problems arise when the population exceeds the level the system can support because cropping is intensified and the fallow period shortened. The natural cycle of regeneration is broken and soil degradation sets in (see Box). The savanna soils are particularly susceptible. The extent of the area under shifting cultivation is not well established, but in Africa south of the Sahara, the minimum arable area involved is about 75 million ha, of which at least 36 million ha are harvested annually.

With mounting population pressure, shifting cultivation will have to be replaced by more permanent systems. Agrosilviculture, including the establishment of fallows of fast-growing tree species which enrich the soil, offers promise in this regard.

The pressure of population on land and the demand for forest products, particularly fuelwood, are also leading to severe deforestation and degradation of forest resources. It is estimated 19/ that closed broadleaved forests in Africa were cleared at a rate of about 1.3 million ha a year in 1976-80, or about 0.6 % annually of the area existing in 1980. The annual rates of clearance in other tropical regions of Asia and Latin America are also about 0.6%. It is more difficult to estimate the current rate of deforestation of the mixed forest and grassland tree formations (open broadleaved forests), but in Africa it appears to be about 2.6 million ha a year, equivalent to a rather lower proportion (0.5%) of the existing resources. The rates of clearance in other tropical regions tend to be higher (0.6%). This is because, especially in Asia, open forest resources represent a smaller share of the total than in Africa where large areas of these formations are not yet subject to severe population pressure.

One extreme aspect of the widespread deterioration of ecosystems under the combined pressure of adverse climate and agricultural exploitation is desertification. It is basically a problem of the misuse of land. The activities pursued in susceptible areas are inappropriate for the resources, either in nature or degree.

The United Nations Conference on Desertification held in 1977 drew attention to the hazards to which Africa's land is exposed as overexploitation continues. The area of extreme desert in Africa extends to 6.2 million ha, or 20% of the land area, but an additional 10.3 million ha, or 34% of the land area, is classified as having a very high to moderate degree of desertification hazard. Although the desertification hazard is particularly alarming in the more arid areas, it is not confined to them; the sub-humid and mountain areas also face significant hazards.

18/ FAO/UNEP/UNESCO. A Provisional Methodology for Soil Degradation Assessment, Rome, 1979.

19/ Tropical forest resources. FAO Forestry Paper No. 30, FAO/UNEP, Rome, 1982.

SHIFTING CULTIVATION/BUSH FALLOW

Shifting cultivation or bush fallow farming refers to an agricultural production system in which land is cleared and cultivated for a short period alternated with a long fallow period for the restoration of fertility. The two terms have been used synonymously in many cases. However, in its original meaning, "shifting cultivation" involves movement of cultivation from one location to another, as well as relocation of the cultivator's house along with the crops. Although this practice still applies today in some countries, there is generally a development towards permanent settlement with fields being put under shorter or longer fallows. The term "bush fallow" more aptly describes the latter farming system.

One of the most important features of the bush fallow farming system is the reliance on nature, rather than on technology, to restore soil fertility. Farming in such a system, is mainly for subsistence with only small proportion of the produce available for sale. Simple farm tools are used with manual labour.

The system is an extensive form of agriculture which can be successful only if the ratio of land to population is high enough to ensure a minimum fallow period of five to ten years or even twenty years, according to climatic and soil conditions. Socio-economic changes and particularly demographic pressures cause a reduction in the availability of cultivable land. The fallow period then shortens with all other factors involved in the system remaining virtually unchanged. Yields decline as a result of inadequate recuperation of the fertility of the soil.

In Sierra Leone, for example[a/], the average fallow period steadily decreased from 10.7 years in 1972 to 9.8 years in 1974 and 8.8 in 1978. Population density increased from 35 per km^2 in 1970 to 38 in 1978, well above the maximum level of about 25 per km^2 for a bush fallow system to be sustained. The yield of upland rice in Sierra Leone fell from an average of 780 kg/ha from land fallowed for more than 10 years to an average of 540 kg/ha when the fallow lasted only 3-4 years.

Through its joint project with UNFPA, "Land Resources for Populations of the Future", FAO is attempting to determine the critical lengths of periods of cultivation and non-cultivation under different conditions of soil and climate. This may be shown by the cultivation factor R: where $R = \frac{C}{C+F} \times 100$; C = years of cultivation and F = years of fallow. Thus, three years of cultivation followed by 10 years of fallow gives an R value of 3/(3+10) x 100 = 23.

For example, to maintain fertility and avoid soil degradation at low level of inputs (corresponding to traditional farming methods), soil typically found in the savanna zone of Asia and Africa require only a moderate rest period: R = 35 to 40 or cultivation for two years in every 5 to 6. A compromise figure of one year cultivation in three is believed to be acceptable. Under intermediate levels of inputs use, R factors on these soils can reach 50-60, meaning cultivation somewhat more than half the time. What is clear is that - with increasing population pressures - required R factors are being exceeded, technologies are not being adopted to correct this, soils are degrading and crop yields are declining.

The improvement of the food production system in these situations of growing land and population pressures comprises, among others, the development of especially adopted soil management and input systems to ensure sustained crop yields.

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a/ FAO/UNDP (1980). Bush fallow in Sierra Leone: An Agricultural Survey. AG: DP/SIL/73/002 Technical Report 6, Freetown.

LABOUR, ANIMAL AND TRACTOR POWER

Agricultural Labour Force

Thus far, some land aspects of the vital land-person ratio have been briefly examined. But factors influencing the person or population side are equally important. For example, drawing on two United Nations studies on long-term population prospects, The State of Food and Agriculture 1981 drew attention to the future trends in world population growth and their implications for agriculture 20/. Rapid urbanization and accelerated migration of rural people to towns and cities, together with large increases in total population, are expected to continue in many developing countries. As shown in the following section, the agricultural labour force 21/ in these countries will not become much larger. This raises the question: will enough workers remain in agriculture to meet the expanding wants for food and other agricultural products by the people who are not on farms?

The United Nations medium-variant projections indicate that by the year 2000 just over one-half of the world's population and 44% of that of the developing countries will be living in urban areas. Not all people who remain in rural areas are dependent on agriculture. This dependence is decreasing because more and more farm households have family members who take on non-farm work full-time, part-time, or seasonally.

According to the UN projections, the agricultural labour force in the world as a whole will be growing slightly in absolute numbers, but declining as a share of the total population and labour force (Table 1-23). In the developed countries it has already been falling in absolute numbers for many years. By 2000, Africa is expected to be the only region with more than half of its total work force in agriculture.

Especially relevant to the world food situation is the question of how many people will the farmers and farm workers have to feed and supply with non-food agricultural products in the future as compared to the present. FAO calculations indicate that in both developing and developed countries the numbers of people depending on each member of the agricultural labour force for their food and other agricultural products will be increasing. Between 1980 and 2000 the ratio of total population (excluding agricultural labour force) to agricultural labour force is expected to rise from 3.8 to 5.3 in the developing market economies. The ratio in developed countries is expected to double from 25 to nearly 55. The increase in the ratio is greater in Europe than in North America, where it is already more than 80 (Table 1-24).

20/ FAO. The State of Food and Agriculture 1981, Rome, 1982, pp. 42-47.

21/ All economically active persons engaged principally in agriculture, fishing and hunting. The sources drawn upon are:
ILO, Labour Force, 1950-2000, Vols. I, II, III, IV, V and VI, Geneva, 1977 and FAO, Estimates and Projections of Agricultural and Non-Agricultural Population and Labour Force, 1950-2000, mimeographed, ESS/Misc/78/3, Rome, 1978.

TABLE 1-23. AGRICULTURAL LABOUR FORCE IN DEVELOPING AND DEVELOPED COUNTRIES, 1980 AND 2000

	Developing countries	Developed countries	World
	..... million		
Agricultural labour force			
1980	759	68	827
2000	813	37	850
	..... %		
Agricultural labour force as % of total population			
1980	23	6	19
2000	17	3	14
Agricultural labour force as % of total labour force			
1980	59	12	45
2000	43	6	34

Source: FAO, ESS.

TABLE 1-24. RATIO OF TOTAL POPULATION EXCLUDING AGRICULTURAL LABOUR FORCE TO AGRICULTURAL LABOUR FORCE

	1980	2000	Change 1980 to 2000
	..... %		
Developing market economies	3.8	5.3	40
Africa	2.7	4.2	56
Latin America	8.3	12.5	51
Near East	5.1	7.5	47
Far East	3.4	4.5	32
Other developing market economies	1.5	3.0	100
Total developing countries	3.3	4.9	49
Asian centrally planned economies	2.5	4.1	58
Developed market economies	25.2	54.8	118
North America	81.7	148.5	82
Western Europe	20.8	47.4	128
Other developed market economies	14.0	30.0	114
Eastern Europe and USSR	8.9	19.7	121
Total developed countries	16.1	4.9	117
World	4.4	6.2	41

Source: FAO, ESS and ESP.

Animal and Tractor Power

One of the key questions in planning agricultural development strategies relates to the use of animal and tractor power to augment or substitute for human labour so as to raise its productivity. There is a delicate balance between the objectives of raising output and income and that of maintaining employment opportunities.

The AT 2000 study provides an overview of the basic sources of agricultural power (Fig. 1-9) in the developing world. Africa is the region that depends most heavily on human labour: 20 out of 37 African countries studied were estimated to rely on human labour for more than 90% of their agricultural power.

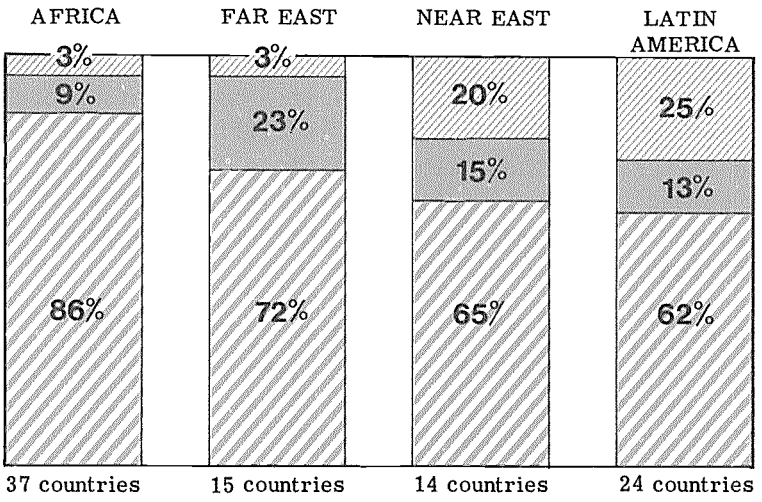

Figure 1-9
RELATIVE IMPORTANCE OF HUMAN LABOUR, ANIMALS AND TRACTORS AS SOURCES OF POWER IN 90 DEVELOPING COUNTRIES, IMPUTED ESTIMATES FOR 1980

Source: FAO, AT 2000

As regards the use of animal power, more than half of the draught animals in the 90 countries are in a single country: India, with 84.5 million draught animals has 51% of the total. It is followed by Bangladesh with 11.4 million (7%), Brazil 8.8 million (5%), Indonesia 6.0 million (4%) and Pakistan 5.9 million (4%).

However, numbers have to be considered in relation to the cultivable land. The average for all 90 countries was 24 animals per 100 ha of arable land. Mauritania heads the list with 65 per 100 ha, followed by Laos 61, Nepal 53 and then India with 50. Countries in Africa generally have a lower intensity: after Mauritania comes Madagascar with 38 and Ethiopia and Kenya with 37 draught animals per 100 ha.

The difficulty of introducing on a wide scale animal traction in Africa is shown by the wide disparities in its use even between adjacent countries. Setting aside Mauritania, which has a relatively small arable land area and is a special case, Mali has 18 draught animals per 100 ha. Yet Niger, also in the Sahel, uses only 6 per 100 ha. A possible reason for this is that the use of ox-driven technology in the Sahel may result in increased requirements for labour in periods when its opportunity cost is relatively high

even if total labour cost per hectare of land falls 22/. Thus in Mali, on irrigated rice farms, use of oxen enabled a large land area to be cultivated without imposing labour constraints at other times of the season. Here animal traction has been widely adopted. But in Upper Volta, small farmers who grow cereal crops for food find it costly to maintain cattle in the dry season; cattle have been entrusted to Fulani transhumant herdsmen. Attempts to introduce animal traction have met with little success under these conditions.

The Sahelian experience thus shows that the constraint to adoption of animal traction may not be farmers' attitudes as much as the difficulties created by shifting of seasonal labour peaks within the farming system which render animal traction uneconomic.

A failure to adopt animal power may also be due to poor technology. For example, ox-cultivation can lead to greater labour requirements; because the wider spacing of the crop rows required, it creates greater demands for weeding later in the season. Yet it has been noted that, even if ox-drawn weeders are part of the equipment packages, farmers will rarely allow their crops to be weeded by animal power once the crops are above knee height. Again, in East Africa, the most widely used ox-drawn tool is a mouldboard plough originally developed for use in more friable temperate soils. It is difficult to use in typical tropical soils and this single factor, together with the absence of a workable replacement, may account for the slow spread of ox-cultivation in this sub-region even though other factors would appear to support its wider use. Thus draught animal power technology requires improvements and adaptation for it to succeed.

Tractor usage is more evenly dispersed, with 5 among the 90 developing countries having 61% of the total in 1980. Brazil led, with 495 000 tractors (19% of the total), followed by India with 326 000 (13%), Turkey 266 000 (10%), Mexico 254 000 (10%) and Argentina 236 000 (9%). The average size and hence the working capacity of the tractors used may differ widely among countries.

Again the distribution of tractors in relation to arable land was different. The average for all 90 countries was 0.4 tractors per 100 ha of arable land. Suriname was the most intensive user with 3.8 tractors per 100 ha, India was next with 1.9, followed by Cyprus (1.8), Republic of Korea (1.7) and Uruguay (1.6).

In the 1970s, the number of tractors used in world agriculture increased by 3% per annum. The increase was much faster in the developing countries (over 9% per annum) than in the developed (2%). The former were, of course, starting from a much smaller base. In the developing countries, there were particularly high rates of growth in the Asian centrally planned economies and in the Near and Far East. But in Africa and Latin America the rate of tractorization barely exceeded the rather low rate prevailing in western Europe. In North America, the number of tractors has declined because of the trend towards using larger tractors with a greater capacity.

The conflict aroused by the need to ease the drudgery of farm work and increase labour productivity on the one hand, and the perceived need to create employment opportunities in rural areas on the other, has been strongly felt in the broad area of mechanization and especially tractorization 23/. The rise in the costs of energy during the 1970s appeared

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22/ Delgado, Christopher L. and John McIntire, Oxen Cultivation in the Sahel, American Journal of Agricultural Economics, Vol. 64, No. 2, May 1982, pp. 188-196.

23/ See, for example, SOFA 1973, Chapter 3. Agricultural Employment in Developing Countries.

to have tilted the balance away from proposing mechanization as a general prescription. Yet as evidence accumulates on the seasonal and, indeed, chronic labour shortage in many farming situations in Africa, the case for selective and appropriate mechanization to reduce labour bottlenecks and farm drudgery may need re-examination. Rural electrification could bring benefits worth exploiting.

Experience with mechanization in many developing countries has shown that its adoption may be distorted by policies that perhaps unintentionally promote its use such as over-valued exchange rates, low rates of interest and easy access to credit.

MODERN INPUT USE

Modernization of agriculture normally involves the wider use of an array of inputs - such as improved seeds, fertilizers and pesticides - usually in the form of a package. Within technical limits the inputs may be substituted for each other depending on their relative cost and availability. Often they are associated with increased irrigation, discussed earlier.

Improved Plant and Animal Genetic Material

The quality of improved seed cultivars can be regarded as the core element of most crop improvement programmes. Yet a recent study 24/ indicates that, while most European and North American countries had functioning seed industries for basic food, industrial, vegetable and pasture crops, the situation is much less favourable in developing countries. Agricultural research institutions were in operation in most of them, but only a few had sufficient installations for the production, quality control and distribution of improved seeds, despite recent efforts to implement seed improvement programmes.

Nevertheless some progress can be seen since the mid-1970s in the three broad areas of seed improvement: cultivar improvement, seed quality control, and seed production and distribution. By 1979/80 few developing countries reported no activities in these three areas with respect to basic food crops. But half or more of them had no programme in industrial or vegetable seeds, and there were very few programmes in pasture seed development. Overall seed improvement programmes were widely developed in South America. Programmes in Asia were oriented more towards basic food crops and vegetables and those in Africa towards industrial crops.

AT 2000 estimates that by 1980 some 27% of the developing countries' annual seed consumption was for improved varieties. Regional usage was: Latin America 44%, Near East 32%, Far East 23% and Africa only 9% 25/.

24/ FAO Seed Review 1979/80. AGP: SIDP 81/7.

25/ FAO (1981) op. cit. p. 168.

Constraints in the seed sector of developing countries are the lack of proper institutions including, in some cases, no statutory framework for the testing and controlled release of planting materials; a lack of funds for facilities and equipment; and a lack of trained manpower particularly at lower and intermediate levels.

In response to requests from member nations, FAO implemented its Seed Improvement and Development Programme (SIDP) in 1973. By 1982, 130 countries were cooperating with the Programme. In the early years of the programme the strategy adopted was to assess the effectiveness of seed production activities in participating countries, develop technical guidelines, introduce suitable crop varieties and formulate and implement seed projects. Emphasis was placed on the production of quality seed of food crops but not to the exclusion of other crops of economic importance.

Since 1982, there has been a focusing of the Programme's activities towards seed utilization campaigns and the establishment of seed security reserve stocks. Increased emphasis has been placed on technical support to strengthen national seed services.

Much concern has been voiced about the need to encourage collection, conservation, maintenance and international exchange of plant genetic materials of agricultural interest. This is not easily accomplished, for it raises questions as to the appropriate roles of various national and international entities; the finance of such endeavours; adequate protections against spread of plant diseases and pests; and the proprietary rights of individual plant breeders, research centers and commercial operations. FAO has been strongly involved in technical and organizational support of efforts to improve the situation, especially those related to access of developing nations to improved genetic materials. These issues will be considered at the Conference of FAO in November 1983.

Although seed improvement programmes clearly refer to crop production, there is the equally important corollary for livestock - the preservation and improvement of animal genetic resources, along with encouragement of sound animal breeding and selection practices. As discussed in Chapter 2, remarkable increases in livestock productivity, have been achieved in developed countries. The techniques that produced these are potentially reproducible in developing countries too as shown by rapid improvements in the productivity in some countries' poultry industries.

Three points of concern should be highlighted:

- the need to generate breeding stock which comply well with a wide range of socio-economic objectives and not solely with a criterion of maximum output;

- the need to conserve indigenous genetic material which may have inestimable value in the future for disease resistance or other desirable traits;

- the need to ensure that animals are adapted to the environmental and management conditions in which they are required to perform.

Fertilizers

Consumption of fertilizer nutrients per hectare of arable and permanent crop land has nearly tripled in the developing countries since 1970 (Table 1-25). The increase has been especially marked in China and the other Asian centrally planned economies, which now use

fertilizers more intensively than developed countries as a whole. China also uses exceptionally large amounts of organic manure but these cannot supply sufficient quantities of the nutrients required to sustain high yields. Mineral fertilizers thus complement organic manure. Among developed countries a faster rate of increase in Eastern Europe and the USSR is particularly apparent.

TABLE 1-25. FERTILIZER CONSUMPTION IN RELATION TO ARABLE LAND AND LAND UNDER PERMANENT CROPS AND COMPOSITION BY NUTRIENT, DEVELOPING AND DEVELOPED COUNTRIES.

	Total nutrients in 1980/81		Share in 1979/80		
	per ha	% of 1970	Nitrogen	Phosphate	Potash
	kg/ha		%		
Developing market economies	33	247	55	30	15
Africa	10	211	46	35	19
Far East	38	255	66	21	13
Latin America	46	229	39	37	24
Near East	34	260	61	37	2
Asian centrally planned economies	146	330	82	15	3
Total developing countries	49	273	66	24	10
Developed market economies	123	128	45	29	26
North America	99	140	49	24	27
Oceania	38	113	14	74	12
Western Europe	218	125	46	28	26
Eastern Europe and USSR	105	165	43	31	26
Total developed countries	116	140	45	29	26
World	80	164	51	28	21

Source: FAO, Fertilizer Yearbooks.

The highest rates of use per hectare have been and continue to be in Western Europe. This partially explained by relatively large applications of fertilizers to grassland. On the average, developing countries are still applying nutrients at less than half the rates used by developed countries. Among developing regions Africa uses the least.

Developing countries, especially the Asian centrally planned economies, are tending to use higher percentages of nitrogen in the nutrient mix than developed countries, mainly because of differences in their crop patterns. They are the main producers of rice, which is a major user of nitrogen. Latin America has been consuming a smaller proportion of nitrogen than the other developing regions. Among the developed regions, Oceania has been using relatively high amounts of phosphate and low amounts of nitrogen, largely because of the predominance of pastures.

The regional averages shown in Table 1-25 conceal the very low rates of fertilizer use in many individual developing countries. In 1980/81 half of the 107 developing countries for which data are available were using less than 20 kg per ha, and a quarter were using less than 5 kg. In contrast, among 34 developing countries, fully half were using 165 kg or more per ha, and only one less than about 40 kg.

The pattern of fertilizer use also has some major implications for energy consumption by the agricultural sector. This is because nitrogenous fertilizers are estimated to require nearly 6 times as much energy to manufacture, pack, transport and apply as the least-energy-using potassic fertilizers 26/. By the late 1970s, nitrogenous fertilizers were consuming over 80% of all the energy used in the fertilizer sector. This is mainly because ammonia derived from natural gas is used as a feed stock for the most widely used nitrogenous fertilizers and accounts for about 55% of the energy used in their manufacture. The other 45% is accounted for by fuel costs. In contrast, phosphatic and potassic fertilizers use less energy in their manufacture than in their packing, transport and application.

The difference in the estimated energy used in the form of fertilizers per ha of land is striking: the Asian centrally planned economies apparently consume more than Western Europe per ha of land (Fig. 1-10). As fertilizer accounts for nearly 70% of the energy

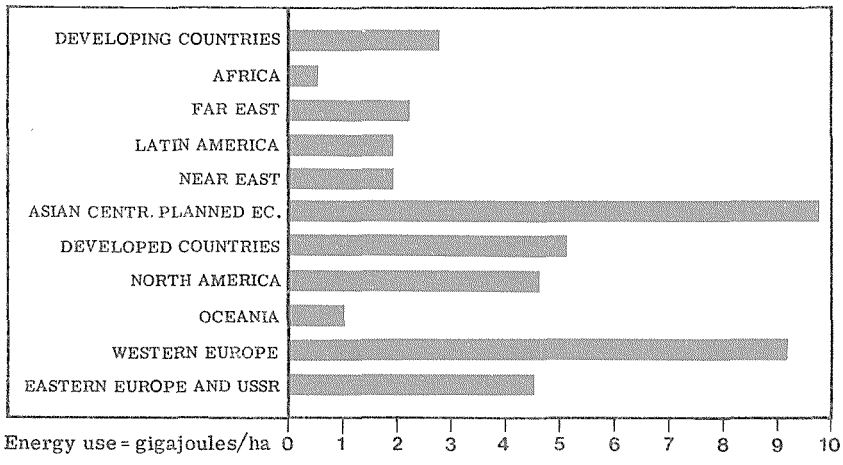

Figure 1-10
ESTIMATED RATES OF ENERGY USE PER HA. OF ARABLE LAND THROUGH FERTILIZER USE, 1978/79

(1 gigajoules = 1 thousand million joules)

Source: IFDC and FAO, ESS

used by the agricultural sector in developing countries as compared to only 40% in the developed, the relative prices charged to farmers at the farm gate could strongly influence efforts to economize on energy consumption. This issue may not appear particularly critical at this time of apparently abundant world supplies of petroleum products. Nevertheless it seems that such relative abundance stems more from the effects of the current economic recession - especially on such high energy users as steel and cement manufacturing - than on genuine energy conservation. The prices of energy, and in turn

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26/ The estimates of energy use in US barrels of oil per metric ton of nutrient are: N 12.8, P 2.9, and K 2.2. See International Fertilizer Development Centre (IFDC), Energy and Fertilizer: Policy Implications and Options for Developing countries, Muscle Shoals, Alabama, 1982. See also FAO, Energy for World Agriculture, Rome, 1979, pp. 50-53.

fertilizers, could rapidly increase when economic activity picks up 27/.

For example, in India fertilizer use had spread to about 85% of the irrigated land by 1979/80. So there is much less scope to promote fertilizer use through its wider adoption on land already irrigated. The achievement of growth targets for irrigated land as set down in India's Sixth Plan, nevertheless, would go some way to promote fertilizer use in parallel. However, there is considerable economic potential to fertilizer use under rainfed conditions in India providing that the distribution network expands in these areas. Supply side considerations are also important because limiting supplies reduces the motivation of the fertilizer industry to promote sales and improve distribution. Efforts are needed to ensure adequate domestic production capacity, to utilize this capacity more fully, to manage stocks more effectively and to maintain imports as planned. It seems that many developing countries could learn from India's experience.

Clearly farmers are very conscious of relative prices of fertilizers and crops. For example in Pakistan, offtake of fertilizer which has grown 1000 fold over the past 30 years, suffered setbacks in times when the nutrient/crop price ratios deteriorated. Recent examples were in 1969-71 and 1973-75 as a result of a reduction in fertilizer subsidies 28/. Several other countries in Asia recently have had to reduce fertilizer subsidies. In Sri Lanka fertilizer prices approximately doubled between 1980/81 and 1981/82.

Despite the need and the scope for expanding fertilizer use and hence agricultural output, intensive users of fertilizers, in both developed and developing countries, may also want to examine their fertilizer policies and programmes closely in the years to come, particularly with a view of greater efficiency of use of all sources of plant nutrients within an integrated nutrient supply system. For example, in 1980/81 sixteen developing countries were consuming more than 100 kg of fertilizer nutrients per hectare of cropland and so are already moderately intensive users of fertilizers.

It is estimated that 40% to 70% of nitrogen applied is lost as far as plant nutrition goes and under wrong management some enters the ecosystem as a water pollutant. For phosphorous about 15% - 20% is utilized by the crop receiving the application. The residual phosphorous is partly available to succeeding crops and partly fixed in the soil depending on soil conditions. Losses incurred by potassic fertilizers are less.

The fertilizer manufacturers can improve the efficiency of fertilizers themselves, through the wider development of controlled-release fertilizers and materials amenable to deep placement to inhibit premature leaching, for example. However, much efficiency can be gained by improving fertilizer management. This means knowing and applying the correct dosage, having a proper balance of nutrients, and applying fertilizers at the right time and in the right place.

27/ Desai, Gunvant M. (1982), Sustaining Rapid Growth in India's Fertilizer Consumption: a Perspective Based on Composition of Use. IFPRI Research Report 31, Washington, August.

28/ Current Fertilizer Situation 1981-82 and Outlook 1982-83 and 1983-84. National Fertilizer Development Centre, Special Report - 10, Government of Pakistan, Islamabad, January.

Pesticides

An estimate for 1980 shows that the United States and Western Europe dominate the world market for agricultural chemicals, representing over half of the total.

Herbicides account for the largest value with about 42% of the total (Table 1-26). The same source also estimates that over half of current pesticide use is accounted for by only five crops: maize, rice cotton, soybeans and wheat.

TABLE 1-26. ESTIMATED USE OF PESTICIDES, 1980

	World	United States
	..... million $	
Herbicides	4 891	2 171
Insecticides	3 916	903
Fungicides	2 199	226
Others	559	199
Total	11 565	3 504

Source: A Look at the World Pesticide Market, Farm Chemicals, September 1981.

World trade in pesticides grew at an annual rate of nearly 20% during the 1970s. Imports by developed countries account for most of this growth, notably those of North America, which increased by 30%. The increase in the developing market economies has been slower.

Herbicide use is concentrated very much in developed countries, as is to be expected from their relative scarcity of agricultural labour. However, the use of such chemicals as 2, 4-D appears to be increasing in such diverse developing countries as India and Mexico.

The limited data available to FAO indicate that the consumption of the "older" chlorhydrocarbon insecticides, such as DDT and Aldrin, appears to be declining even in some developing countries because of environmental fears. The use of parathion and other organophosphates and carbamates has increased. Some countries engaged extensively in fruit and wine production stand out as users of fungicides.

Pesticide use is limited at present by depressed prices for some agricultural commodities, continuing environmental fears, and restrictions imposed on trade. Other factors are the trend towards integrated pest control, whereby crop losses are reduced without relying so much on chemicals (see Box), and the use of more complex chemicals applied at lower rates and with more efficient machinery. On the other hand, reduced tillage practices adopted for soil protection as well as to reduce energy costs and machinery use require more chemicals to control weeds and other pests.

INTEGRATED PEST CONTROL

As a result of the various problems arising from the indiscriminate use of pesticides, new approaches were needed for insect control. The integrated pest control approach, advocated as early as 1954, was promoted by FAO in the early '60s. It attempts to use all the known techniques of control to maintain pest populations below the level at which they cause economic damage to crops. Under the FAO/UNEP Cooperative Global Programme for the Development and Application of Integrated Pest Control in Agriculture, a number of regional projects are now under way focusing on crops of major socio-economic importance. An example of one successfully completed project has been the control of the coconut palm Rhinoceros beetle in the South Pacific. Information was obtained on the life-span, behaviour and ecology of this insect. Subsequently, practical and efficient integrated control techniques were developed. These were based on the prevention of the build-up of beetle populations by biocontrol agents, one of which, a virus, harmless to humans and animals, was the most important. Control measures were also directed at the elimination of potential breeding sites through environmental sanitation and re-utilization of coconut timber. Successful control programmes were carried out in the island states of the South Pacific. Later, these control techniques were also expanded to South and Southeast Asia and to the islands of the Indian Ocean.

In the past the increased use of some insecticides, such as DDT and dieldrin, gave rise to concern about their possible effects on non-target organisms. For example, in tsetse control, the application of persistent formulations of DDT and dieldrin from the ground to 10% or so of the total target area, as still used in some countries, can have a serious impact on terrestrial and acquatic fauna if care is not taken to place the insecticide in resting sites of the pest within the vegetation. However, usage of persistent formulations is rapidly declining in favour of serial applications of Endosulfan and, to some extent, Deltamethrin. Cloth screens and traps have also been used successfully in tsetse control. Research on improving insecticide formulations and application equipment is in progress so that lower dosages may be applied with greater selectivity.

Animal industries employ insecticides to control a variety of ectoparasites of livestock, such as biting flies, mites and ticks that transmit diseases, damage hides and skins or reduce animal productivity through the irritation they cause. Much work is being done to find ways of reducing the livestock industries' dependence on the use of acaricides.

Examples of these ways are new methods of applying insecticides, the exploitation of genetic resistance of the host to ectoparasites in control programmes to reduce the frequency of application of insecticides, improved knowledge of the ecology of ectoparasites to plan control programmes and stimulation of the host's resistance to ectoparasites by artificial immunization. These new approaches hold out the hope that ectoparasite control may be achieved in the future with appreciably less insecticide usage per animal unit. Not only will this reduce costs but it also will reduce the risks of pollution and generating resistance in the pests themselves.

Animal Feed

The increased use of concentrate animal feeds such as cereals, oilseeds and milling by-products in livestock industries has been associated with marked increases in livestock output and productivity. The use of cereals and other concentrate animal feeds rose rapidly during the 1950s and 1960s in North America and both Western and Eastern Europe.

A rapid growth has also become evident more recently in developing countries where the increase averaged 9% a year in 1976-80. By 1981 nearly 600 million tons of cereals (excluding rice) were used for livestock feed, 250 million tons in the USA and the USSR alone. The use in developing countries was about 100 million tons, 17% of this in Brazil. This issue is discussed at greater length in Chapter 2.

There has been a shift in the kinds of livestock produced away from largely forage-consuming ruminants towards grain-consuming poultry and, in some countries, pigs. For example, the annual rate of increase of poultry production in 1976-80 was 7% in the world as a whole. During the same period, world production of beef and buffalo meat fell by 0.7% a year, and that of mutton and goat meat rose by only 1.4% a year.

These changes in the pattern of livestock production have influenced the extent to which countries and regions are using their domestic output of feed grains for animal production. A rough measure is provided by the percentage of their production of cereals, pulses and oilseeds that is fed to livestock. The developing countries use much less than the developed countries but, as their livestock systems intensify, they are using more of their production of these commodities as animal feed. The percentage rose from 8.5 to 14.1% in developing countries, and from 32.2 to 35.9% in developed countries between 1966-68 and 1978-80.

The rapid increase in the demand for livestock products poses particular problems for agricultural policy makers in developing countries. They must try to avoid having cereals bid away from low-income consumers by the demand for animal feed. Apart from the redistribution of incomes in favour of low-income consumers, this implies increasing cereal or other feed supplies through either domestic production or imports.

Food contamination is a pollution problem that is becoming more prevalent through the increased use of animal feeds. An example is the presence of toxic metabolites (mycotoxins), the production of which is favoured by high temperature and atmospheric humidity, conditions widely found in the humid tropics. Food and feed may also be contamined by the heavy metals produced by some industries, and by pesticides.

The FAO/WHO Codex Alimentarius has been developing international food standards for many years. FAO, WHO and UNEP are also developing a Joint International Food and Animal Feed Contamination Monitoring Programme.

AGRICULTURAL RESEARCH, RESOURCE AND INPUT USE

With the current need to improve agricultural productivity - to raise output and incomes - the question of agricultural research to develop improved technologies takes on added importance. Agricultural research, therefore, can be regarded as a link between the 'basic' resources with which a country is naturally endowed (land, labour and water) and the use of inputs such as improved seeds, fertilizers and pesticides. Scarcities of any of the basic resources will generate pressures to develop technologies which economize in their use.

For example, in Japan the major force behind agricultural research was a growing land scarcity which led to the introduction of land-saving biological innovations. In the US, on the other hand, the need was for labour-saving technology as land was not scarce but labour was. This accelerated the development of mechanized agriculture.

However, in order for such need or requirement to be effectively reflected in new technologies, the priorities of the research programme will have to be appropriately designed. Several factors may, however, introduce biases in this process:

- The communication of needs may be weak or inadequate. Such situations may exist in developing countries where farmers need improved technologies but in practice cannot make their needs known to the administrators of agricultural research programmes. The latter have to assume the responsibility of deciding what directions such programmes should take and would gain from an effective process of extension-research feedback.

- Where technologies are introduced from other countries, either directly or through the training of researchers and administrators (situations commonly found in developing countries), the technologies themselves are orientated to the factor or resource price ratios pertaining in the originating - usually developed - country, and they may not be appropriate to the situation prevailing in the countries adopting them.

- There appear to be serious limitations or gaps in the range of innovation possibilities. For example, it is not easy to develop farm equipment that is simple and robust yet cheap. In contrast, the possibilities of developing, testing and introducing innovations that economize on land (increase crop yields, for example) are not so intractable 29/.

Agricultural research also has an important role in promoting and encouraging the substitution of inputs and economizing on their use. With the rising costs of such inputs as fertilizers and irrigation water, increasing emphasis has been given to developing crop varieties and agronomic practices that economize on the use of inputs. New directions in plant breeding have led to the development of varieties that are more pest-resistant, thereby reducing pesticide costs. Nitrogen-fixing legumes can be sown with other crops to reduce required applications of nitrogenous fertilizers.

Economic Returns and Levels of Expenditure

Numerous studies have been made of the rate of return on investments made in agricultural research, but more for developed than developing countries 30/. The rates are often well above the 10 to 15% usually considered as the opportunity cost of capital. Returns to research even above 50% are sometimes quoted. Such rates suggest that investment in agricultural research can be extremely worthwhile.

29/ See Binswanger, Hans P., Measuring the Impact of Economic Factors on the Direction of Technical Change in Arndt, Thomas M., Dana G. Dalrymple and Vernon W. Ruttan (eds.) Resource Allocation and Productivity in National and International Agricultural Research, Univ. of Minnesota Press, Minneapolis, USA, 1977.

30/ See several contributions in Arndt, Thomas M. et al. (1977) op. cit.

The importance of agricultural research received due recognition in the early 1970s with the creation of the system of International Agricultural Research Centres (IARC) of the Consultative Group on International Agricultural Research (CGIAR). This international agricultural research programme is sponsored by the World Bank, UNDP and FAO and has the support of both government and non-government donors.

THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH (CGIAR)

The CGIAR, established in 1981, is an informal association of countries, international and regional organizations, and private foundations dedicated to supporting a system of agricultural research centres and programmes around the world. The purpose of the research effort is to improve the quantity and quality of food production in the developing countries. The World Bank, the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Development Programme (UNDP) are co-sponsors of this effort. The World Bank provides the Chairman and Secretariat of the Consultative Group. The Group is advised by a Technical Advisory Committee (TAC) whose Secretariat is provided by FAO. The Group has 44 members, of which 34 are donors contributing about $150 million in 1982. The other 10 countries represent the five regions of the developing world.

The Group initially took on responsibility for four international research centres founded by two private foundations: the Rockefeller and Ford Foundations. Two of these centres, one concerned with rice and the other with wheat and maize, had already demonstrated that internationally managed research institutes, staffed and equipped to a high standard, could develop new, high-yielding varieties of seeds that bring about dramatic increases in food production. The formation of the Group enabled the existing institutes to expand and new institutes to be created on similar lines. Most food crops of major importance to the developing world have now become covered by internationally funded research.

Today there are 13 institutions in the system of international research supported by the Group. The full list is shown in the glossary of names at the beginning of this document. Their research and training activities encompass crops and animals which account for three-quarters of the food supply of the developing countries and for an even higher proportion of their protein intake. The institutions employ about 7,000 people, about 600 of whom are senior scientists recruited worldwide.

However, it is estimated that only about six developing countries have a well-developed agricultural research infrastructure, well organized and with generally adequate levels of staffing 31/. Another ten have research networks which may be reasonably well staffed but where research activities are poorly organized or managed. Fully 40 countries, each large enough to justify a comprehensive national agricultural research system, lack the necessary research infrastructure and manpower. Then there remain the many countries with a financial resource base which is too small to justify their own national programmes aimed at specific crops or livestock, but need adaptive research capability with close links to strong research institutions outside their boundaries.

31/ FAO National Agricultural Research in Developing Countries, C81/26, Rome, 1981, p. 8.

If the normative growth rates of agricultural production proposed in FAO's AT 2000 study are to be achieved, increases in agricultural input use by developing countries will have to be extremely large. For example, the projections indicate that fertilizer consumption in the 90 developing countries covered in the study would need to rise four or five-fold by the end of the century. Unless these countries possess or have access to vigorous agricultural research programmes that generate enhanced capabilities for effective use of inputs, overall production objectives will be jeopardized. This underlines the emphasis that needs to be placed at both national and international levels on research on crops, livestock and farming systems of developing countries. The World Food Conference in 1974 recommended that expenditure of the order of 0.5% of agricultural GDP was a reasonable target for support of agricultural research by developing countries. This figure is now exceeded by the majority of them. More recent thinking 32/, however, suggests that a 1% target is advisable at least for those countries that are relatively advanced in this field. (Developed countries typically spend about 1-2% of their agricultural GDP on research.)

It may be argued that more expenditure on agricultural research is not needed because farmers in developing countries could be much more fully utilizing existing knowledge. But it can also be argued that the faster the advance in basic knowledge, the greater are the returns from the research subsequently applied to that basic knowledge. It also seems that countries which do not have a capacity to do some significant agricultural research cannot expect to benefit fully from research done by others.

32/ FAO (1981), op. cit.

2. Livestock Production: a World Perspective

INTRODUCTION

The topic of this chapter is livestock production in a world perspective but with particular emphasis on livestock development issues in developing countries. There are several reasons for such a focus.

- Public discussion often deals with livestock in an over-simplified manner, assuming that most animal production depends heavily on cereal feeds and that curtailment of animal production will automatically result in more food grain being accessible to malnourished people. Questions can in fact be raised about the extent to which livestock systems utilize grain, but some do not compete for sources of human food.

- During the past two decades, world attention has focused on the green revolution in crop production achieved in many developing countries. By contrast, livestock have received very little attention. Yet there are possibilities for "breakthroughs" in animal production, particularly in the areas of animal breeding, feed utilization and disease control.

- Dynamic changes in world supply and demand patterns for meat, milk and other livestock products are taking place. Agricultural leaders in developed as well as developing nations need to examine afresh their programmes and policies related to livestock production, pricing and trade. More than ever before, such reassessments will need to reflect understanding of events not only in the domestic livestock sector but in other sectors and elsewhere in the world.

- Technological, economic and demographic changes are making it necessary for nations to address questions of basic production and marketing structure in their livestock sectors. With the growth of urban populations, large agribusinesses and international trade, it has become costly and politically difficult for many industrialized countries to continue the protection of small livestock producers and processors. In the developing countries, there are tendencies for commercial livestock operations to emerge that have little linkage to people and feed resources in existing agrarian structures.

- In this era of concern about energy supplies, ecological balance and environmental quality, several non-food attributes of livestock take on more importance. There is renewed interest in the role of animals as sources of draught power, fibre, and partially converted biomass for manure and fuel use.

- There is a need to review the broad objectives of livestock policies and programmes. The aims of livestock sector actions and assistance have often become obscured and fragmented amid the dynamic changes that have taken place in many countries in recent years.

This chapter does not provide hard-and-fast answers about what should be done. Indeed, what is best for any one country will depend on its unique setting, capabilities and aims. Instead, the intent here is to provide a point of departure for diagnosing in an orderly fashion what could be done in any one situation to help the livestock sector develop or adjust to changing circumstances. Attention is drawn to important policy issues, programme decisions and economic relationships. Much of the chapter is devoted to technical aspects and geographic settings of livestock production systems, for it is felt that economic policies and development programmes have to be in tune with these realities if they are to be effective.

Livestock production has a multi-purpose role in agriculture. Particularly in developing countries, it is an integral part of farming systems and rural life styles that can utilize otherwise unproductive land areas and be a source of security without making people highly dependent on external inputs or complicated technologies. Yet, the question remains: how to satisfy the rapidly increasing demand for livestock products arising in developing countries by exploiting the production potential of these systems?

The most striking gains in livestock productivity have been achieved where technologies have been imported from developed countries. This has involved highly commercial and specialized approaches rather than the improvement of existing systems of production. It has also led to a greater dependence on imported capital goods, technical expertise and animal feeds. Such approaches can be justified in only a limited number of development situations.

The main thesis of this chapter is that traditional farming systems involving livestock can be improved or adapted and new systems introduced that are more appropriate to the economic and social environment of most developing countries. This improvement or adaptation rests on technological upgrading in three main areas: livestock feeding, its breeding and health. The possible ways to evolve animal feeding systems that are more compatible with other development and food needs require:

- effective use and management of pasture, range and waste lands for ruminant production;

- emphasis on forage grasses and legumes as integral components of crop production (which in the long run many enhance rather than compete with total cash crop production);

- wider use of crops that can be produced locally as substitutes for imported animal feeds;

- through physical and chemical treatment, changes in storage and processing and even genetic approaches, better digestibility and so fuller utilization of straw, bagasse, rice bran, banana stems, and other crop by-products;

- improvement of traditional scavenger-type production of poultry, pigs and other livestock commonly found on family holdings.

The strategies adopted with regard to livestock feeding will strongly influence those regarding breeding, the second main area for improvement. There are several possibilities but the approach is to select and upgrade economically useful local stock, if need be, by drawing on breeding material and genetic advances in other countries. Particular emphasis may be given to livestock breeds and species adapted to specific conditions

and uses. Examples are the water buffalo for draught power, milk and meat in the humid tropics; camels, sheep and goats for arid environments; trypano-tolerant cattle, sheep and goats; and rabbits and other small stock with high reproductive rates for backyard production systems. The importance of identifying, protecting and utilizing native breeding stock should be stressed in order that genetic potentials for improved disease and environmental tolerance are not lost.

The third area of technological improvement lies in animal health. Disease monitoring networks, veterinary services and supplies, and quarantine mechanisms are at the heart of effective animal health programmes. Yet, in developing countries, these services are not always available or only inadequately so. In most cases, past efforts to prevent and control diseases affecting animal productivity have shown a high pay off. But given the continued constraint on the resources for veterinary services in most developing countries, decisions on what aspects of disease prevention and control should have priority ought to be based on a careful assessment of costs and benefits.

In focusing on this theme of integrated approaches to improvement of livestock systems, the chapter shows how livestock can serve as an important vehicle toward equitable rural development in both arid and humid settings in developing countries. Three illustrative programmes are examined. One has had considerable success in improving sheep production and grazing practices in Syria. It has used approaches which comply with the traditional independence of the nomadic people. It has also tailored water development, forage establishment and grazing practices to local agronomic conditions.

The second example is Operation Flood, a large dairy programme in India. It has centred around the development of cooperatives as a means of enabling small producers to sell processed milk to urban markets. Other forms of assistance to the producers such as improvement of feed supplies, veterinary and breeding services, and technical advice have been closely interwoven from the start. Channelling of profits into community improvements has also been a fact.

The third example is another smallholder dairy programme, this time in Kenya. This programme built on a land reform programme and the then newly-conferred ability of smallholder farmers to grow cash crops. Dairying integrated itself well into these labour-intensive farming systems, often on land settlement schemes. A reform in the pricing policy which purposely did away with supply quotas that discriminated against small-scale producers, an effective marketing system, as in India, built on a cooperative structure, and the provision of technical services, particularly artificial insemination, fortuitously worked together to ensure the programme's success.

These examples differ considerably in their style and emphasis. But common to all three is their view of livestock improvement as a means toward better human wellbeing. They also illustrate the usefulness of interdisciplinary programme approaches that go beyond conventional agency boundaries and that link with the cropping potentials, marketing and processing needs, agrarian and community structures, and the people of the particular setting at hand.

THE ROLE OF LIVESTOCK IN DEVELOPMENT

Livestock are multi-purpose. They provide man not only with food but also with draught power. In some situations, they also serve as a means of capital accumulation. They supply manure that can be used for fuel and fertilizer and are a source of hides, skins, wool, hair and numerous other products. In many societies, especially pastoral ones, they have complex cultural values which may be an integral part of the life of both the family and the community.

It is only in the last century that livestock production and utilization has become very intensive in the industrialized countries. Yet livestock products have, for centuries past, provided the raw materials for such traditional rural industries as tanning and candle-making, and the thriving mediaeval wool industry. Modernization of the livestock industry really began through the impetus of the industrial revolution in Europe that gave new impulse to or expanded market-oriented urban centres which had to purchase their own food supply. Once the market incentives existed, the technology soon followed resulting in improvements in both animal production and product processing. In particular, new technology reduced transport costs and led to the opening up of new areas for meat production in North and South America and in Oceania. The availability of cheap grain from low cost production areas in North and South America also led to radical changes in the pattern of agricultural production. Grain began to be increasingly used in intensive meat, milk and egg production to satisfy the demands of growing industrial markets. Improvements in food technology made it possible to chill, freeze and can meat and to process milk. Such techniques considerably extended the shelf life of these perishable products. They expanded the market for animal products and gave the producer a great deal more flexibility in his production process.

TABLE 2-1. GROSS VALUE OF LIVESTOCK PRODUCTION IN 1980

	Developed	Developing	Total
	..... Thousand million US$		
Meat	109	62	171
Milk	71	21	92
Eggs	16	9	25
Hides/skins	3	3	6
Wool	3	1	4
Draught	6	40	46
Manure	4	6	10
Total	212	142	354

Note. Livestock products have been valued at market prices. Non-product values - draught and manure - have been estimated on the basis of the values of the mechanical power or chemical fertilizers which are replaced by livestock.

In developing countries this activity is carried out both on the rangelands and in close conjunction with the production of crops, particularly cereals. In the last two decades a massive international effort has gone into the improvement of cereal production by using new genetic-chemical technology. The small farmer who uses this technology rarely produces cereals in isolation, but usually pursues a mixed crop/livestock system of farming. The livestock are integrated into the system not only in generating income, but as a form of capital that can be readily liquidated, provide draught power and manure while consuming crop residues which otherwise would be unused.

Non-food values are frequently ignored when estimating the contribution of livestock to gross agricultural production. If the estimated values of draught power and utilized manure provided by livestock are included, the total annual value of livestock production increases only marginally in the developed countries but by almost one-half in the developing countries (Table 2-1).

LIVESTOCK AS A SOURCE OF FOOD

In 1980 world production of meat, milk and eggs for human consumption was estimated to be 140, 469 and 28 million tons respectively. Together with fish (about 50 million tons caught for food) these products provided in that year 33% of the global average daily intake of protein as well as 17% of the total intake of calories. Progress in raising the average levels of protein intake has been rather slow in developing countries and regional differences have been increasing (Table 2-2). The averages shown in the table also conceal major differences between countries within the regions as well as varying consumption levels within countries themselves. For example, at the national level, 1975/77 average annual intakes ranged: for meat from 120 kg per caput in the USA to 1.4 kg in India; for milk from over 300 kg in Finland to 0.4 kg in Indonesia; and for eggs from 21 kg in Israel to 0.1 kg in India.

TABLE 2-2. GLOBAL PROTEIN INTAKES

	Protein of animal origin (including fish)			Protein of vegetable origin	Total protein
	1961/63	1969/71	1978/80	1978/80	1978/80
	..... (Grams/caput/day)				
Developing market economies	10	11	12	46	59
Africa	9	11	11	43	54
Far East	7	7	7	43	50
Latin America	25	25	28	39	66
Near East	13	13	16	58	74
Asian centrally planned economies	10	9	12	53	65
Developed market economies	44	51	56	43	99
Eastern Europe and USSR	37	44	51	50	100
World	21	22	24	46	69

Source: FAO Production Yearbooks.

While there is some debate, many nutritionalists feel that humans will not have the needed amounts and kinds of amino acids unless their diets include protein from either animal (including fish) products or an unusually well designed combination of foods from plants. Per caput intakes of protein from animal sources differ widely from region to region in the world (Table 2-2). In places where little animal protein is consumed the nutritional situation of the lowest income groups is often precarious because they cannot afford enough or the right kinds of vegetable sources of protein to fill the gap.

This situation is related to the failure of animal production to keep pace with the annual growth in the human population of these countries, which has approached 3% over the past two decades. Demand has been depressed by rising prices associated with the shortfall in supply affecting low income consumers in particular. Yet shortfalls would have been even greater if pig and poultry meat production had not grown at high rates in some instances. However, much of the latter was based on the use of cereal-based concentrate feeds. This, in turn, raises further questions of nutrition policy and equity in countries where, while calorie deficiencies exist, cereals are used to produce meat for consumption by higher income groups.

TABLE 2-3. FOOD PRODUCTION FROM SOME COMMON AGRICULTURAL SYSTEMS

Type of production	Typical yields per annum of Protein (kg/ha)	Gross energy (megajoules)
Crop		
Wheat	225	41 000
Potatoes	450	78 000
Vegetables	500	25 000
Non-ruminant livestock		
Pigs	66	9 700
Eggs	100	6 600
Broiler	100	4 800
Intensive ruminant (crop + grass)		
Milk 1/	95	8 500
Intensive beef	55	6 400
Extensive ruminant		
Sheep	27	3 300
Beef cows	32	4 000

1/ Milk data corrected to allow for replacements.

Source: Modified after Holmes, W. The Livestock of Great Britain as Food Producers, Nutrition, London, 29, (6) 331-336, 1975.

As a country develops, its use of grain for animal feed usually increases. Whereas currently over 60% of all grain consumed in developed countries is fed to animals, the proportion in developing countries is only 13%. Globally developing countries account for a minor proportion of world feed grain use: their share has risen only slowly from 15% in the early 1960s to 17% in 1980. Nevertheless, in absolute terms, this 1980 figure represents the feeding of close to 100 million tons of grain to livestock in these countries.

It is well recognized that livestock production is not an efficient way to produce protein and energy in situations where land can be used for crop production. Indeed, comparing crop to even intensive non-ruminant livestock production in developed countries, crops can produce at least 2 to 2½ times as much protein and energy as livestock per hectare of land (Table 2-3). For this reason it is sometimes argued that, if the wealthier countries were to reduce their consumption of animal products, sufficient land would be released for crop production to provide enough food energy to overcome deficits existing elsewhere in the world. Such arguments ignore the many complex economic issues involved in such a shift in resource use. Some of these will be addressed in the section on feed resources.

A better approach would be to give due attention to the potential for improving animal production through greater technical efficiency in the developing countries themselves. This potential is considerable (see box). If it were realized, it would undoubtedly do much to improve animal protein intakes as well as agricultural income levels in developing countries. In so doing, it would promote their development. How to realize this potential is the central issue of this chapter.

LIVESTOCK AS A SOURCE OF POWER

In developing countries animal draught power represents a major output from the livestock sector, although it is one that is usually underestimated or ignored. In fact, about half the energy these countries use for agriculture is contributed by livestock 1/. Animals provide 23% and 9% of the use of power for agricultural prduction in Asia and Africa respectively and, in this respect, are more important than tractors (see Fig 1-9). In Latin America and the Near East animals still provide about one-sixth of agricultural power though tractor use has increased rapidly in the past decade.

The use of draught animals is not restricted to the cultivation of crops. They are also used for transport - various estimates have suggested that 20% of the world's population is dependent upon animals for their transport needs - and as a source of power for processing crops and for irrigation.

Where farmers use livestock for traction purposes or burn manure for fuel this does not necessarily provide a direct income but it may save either purchased inputs or family labour. Where the ground is too hard for hand cultivation before the rains, or where double or triple cropping is practised, the timing of land preparation and planting may be critical. Without draught animals for cultivation the chances of a successful crop under these conditions may be low. In such circumstances, draught animals may be used for cultivation for only 30 to 50 days a year but without them the prevailing farming system could collapse. Similar peaks in power requirements may occur at harvest time; for example, when animals are widely used to gather and thresh grain.

1/ FAO, Report of the FAO Expert Consultation on Appropriate Use of Animal Energy in Agriculture in Africa and Asia, Rome, 1982.

The world's total draught animal population has been estimated to be of the order of 280 million head of which about 75% are large ruminants, 19% equines and 5% camelidae 2/. Clearly, the large scale replacement of these animals by tractors would be a costly process which would have important implications for foreign exchange requirements, employment and fossil fuel consumption. Nevertheless, a number of countries have encouraged tractorization, particularly the use of hand tractors, but their purchase and operational costs restrict the pace at which this can be carried out. Also many of the world's farms are too small to economically justify a tractor at all at present levels of output. However, some form of additional power input in the future will be essential because in most developing countries the present power available from all sources - but predominantly human labour - is considerably less than that required to achieve the full potential for improved crop yields.

Indonesia, Sri Lanka and the Philippines provide striking examples of the growing demand for draught animal power. For Indonesia's transmigration programme World Bank funds are being used to import several thousand Brahman cattle every year from Australia to meet the deficit of draught animals. In Sri Lanka, semi-feral buffaloes are being re-domesticated to replenish the rapidly growing shortage of draught animals. In the Philippines and in a number of other south-east Asian countries, a ban has been imposed on the slaughter of buffaloes to prevent the continuing depletion of draught animal power.

In its AT 2000 study, FAO calculated that power input to agriculture in developing countries would have to increase by 2.3% per annum to achieve an overall agricultural growth rate of 3.4% per annum until the year 2000. This would involve an overall increase of 15% in the number of draught animals but an increase of over 400% in tractor numbers. The required increase in tractor numbers may be hard to attain and, if so, draught animal numbers may well increase at a somewhat faster rate than that projected.

For many farming operations a pair of draught animals, or even a single animal, suffices. However, the power potential of working animals is seldom realized because of the bad harnesses and crude and inefficient implements with which they are used. They are also susceptible to losses through disease. Development and local manufacture of improved animal drawn equipment and improved veterinary services can promote the application of this source of power considerably as shown by the examples of Senegal and Sierra Leone. A recent report from the latter country indicated that ox ploughing and weeding using improved equipment cost considerably less than when the same tasks were done by either tractor or even manual labour 3/.

LIVESTOCK AS A SOURCE OF EMPLOYMENT

The role of the livestock sector as a source of employment is not easily determined in areas where a monetary economy does not exist, in areas of underemployment, or where women and children tend the stock. The opportunity cost of many tasks in animal husbandry can be low in such situations because the labour employed may not have alternative gainful employment. It is attractive as a labour activity on the family farm because much of the work can be performed by women or even children and the tasks are regular rather than seasonal.

2/ Ramaswamy, N.S., Report on Draught Animal Power as a Source of Renewable Energy, FAO, Rome, 1981. Another useful source is Goe, Michael R. and Robert E. McDowell. Animal Traction: Guidelines for Utilization, Cornell International Agriculture Mimeograph 81, 1980.

3/ Starkey, P.H., 1982 World Animal Review 42: 19-26.

As development proceeds, livestock production normally does not generate much gainful employment. In arid areas of Australia, for example, one man may serve to look after 700 head of cattle equivalents. However, this figure drops to 300 in the higher rainfall areas of Australia as it does in tropical and sub-tropical Latin America and it falls still further to 70-100 cattle equivalents on better pastoral areas in both continents. In intensive specialized beef and dairy units in Brazil, the labour use is equivalent to 13 to 18 cattle units per man respectively 4/. This was the type of labour intensity found in western Europe in the 1950s since which time, under the pressure of increasing labour costs, the number of stock handled per man on typical highly capital intensive dairy farms has risen to more than 100.

The impact of intensification of livestock production on labour use can be seen in the EEC where, although dairy cow numbers remained virtually constant between 1960 and 1980, the number of cows per herd almost doubled. In Holland and the UK over 80% of cows are now in herds of 30 or more animals. These changes have coincided with the fall in the proportion of the EEC workforce employed in agriculture which has declined from 16.6% in 1960 to 7.4% in 1979 5/.

In the early stages of industrializing and intensifying the livestock industry, it becomes more labour-intensive and jobs are created. However, as development progresses, increasing wage rates and easier access to capital lead to a high degree of mechanization with a consequential lowering in labour inputs and a vast increase in output per man. In the United States' poultry industry the labour used to produce 100 kilograms of turkey carcass fell from 63 to 2 man hours between 1914 and 1973; and that to produce the same weight of broiler chicken fell from 17 hours in the late 1930s to 0.6 hours in the early 1970s. Changes of this nature are likely to occur in developing countries too and have already started in some. However, the existence there of considerable underemployment and lower wages, plus the shortage of capital to exploit new technologies, will probably mean that the pace of change will be somewhat slower than what occurred in developed countries. It is also likely to be restricted to countries in the middle income group.

LIVESTOCK AS UTILIZERS OF MARGINAL LANDS AND CROP BY-PRODUCTS

The capital intensive type of livestock farming now seen so frequently in Europe and North America is well adapted to economies where capital is available, surplus grain exists and labour prices are high. These conditions seldom prevail in developing countries where livestock agriculture is usually geared to a low input system which maximizes the use of land and waste materials otherwise unsuitable for use by man. It is this ability of livestock, particularly ruminants, to utilize such materials and so to be an integral part of the farming system, that constitutes a major, if largely hidden, asset in developing countries' agriculture.

The pattern of livestock feeding varies very much according to local conditions. Thus in much of the densely populated areas of Asia grazing is extremely limited, being restricted to the banks of canals and roads. Fodder crops are rarely grown and the major feed is cereal straw. Cattle and, in some countries, pigs are fed a variety of waste

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4/ Jahnke, H.E. in World Animal Science Vol. 1. Tribe, D.E. and E. Peel (eds.), Elsivier Publications, Amsterdam (in press).

5/ EEC Dairy Facts and Figures 1981, Milk Marketing Board, Thames Ditton, U.K.

materials such as vegetable refuse, ground and fermented rice hulls, cassava peelings, soybean and sweet potato vines and chopped banana stalks. As these materials are not suitable for human food there is little conflict between livestock and man for either land or source of food.

The humid and sub-humid tropics occupy 28% of the world's land surface and include permanent pastures and rough grazing land. These lands feed about 40% of the world's ruminant stock and provide about 15%, 11% and 12% respectively of the world's beef, sheep-meat and milk. Some of them have soil, topography and other features that could enable them to be used more extensively for crop production in the future. But to do so many of them would require large investments in development. Furthermore, many of the acid infertile soils of the lowland humid tropics yield poorly with present genetic-chemical technology. Therefore livestock are likely to play an important role in their utilization for some time hence.

The same is also true of the world's vast areas of arid and semi-arid rangelands where plant production is severely curtailed. The people inhabiting such areas have evolved a complex system of land use in which there is a delicate balance between the range ecosystem and livestock and, in some cases, wildlife. Stock have been bred for survival utilizing low quality forages, with variable patterns of rainfall and plant production. The plant species found on the range have evolved under a system of intermittent grazing by a variety of herbivores. The pastoralists in these areas of low crop potential have become heavily dependent on their livestock whose milk - and sometimes blood - may provide the most important components of their diet. For such societies human survival is closely related to the survival of their stock, as has been shown dramatically by the drought in the Sahel in the early 1970s and in Ethiopia and Somalia. In such circumstances, the animal and its husbandry become closely interwoven with a society's culture. In this way communities can pursue a way of life that utilizes some of the harshest parts of the world's surface which would otherwise not be habitable by man.

Such arid zone pastoralists provide an extreme example of the use of livestock, specifically ruminants and camels, as converters of forages and browse to products consumable by man. But even in developed countries, some 75% of the feed intake of ruminants - as opposed to 97% in developing countries - is derived from fibrous forages. Much of this feed is produced on lands unsuitable for crop production or which otherwise would be fallowed; and much is also produced on land as part of a crop rotation.

About a quarter of the total energy content of supplementary feeds fed to livestock is derived from crop by-products which, by virtue of their characteristics such as texture, palatability and high fibre content, have a very limited potential for use as human food. In this sense, as will be discussed later, the disaggregation of the agricultural sector into crop and livestock sub-sectors is a highly artificial one in most situations.

LIVESTOCK AS A MEANS OF CAPITAL ACCUMULATION

Apart from the value of their output, livestock may also represent an important capital asset in many farming systems. The overall investment in livestock in world agriculture, leaving aside the value of the land grazed by stock and the buildings and fences used to contain them, is, at a conservative estimate, of the order of US $400 thousand million.

In most developed countries the high costs of labour and the availability of capital associated with an efficient credit system have led to the establishment of large livestock

enterprises with very high capital investment. A similar situation can be seen in the state-owned and collective enterprises of centrally planned economies. Yet even on small farms in developing countries livestock frequently represent between 20 and 50% of farm capital and contribute directly a similar proportion to farm income.

In pastoral societies livestock owners often attach greater importance to stock numbers than to their productive efficiency as they are their means of survival. Livestock have a multiple value and can represent variable combinations of wealth, prestige, and prequisites of adulthood, marriage or parenthood. They may be vital for subsistence as well as being convertible into cash.

The reproductive potential of livestock also means that they represent a form of investment in such situations where institutional saving is not possible. An animal which is not consumed or sold represents an addition to the farmer's wealth. To do so, however, it must survive drought and disease. Upgraded exotic stock may be more profitable as markets develop but, for the farmer whose goals are essentially those of capital formation and risk aversion, traditional breeds of stock may be preferred.

LIVESTOCK BY-PRODUCTS AND THEIR USES AS MANURE, ENERGY OR INDUSTRIAL RAW MATERIALS

The faeces produced by livestock contribute to this crop-livestock interdependence by improving soil fertility. Dried ruminant faeces are also an important fuel in parts of Africa and Asia. For example, in India 60-80 million tons are estimated to be used in this way annually 6/. A number of countries have also used ruminant and pig faeces to produce methane as a source of energy.

Faeces from intensively fed livestock have a particularly high content of nutrients which can be utilized by recycling them as a feed supplement for ruminants, pigs, poultry and fish. In a number of countries of south-east Asia, for example, livestock excreta are used as feed and fertilizer for fishponds which are often integrated with duck production. Using this system, commercial yields of 10 tons fish/ha/year have been recorded 7/.

Faeces are not the only by-product produced by animals. Their carcasses provide a large number of products other than meat. These are often defined as inedible products but viscera are eaten to varying degrees in many countries, as are fats, and even hides and skins. Fat in the form of lard or tallow is often removed from the carcass. World production of these latter products in 1980 was 10.3 million tons with a market value in excess of US $1.4 thousand million, equivalent to about 5% of the value of exports of live animals and meat. Such fats may be used directly for human consumption or be rendered for the manufacture of margarine, cooking fat and other products. Lower quality animal fats are used in the manufacture of soap, glycerol and detergents. However, recently these latter markets have encountered very heavy competition from petrochemical derivatives.

Synthetics also compete strongly with wool and, to some extent hides and skins. Yet the use of these natural products continues to be important and represents between 5 and

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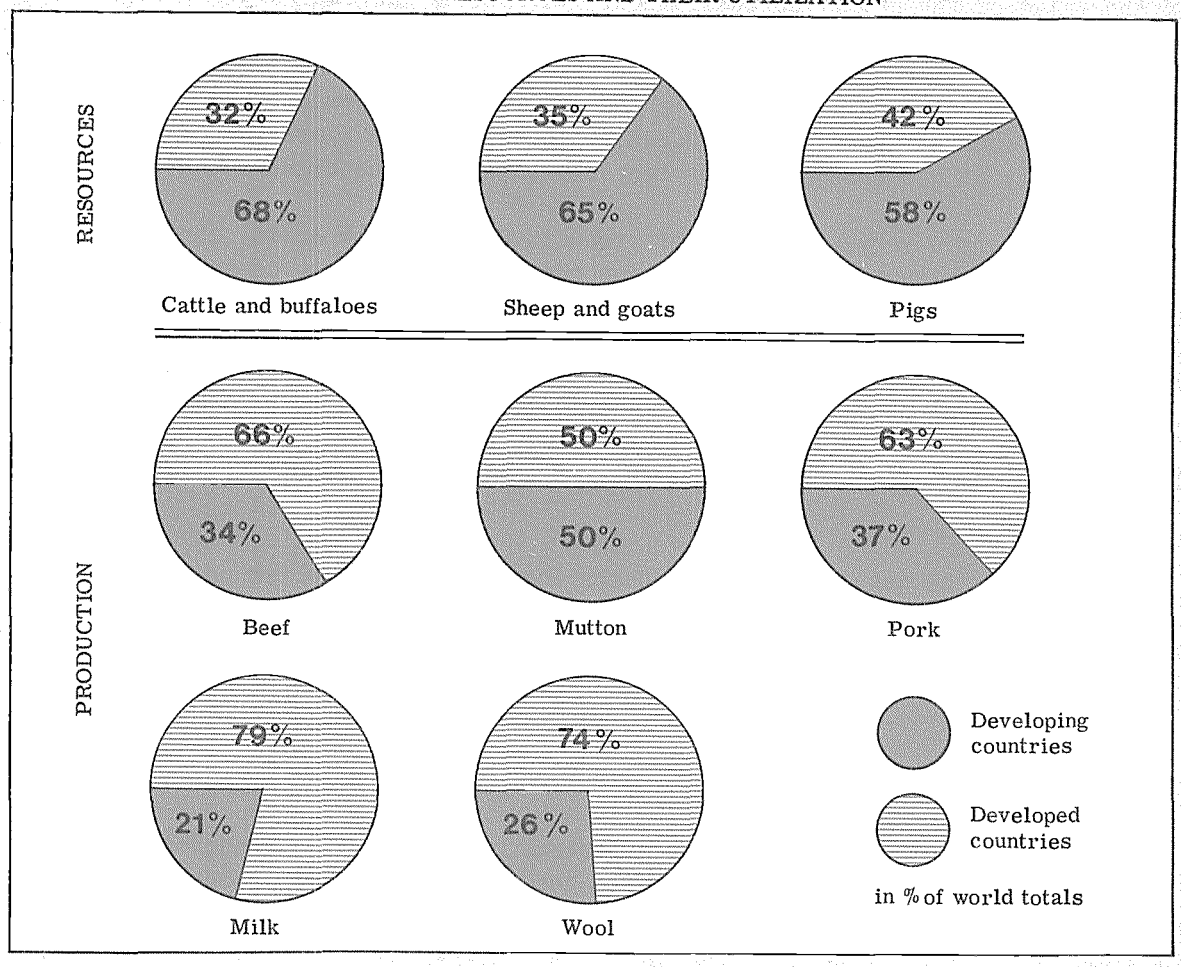
6/ Ramaswamy, N.S. op. cit.

7/ Edwards, P., A Review of Recycling Organic Wastes into Fish, With Emphasis on the Tropics. Aquaculture 21: 261-279, 1980.

LIVESTOCK RESOURCES AND THEIR UTILIZATION



The developing countries contain 75% of the world's human population, 58% of all agricultural land, 68% of the world's cattle and buffaloes, 65% of its sheep and goats and 58% of its pigs, but produce relatively much less in terms of animal products because productivity is lower than in developed countries. This difference in productivityis well demonstrated by comparing average milk yields.

Productivity of Dairy Cattle by Region
(1969-71 to 1979-81)

	Yield of milk per dairy cow	
	69-71	79-81
	.....metric tons.....	
World	1.85	1.92
Total developed countries	2.81	3.13
Total developing countries	0.61	0.66
Africa	0.33	0.36
Far East	0.48	0.51
Latin America	0.91	0.95
Near East	0.60	0.64
Asian Centrally Planned Economies	0.49	0.67

Source: FAO Production Yearbooks.

10% of the value of the animal carcass. Wool, in spite of a reduced share in a vastly expanded world fibre market, still has sales of over 2.5 million tons a year. This amount is not very different from its market volume prior to the introduction of synthetics. Hair from the camelidae and from goats is also an important commodity in certain arid or highland areas, such as Namibia, the Andean Altiplano and the Himalayas. It is used to produce a variety of garments as well as tents, blankets and handicrafts.

Fifty years ago a very wide range of products derived from animal carcass glands were used to produce pharmaceutically active compounds. However, these compounds are increasingly being either synthesized artificially or replaced by synthetic analogues. This trend is likely to accelerate under the impetus of genetic engineering which has already enabled insulin to be synthesized. In the long run many of the animal endocrine glands, which formerly produced glandular extracts, are likely to be rendered down as meat meal in the same way that bone, horn and hoof, formerly the raw materials for combs, buttons and handles, are now usually ground into bonemeal as they are rarely competitive with products made from plastics.

Indeed, among the many animal by-products formerly available for processing, it is only a few such as hides, skins and hair that seem likely to survive in widespread use in the future. This is because they possess a micro-structure that not only determines their final properties but is difficult to synthesize economically.

LIVESTOCK AS A SOURCE OF EXPORT EARNINGS

Livestock and their products are an important component of international trade. The total annual values of meat and meat products and of milk and dairy products traded internationally, including intra-EEC trade, were US $40 thousand million in 1980, representing nearly 17.5% of current world trade in agricultural (crops and livestock) products. Most of this trade, however, takes place between developed countries, or from them to developing countries. Developing countries' exports account for less than 10% of total exports of livestock products (Table 2-4) and livestock products account for only about 6% of their exports

TABLE 2-4. WORLD TRADE IN LIVESTOCK PRODUCTS, 1980

	Live animals and meat		Milk, eggs and dairy products		Balance of trade	% of world trade	
	Exports	Imports	Exports	Imports		Exports	Imports
	..... US $ million						
Developing market economies	3 269	5 380	167	4 713	-6 657	8.6	24.4
Africa	554	695	3	1 133	-1 271	1.4	4.4
Far East	196	828	87	796	-1 341	0.7	3.9
Latin America	2 282	926	59	1 112	+ 303	5.9	4.9
Near East	235	2 754	18	1 615	-4 116	0.6	10.6
Asian centrally planned econ.	834	41	136	101	+ 828	2.4	0.3
Developed market economies[1/]	19 634	19 954	12 891	8 516	+4 055	81.6	68.8
Eastern Europe and USSR	2 547	1 988	427	647	+ 339	7.5	6.4
World	26 284	27 363	13 587	14 001	-1 493	100.0	100.0

1/ Includes intra-EEC trade.

Source: FAO Trade Yearbook 1980.

of agricultural products. Yet developing countries were at the same time, responsible for 20% of the imports of meat and 34% of those for milk and milk products, and these account for about one-fifth of their agricultural imports. Thus developed countries have benefited more from the growth in world export trade in livestock products. Trade issues are discussed in a following section.

LIVESTOCK: AN INTEGRAL PART OF FARMING SYSTEMS

Apart from providing important - if variable - nutritive components of the diet, the preceding discussion shows that livestock perform a multipurpose role in agriculture. In the context of developing countries, the main strength of livestock production as a means of promoting development lies in its integration with traditional and often small scale farming systems, both as a source of food and income and also as an input through the provision of draught power and manure.

Within both extensive pastoral systems and small scale intensive farming, livestock are of inestimable value in utilizing land resources or feed materials which otherwise cannot be used directly by man. Labour employed in these systems often has few alternative economic pursuits.

TRENDS IN LIVESTOCK PRODUCTION AND TRADE

In the world livestock economy, growth in demand has shifted from the developed regions over the past decades. With population rising at an annual average rate of less than 1% and per caput demand nearing saturation point, their consumption of animal products has tended to level off and, more recently, even to decrease. But, in the developing regions, demand has been stimulated by rising per caput incomes, rapid population growth of more than 2% per annum and high rates of urbanization, often accompanied by a rapid westernization of the diet. Consumption has increased rapidly in the case of poultry meat and eggs.

PRODUCTION TRENDS

Production trends have only partially followed those of demand. In particular, in the developed market economies, agricultural policies have had difficulty in adjusting production and processing capacities to stagnating or shrinking domestic outlets. Yet, in developing countries, domestic animal production has generally lagged behind demand. At the beginning of the 1970s these countries were net exporters of animal products, especially meat, milk products and eggs. In all Eastern European countries livestock production has lagged behind demand growth and the resulting deficits have been met by imports, mainly from other developed countries.

Past trends in livestock production in the developing countries have been encouraging for pig and poultry meat and eggs. But they have been disappointing for meat and dairy products from ruminant animals where increases in production have been attained largely by increasing numbers rather than by increasing productivity (Table 2-5).

TABLE 2-5. ANNUAL RATE OF CHANGE IN LIVESTOCK PRODUCTION, 1969/71 TO 1979/81

	Nos. Head	Nos. Slaughtered	Carcass weight	Production
	..... %			
Developing countries				
Cattle	1.1	1.8	0.1	1.9
Sheep and goats	1.3	2.0	...	2.1
Pork	4.1	4.1	0.6	4.8
Cow milk	2.4	n.a.	0.8	3.2
Poultry	3.6	...	...	7.5
Eggs	...	n.a.	n.a.	5.1
Developed countries				
Cattle	0.7	0.4	1.1	1.5
Sheep and goats	-0.6	-0.9	-	-0.7
Pork	2.2	2.5	0.3	2.8
Cow milk	0.2	n.a.	1.1	1.3
Poultry	2.2	...	...	5.2
Eggs	...	n.a.	n.a.	1.9

Notes. During the 1970s the catch of fish has been increasing at an average annual rate of nearly 4.5% for developing countries but less than 1% for developed.

n.a. means "not applicable".

Source: FAO Production Yearbooks.

Greater production in developed countries has been accompanied by more specialization and larger units. In the 1970s cattle numbers in these countries increased by less than 9% and dairy cow numbers by 4%, although production of beef and milk increased by 15% and 14% respectively. Yet the growth rate in livestock production in the developed countries has been less than that in developing ones.

Production of beef cattle and pig meat in most major producing countries has been characterized by self-perpetuating cyclical variations in both output and prices. The basic mechanism for this tendency is an inventory cycle within the breeding and fattening herds. For beef cattle the length of the cycle from peak-to-peak in production is normally 6 to 8 years if there are no external disturbances to its regular rhythm. This length of cycle appears to apply to almost three-quarters of the world's commercial beef production 8/.

Pig meat replaced bovine meat as the most important meat product in developing countries in the 1970s (Table 2-6). The share of poultry meat in their total meat output also rose

TABLE 2-6. GROWTH RATES IN WHITE MEAT AND HEN EGG PRODUCTION IN 90 DEVELOPING COUNTRIES AND ASIAN CENTRALLY PLANNED ECONOMIES, EARLY 1960s TO LATE 1970s

	1961/65	1969/71	1978/80	Per annum growth rates 1963-70	1970-79 Actual	1980-2000 AT 2000
	.... 000 metric tons			..... %		
PORK						
Africa	135	179	263	4.1	4.4	6.8
Far East	990	1 280	1 395	3.7	1.0	5.4
Latin America	1 302	1 655	2 321	3.5	3.8	4.4
Near East	8	17	21	11.4	2.4	4.2
Asian centrally planned economies	...	10 113	16 079	...	5.3	...
POULTRY MEAT						
Africa	276	387	732	4.9	7.3	8.1
Far East	437	637	1 045	5.5	5.7	8.8
Latin America	632	1 200	2 737	9.6	9.6	5.2
Near East	189	332	771	8.4	9.8	10.1
Asian centrally planned economies	...	1 779	2 832	...	5.3	...
HEN EGGS						
Africa	338	389	582	2.0	4.6	7.3
Far East	594	817	1 667	4.7	8.3	6.3
Latin America	1 102	1 381	2 341	3.3	6.0	4.9
Near East	271	328	702	2.8	8.8	8.6
Asian centrally planned economies	...	3 451	4 583	...	3.2	...

Sources: FAO Production Yearbooks, AT 2000, FAO, 1981.

8/ FAO, Cyclical Problems in World Production and Trade in Beef and Veal: Possibilities for Ameliorative Action. CCP ME 75/4 Rome, 1975.

from 12% in 1970 to 17% in 1980, and since the mid 1970s their egg production has increased at a rate nearly three times that of developed countries. But the difference in the growth of milk production has been much less pronounced and is strongly influenced by structural considerations which are discussed later.

Throughout the developing regions, modern large-scale poultry and egg production and processing enterprises have now been established, mainly in the peri-urban areas, along the pattern originally evolved in North America in the late 1940s and subsequently transferred to other developed countries. To a lesser extent, similar enterprises have also been set up for the production and marketing of pig meat and, sometimes, milk.

Such large-scale operations are highly automated and capital intensive. They require a small but skilled labour force. They also require equipment and production requisites that usually have to be imported by developing countries although some of them such as Brazil, India, Korea Rep. and China are manufacturing them locally. The expansion of this activity would offer prospects for the development of local agro-industries.

The extent to which modern poultry enterprises have developed appears to be closely related to the general socio-economic development of individual countries. In the higher income and more urbanized countries of Latin America, North Africa and the Far East their share of the total national poultry production is over 80% and it has reached over 90% in some high income Near East countries. However, even in some lower income countries such as Pakistan, India, Sri Lanka, Zambia and Ghana between one-third and two-thirds of poultry production now comes from the commercial sector.

Traditional systems of poultry production are more frequently found in Africa south of the Sahara, and in a number of lower income Asian countries. Productivity is low from birds which scavenge around the homestead and are fed only on household scraps, but there is virtually no cash input involved.

With regard to milk, although the average growth rate of world production has fallen from 3% in the 1950s to less than 2% in the 1960s and the 1970s, the international dairy situation has remained one of supplies almost chronically exceeding commercial outlets in the developed countries. The surplus problem was concentrated in the United States in the first two decades after World War II and has appeared there again recenlty. But it shifted to the EEC as well in the late 1960s.

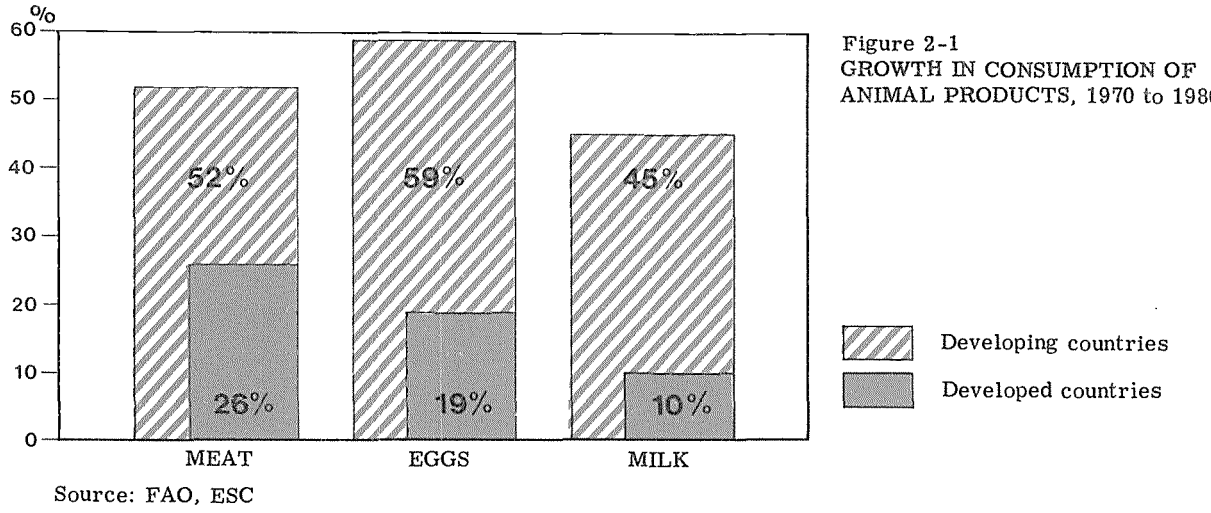
The decline in commercial demand for milk and milk products in the developed market economies partly reflects changing food consumption habits - only 17% of the milk delivered to dairies in the EEC is consumed as fresh milk - as well as structural changes in both the agricultural and the milk processing industries. The principal cause of the growing discrepancy between output and commercial outlets in these countries has been government policies in North America and some countries in Western Europe which have supported high prices for dairy farmers. These policies arising from agricultural structural problems have resulted in surpluses and the accumulation of large stocks of butter and skim milk powder. Their disposal has distorted the pattern of international trade in dairy products.

In contrast to this situation developing countries have seen their domestic supplies lagging increasingly behind demand and, as a result, they now account for the greater part of world imports of dairy products. There are many developing countries for whom dairy development is essential, not only to improve nutritional standards and reduce the foreign exchange costs of imports, but also as a means to intensify and diversify agriculture and raise small farmer incomes. However, to date, progress in dairy development, with a few

outstanding exceptions, has been very slow. While there have been numerous local shortcomings and failures, the over-supply situation in international markets has also been a contributory factor. It has frequently resulted in the limited funds available for agricultural development being invested in projects which offer a better return than dairy production, with a growing gap between demand and local supplies of milk products. Developing countries which, thanks to very favourable ecological conditions, would appear to be potential exporters, have little chance of realizing this potential because they would have little hope of competing with the subsidized exports of developed countries. A similar situation has also developed in meat.

TRENDS IN CONSUMPTION AND TRADE

It has been shown that during the past two decades the growth in demand for animal products in developed countries has slowed down and on occasion consumption has even declined. In contrast, in the developing countries, where consumption levels are much lower, demand has been strong, constrained only by income levels as well as the availability of livestock products and hence their prices (Fig. 2-1). Throughout this period, the growth in consumption has exceeded that of production in developing countries, the deficit being met by imports.



Source: FAO, ESC

Figure 2-1
GROWTH IN CONSUMPTION OF ANIMAL PRODUCTS, 1970 to 1980

The Near East Region, reflecting petroleum export earnings and an influx of migrant labour, has experienced the most rapid rise in demand for meat and other animal products. With pig meat consumption being negligible because of religious reasons and bovine, sheep and goat meat supplies being less ample, poultry meat consumption in this region has, over the past decade, risen by more than 13% annually. Growth in poultry meat consumption has been impressive in other regions also. Pig meat and egg consumption has risen fastest in the Far East.

Growth in the consumption of animal products has been promoted by price controls and/or subsidies which have mainly benefited urban consumers. But the principal factor stimulating consumption, particularly that of poultry meat, eggs and, to a lesser extent, pig meat, has been the decrease in their prices relative to other livestock products, reflecting the technical progress in poultry and pig farming. A recent study from Brazil, Chile and Colombia

showed that in all three countries the prices for poultry meat and eggs fell in constant terms during the 1970s, whereas during the same period prices for beef and cow milk rose.

In those countries where foreign exchange has not been a limiting factor, imports of livestock products have grown rapidly. Developing countries now account for over 40% of world imports of dairy products. They are also net importers of eggs (Table 2-7). In meat as a whole former sizeable net export trade recently has turned into substantial net imports.

Recent FAO estimates of demand for meat and milk suggest little change in the recent pattern of demand. Growth in meat consumption will probably remain concentrated in the richer developing countries. In Eastern European countries there are likely to be some increases in retail prices that may curb demand. Japan is one of the few among the developed market economies with scope for a significant increase in meat consumption. A recovery

TABLE 2-7. DEVELOPING COUNTRIES' TRADE IN LIVESTOCK PRODUCTS

	Shares of developing countries in the volume of world trade in livestock products				Balance of trade in developing countries 1/		
	Imports		Exports				
	1968/70	1978/80	1968/70	1978/80	1958/60	1968/70	1978/80
	..... %				..... '000 tons		
Total Meat	15	21	28	16	+1 201	+1 042	- 394
of which:							
cattle meat	15	16	41	19	+ 810	+ 999	+ 440
sheep/goat meat	18	29	19	10	+ 59	+ 10	- 257
pigmeat	12	4	12	4	+ 52	+ 6	- 5
poultry	23	52	6	14	- 10	- 99	- 577
Eggs in shell	20	31	15	12	- 54	- 23	- 143
Milk and milk products	34	41	1	1	-1 151	-7 102	-15 749

1/ + net export; -net import.

Source: FAO Trade Yearbooks.

of economic activity could result in some strengthening in high income countries' demand for meat but their elasticities of demand with respect to income or expenditure are now low overall 9/. Also health considerations appear to increasingly influence consumer attitudes.

Turning to possibilities to expand world meat supplies it can be argued that most of the increase is likely to come from poultry and, to a lesser extent, pig meat. It is expected that industrial systems of production such as intensive broiler production will continue to expand rapidly in developing countries and the centrally planned developed economies. But this would depend on the continued ready availability of high energy feeds.

9/ For example, in Canada in 1957 the estimated expenditure elasticity for meat was estimated to be 0.16. By 1969 this estimate was halved to 0.08.

At the same time, developing countries have unexploited feed resources that can be used by ruminant animals, as will be discussed below. Thus there is scope to expand beef production in several developing countries in Asia and Africa, primarily for domestic consumption though it would require removal of the many technical and socio-economic constraints currently hindering expansion of beef output. There is also scope to increase beef output in Eastern Europe and the USSR. On the other hand, in Western Europe, where most beef comes from the dairy herd, the continued surplus production of milk products and beef would appear to portend future reductions in cattle numbers.

Medium term prospects for the sheep sector are somewhat brighter than for bovine meat production. Nevertheless, the shift from cattle to sheep farming recently experienced in a number of countries with important pasture industries seems to be losing momentum.

For dairy products, supplies are expected to continue to exceed commercial outlets by a considerable margin for some years hence. Though the continuation of current policies to subsidize both the human consumption and feed use of some milk products in several developed countries would produce an apparent overall balance by 1985, it would conceal the wide discrepancy between output and commercial outlets. The difference would remain particularly striking in the EEC and the United States where considerable liquid and dry skim milk is used for animal feed. For example, the use of liquid and dry skim milk in animal feeds in the developed market economies in 1981 was about 1.6 million tons of skim milk powder equivalent. This was six times the volume of food aid in skim milk powder and more than twice the volume of international commercial trade in this product. Most of this usage occurred in the EEC where in addition about 30% of butter consumption is subsidized. If these dairy subsidy policies remain unchanged, the use of these products as animal feed is likely to grow considerably. This would imply that the share of the traditional low cost producing exporters in world dairy product trade would probably decline still further and there would be very little scope for export-oriented dairy development to occur in developing countries.

In contrast, in Eastern Europe and USSR milk production has actually slightly declined over the past 5 years. As a consequence imports have greatly increased. For example, net imports of dry milk products more than tripled in value between 1979 and 1981.

FAO's study AT 2000 placed considerable stress on the role of livestock development in achieving a wide range of development objectives under a high demand growth scenario. It estimated that livestock production in the 90 developing countries studied will need to grow by up to 4.5% per annum over the next 20 years. About half of the growth in demand comes from expected population growth and the remainder from increases in per caput incomes. The overall growth rate would have to be nearly double that of the last two decades. Such an increase in growth in the livestock industries of the developing countries would require major efforts and is unlikely to take place in the absence of supportive policies from the developed countries. Certainly, in the dairy sector, a continuation of the existing protectionist policies of the developed countries is unlikely to be of much help in promoting dairy development in the developing regions.

Current policies of the developed countries towards international trade in meat also restrict the prospects for developing countries for some of which this trade is becoming important (Table 2-7). For example, in 1981 about 15% of world exports of all fresh meat were from developing countries, and for fresh poultry meat the figure was 20%. Most of this was from one country, Brazil. Quantitative restrictions in the form of import embargoes, quotas, voluntary export restraint arrangements, restrictive licensing and centralized procurement have been increasingly introduced. Moreover, minimum import prices, enforced by variable levies, have been applied to an increasing extent. Barriers of a technical nature,

such as animal health regulations, although recognized as necessary to prevent the introduction of diseases, also have substantial effects on international trade in livestock and animal products. At the same time, recourse has increasingly been taken to the subsidization of exports. The net effect of these various protectionist measures has been to adversely affect the export earnings of low cost producing countries, both developed and developing, and to counteract livestock development efforts.

A factor which is likely to influence the future of animal production in developing countries is the extent to which they are able to supply, either from their own production or from imports, the quantity of grain required to meet the very high growth targets suggested for their pig and poultry industries. Reference has already been made to the extent to which pig and poultry meat have substituted for ruminant meat in some countries.

Another type of substitution which has aroused considerable attention is the use of vegetable based meat or milk substitutes or extenders to replace animal based products. In general, vegetable products are cheaper than animal ones, although there are often strong consumer preferences for the latter.

The best known vegetable substitute is margarine whose early success was due to its advantages and the ease with which butter, a homogenous product without cellular structure, could be simulated. More recently, sales of margarine have been promoted on health grounds because of its high ratio of polyunsaturated to saturated fats. The substitution of milk and cheese by plant products would undoubtedly have followed that of margarine had they not been held back by legislative protection gained by the dairy farmers of the developed countries. However, more recently filled milk with butter fat being replaced by cheaper vegetable fat, has appeared on a number of markets; and extended milk, a combination of plant and animal fats and proteins, has been widely used in India. The prospects for expanding the use of these types of products should be promising in many developing countries where dairy production has limited scope but vegetable oil production could be expanded.

The use of vegetable substitutes, such as soybean protein, for meat has been constrained by technological problems and a lack of consumer acceptance. The technology has improved considerably during the past decade but is still very capital intensive and requires considerable energy inputs. Consumer acceptance problems remain ones of flavour and texture.

To date, there has been little success in introducing meat substitutes into developing countries because their price usually puts them out of reach of the income groups that require additional animal protein.

SOME KEY ISSUES ARISING FROM THE TRENDS

The issues arising from this brief survey of trends in the production, consumption and trade of livestock products are clearly demarcated between developed and developing countries. In the market economies of the first group, many issues revolve around the adjustment of production capacity to stagnating or even declining domestic markets. Such problems are particularly acute in the case of dairy products, and are closely related to questions of farm size and numbers, especially in the EEC. They have given rise to protectionist trade measures which are impinging on the interests of exporting countries which face increasingly stiff competition. In some developing countries, even their domestic livestock industries are threatened by the increasing quantities of products available on world markets at subsidized prices.

Eastern Europe and the USSR do not face such demand declines. Rather it is a question of satisfying growing demand for livestock products, which is continuing to rise at a time when foreign exchange to finance increased imports is constrained.

In the face of rapid rates of increase in demand, developing countries' production of beef and dairy products has been disappointing, but more encouraging for pig and poultry products. How best to harness their potential capacity to both satisfy increased demand while promoting rural welfare is the key issue facing livestock planners in these countries. The opportunities offered by technological advances in animal breeding, feeding and health are explored in the next section.

THE EFFECTS OF RISING INCOMES ON THE DEMAND FOR LIVESTOCK PRODUCTS

When people's incomes rise above bare subsistence levels and they start to have some money to spend, the usual pattern is to use a high portion of this new income for food. Not only do they eat more but - for reasons of nutrition, taste or status - they tend also to start consuming 'preferred' food products. In many societies, livestock products such as meat and milk rank high among these preferred additions to the diet. As economists would say, livestock products tend to have a 'high income elasticity of demand'. That is, a one-percent increase in income results in more than a one-percent increase in consumption. This characteristic of the demand for animal products tends to be true for lower-and middle-income levels; people in affluent societies do reach a point when additional income results in little or no further increase in amount or quality of these commodities in their diets.

These tendencies may create basic problems for agriculture. In some situations of low income countries demand for preferred foods such as meat and dairy may rise very fast under the combined effect of rising per caput income and population. This rise may be so rapid that domestic supplies of the products cannot keep pace. As a result, prices rise or imports have to be allowed. On the other hand, at high levels of average income, income elasticities will have significantly declined - population growth also will be less - and rates of demand growth for livestock products will be very low or even negative for some. This can create severe difficulties in adjusting supply, especially when many farmers depend on the production of these products for their livelihood.

The following table drawn from a selection of food expenditure surveys, shows the wide range of expenditure elasticities between countries with different income levels, and how these change over time. Of course, increased expenditure on a particular food item does not necessarily mean that correspondingly more of it will be consumed. The consumer may prefer to buy more expensive, better quality products. This tendency in particular applies to livestock products whose differences in quality can be wide.

Income elasticities of expenditure[a/]

(i) Differences between countries

	Per caput GNP current $	Elasticities Meat	Fresh milk
Germany, F.R., 1978	10 300	0.54	0.61
Mexico, 1977	1 160	1.02	1.03
Tunisia, 1974/75	680	1.08	1.09[b/]
Indonesia, 1978	340	2.18	1.93[c/]
Sri Lanka, 1977	160	1.23	1.20
Bangladesh, 1973/74	90	3.25	3.81

a/ A log-inverse function has been used for all examples as it is one of the best to cover a wide range of incomes and hence is valid for making international comparisons between countries.
b/ Milk and dairy products.
c/ Milk, dairy products and eggs.

Sources: FAO. Income elasticities of demand for agricultural products, forthcoming.
World Bank. World Atlas, various years.

(ii) Changes over time

	Per caput GNP constant $	Elasticities Beef and veal	Fresh milk
United Kingdom, 1960	5 076	0.25	0.18
United Kingdom, 1973	6 779	0.10	0.04

Sources: FAO. Income elasticities of demand for agricultural products, CCP 72/W.1 Rome, 1972.
FAO. Income elasticities of demand for agricultural products, ESC/ACP/WD.76/3 Rome, 1976.

IMPROVING THE UTILIZATION OF THE PRODUCTION RESOURCES

The productivity of domestic livestock is influenced by a variety of different environmental, social, economic and technical factors. Efforts at changing existing systems of production may involve modifying any one or all of them. In a large number of cases they have, in the past, focused upon the technical aspects of change. These tend to be easier to manipulate than environmental or socio-economic factors: the former because they are largely outside of human control except where controlled-environment housing is practical and economic; and the latter because they involve a range of political and human linkages that seldom relate to only one change agent or institution.

In contrast, changes relating to animal feeding, breeding and disease control which are likely to improve productivity can often be readily identified. Furthermore mechanisms or institutions through which they need to be implemented frequently exist. Thus efforts at livestock development over the past two decades have emphasized animal genetic improvement, feed resource utilization and disease control.

It has become recognized that research knowledge from the developed world is not necessarily suited to nor readily adopted by the farmers of the developing world. New approaches may be required if livestock productivity there is to be increased. The better utilization of the available feed resources is of paramount importance because this will influence the directions policies aimed to improve livestock genetic resources should take.

FEED RESOURCES AND THEIR UTILIZATION

Most of the available feed energy supplies come from forage feeds such as those from rangelands and pastures. In developing countries, crop residues and household wastes are important sources of feed also (Table 2-8).

TABLE 2-8. ESTIMATED SOURCES OF LIVESTOCK FEEDS BY TYPE OF LIVESTOCK, 1977-78

	Grain	Protein meal/cake	By-products	Forage & other	Total
	..... %				
Poultry	4.5	1.0	0.8	0.6	6.9
Sheep and goats	0.3	0.1	0.4	11.4	12.2
Cattle and buffalo	5.8	0.5	2.3	47.1	55.7
Pigs	5.3	0.6	2.4	1.8	10.1
Draught animals	0.7	0.1	0.3	14.0	15.1
All livestock	16.6	2.3	6.2	74.9	100.0

Total estimated feed requirement was 8707.4 thousand million Mcal of energy.

Source: Wheeler, R.O. et al. The World Livestock Product, Feedstuff and Food Grain System, Winrock International, Morrilton, Arkansas, 1981.

The group of livestock which are basically forage eaters, including ruminants, the equidae (horses, donkeys etc.), rabbits and, to some extent, the goose, all have digestive systems that make the utilization of coarse foods possible. The ruminants are of particular interest because of their large numbers in the developing countries and their efficiency in digesting and utilizing roughages and agricultural by-products. They are also able to utilize sources of non-protein nitrogen such as urea. However, ruminants are able to do this only to a degree that meets their requirements for maintenance, late growth and moderate milk yield. For peak periods of growth and production, low energy forages are inadequate. For high productivity it is necessary, therefore, to replace poor quality roughages with high quality forage and a certain amount of grain since these contain more than twice as much energy on a dry matter basis.

There are other intrinsic limitations to the efficiency of the rumen and the ruminant. Recent research has shown that for the ruminant to function well its feed should, in addition to roughages and some easily digestible energy such as molasses, contain some high quality protein and starch which can bypass the rumen breakdown and be digested and reabsorbed in the lower parts of the intestine. Feed grains serve as a good source of appropriate bypass starch. However, in many countries feed grains for ruminants and other grass-eating stock also compete with the demand for cereals for human consumption. So throughout the world such stock are raised principally on rangelands, forages, crop residues, agro-industrial by-products and animal and food wastes.

Permanent Pastures and Grasslands

The distribution of permanent pastures in relation to the number of ruminant livestock varies greatly between different parts of the world (Table 2-9). The number of livestock in comparison to the area of permanent pastures is very large in Asia and the Far East. Africa is the region with the largest area under pasture but with the lowest density of livestock, partially because of the presence of the tsetse fly. Latin America also has large areas under permanent grass which supports a density of livestock almost equivalent to the average for the world.

In Oceania, particularly New Zealand, very efficient milk production systems, based almost entirely on permanent pastures, have been developed. In western Europe and North America, dairy production has developed along different lines and is based on integrated crop-livestock systems in which food crops are rotated with forages and feed grains.

Obviously, grasslands differ considerably in quality and carrying capacity. The global picture given in Table 2-9 indicates only the relative importance of the permanent grasslands in different regions.

In Asia and, in particular, on the Indian subcontinent, demographic pressures and the small area of permanent pastures in relation to the livestock numbers make it necessary to rely on crop residues (mainly straw) and agro-industrial by-products as the main source of ruminant feed. In Latin America and Africa the main challenge is the utilization and improvement of available grassland.

The pressure on the rangelands can be reduced, particularly in the dry season, by providing supplementary feeding for grazing animals. This may be done through the use of fodder shrubs or trees or by giving livestock access to cultivated lands. A striking example of the success of this approach is provided by a FAO/WFP project in forest watershed grazing areas of central Turkey. The cultivation of forage legumes was introduced

TABLE 2-9. EXTENT AND DISTRIBUTION OF PERMANENT PASTURES AND RUMINANT LIVESTOCK, 1980

Regions	Permanent pastures	No. of ruminant livestock units 1/	Ruminant livestock units
	million km^2	millions	Nos/km^2 of pasture
Africa	6.3	135	21
Asia and Far East	0.4	324	810
Latin America	5.4	229	42
Near East	2.8	69	25
Sub-total	14.9	757	51
Asian centrally planned economies	3.5	109	31
Total developing countries	18.4	866	47
North America	2.7	100	37
Western Europe	0.7	92	131
Oceania	4.6	48	11
Others	0.8	18	22
Sub-total	8.8	258	29
Eastern Europe and USSR	3.9	138	36
Total developed countries	12.7	396	31
World	31.1	1 262	41

1/ Conversion factors used: buffalo 1.0; cattle 0.8; sheep and goats 0.1.

Source: FAO Production Yearbook 1981.

on fallow land belonging to the villagers whose livestock grazed the watershed areas. The extra forage which then became available from the fallow land made it possible to keep the traditional grazing areas free from livestock during the spring. This caused a spectacular recovery of the growth and vigour of the native range vegetation.

Cultivated Forages

Forages from arable lands form the basis for dairy cattle and, to a lesser extent, for other types of ruminant livestock production in Europe and North America. The inclusion in the crop rotation of the two to three year forage crop - generally a grass legume mixture - as a substitute for fallow became common practice among west European farmers during the early part of the last century. Fodder maize and other green cereals are now finding an increasingly important role as a forage and silage crop not only in North America but also in Europe as far north as Scandinavia.

A number of tropical forages and pasture legumes with a high potential in different ecological zones have been identified and improved through plant breeding research and development. Several tropical grasses yield as much as 50 tons of dry matter per hectare in the humid tropics when given adequate nitrogenous fertilization and appropriate management, and yields of over double this level have been recorded experimentally. Sugar-cane has also been found to have a good potential as a forage crop and offers opportunities for small farmer diversification into livestock production in some situations.

The major constraint to increased animal productivity on large parts of the grasslands in Latin America is the poor fertility of the soil. The infertile allic soils that predominate in the savannah areas cover over 300 million hectares but do not readily lend themselves to crop production. Utilization through ruminants appears to be the most promising alternative. However, more information is still required on management techniques to do this efficiently and this is an area of high priority in agricultural research programmes for the region.

Experiments in the more fertile areas of tropical Latin America have shown that productivity can be increased considerably by introducing improved techniques and methods of pasture management. A FAO/UNDP project 10/ in the Peruvian tropical lowlands (Selva) demonstrated that the traditional technique of burning the rain forests and then sowing Hyparrhenia rufa resulted in pastures with a carrying capacity below 0.5 cows per hectare. The introduction of a legume such as Stylosanthes quianensis, which is adapted to the high acidity and aluminium content of the soil, enabled both the stocking rate and the daily gain to be doubled, and gave more than a fourfold increase in total liveweight gain per hectare (over 600 kg per year).

Although the scope for increasing beef production in Latin America in this way is considerable, it will require large investments to develop the required skills and infrastructure if possibly irreversible environmental damage is to be avoided. The introduction of leguminous pastures will require the availability of phosphatic fertilizers at reasonable prices. It will also require considerable research into methods of increasing phosphorous uptake by plants as well as a better knowledge of the phosphorous requirements of different legume species.

Pastoralism is the predominant system of grassland utilization in Africa south of the Sahara. It implies communal ownership of land and water resources and private or clan ownership of livestock. In the arid and semi-arid areas, population pressure, both human and animal, has upset the balance between the regenerating capacity of the grasslands and the demands put upon them, resulting in land degradation and very low productivity per animal. Here sociological rather than technical factors impose the major constraint to the development of the rangelands.

African highland areas with their favourable climate and conditions for crop production are already very densely populated in many instances and their communal grazing areas are steadily giving way to crops. In sub-humid and humid Africa, the pasture potential is good but the development of livestock production is greatly hampered by disease, in particular trypanosomiasis (sleeping sickness in humans) and streptothricosis, a skin disease.

10/ Santhirasegaram, K., Recent Advances in Pasture Development in the Peruvian Tropics. 1976. World Animal Review 17: 34-39.

In the Near East and North Africa, about 23% of the land area is considered as permanent range and grassland. A further 60% can be classified as desert, although parts allow some rough grazing. The major grazing animals are sheep and goats which are managed in semi-nomadic and transhumant production systems. As in Africa south of the Sahara, overgrazing is a major problem. During the last few decades it has worsened due to the extension of cropping into areas marginal for cereal production, and because livestock numbers on the range have greatly increased.

A FAO/UNEP programme for the Ecological Management of Arid and Semi-Arid Rangelands (EMASAR) has been established to stimulate the improvement of the rangelands, particularly in this region and the Sahel, by fostering an integrated land use approach to the management of natural resources within the potentials and limitations of the various ecosystems found there.

A major policy issue concerning the cultivation of forage crops in developing countries is whether the governments of countries facing land and grain shortages should promote the use of cultivated fodders. This question has no simple answer. In mixed farming systems in the humid tropics or in irrigated areas, a well managed forage crop can compete with cereals in terms of yield of livestock feed units per year and per unit of land. But the question still remains whether human welfare would be promoted by using the land for grain production for human consumption instead.

Feed Grains and Other Concentrates

Although pastures and fodder predominate as the most important animal feedstuffs in the world, progress in increasing output of these types of feeds has been slow. With grain output growing much faster, its use as feed has increased considerably over the past twenty years. Feed grains are by far the major form of concentrate feeds in all developed regions and in Latin America and the Near East (Table 2-10). In other developing regions grain feeding of animals is a fairly recent development and milling and by-products are still relatively more important.

The use of cereals as feed nearly doubled in developing countries between the second half of the 1960s and the same period in the 1970s. During that time the share of feed in total cereal consumption other than rice rose from 22% to 35%. Feed use of milling by-products and of oil cakes and meals increased by 44% and 81% respectively. The growth in the utilization of cereals was particularly marked in Asia, but has also been evident in Latin America and in the Near East. This results mainly from the expansion and intensification of egg, poultry meat and pig meat production, which is presently estimated to account for over two-thirds of the utilization of these concentrate feeds in developing countries. Only in Africa has the use of concentrate feed remained low, though it has also been rising.

Among the feed grains, maize is by far the most important in both the developing and the developed countries. It accounts for a little over 40% of all grain fed to livestock. In many developing countries maize is also a major grain for human consumption, in Latin America and Africa especially. In the rural areas of such countries, maize is fed to livestock only exceptionally. Barley is the second most important feed grain in both developing and developed countries. Its use is common in the Near East where surplus barley is traditionally used for fattening sheep. On a world basis, wheat ranks third in importance accounting for about 15% of all grain fed to livestock. About half of this quantity of wheat is used in the USSR.

The development of compound feed manufacture in developed countries has extended the range of products used as feedstuffs, but has tended to replace on-farm mixing rather than to create additional demand for feed. It has, however, played a role in increasing the use of grain substitutes and thereby in reducing the cereal content of rations. For example, in the Netherlands the share of cereals in compound feeds has been reduced to under 25% due to the widespread use of cereal substitutes, especially cassava.

TABLE 2-10. USE OF MAIN CONCENTRATE FEEDS 1966-70 AND 1976-80

	Average 1966-1970				Average 1976-1980			
	Cereals	Milling by-products	Oilcakes & meals	Total use	Cereals	Milling by-products	Oilcakes & meals	Total use
	..... %			mill. tons	..... %			mill. tons
World	75	15	10	520	75	14	11	722
All dev.ing countries	46	42	11	97	55	34	11	174
Africa	40	40	20	5	43	43	14	7
Latin America	76	16	8	25	73	14	14	44
Near East	67	25	8	12	70	20	10	20
Asia	29	57	14	56	45	45	11	103

Source: FAO, ESC.

Unmixed feeds or on-farm mixing are still the main way in which concentrate diets are prepared in developing countries. However, the growth in their production of compound feeding stuffs has been rapid - over 10% per year - in the last decade, especially for poultry rations. Latin America and the Far East have been the main producing regions, although the growth rate has been fastest in the Near East.

Most feed mills in developing countries have been established in the last decade. The larger mills are often part of integrated animal production enterprises affiliated to flour milling companies. Within government programmes to increase livestock production, the compound feeding stuffs industry has received considerable incentives, such as cheap credit, tax exemptions and subsidized raw materials. Although a number of mills have computer facilities for calculating least cost formula rations, few of them- with notable exceptions in India's dairy co-operative feed plants and in Kenya, for example - make much effort to maximize the use of local by-products, particularly cereal substitutes. The growth of the compound feed industry in developing countries therefore has often been associated with rising imports of feed grains.

In quantitative terms, coarse grain imports to developing countries for use as animal feed rose from 2 million tons annually in 1966-70 to nearly 16 million tons a year in

REDUCING MEAT CONSUMPTION TO HELP THE HUNGRY: IS IT EFFECTIVE?

In the affluent nations there are many individuals and organizations who are genuinely concerned about the wellbeing of the poor, both in their own midst and in developing countries. In their endeavours to help, sometimes these groups call for consumer boycotts against excessive consumption of meat. They hope that such reductions in meat consumption will lower the amount of grain fed to livestock and that, in turn, this will make more food grains available for malnourished people. However, the following considerations should be taken into account:

- If a noticeable lessening of demand for meat did take place, there could well be reduced demand for grain to feed livestock and downward pressures on grain prices. However, many grain producers would be likely to respond to the weakened prices by cutting back on the amount of grain they produce. One million tons less fed to livestock would not necessarily generate one million tons more for human use.
- Livestock, ruminants especially, do not live exclusively on grain. While feed grains are often used in commercial operations to fatten animals, a large proportion of the meat produced is derived from pastures, by-products and wastes. On the average livestock depend on grain to the extent of less than 20% for their feed requirements. For cattle this figure is only 10%. So the savings on grain would be less than is commonly assumed. For example, in 1978-80, on average 126 million tons of meat were produced for the use of 562 million tons of cereals (excluding rice), an average input-output ratio for the whole livestock system of 4.5 ton grain for 1 ton of meat. Assuming other things remained unchanged, a 10% reduction in meat consumption could lead to a reduction in cereal use for feed of between 55-60 million tons of cereals. But only 15% of this is wheat, or 9 million tons, equivalent to only about 2% of average wheat production in 1978-80. The remainder is coarse grains, mostly yellow maize which is not a preferred food in maize-consuming societies.
- Even if grain does become more accessible, much of it would probably be purchased for use by people and nations with relatively high incomes. Those without much money or foreign exchange would still be unable to buy the grain, even at lower prices. Hunger is often more a problem of purchasing power than of supply. There is thus a transfer problem: how to ensure that the grain saved can be consumed by those most in need?

There are, however, certain circumstances where reducing livestock production can have more direct and striking impacts on grain availability for human consumption. Examples of such situations are the centrally planned economies that use non-market mechanisms to establish food production and consumption patterns; and isolated, self-sufficient rural villages that have little or no trade interactions with the outside world.

1976-80 (Table 2-11). About 70% of these imports were made by only ten countries but many others, including some of the lowest income group, also significantly increased imports of their feed grain. A similar situation also applies to developing countries' imports of oilmeals which have risen by 20% per annum over the past decade.

TABLE 2-11. COARSE GRAINS: ESTIMATED UTILIZATION AND IMPORTS AS ANIMAL FEED IN DEVELOPING COUNTRIES

	Utilization for feed		Feed use as share of total utilization		Imports for feed		Feed imports as share of feed utilization	
	1966-70	1976-80	1966-70	1976-80	1966-70	1976-80	1966-70	1976-80
	million tons		..... %		million tons		..... %	
TOTAL COARSE GRAINS	38.8	84.2	22	35	1.9	15.9	5	19
Africa	1.6	2.9	5	8	0.1	0.7	5	26
Latin America	18.4	30.4	52	57	0.5	5.4	3	18
Near East	7.2	11.4	43	51	0.4	3.1	5	27
Far East	11.6	39.5	12	31	0.9	6.7	8	17

Source: FAO, ESC.

The medium growth assumption (Scenario B) of FAO's study AT 2000 suggests that there will be a continuing strong rise in demand for livestock products in the developing countries over the next 20 years. This is expected to lead to an equally strong upward growth trend of about 6% per annum in the use of feed grains. It implies that the current feed grain use of about 100 million tons in the developing countries could triple by the end of the century. Yet even by then this amount is likely to be less than half of the feed grain used in developed countries. However it would mean a greater dependence on feed imports in developing countries as a group, possibly worsening their balance of payment problems that are already critical in many cases. A basic question to be addressed, therefore, is to what extent a livestock development strategy should depend on imported feeds or whether indigenous feed resources could be exploited. A major source of indigenous feeds are the by-products obtained from agricultural production and processing.

Agricultural By-products

Crop agriculture produces large amounts of lignocellulosic by-products such as straws, hulls, chaffs and stalks. The amount of straw produced annually exceeds 2 000 million tons of which slightly less than half is produced in developing countries. Other fibrous products available in large quantities are bagasse (112 million tons) and sugar cane tops (69 million tons) 11/.

11/ Sansoucy, R. and P. Mahadevan, Potential Lignocellulose Resources and their Utilization by Ruminants in Tropical Regions. FAO/IAEA First Research Coordination Meeting on Isotope-aided Studies on NPN and Agro-industrial By-products Utilization by Ruminants with Particular Reference to Developing Countries. 30 November-4 December 1981. Vienna.

NEARLY ONE-HALF OF WORLD PRODUCTION OF WHEAT AND COARSE GRAINS IS FED TO LIVESTOCK

Feed grain use in developed countries rose very steeply in the 1950s and 1960s when large scale intensive systems for the production of eggs and poultry meat were introduced first in the USA and then in Europe. Similarly, intensive pig and beef production expanded and dairy cattle feed included greater proportions of concentrates. Strong demand for livestock products and the resulting use of more grain provided the main stimulus for the expansion of grain production during this period when the international demand for grain as food slackened. This use of grain as feed continued to increase up to 1973 when there was a strong rise in prices due to world shortages of grain. The primary effect of this was to reduce the quantity of grain fed to cattle, the principal consuming species.

This change reflects the high sensitivity of grain feed use to price changes, particularly for ruminants feed. In periods of high grain prices beef producers have the alternatives of resorting to pasture and by-product feeding (which, although more time consuming, are then more cost effective), or to the early slaughtering of stock. The reduction in feed grain use by ruminants was particularly marked in the large beef-lot industry in the USA where feed grain use fell by over 25% between 1973 and 1974 (see table on next page). Smaller reductions took place in some other countries, notably the USSR, but recovery was rapid and since 1975 global feed grain use expanded at an annual rate of 7%.

By 1981 nearly half (47%) of world production of wheat and coarse grain, 586 million tons, was fed to animals: 100 million tons in developing countries. A recent estimate a/ indicated that 37% of grain fed was used for cattle, 34% for pigs and 29% for poultry in 1977 (see table on following page).

a/ Wheeler, R.O. et al, 1981, op.cit.

Straw constitutes the major feed for ruminants in some countries, such as Bangladesh, Pakistan and parts of India, while in many other developing countries it is a very important feed resource during certain periods of the year. But lignocellulosic by-products are characterized by low digestibility and low protein content. As their passage through the digestive tract is slow, the voluntary feed intake becomes low. In most situations straw feeding can, therefore, barely cover the maintenance requirements of ruminants. Hence, in countries where straw is the main feed resource, the basic questions are how and to what extent it might be possible to improve its feeding value or correct its deficiencies, at least partially, through appropriate supplementation.

Experience from several developing countries has shown that under village conditions, supplementation of straw rations by small amounts of minerals, urea, green fodder and oil cakes has a very positive effect on animal productivity and health and enables the utilization of lignocellulosic products to be increased 12/. Straw is usually chopped before use and a chemical treatment to improve its digestibility and feeding value has also been proposed from time to time. Recent techniques using ammonia gas, ammonium salts and urea seem to have potential particularly as they have the additional advantages of adding

12/ FAO, Report of the FAO/ILCA Workshop on the Utilization of Crop Residues and Agro-Industrial By-products in Animal Feeding. Dakar, 21-25, November 1981.

Feed grain use in selected countries and US export prices for maize, 1970-81

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
	..... $/ton											
Maize price 1/, USA	58	58	56	98	132	119	113	95	101	115	126	131
Feed grain use 2/	..... million tons											
WORLD	412	454	473	489	466	464	483	515	553	569	563	586
USA	135	143	148	143	106	117	114	123	142	141	125	136
USSR	77	85	93	99	101	85	105	113	120	123	120	121
China	6	14	10	17	23	24	22	28	33	37	39	40
Canada	17	19	16	17	16	17	15	17	16	18	18	19
France	15	15	16	17	16	15	16	17	18	18	18	18
Brazil	9	9	11	10	11	11	12	13	11	13	17	17
Japan	9	10	10	12	13	12	13	15	16	17	17	17
Poland	12	13	14	16	18	15	17	17	18	16	17	17
Germany, Fed. Rep.	15	15	15	17	16	17	17	16	16	17	15	15
Spain	8	10	10	11	12	12	10	11	12	13	15	14
TOTAL (above 10 countries)	303	333	343	359	332	325	341	370	402	413	401	414

1/ Prices are for No. 2 US yellow maize f.o.b. gulf ports.

2/ Feed grain is defined as cereals excluding rice.

Note: the 10 countries listed accounted for 70% or more of total feed grain use during this period. Among developing countries, significant users of feed grain in 1981 were (in million tons): Mexico 11.2; Argentina 6.8; Korea Republic 2.6; Korea DPR 2.0; Egypt, Iran and Venezuela 1.9; Saudi Arabia 1.8; Syria 1.3; and India 1.1. The growth rate of feed use has been rapid in some of them, e.g. Saudi Arabia where, between 1971 and 1981, it has been more than 50% per annum.

Source: FAO, ESS.

non-protein nitrogen to the forage. Experiments in Bangladesh have demonstrated a practical method of using urea at the village level, though more research is required before large scale application can be recommended 13/.

13/ Saadullah, M., M. Haque and F. Dolberg, Treated and Untreated Paddy Straw for Growing Cattle. In Proceedings of Seminar on Maximum Livestock from Minimum Land. Bangladesh Agricultural University, Mymensingh, p. 137-155, 1981.

While lignocellulosic by-products are available on practically every farm, by-products from post harvest processing and agro-industries are much less evenly distributed. They may be available in very large quantities but in areas where there are few livestock. In developing countries large quantities of agro-industrial by-products are still being wasted and much could be used more effectively were it better processed and stored. An example is rice bran whose feed value is often reduced by poor processing, resulting in rancidity. These by-products may conveniently be divided into three groups: 14/

a) energy rich by-products derived from sugar cane and sugar beet, citrus fruits, bananas, coffee, pineapple etc.;

b) protein supplements such as oilseed cakes and meals, by-products from the animal processing industry; low quality pulses not used for direct human consumption; and fishmeals, only a minor part of which are obtained from the offals and wastes of other methods of processing fish;

c) by-products of cereal milling and milk processing which occupy an intermediate position between the first two groups in terms of nutrient content.

Several of the energy rich by-products have high feeding values and can be used as major ration components for ruminants and, sometimes, for pigs. For example waste bananas, fresh, ensiled or dried, have been shown to be an excellent feed. One ton ofwaste bananas balanced by a protein supplement will feed a pig to 90-100 kg, slaughter weight. Other by-products from banana plantations, such as stems, peelings and leaves, are useful as ruminant feed.

Molasses is used worldwide as an energy supplement in cattle rations. It is also used as a major basic feed for cattle in some sugar producing countries. Sugar-rich by-products lend themselves well to silage making in combination with other by-products, a number of which are used in animal rations.

A major problem with many by-products is that of utilizing them more extensively in small scale livestock production. Most of the techniques developed so far have been suitable mainly for large scale fattening schemes because the by-products are available in sufficient quantities within a limited area. Their shipment to scattered smallholders would be costly. Dehydration is widely used to facilitate the use of beet and citrus by-products in temperate countries but this technique has not yet been found economic on a commercial scale in most developing countries.

14/ FAO, New Feed Resources. FAO Animal Production and Health Paper No. 4, 1977.

Cassava, a traditional energy-rich food crop of the lowland humid tropics, is being used increasingly as an animal feed both in developing countries and Europe (Table 2-12). There, dried cassava chips or pellets, although not strictly by-products, have become important substitutes for grain and are being used at high levels in pig, poultry and cattle rations.

TABLE 2-12. EEC IMPORTS OF SELECTED CEREAL SUBSTITUTES

	1975	1976	1977	1978	1979	1980	1981
	.....million tons.....						
Cassava and sweet potatoes	2.3	3.8	6.0	5.9	5.4	4.9	6.2
Molasses	1.7	2.6	2.7	2.8	3.3	2.9	2.8
Maize gluten	0.9	1.5	1.5	2.0	2.3	2.9	3.0
Brans	1.2	2.2	1.9	2.0	2.0	1.8	2.0
Brewery and distillery waste	0.1	0.1	0.1	0.1	0.2	0.3	0.3
Beet/citrus pulp	0.6	0.8	1.1	1.3	1.4	1.6	1.5
Total	6.8	11.0	13.3	14.1	14.6	14.4	15.8

Source: FAO, ESC.

The major suppliers to the world trade in feed cassava are Thailand and, to a lesser extent, Indonesia. These countries have capitalized on the low import levies faced by cassava entering the EEC and have developed cassava into an important cash crop. Thailand's total annual output of 15 million tons of fresh roots is provided mainly from producers who produce only 50-2 000 tons per annum. Despite some drawbacks, cassava appears to be a crop with considerable potential as an animal feed in countries where it grows well but feed grains do not, and where protein supplements are also available.

Soybean is by far the most important protein supplement (Table 2-13). The production of soybean meal has shown a steady upward trend in the last two decades. During this time developing countries, particularly Brazil, have increased their share of both production and export. Currently about two-thirds of world production of oilcakes and meals and three-quarters of world trade in these commodities relate to soybean products. Cotton-seed cake and fish meal are the next two most important livestock feeds. Neither of them has increased in production at a rate comparable to soybean. Fishmeal availability may well decline because those stocks of fish which normally provide the basis for fish-meal industries are either fully or over exploited.

Although the USA dominates both production and trade in oilcakes and meals, Brazil, China and India are also important. By the early 1980s, developing countries accounted for 40% of world production and 36% of exports and 15% of imports of these products.

Meat, blood and bone meals are widely used as ration supplements in the industrialized countries. Unfortunately, the slaughterhouse processing industries are poorly developed in most developing countries as a consequence of which these by products are often wasted.

However, animal wastes such as poultry litter and poultry manure are used increasingly as feed in both industrialized and developing countries 15/.

The third group of by-products comprises those from cereal milling and processing, including brewers' and distillers' grains, and also those from milk processing. These are almost fully utilized as feed in both developed and developing countries. The amount available varies little from year to year but increases only at a rate corresponding to the expansion of the industries concerned. Milling by-products make up a much larger part of the concentrates in developing countries where rice bran in particular is very widely used.

TABLE 2-13. OIL CAKES AND MEALS AND FISHMEAL (100% PROTEIN BASIS), PRODUCTION (1981) AND TRADE (1980)

	Production	Exports	Imports
	..... '000 tons		
World total	40 280	19 920	20 300
Vegetable oil cakes	37 440	18 570	
Soybean	25 430	15 590	
Cottonseed	4 090	360	
Groundnut	2 190	670	
Sunflower seed	1 860	640	
Rapeseed	2 070	480	
Linseed	460	330	
Copra/palm kernel	540	350	
Fishmeal	2 850	1 350	
By economic region			
Developing countries	16 200	7 270	2 710
Latin America	8 570	6 090	910
Africa	740	250	100
Near East	720	110	310
Far East	3 100	750	1 330
Asian centrally planned economies	3 040	40	590
Developed countries	24 080	12 640	17 590

Source: FAO Commodity Review and Outlook, 1981/82.

15/ For a fuller treatment of this topic see FAO 1977 (op. cit.); Muller, Z.O., Feed from Animal Wastes: State of Knowledge. FAO Animal Production and Health Paper 18: 1980, and Muller, Z.O., Feed from Animal Wastes: Feeding Manual. FAO Animal Production and Health Paper 28: 1982.

FAO estimated that 31% of the metabolizable energy of the concentrates fed in the developing countries in the period 1972/74 came from milling by-products, 57% from grain and the balance (12%) from oil cakes and meals 16/. For the developed countries the corresponding figures were 7%, 83% and 10% respectively.

Feed Strategies for Livestock Development

Developing countries are far from being a homogenous group with regard to their projected rise in human demand for cereal products, their potential for domestic feed grain production, their alternative feed resources or their ability to import livestock products and grain. The development policy options open to them, therefore, vary considerably from country to country. However, the development of intensive large-scale poultry production seems in many countries to be considered the sole or at least the major policy option to respond to the increased demand for meat in urban areas.

Industrialized poultry production is efficient in the use of both feed and labour and is therefore commercially attractive, particularly if feed is abundantly available at low costs on the world market, the technology can be easily imported and capital is also available. However, many developing countries, which have surplus labour and crop by-products suitable for use as animal feed and yet face foreign exchange and capital constraints, cannot be advised to pursue this pattern of poultry development as the sole option. In these situations the development of small commercial units of say 100-500 layers, using commercial type feed but attempting to substitute locally produced feeds for imported grains, might be a viable proposition. Such units also offer opportunities for reducing marketing costs through cooperative efforts in egg collection, quality control and sales 17/.

An alternative strategy is that of improving traditional scavenger production. Several countries have embarked on this type of programme. For example, a large scale effort is presently under way in Pakistan to increase rural poultry production through the distribution of improved stock, backed up by vaccination services, management advice, feed distribution and the training of extension staff and farmers, including rural women who generally take care of poultry on the farm.

Milk production is another type of livestock production which has proved to be a good instrument for equitable rural development in small farmer systems. Medium to high producing dairy cows are as efficient feed converters as intensively managed poultry. In addition, dairy production is far less dependent on grain than poultry.

It has been estimated that in the late 1970s poultry used about 27% of all the feed grain consumed by livestock but produced only 9% of the human food energy provided by livestock. For pigs the corresponding relationship was 32:30 and for beef and dairy cattle

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16/ FAO, Utilization of Grains in the Livestock Sector: Trends, Factors and Development Issues. Committee on Commodity Problems, Intergovernmental Group on Grains GR 80/5, 1979.

17/ FAO, Report of the FAO Expert Consultation on Rural Poultry and Rabbit Production, 30 November-3 December 1981, Rome, 1982.

combined 35:58 (Table 2-14). While beef cattle are poor grain converters, they can consume crops not directly utilizable by man. This attribute is often forgotten in the bid to modernize animal production by creating large scale beef cattle fattening enterprises that are based on imported feed and which have little or no impact on the development of the domestic agricultural sector.

TABLE 2-14. USE OF FEED ENERGY AND GRAIN BY LIVESTOCK AND THEIR OUTPUT IN TERMS OF HUMAN FOOD ENERGY

	Percentage of total metabolisable energy consumed by each species of livestock	Percentage of total grain used by livestock fed to each species	Percentage of human food energy coming from individual livestock species
Beef	32	17	18
Dairy	24	18	40
Draught	15	4	-
Sheep and goats	12	2	3
Pigs	10	32	30
Poultry	7	27	9
Total	100	100	100

Source: Modified after Fitzhugh, H.A. et al., The Role of Ruminants in Support of Man, Winrock International, Morrilton, Ark., 1978.

Given widespread undernutrition and underemployment, plus the shortage of capital on one side, and a growing number of small farmers and landless labourers on the other, a combination of a number of systems of animal production would need to be promoted in developing regions. Modern intensive livestock production will doubtless meet a larger share of the expanding urban demand. However, if equity and employment creation are major concerns, more consideration needs to be devoted to the development of rural smallholder production of meat, eggs and milk.

In some developing countries it has been argued that as the feeding of small amounts of grain, minerals and oil cakes have a profound effect on the productivity and health of indigenous stock, a more equal distribution of the limited amounts of concentrate feeds would maximize their national benefits. This could be done by making feed resources available to smallholders rather than concentrating the best feed and livestock on a limited number of intensive modern enterprises.

The advocates of this policy[18/] recommended that developing countries avoid the use of exotic dairy cattle and poultry and base their development on resources available locally, such as indigenous stock and crop residues. Whilst this may have some attraction

18/ See, for example Jackson, M.G., F. Dolberg, C.H. Davis, M. Haque, Maximum Livestock Production from Minimum Land. Proceedings of Seminar at Bangladesh Agricultural University, Mymensingh, 1981.

for a country whose animal feed resources are extremely limited, such as Bangladesh for example, it is not yet a developmental strategy that has been proven. All of the relatively limited number of successful livestock development programmes that have been recorded appear to have been associated with some degree of intensification and specialization.

ANIMAL GENETIC RESOURCES

The last 30 to 40 years have been a period of very intensive activity in animal breeding and selection resulting in rapid increases in animal productivity. A combination of factors is responsible,such as the introduction of national recording schemes, the unravelling of the basic concepts of quantitative genetics, the development of artificial insemination and the use of computers. Consequently, the changes that have taken place in the livestock populations of the industrialized countries over the last four decades have exceeded those occurring over hundreds of years previously. Breeds and strains which were competitive have tended to disappear rapidly.

Although these changes have been confined largely to developed countries, the techniques that produced them have also been introduced to developing countries. Large changes, therefore, are likely to occur in the composition of their livestock populations as well in the near future.

Genetic variation is the basis for future genetic change and improvement. Since it has been developed over thousands of years, care needs to be taken to ensure that potentially useful genes are not eliminated through concentration on a few outstanding breeds. It is important that breeds adapted to the often harsh environments of developing countries are not summarily discarded without evalution and replaced by non-adapted breeds which, although giving excellent production results in temperate climates, may lack the ability to withstand a harsher environment. Thus, a potential conflict exists between rapid improvement and conservation for the future. This must be recognized in applied breeding schemes.

Genetic Improvement in the Developed Countries

The effect of genetic selection, together with improvements in feeding, management and veterinary care, on animal productivity has been spectacular in the developed countries. In commercial poultry production, for instance, the amount of feed required for the production of one kg of meat has been reduced from 3 or 4 kg 30 years ago to about 1.8 kg today. The required slaughter weight of about 1.5 kg is now reached in less than 7 weeks as opposed to over 12. Parallel changes have taken place in pig production. Milk production per cow has shown marked increases. For example in Sweden the recorded output of milk per cow increased from 2 533 kg (4% fat basis) in 1900 to over 6 thousand kg in 1980. Similar improvements have occurred in the USA where in 1961/65 16.2 million cows produced 57 million tons of milk, whereas by 1980 a slightly greater quantity of milk was produced by only 10.8 million cows.

Dairy cattle breeding programmes in much of Europe and North America, are now organized by farmer cooperatives which arrange artificial insemination services, milk recording and the genetic evaluation and selection of bulls. Although an individual farmer can influence the policy and work of the cooperative, most of the important decisions relating to bull selection are made on a population basis rather than on an individual herd basis. In some countries the influence of commercial companies selling semen from their own bulls has also increased.

This process of commercialization has gone much further in poultry production where the individual producer no longer contributes to breed improvement. Breeding and selection is usually carried out by a few large international companies, several of which are subsidiaries of pharmaceutical firms which also market antibiotics, vitamins and other additives used in the poultry industry. The multiplier/hatcher buys parent stock from the breeding company for the production of commercial layer or broiler chicks. The male and female grandparents have each been produced through the crossing of at least two different lines. This guarantees a certain degree of hybrid vigour in both the parent stock and the commercial birds provided by the hatcheries. As the breeding companies retain the grandparent stock and/or the lines from which these were produced, they can ensure that their selected lines are not being directly multiplied by other producers.

Genetic Improvement in the Developing Countries

The developing countries have two possible options for improving the genetic production potential of their livestock: (a) to build up the necessary infrastructure for selection within and between their existing livestock strains, and (b) to import breeding stock from other countries to improve their domestic populations. The two methods are not mutually exclusive. The choice of method or the optimum mix between the two approaches will depend on the species, the type of production system, climate, level of existing infrastructure and the economic situation of the country.

Dairy cattle. With some exceptions, such as the Sahiwal cattle of Pakistan and India, some Criollo strains in Central America and the Kenana and Butana cattle of the Sudan, the genetic potential for milk production from indigenous cattle in the developing countries appears to be low. As a consequence of this and of these countries' increasing demand for dairy products, cattle from the temperate regions have been imported into some of them.

The performance of these importations and of the crossbreeds derived from them has been variable because in some locations animals have their genetic potential constrained by environmental stresses and diseases of a tropical environment. But generally speaking, in both the arid and the highland areas of the tropics, if reasonable animal health and management standards are practised, it is possible to produce purebred or high-grade temperate stock through upgrading or through the development of a crossbreeding system based on animals with a high level of temperate blood. Successful examples of this type of breeding can be found in Kenya, Bolivia and the Deccan Plateau of India where artificial insemination has been found to be an excellent tool for introducing genes from temperate animals for crossbreeding and subsequent upgrading.

The real problems with temperate cattle are encountered in the humid tropics. Large-scale experiments and practical development projects in India, Thailand and elsewhere have shown that in hot, humid areas an intermediate type with 50-75% temperate blood is superior to both the European purebred whose fertility and viability is severely affected by the climate, and to the local cattle whose genetic potential for milk is insufficient. In general the first cross shows very marked hybrid vigour (see Box).

Although the use of purebred temperate dairy cattle is not therefore feasible in the humid tropics, there are at least three useful alternative approaches 19/.

19/ FAO, Report on Expert Consultation on Dairy Cattle Breeding in the Humid Tropics, Hissar, India, 1979.

CROSSBRED CATTLE OUTPRODUCE PUREBREDS IN INDIA AND THAILAND

India has a long experience in crossbreeding both Indian and European-type dairy cattle. Trials have shown that milk yield rises with an increasing level of temperate breed blood and peaks at a level of 50%. After this point it declines very slowly until 75%. Beyond this point yields fall steeply. Calf mortality is at a minimum at 50-60% European blood. The superiority of the intermediate grades in terms of production per day of calving interval and per day of age at second calving was also clear. These two measures summarize the effect of three economic traits related to the efficiency of production: milk yield per lactation, age at first calving and calving interval.

Where management is optimum, the yield of the purebred may be better than that of the crossbred but the problems of poor health, low cow fertility and high calf mortality may remain. For instance, at the Thai-Danish farm in Thailand where the management, feeding and health service were excellent, the Red Danish purebred had a higher milk yield than the zebu, but its fertility and viability were low, so that overall dairy merit was higher for the crosses.

Milk Yield per day of calving interval and per day of age at second calving in crossbreeding trials in India

Effects	No. of observations	Milk yield kg/day of: Calving interval	Age at second calving
Overall mean	781	5.72	1.61
Genetic groups:			
Sahiwal	97	4.52	1.35
25% Friesian	121	5.11	1.39
50% Friesian	206	6.40	1.82
62.5% Friesian	276	6.58	1.75
75% Friesian	81	5.98	1.76

Source: Dhillon, J.S. and A.K. Jain, Comparison of Sahiwal and different grades of Holstein Friesian x Sahiwal crossbreds for efficiency of milk production, Indian J. Dairy Science 30: 214-217, 1977.

Performance of Red Danish (RD), Indian Zebu (Sahiwal and Red Sindhi) and their crossbreds in Thailand

% genes from RD	1st lactation yield (kg)	percent abortion	mortality Up to 6 months	mortality 6 months to calving	calving interval (days)
0	1 000	4.6	15.5	5.4	467
50	2 000	1.8	5.9	0	443
100	2 300	21.5	7.3	23.7	525

Source: Madsen, O. and K. Winther, Performance of purebred and crossbred dairy cattle in Thailand, Anim. Prod. 21: 209-216, 1975.

- The formation of a new breed through crossing local and temperate cattle. The few successful examples of this approach include the Jamaica Hope which is about 20% zebu (mainly Sahiwal) and 80% temperate (mainly Jersey), and the Australian Milking Zebu which is about 40% zebu and 60% Jersey. Both breeds have been quite successuful in semi-extensive production systems. A large scale crossbreeding programme is now underway in India. to develop a new dairy breed which will be about 75% temperate, based on Friesian, Jersey and Brown Swiss breeds crossed with local stock.

- Systematic crossbreeding through using semen from bulls of a temperate and a local breed alternately, in some form of continuous rotation. This system exploits hybrid vigour and, in addition, exploits the breeding progress made in the country from which the temperate breed originates. It can also be made quite flexible to allow for a higher level of temperate genes as the husbandry improves. The main problem is the scarcity of good local breeds to include in the rotation.

- Improvement of local strains. With some exceptions, listed above, indigenous cattle breeds in the developing countries have a low dairy potential. As a result, there has been a general neglect of dairy improvement programmes although, by using the best of the indigenous breeds, some improvement can be expected in the long term.

Livestock development planners will need to choose the economically most sensible alternative for a given situation from among the several technically possible. Questions concerning the need for breed importations, the role of artificial insemination and the place of embryo transfer have attracted a lot of attention.

Although there are examples of successful cattle importations, the number of unsuccessful ones with high stock mortality is embarrassingly large. For a country which has cattle available for upgraidng, it is doubtful whether large-scale importations of female stock over and above the establishment of a small nucleus herd is an appropriate dairy development strategy.

On the other hand, artificial insemination using frozen semen is an excellent method for introducing breeding material into a country. The upgrading of local cattle through the use of temperate bulls or semen produces a hardy first generation cross. Through gradual upgrading or continued crossbreeding, it is possible for the farmer to adapt his management to a more demanding and better yielding cow. In terms of rural development, this approach will be more successful than importation. A completely integrated turnkey operation with imported cows, controlled environment buildings, irrigated forage and feed production and sophisticated milk processing may still be the preferred approach for countries with sufficient financial resources.

The techniques of embryo transfer have been improved considerably during the last few years and are now used commercially. In developed countries with well-functioning artificial insemination services and progeny and performance testing programmes, the additional genetic progress to be made through the use of embryo transfer in dairy cattle appears to be small in relation to cost, and its use has, therefore, been limited so far. In developing countries, the technique would obviously permit the transfer of genetically superior material from one country to another. It also has potential for multiplying stock of specific genetic merit and could be used, for example, to transfer a large number of embryos from trypanotolerant cattle into non-tolerant ones. However, the cost would be high and it is difficult to foresee smallholder livestock owners benefiting widely from embryo transfer techniques, unless cloning of embryos becomes possible.

Beef cattle in the developing countries often have to live under harsh environmental conditions characterized by periodic droughts, shortages of feed and the occurrence of endemic diseases and parasitic problems. The hardiness of the animals is thus a production trait of major importance. Under unimproved to moderately improved conditions, well-adapted strains developed in the tropics do better than imported well-recognized breeds from the temperate zones. For instance, beef production in the tropical north of Australia is now completely dominated by zebu and zebu crosses. In Botswana, the local Tswana and Tuli cattle are superior to Afrikander cattle developed under better environmental conditions in neighbouring South Africa. The Boran cattle, which have undergone genetic improvement in Kenya, have been found to do well throughout East Africa as have Sahiwal cattle.

It is important that the productivity of these local breeds be subject to systematic evaluation. The practical recording and selection programme for beef cattle which was developed in Botswana and later introduced into Swaziland, provides a good example of what can be done 20/. Selecting for increased disease resistance also needs increased attention and more research is required along the lines of the pioneering work at the Belmont Station in Australia where a practical methodology for selection for resistance to internal and external parasites has been worked out 21/.

Sheep and goats are usually raised under the same difficult conditions as beef cattle or they occur in small scale sedentary production systems. The several strains that are found are well adapted to their local environments. The fleece from indigenous sheep breeds often has characteristics of value for traditional cottage industries. Attempts to improve local breeds through importations such as the Merino and the Corriedale, usually have been unsuccessful and, in many circumstances, improvements in feeding, management and disease control constitute the most effective way of increasing productivity.

Milk sheep and dairy goats are important in the Near East where the Awassi sheep and the Damascus goat are particularly well-known. Useful programmes have been developed for the genetic improvement of the Awassi sheep in Israel and for the Damascus goat in Syria and Cyprus.

Prolificacy varies greatly between sheep breeds. Under very harsh conditions, high prolificacy is hardly an advantage because of increased lamb mortality. However, under intensive sedentary production systems, a large lamb crop can be very desirable. There are a number of sheep breeds found in developing countries which have a very high prolificacy, such as the Barbados Blackbelly, which has an average litter of 2-2.3 lambs, the D'man sheep of Morocco (2 lambs) and the Priangan of Indonesia (1.4-2.1 lambs) 22/. These breeds warrant further development and distribution to other developing countries with similar climates and production systems.

20/ Trail, J.C.M. and T.W. Rennie, Botswana Performance Testing of Beef Cattle. World Animal Review 14: 37-42, 1975.

21/ Turner, H.G. and A.G. Short, Effects of Field Infestation of Gastro-intestinal Helminths and of the Cattle Tick (Boophilus microplus) on Growth of Three Breeds of Cattle. Aust. J. Agric. Res.23: 177-193, 1972.

22/ FAO, Prolific Tropical Sheep. FAO Animal Production and Health Paper 17, 1980.

Poultry production in the developing countries takes place in two parallel, often rather independent systems: rural and industrial. For the improved rural sector, commercial chicks are provided by hatcheries which get their parent stock from breeding units which use traditional breeding techniques, working with one "pure line" which is improved each year. The industrialized units use breeding stock from multinational breeding companies with which they often have some kind of franchise relationship.

Many countries, particularly the oil exporting developing countries, import practically everything for their poultry industry. The more resource-poor countries limit their imports to breeding stock and some equipment. The poultry feed being used in these importing countries is generally of poorer quality than that in those countries where the stock are bred and selected and which, therefore, will not reach their full genetic potential. The larger developing countries with trained manpower should consider developing their own poultry breeding programmes in order to avoid the continuous import of breeding materials and also to produce strains that would be more efficient on lower grade diets.

Underutilized Animal Genetic Resources

It has been recognized that some potentially viable animal breeds and strains in the developing countries are much underutilized 23/. These include Boran and Sahiwal cattle, Awassi sheep, Shami goats and several prolific sheep breeds mentioned above. In addition, the water buffalo, trypanotolerant livestock and the camelidae of the old and new world warrant more attention.

There are approximately 130 million water buffalo in the world, with the largest population in India and China. The buffaloes of the Indo-Pakistan subcontinent and west thereof - referred to as the riverine type - are used as dairy, work and meat animals. The swamp buffalo of south-east Asia and China is the major work animal of that area but gives little milk. In India, Pakistan and Egypt the buffalo is a dairy animal. The buffaloes of Italy, Bulgaria and Iraq are also good milk producers and in Italy the buffalo is the foundation of a flourishing cheese-making industry. Interest in the dairy buffalo is increasing in south-east Asia, Africa and tropical Latin America because it is assumed that it is adapted to hot, humid environments. However, the available evidence suggests that buffaloes are heat sensitive and need constant access to water.

In spite of the importance of the buffalo, the governmental infrastructure for its improvement is weak or non-existent in most countries. However, artificial insemination services for buffalo breeding have been developed in Egypt, India and Pakistan and in all these countries semen can now be frozen. Services for milk recording and progeny testing of bulls, as well as for the performance testing of growth rate and draught ability need to be established or strengthened in all major buffalo countries. In some countries, high-yielding dairy breeds or strains are known to exist such as the Murrah of India and the Nili-Ravi of Pakistan. However, very little is known about their relative productivity and merit in comparison to breeds from other countries.

Two recent actions which should help to increase knowledge about the buffalo are the establishemnt of an International Buffalo Information Centre in Thailand sponsored by the International Development Research Centre (IDRC) and the Buffalo Research Network in Asia with the support of UNDP.

23/ FAO, Animal Genetic Resources Conservation and Management. FAO Animal Production and Health Paper 24, 1981.

Trypanotolerant livestock. A major part of the high rainfall area of Africa is infested by the tsetse fly, the vector of African trypanosomiasis, which makes livestock production difficult. Some cattle, sheep and goat strains have, through natural selection, developed varying levels of tolerance to trypanosomiasis. These livestock occur in varying numbers in all the west African coastal countries from Senegal to Cameroon, as well as in some of the landlocked states. The trypanotolerant cattle are all of the taurine, straight-back type and can be divided into two groups: the Longhorn (N'dama type) and the West African Shorthorn of which there are both full-sized and dwarf types. Trypanotolerant sheep and goats are dwarf species which occur together throughout West Africa including the coastal zone 24/.

A FAO/ILCA/UNEP survey and further studies by ILCA show that there are approximately the following trypanotolerant numbers of livestock: 8 million cattle, 11.5 million sheep and 15 million goats. The survey also compared the limited information on the productivity of trypanotolerant cattle with information from non-tolerant zebus kept under similar conditions, but without tsetse challenge. For trypanotolerant cattle under light tsetse challenge, the productivity index was only 4% less than that of a wide range of indigenous zebu and Sanga cattle in non-challenge areas throughout Africa. There was no significant difference between the two major trypanotolerant cattle groups, the N'dama and the West African Shorthorn. The influence of the level of tsetse challenge on the productivity of the trypanotolerant livestock was marked, however. The productivity index was 27% and 53% less for medium and high challenge respectively, compared with low challenge. There was no evidence to suggest that the trypanotolerant breeds of sheep and goats have a lower level of productivity than other sheep and goats in Africa.

Camelidae. The old world camels and the camelidae of the new world such as the llama and alpaca, provide important services and food for people who live under difficult environmental and economic conditions. There are presently about 17 million camels of which less than 2 million belong to the two-humped group. The camel is vital to the economies of countries such as Somalia (5.4 million camels) and the Sudan (2.9 million) as well as some countries of central Asia. This is because of its high degree of adaptation to an arid environment, including its ability to live on plants inedible for other species, the widespread use of its milk and its usefulness as a pack animal and as a producer of hair and fuel. In spite of their decreasing role in overland transportation, their number has increased by about 20% between 1950 and 1978. The camel is likely to continue to have a role in meat and milk production on the type of rangelands which other domestic animals cannot exploit. Very little is known about the production characteristics of different types of camels and further work in this area is needed.

The South American camelidae number about 7 million, the most important of which are the alpaca and llama. The advantage of these two species lies in the efficient use they make of the Andean altiplano ecosystem. Their adaptation to high altitudes make it possible for them to utilize, for food and fibre production, areas which are more than 4 000 m above sea level where crop production is impossible and cattle and sheep do not thrive. Alpaca and llama are kept almost exclusively by resource-poor people for whom they are an important source of food and employment. Alpaca wool fibre is of high quality and forms the basis for an important cottage industry. Considering the unique characteristics of these two species and their importance for the livelihood of the Andean population, efforts to improve their productivity through breeding and development in general warrant greater international support.

24/ FAO, Trypanotolerant Livestock in West and Central Africa, vols. 1 and 2, FAO Animal Production and Health Paper 20, 1980.

Other species. Rabbit production is gaining popularity in several developing countries, particularly in backyard production systems close to the cities. Very little has been published on the productivity and adaptability of different types of rabbits in these conditions 25/. There are several other species which are of importance in specific areas, such as the yak of the Himalayas and the guinea pig and capybara of Latin America. Several wild species could become useful alternatives or complements to cattle and sheep in rangeland areas. Interesting work is underway on the domestication of wild bovidae and cervidae in different parts of the world, in particular the oryx and the eland.

The Conservation of Livestock Genetic Resources

Livestock populations in developed countries have for some years been subject to strong selection within intensified production systems, resulting in very large production increases. Populations or breeds that did not respond well to changes in requirements were discarded, with the result that the number of breeds has rapidly decreased. A FAO/UNEP survey of Europe in 1975 26/ showed that 115 of the European and Mediterranean breeds were being threatened by extinction and only 30 were holding their own. There has been a change towards Friesian cattle in practically all of the lowland areas; and towards Simmental cattle in the moderately elevated areas of central and south-eastern Europe. In order to save some of the rarer breeds from complete extinction, special conservation herds have been set up with public or private support in many European countries.

Crossbreeding with European-type livestock, particularly dairy cattle, and the replacement of indigenous poultry with high-yielding commercial strains are under way in many developing countries. However, it is unlikely that environmental conditions, in particular the availability of feed and an improvement in disease prevention and control, will permit the widespread use of either crossbred or purebred European-type livestock in the near future. On the other hand, very little systematic work in the genetic improvement of local livestock has yet been undertaken. The conditions for genetic resource development are thus quite different from those in the industrialized countries where considerable knowledge exists about the breeds currently in use. In developing countries, appropriate systems of recording and evaluation need to be developed, taking into account not only productivity at government stations but also at the farm level. Considerable emphasis will have to be given to tolerance and resistance to both disease and environmental stress to ensure that desirable genes are maintained.

ANIMAL DISEASE CONTROL

One of the major determinants of livestock productivity and development is the health status of the stock. Although the individual livestock owner can obviously influence this in many ways, his control is far from absolute. In the case of diseases caused by infectious agents the health of his stock is also dependent on that of stock nearby.

25/ FAO, Report on the Expert Consultation on Rural Poultry and Rabbit Production (13 November to 3 December 1981), Rome, 1982.

26/ FAO, Pilot Study on Conservation of Animal Genetic Resources, 1975.

It is generally accepted that a state veterinary service is essential to control the spread of major diseases. The standard reached by such services varies widely from country to country. In most developed and in many developing countries national veterinary services now include both diagnostic laboratories and appropriately distributed field services with necessary supporting staff and vaccine production laboratories. The necessity for the latter depends on the diseases involved, size of the country and the availability of safe, effective vaccines from other sources. An animal quarantine service is also mandatory since the volume of trade and the speed of transportation have greatly increased in recent years and distance is no longer an important barrier to the spread of disease.

The damage that can be done when a disease enters a country that was previously free can be illustrated by the outbreaks of foot-and-mouth disease (FMD) in Denmark in 1982 which, although eliminated within a period of a few weeks, cost approximately US $20 million as compensation for slaughtered animals alone. Furthermore, restrictions imposed on agriculture and on other industries and on exports increased the cost by several million dollars a week.

The shortage of trained manpower is one of the constraints to building up a strong veterinary service in developing countries, especially in Africa. However, some countries are attempting to overcome this by innovative approaches, designed specifically for local conditions and using lower level personnel such as animal health assistants. These play an important role in the Indian Dairy Development Programme (Operation Flood) described later, as do the nomadic scouts appointed and paid for by village communities in Ethiopia, Madagascar and Niger. Although it may still be too early to evaluate the effectiveness of these 'barefoot vets', they represent a realistic approach to providing a low cost animal health service, particularly in countries which are unable to afford a field service staffed by highly trained professionals.

The Control of Major Infectious Animal Diseases

A prime function of most state veterinary services is either to eradicate certain diseases or to reduce their incidence. These are usually diseases that:

- are of major economic importance
- have public health implications, such as rabies, brucellosis
- have recently been introduced and threaten to disrupt the industry, such as African swine fever (ASF) in Latin America
- can be effectively controlled by vaccination, such as rinderpest.

Many countries have made strenuous and continuous efforts to eradicate major diseases such as bovine brucellosis, tuberculosis, glanders, FMD, classical swine fever (CSF), sheep pox, Newcastle disease (ND), rabies, East Coast fever (ECF), babesiosis and its major vector tick Boophilus microplus. As a result, some of these diseases have been eradicated either from countries or from regions of the world. Today, the industrialized countries enjoy freedom from most of the major classic epizootic diseases. In Europe efforts are now being concentrated on the eradication of the residual foci of such diseases as ASF, CSF and ND.

Other diseases such as rinderpest and contagious bovine pleuropneumonia (CBPP), which once appeared sporadically in some European countries, have been eradicated. The incidence of FMD in Europe has been considerably reduced and several countries are now free from it.

Progress has been much slower in the developing world. Although there have been a number of successes, disease eradication has been fraught with difficulties and frustrations. Yet ASF has been successfully eradicated from Cuba, the Dominican Republic and Malta. Babesiosis has been eradicated from large areas of Argentina and Mexico. ECF has been eliminated in a number of southern African countries, although its tick vector Rhipicephalus appendiculatus persists. CBPP has been eradicated from the Central African Republic, glanders from the majority of countries in Africa and Asia and Brucella melitensis from sheep and goats in Cyprus. FMD has been eradicated from all central American countries and also from Chile, although it occurs in all other countries in Latin America and is widespread in Africa, Asia and the Near East.

A coordinated vaccination campaign against rinderpest known as Joint Project 15 (JP 15) which was carried out between 1963 and 1973, coupled with the general strengthening of veterinary services in many African countries, contributed to a recent significant decrease in the incidence of rinderpest. However, the disease was, and still is, enzootic in Sudan and in Ethiopia and probably in some other countries in Africa. Recently its resurgence has been reported from some countries in western Africa. In response, emergency action supported by FAO, OIE 27/ and the EEC was taken to organize vaccination campaigns in ten of them.

However, the majority of the cattle population in the region is still fully susceptible to rinderpest due to the absence of follow-up vaccination campaigns. Since it is very difficult to control or to monitor livestock movements across national borders in Africa, it was inevitable that unless more thorough efforts were made to eradicate rinderpest, it would spread again and threaten the region's beef and dairy industries. The recent severe and widespread resurgence of the disease has dramatically underlined this point.

Control of Chronic Diseases

The large group of chronic diseases have effects which are more insidious and less obvious than the major infectious diseases and their importance is frequently overlooked or seriously underestimated. Although outwardly less noticeable, they frequently have an important economic impact through their effects on production or reproductive performance. Examples are enzootic pneumonias of pigs, mastitis in dairy cattle and chronic respiratory diseases of poultry. These diseases can be controlled or prevented by managerial procedures or by prophylactic animal health measures such as medication and vaccination, the application of which is facilitated when stock are raised under intensive conditions. This allows the environment to be adapted to reduce or eliminate the possibility of infection or infestation and it ensures close veterinary supervision and permits improved animal nutrition, a factor which frequently enhances disease resistance. Nevertheless, unless associated with disease preventive measures, intensification of livestock production can increase the risk of disease because of increased stocking rates and higher levels of stress.

27/ OIE: International Office of Epizootics.

Trypanosomiasis

Very large areas of Africa are without cattle and other livestock because of the presence of tsetse flies and the trypanosomes they transmit. Trypanosomes are protozoa which cause wasting diseases-sleeping sickness in man and trypanosomiasis in animals. Losses arise not only from morbidity and death but also from the virtual exclusion of affected areas from agricultural livestock development.

The tsetse fly is present in 37 countries of Africa, infesting some 9 million km^2 or 42% of the total land area. Much of this land has an excellent potential either for pasture production or for other agricultural use and it could support an estimated additional 100 million head of livestock if it were free from this pest.

The rational utilization of the tsetse-infested areas for food production, involving the integration of livestock and crop production, is of vital importance to the future of Africa. This can be achieved if trypanosomiasis is brought under control by attacking either the causative trypanosome or the principal vector, the tsetse fly.

The mostwidely practised control method is insecticidal spraying of the 10% to 15% of the vegetation which provides the dry season resting places for the tsetse fly. An alternative approach is to work directly on the trypanosome. During the two decades, 1940-1960, a number of drugs were developed to treat trypanosomiasis. They were: (a) curative drugs effective with a single dose; and (b) prophylactic drugs affording protection for several weeks or months. The latter proved to be of particular value for livestock exposed to temporary challenge as, for example, during the passage of trade stock through tsetse fly belts.

It is possible to maintain livestock in tsetse infested areas under the protection afforded by these drugs, provided treatment of infected animals is carried out on a sustained basis at intervals commensurate with the trypanosomiasis risk. Currently at least 25 million doses of these drugs are used each year. In using either curative or prophylactic drugs, they must be administered correctly since underdosage can readily lead to resistance of the trypanosomes to further treatment.

Attempts to produce a vaccine for the immunization of domestic stock have not proved successful so far, but a major research effort is being undertaken by the International Laboratory for Research in Animal Disease (ILRAD) in Kenya.

Another important development option is the use of trypanotolerant livestock, as discussed earlier. They can live and breed in the presence of moderate trypanosomiasis challenge but if the infection to which they are exposed is severe or if the animal's vitality is weakened by stress through poor feeding, lack of water, other parasites or overwork, then they too will sicken and may die from the disease.

Thus, all of the control options suffer from some limitations. The distribution of tsetse also is not static and varies as a result of changes in the ecology due to human activities or weather conditions. Nevertheless, successful tsetse control operations have been carried out in, for example, Nigeria where, through selective spraying, it was possible to free about 205 000 km^2 from tsetse in the period from 1956 to 1978. Similar but smaller scale campaigns have also been carried out in a number of other African countries.

In the past,the use of land cleared of tsetse has not always been optimal. Land use planning supported by necessary legislation and the creation of appropriate infrastructures have not kept pace with the elimination of the fly.

FAO has mounted a trypanosomiasis control programme to help overcome the problem. The prime focus is on regional and/or community development using tsetse and trypanosome control methods as planned components for developing areas where the presence of trypanosomiasis effects both man and livestock.

AFRICAN SWINE FEVER (AFS): A COSTLY VISITOR

Under 2% of the world's pigs are found in Africa. Their numbers there have increased very slowly mainly because of the existence of ASF, a virus disease for which there is no effective vaccine or treatment and which can kill up to 90% of pigs in infected herds. For example, the entire domestic pig population in Sao Tomé and Principe had to be eliminated following the sudden appearance of the disease in the country in 1979. Outbreaks of the disease in Cameroon in 1982 ruined years of effort to increase pig production there.

The disease spread from Africa to Portugal in 1957 and to Spain in 1960 and became enzootic in those countries causing substantial annual losses. In Spain the annual cost for compensation alone for the 3% of the national herd that are slaughtered for disease control exceeds US $14 million and the total direct programme costs to date approach US $200 million. Outbreaks have also occurred in France, Italy and Malta where prompt and drastic action eliminated the disease with the exception of Sardinia (Italy) where sporadic outbreaks continue to occur. In Malta, the eradication campaign entailed slaughter of the entire pig population of 80 thousand at a total cost (including indirect costs) to the national economy estimated at US $45 million.

The disease was introduced into Cuba in 1981 and later to Brazil, Dominican Republic, Haiti and, once again, Cuba. In both Cuba and the Dominican Republic, ASF has been eliminated but in the former country eradication necessitated the slaughter of over 400 thousand pigs while in the latter death and voluntary slaughter together eliminated the entire pig population of 1.4 million. A similar operation is under way in Haiti where the entire pig population is having to be eliminated.

The Cost of Animal Disease

According to FAO estimates, at least 5% of cattle, 10% of sheep and goats, and 15% of pigs die annually due to disease. Besides these direct losses there are production losses due to poor reproductive efficiency, retarded rates of growth and low levels of production. But because costs for labour, drugs, transport and other inputs are continually rising and veterinary services have to compete with others for limited government funds, measures to control animal diseases also compete for funds. Decisions on priorities and sizes of disease control programmes generally should be made through appropriate cost-benefit analysis. A number of such studies have indicated that well planned and organized disease control programmes can be very attractive economically. For example, a benefit/cost ratio of 4:1 has been recorded for animal morbidity measures in Mexico; 5:1 for CBPP control in Nigeria; 23:1 for fascioliasis control in Spain; and 14:1 for bovine tuberculosis eradication in Hungary 28/.

28/ Ellis, P.R., Bull. Off. Int. Epiz. 93: 763-767, 1981.

Prior to 1950, rinderpest killed some 2 million cattle annually in Asia, Africa and parts of Europe. The estimated cost of the JP-15 vaccination campaign against this disease was more than US $20 million but it almost eliminated the disease in most countries involved in the campaign, especially in West Africa. In Nigeria, where the disease was eradicated in 1972, the benefit/cost ratio of the campaign was nearly 2.5:1. Cattle owners responded to the ecological pressure brought about by larger herds by changing herd structures towards greater efficiency. There is clear evidence that the reduction in mortality in this situation did not lead to greater pressure on the land 29/.

However, rinderpest is almost unique among animal diseases in its epizootiological simplicity. Few other diseases are likely to be as simple to control. Polyvalent vaccines are needed for many virus diseases and frequently they confer immunity for only a limited time. Nevertheless, even with such diseases, well-planned vaccination programmes can yield a high return. For example, a control programme for FMD permitted Botswana to export beef to Europe and a vaccination programme against the disease in Kenya proved to be very effective.

29/ Felton, M.R., 1976, Studies on the control of Rinderpest in Nigeria, M.Sc. Thesis, University of Reading, 1976.

SOME EXPERIENCES OF LIVESTOCK DEVELOPMENT

The central theme of this chapter is that, in attempting to meet the increased demand arising for livestock products in developing countries, careful development of their livestock sectors can satisfy other objectives as well. The strategies adopted will depend on and profoundly influence the use of the resources available in terms of feed and genetic potential, as shown in the previous sections.

Patience and perseverance are also required where these strategies adapt and build on existing technologies and patterns of resource use if success is to be achieved. A bringing together of various complementary activities and actions is required in the light of a comprehensive understanding of the production system involved. Agrarian reform or the modification of access to the land resource, producer incentives, the provision of credit and processing and marketing facilities, together with the improvement of technology of animal feeding, breeding and health, are all likely components of a livestock development programme. It is the blending of these often disparate activities, frequently administered by different institutions, and understanding the production system, that constitute the major hurdles to making these programmes a success.

The following experiences of some major livestock development programmes undertaken under widely differing conditions are, therefore, instructive.

LIVESTOCK DEVELOPMENT ON ARID AND SEMI-ARID LANDS

More than one-third of the land surface of the globe is arid or semi-arid. Over half of this area, or more than 2 300 million hectares, lies in developing countries. This is an area 50% greater than all of the arable and permanent crop lands in both developed and developing countries. It is an area of high agricultural risk where the scarcity and variability of rainfall are the dominant features.

In these arid lands the environment is normally too dry to permit the successful growth of crops. Nomadism and transhumance constitute the way of life, involving the utilization of ephemeral pastures during the rains and withdrawing to more favoured areas in the dry season. Camels, sheep and goats are the principal livestock in such areas.

The situation is similar in many tropical semi-arid lands which represent transitional zones comprising fragile eco-systems between a purely pastoral economy and one which introduces cropping into its agricultural systems. Because the rainfall is unreliable, harvests are unpredictable, so that a combination of crops and livestock is adopted by some societies; transhumance is common.

Such lands can be both conserved and utilized productively as occurs, for example, in Australia and Mexico where arid lands are grazed under a ranching system. This requires, however, that there is identifiable ownership of both stock and land by an individual or a group of individuals, so that there is an appropriate incentive for preserving the ecosystem. The land tenure changes required to bring this about in collectively owned arid rangelands are not simple to identify or to introduce, given the rapid increases in both human and livestock populations that have recently occurred.

In the arid and semi-arid zones together, the human and livestock populations rose by 75% and 79% respectively between 1949 and 1974. These increases in both human and livestock

populations in only 25 years have led to encroachments of cultivated areas onto traditional grazing lands which are now carrying more stock. They have resulted in severe overexploitation and deterioration of grazing and, not infrequently, have also led to conflicts between pastoralists and cultivators 30/.

Yet the arid and semi-arid zones have continued to hold about 12% of the large ruminant stock of tropical developing countries and to supply about 12% of the beef produced by them. However, the pace of desertification has advanced to such a degree that this level of productivity may be difficult to maintain unless the range is improved. Livestock development projects have a poor reputation in these arid and semi-arid areas. Despite the immense expenditure that has gone into arid land development schemes, little has been accomplished in improving the lot of the pastoralist, the productivity of his stock or the quality of the range which he uses.

The record of the recent past must inevitably raise questions on the soundness of intervention strategies in arid zones. Past efforts have frequently ignored the complex structure of pastoral society which is a workable adaptation to the need to manage not only livestock but also available feed and water. In such societies there is normally a logical management hierarchy of decision making responsibility, with different levels of tribal authority deciding on different issues, such as stock, labour, water and movement regimes. The tribal corporate structure is based on centuries of experience on how to survive in the face of drought, fire, disease, flood or other disaster. But recently these disasters have often been of a magnitude to raise serious questions about the efficacy of traditional approaches to the utilization of arid and semi-arid lands.

Nevertheless, attempts to develop arid lands have seldom capitalized on this experience or on the expressed needs of the pastoralist. More often they have tried to impose on him a ranching model that arbitrarily tries to control the number of stock on a given area of land. Such models are usually based on North American or Australian experience and avoid consideration of the socio-economic and cultural relationships of pastoral societies.

In arid areas there are sound ecological reasons why a unit of land management needs to be very large to allow for periodic movements of livestock. Alienating the land and allocating smaller units as private property may be not only technically questionable but also offers a tremendous risk to equity. Likewise, efforts to settle nomads, either by force or by inducement have not been very successful, although spontaneous settlement is widespread as nomads are drawn into the expanding modern economy. However, the settlement of formerly nomadic groups does not necessarily indicate a change that will lead to self-sustaining society; rather it reflects their increasing reliance upon urban centres.

Appropriate interventions for change have to take into account the opportunities for increasing not only production but also income and equity. At the same time, they must be conscious of the need for conserving the environment. Perhaps the easiest route to change is to learn more from the pastoralist himself and not to assume that the technology already exists for improving range management, disease control and livestock marketing. For example, the assumption that pastoralists will sell livestock in response to price rises

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30/ For an excellent discussion of grazing on arid and semi-arid lands the reader is referred to: UNESCO - Tropical Grazing Land Ecosystems 1979. See also: Oxby, Clare. Group Ranches: A Study of Group Cooperative Livestock Enterprises and their Application in Tsetse and Trypanosomiasis Control Programmes with Special Reference to Cattle, FAO, Rome, 1981.

needs challenging. Pastoralists are individualists, on the fringes of the monetary economy and so their responses may not be identical with smallholders who have wider access to purchased inputs or consumer goods. It is also necessary to re-examine whether the emphasis given to controlling stock numbers should be determined within the context of the way in which existing communal systems operate - see, for example, the discussion on the hema system later in this chapter. There may be much to learn from self-managing pastoral societies which function largely outside of government. Yet such societies seldom seem to have been examined in the formulation of arid zone development strategies. Nevertheless, the real problem of pastoral society is the explosion in the human population which has led to a build up in stock on communal lands well in excess of their grazing capacity.

One possible approach for alleviating pressure on nomadic areas is that of stratification, based on comparative advantages in resources, skills or location. In this way the more arid areas may be used as specialized breeding zones, using traditional management, as is done in Northeast Kenya. The less arid areas may be used for raising grower stock, which may ultimately be fattened in areas of high potential or where by-product feeds are available. For such a strategy to be attractive to the pastoralist there needs to be a marked price differential per kg favouring immature over mature animals. Such a differential rarely exists in developing countries and past efforts at stratification have seldom proved attractive to the primary producer 31/. Stratification also necessitates a more complex marketing infrastructure to enable cattle to flow through the system. A change of this nature is often strongly resisted where traditional marketing systems are firmly entrenched, particularly so when stratification involves trade across international borders.

A number of studies have shown that traditional systems of livestock marketing in Africa generally perform well in terms of distributing livestock and meat at low costs 32/. They have also shown that expectations from the possibilities of marketing schemes alone - and of stratification - are often exaggerated 33/. Both strategies undoubtedly have a role to play but only as a part of a well planned and integrated development programme which also has production components.

An approach to integration which seems to offer considerable potential in both arid and semi-arid lands is the wider use of agro-forestry. This cannot only provide much needed forage for livestock, particularly during lean periods, but can also supply fuel wood and permanent soil cover which both improves soil fertility and inhibits erosion. One of the attractions of integrated livestock production and forestry is that it can be a profitable venture for the small landowner, although it may call for a considerable degree of management skill.

The grazing of sheep and cattle under trees has been pursued in the temperate developed countries for centuries, with fire, tree thinning and harvesting being used to effect a balanced level of production. In the tropical developing countries of Latin America, a

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31/ Ferguson, D.S. A conceptual framework for the evaluation of livestock development projects and programmes in sub-saharan West Africa, CRED, University of Michigan, 1979.

32/ SEDES, Coûts de trasport et législation du commerce du bétail et de la viande dans les Etats de l'Entente, Paris, 1969.

33/ Jahnke, M.E. Livestock Production Systems and Livestock Development in Tropical Africa. Kieler Wissenschaftsverlag Vauk, Kiel, 1982.

similar approach is often followed, although forest land does tend to be cleared to establish pastures rather than being linked in a sustainable wood and livestock production system 34/.

In arid areas of the Sahel, India, Pakistan, Chile and Peru, fodder trees such as species of Prosopis and Acacia provide the only dependable source of livestock feed and help to stabilize the desert. Some species, such as Prosopis, have a multi-use potential because they can absorb atmospheric moisture through their leaves and grow on poor soils in areas where the annual rainfall is as low as 75mm or less.

Sheep Development in Syria

One of the most successful development schemes in the arid zone and one which involves both stratification and integration with crop agriculture, occurs in Syria. Here sheep production is the major livestock activity, based largely on the grazing potential of the steppe which covers about 11 million ha or 58% of the country's land area. The Government initiated a programme for the improvement of the steppe after the disastrous effects of three consecutive years of drought (1958-1960) which had resulted in a reduction of the sheep population from about 5.9 million to 2.9 million; by 1980 it was about 8.8 million. A special Steppe Department was set up and efforts were made to improve the situation for the bedouins and their flocks. Since 1964 this Department received continuous assistance from the World Food Programme (WFP), while it also received help from a FAO/UNDP Project and, since 1978, from a World Bank loan.

The general problem of improving the steppe and the lot of the bedouin has been tackled on a broad front. Grazing cooperatives were established to limit over-grazing and the destruction of the ranges. Each cooperative was given the sole right to graze certain demarcated areas and each cooperative family received a licence for grazing a specified number of sheep (usually 100-125). Efforts were made to keep the sheep off at least a part of the cooperative's range area during critical growing periods of the year. The approach was, in effect, a revival of the ancient hema system of range management which had previously been applied by the bedouin tribes. By 1981, 105 hema cooperatives with 2.5 million sheep on 6 million ha of rangeland had been established 35/.

There were considerable initial difficulties in getting cooperation from the bedouins as they were afraid of losing their independence. The programme started in small areas from where it has expanded gradually as the pastoralists gained confidence in it. Fattening units were set up on a cooperative basis in cereal producing areas to limit the bedouin's dependence on merchants for the purchase and fattening of animals and to reduce the grazing pressure on the steppe. In 1981, 55 such cooperatives were in existence with 4,400 members fattening 1.5 million sheep. Through research and experiments carried out as part of the overall programme, efficient fattening rations, based on locally available products, have been worked out for use by the cooperatives.

34/ See E.K. Byington and R.D. Child, Forages from the World's Forested Lands and Ruminant Animal Production in Child, R.D. and E.K. Byington (eds), 'The Potential of the World's Forages for Ruminant Animal Production', Winrock, Morrilton, Ark., 1981.

35/ Draz, O. The development of the arid and semi-arid rangelands of the Near East. Modernization of traditional systems based on experience in Syria. World Anim. Rev. (in press).

In Syria, as in other countries in the Near East, the spread of cultivation to low rainfall rangeland has caused large areas of it to degenerate. In order to overcome this problem, a series of legislative orders were enforced which prohibited the ploughing and cultivation of rangelands within the Syrian steppe. Drought resistant shrubs such as Atriplex were planted to regenerate the range. So far, about 7 000 ha have been planted.

A further facet of the programme is the production of a forage crop on fallow lands to provide additional dry season feed for breeding stock. A programme for the introduction of a forage, usually a vetch, was started in 1967, again with WFP assistance, in the better rainfall areas at the same time as cultivation of irrigated alfalfa was promoted. The programme had a slow start, particularly in the rain-fed areas. However, from 1974 to 1979, the total area under forages and pulses increased nearly tenfold from 8 600 ha to 83 700 ha.

Finally, in order to improve water availability on the rangelands a number of programmes for establishing surface dams and deep wells have been initiated. No fewer than 2 800 ruined Roman water cisterns have been restored during the last four years.

The overall programme just described has tried to tackle a problem which, to varying degrees, is common to many countries in Africa, Asia and the Near East: how to integrate the nomadic or semi-nomadic pastoralists into the existing economic system and how to protect their basic resource, the rangeland, from degeneration and destruction by overgrazing or by cultivation. In general, the programme has met with success, although many of the results have taken much longer to achieve than originally planned. The programme is noteworthy: (a) for the way in which it has attempted to integrate change into the traditional culture, rather than forcefully attempting to settle the nomads; and (b) for the efforts to optimize the output of the range by integrating its production with cereal and forage crop use and water development.

LIVESTOCK DEVELOPMENT ON HUMID AND SUB-HUMID LANDS

That livestock production on small farms should be regarded as part of a farming system which needs to be looked at in a holistic manner, rather than as a series of discreet activities, is particularly true in the humid and sub-humid tropics. Much of the land in these zones is capable of growing crops as well as feeding livestock. Priority is not always given by the livestock owner to obtaining a high rate of output of food products from his stock because other products and services derived from them are more important in his system. Improvement in the output of livestock products from small farms usually cannot take place without simultaneous improvement of water resources and/or feed supplies. Yet such changes may depend on agencies or programmes whose mandates or goals may have limited involvement with livestock production.

Large ruminant production in non-arid areas is heavily dependent upon fibrous residues and by-products produced on the farm, plus grass, weeds and tree trimmings which are cut and carried from roadsides and verges to tethered livestock. The availability of these feeds may be markedly influenced by crop production practices. For example, stubble burning to permit double or triple cropping may reduce the available straw; the use of herbicides may curtail the supply of weeds in the rainy season; and the production of high yielding varieties of rice, with short silicaceous straw, may reduce both the quality and the quantity of straw available as feed.

The relationship between crop and animal farming also concerns the use of draught animals and the efforts to introduce them to new areas, particularly tropical Africa.

Draught animal use is very widespread in Asia and is now firmly established in most of southern Africa and some parts of the East African highlands. In francophone West Africa, draught animals are widely used for crop cultivation in Mali and Senegal. However, in sub-humid and humid Africa, the use of livestock for draught pruposes is still very limited mainly because of the presence of trypanosomiasis and the difficulty of firmly integrating livestock, or at least draught animals, into the agricultural systems existing there.

A number of efforts have been made to use draught animals more extensively in West Africa on the grounds that this would increase both labour and land productivity. A review of the effects of ox ploughing in West Africa showed significant yield increases over hand cultivation of 21% to 157% for millet, sorghum, maize, rice and cotton 36/.

The impact of introducing draught animals is not, however, always straightforward especially if it leads to a higher demand for labour at times of the year when such labour is costly, if available at all 37/.

Most of the sheep and goats in the humid and sub-humid zones of developing countries belong to smallholders who typically own only a few animals which are looked after by children or the elderly. The small size of individual herds and the communal nature of the grazing make it very difficult to have any impact on this type of owner. The husbandry and management of small stock, as is the case of the buffalo in much of India, is often the prerogative of the women of the family. Their role in this area and in decision making at the household level is usually neglected or ignored by rural development planners. Indeed, institutional support directed at men in areas such as extension, credit and co-operative membership has sometimes reduced women's access to such support. It makes little sense if the end goal of the support is a commodity for whose production or marketing men have little responsibility.

This argument gains added relevance where countries place increasing emphasis on the rearing of non-traditional small animal species such as rabbits, guinea pigs and milk goats for increasing meat and milk production. These species are raised mainly on small farms and usually are managed by women and children.

The extent to which tree crops are used in conjunction with food crops and livestock provides a particularly interesting feature of integrated agriculture on small farms. Leguminous trees and bushes are cut extensively to feed livestock, the best known species being Leucaena leucocephala 38/. Another form of integration involves grazing livestock under tree crops. Various pasture legumes are grown under rubber in Malaysia and Sri Lanka and also in Malawi where, although the shade prevents good forage yields, it permits the growth of seed material. Forages are also grown successfully under coconuts in a number of countries of southeast Asia and the South Pacific 39/. In West Africa, sheep and cattle are grazed under oil plams and kola trees and under mangoes and cashews. However, in all

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36/ Shapiro, K.H. Livestock Production and Marketing in the ENTENTE States of West Africa: Summary Report. Centre for Research on Economic Development, Univ. of Michigan and USAID, Ann Arbor, Michigan, 1979.

37/ See the section on "Animal and Tractor Power" in Chapter 1.

38/ Vietmeyer, N. and B. Cottom. Leucaena, promising forage and tree crop for the tropics, 155 pp. Nat. Acad. of Science, Washington, D.C., 1977.

39/ Thomas, D. Pastures and Livestock under tree crops in the humid tropics. Trop. Agric. (Trin) 55 39-44, 1978.

cases, once a dense canopy forms, insufficient light penetrates to permit a good stand of forage. From the development standpoint, the greater use of short season forage legumes and tree crops such as Leucaena and Glyricidia offer considerable prospects. These leguminous trees offer two other benefits: they add nitrogen to the soil, thus influencing crop yields, and they provide some fuel wood as a by-product. Intervention through the wider use of such multi-purpose trees is a measure that is wholely consistent with an overall strategy for small farms.

Integrated farming systems involving livestock, fish and poultry have existed in China for a long time. In most other Asian countries also there are many such systems of long tradition in popular use. Interest in and experimental work on them is rapidly gaining momentum. These systems, in which waste products from one sub-system become inputs to another, provide an attractive alternative to reliance on food production systems which need high inputs of fossil fuel.

China produces over 800 thousand tons of fish annually from ponds receiving organic matter such as waste, animal manure, rice bran, brewer's waste and various materials gathered in the vicinity of ponds including grass and snails 40/. In the future the recycling of organic wastes in this manner through fish may provide one of the cheapest sources of food of animal origin in tropical countries as well as a profitable way of overcoming the increasing problem of waste disposal in crowded cities 41/.

Different systems of integrated aquaculture are evolving for different purposes. For example, a system of cooperation has developed in the vicinity of Bangkok in Thailand. Small landowners with fishponds of about one hectare permit landless countrymen to build a home and pig pens over their ponds. The pig farmer buys restaurant swill and some concentrates plus rice bran and broken rice. These are mixed with water hyacinth and fed to the pigs. The pig manure and feed waste fall into the pond and provide additional nutrients for the fish. The system also relies on cooperation between the landowner and the pig farmer because the annual fish harvest is a joint effort. In addition, after the pond is drained, the bottom is dredged and the "compost" used for fertilizing crops. Related systems are found elsewhere in south east Asia and involve chickens and ducks.

Dairy Development in India

An outstanding example of change involving small farmers has been carried out successfully in India where extraordinary progress has been made in a highly integrated system of dairy development. India has a long tradition of integrated livestock/crop production in smallholder systems. The average landholding per household is approximately 2 ha. Only 25 - 30% of grain production on these smallholdings is marketed and all livestock feed is in very short supply. Land cultivation is mainly carried out by draught animals.

The supply of milk to the big cities has long been of great concern to central and state governments. By tradition, milk distribution and sales were handled by private

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40/ De-Shan, Z. A brief introduction to the fisheries of China. FAO Fisheries Circular No. 726, FAO, Rome, 1980. See also Wohlfarth, G. Utilization of fish farming. Proc. of the Conf. on fish farming and wastes, London, pp. 78-95, 1978.

41/ Cruz, E.M. and K.D. Hopkins. The ICLARM-CLSU integrated animal-fish farming project: Poultry-fish and pig-fish trials., ICLARM Technical Report No. 2, ICLARM, Philippines, 1981.

vendors, sometimes in close association with city cowkeepers. Milk was often adulterated on its way from the cow to the consumer. In order to secure supplies and to improve milk quality, the public sector built dairy plants and distribution networks within the major cities.

For more than a decade the Government of India has been involved in a large dairy development programme called Operation Flood. During the period 1970-81 this received assistance from the WFP in the form of skim milk powder and butter oil estimated to exceed $100 million in value 42/. These dairy commodities were reconstituted to milk in the city dairies. The sale proceeds were used to build up the dairy processing and distribution system in the country's four major cities (Bombay, Calcutta, Delhi and Madras), to construct dairy factories in the production areas, to erect feed factories, to establish producer cooperatives and to promote milk production in the rural areas. In the current phase of Operation Flood, the role of WFP has been taken over by the EEC, and the World Bank is also providing financial support.

Operation Flood aims at developing producer cooperatives, based on the so-called Anand model which has been developed and put into wide practice in the State of Gujarat during the last 30 years. Farmers in a village with surplus milk to sell, form a dairy cooperative society (DCS) with individual membership and elected executive officers. A union of village cooperative societies is formed at the district level. Each DCS arranges milk collection morning and evening. The amount of milk delivered per producer and per day varies between as little as one litre to usually no more than 10 to 20 litres. The milk at each village society is collected by a truck operated by the milk union and transported to the union's dairy plant.

A typical union collects between 100 and 300 thousand litres per day. The union provides concentrate feeds, minerals and other supplies which are transported to the villages by the milk truck and sold by the village DCS. It also arranges veterinary services, artificial insemination and advice on production matters. The unions in each area, usually a state, have linked together to form a federation of unions which enables member unions to benefit from shared processing, marketing and investment programmes managed by specialists employed by the federation. The cooperative movement has thus developed a three-tiered structure: the village cooperative (DCS); the union of village cooperatives; and the federation of unions.

Operation Flood has been successful in building up the infrastructure for milk collection, processing and distribution. About two-thirds of all funds generated from the sale of WFP commodities have been used for this purpose. The processing capacity in the four metropolitan cities increased from one million litres/day in 1969 to 2.9 million litres in 1980, while in the rural areas processing capacities were increased fivefold to 3.4 million litres/day. Feed manufacturing has received about 11% of the WFP generated funds. Sixteen new cattle feed plants, mostly with a daily capacity of 100 tons, had been completed by 1980. The network for milk collection has been enlarged considerably. No less than 27 district unions have been organized containing 10 thousand village cooperatives and 1.36 million milk producer members. These village cooperatives procured 800 thousand tons of milk in 1981.

A programme of such gigantic proportions as Operation Flood has naturally been subject to much discussion, praise and criticism. Questions have been raised, such as the

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42/ WFP. Summary terminal evaluation report of Project No. India 618, WFP/CFA 12, 1981.

following: Who is benefitting from the programme, is it the already wealthy farmer or will also the small farmer and landless labourer profit? How will it influence the nutrition of the poor in the cities? Has the programme led to a real increase in milk production or is it just tapping milk from rural areas which could not previously be reached by milk collection, perhaps thereby diminishing milk consumption among producer families? Will profitable milk production cause a diversion of land to fodder production and diminish the area available for growing staple foods such as wheat and rice?

Studies of the composition of the membership of village societies in Gujarat where organized dairying is most advanced, indicate that farmers with less than 2.5 acres of land own 57% of the dairy animals. Furthermore, a study by the National Dairy Development Board showed that in a sample of producers 14% were landless, 38% were small farmers (less than 5 acres), while the rest had larger holdings. On the average, the 1.4 million members of all the cooperative societies had an income from milk sales of about Rs. 1 200 in 1980, an amount almost equal to the country's average GDP per head. In many cases an additional benefit to the villages has been the contribution through the profits of co-operative societies to the improvement of village facilities.

The programme has successfully circumvented caste and sex discrimination. Its benefits are available to all livestock owners, irrespective of caste and the village women, who are primarily responsible for the husbandry and management of the buffalo, participate in cooperative activities.

In the cities, dairy products are largely consumed by the wealthier part of the population. In 1980 households of the poorest income segments accounted for about a quarter of the total population in the four metropolitan cities but bought only between 7 and 16% of the total milk supplies. Thus, although Operation Flood may have helped somewhat in increasing the milk consumption of the city poor, the effect has probably been small. For some time to come milk and milk products in urban areas will probably continue to be mainly consumed by the higher and middle income groups. However, in developing countries, the majority of the poor people are generally found in the rural areas. Dairy development programmes such as Operation Flood can, therefore, assist in recycling some urban income to the rural areas where the poor will benefit either directly as small-scale milk producers, or indirectly through increased job opportunities. The importance of the programme in job creation is considerable. Not only are a range of new service and manufacturing industries dependent upon the milk plants but infrastructure for whole areas including better roads, clinics and houses has been constructed on funds derived from milk sales.

The possibility or likelihood that profitable milk production could cause a distortion in the land-use pattern with a reduction in the production and availability of staple foods has been raised as another major issue. Indian milk production is based on the use of agricultural by-products and is likely to continue to do so. There have been some slight increases in forage production in Operation Flood areas, but information on this is incomplete. However, experimental results and practical experience indicate that a small area of forage production can be introduced into the cereal rotation with a good impact on milk production and only a minor effect on total grain yield 43/. The concentrates used in the dairy development programmes are, furthermore, based mainly on broken grains, which are not generally used as human food, and on brans and oil cakes. Of the latter, India still exports about 1 million tons annually.

43/ Groenwold, H.H. and P.R. Crossing. The place of livestock in small farm development: an Indian example. World Animal Review 15: 2-6, 1975.

Although hard facts are lacking, it would appear that the effect of dairy development on grain production has been mainly positive. It has been regularly observed that in those villages where dairy societies are functioning well, marked increases in agricultural production are occurring. The reason for this is that the average farmer sells only 25-30% of his food grain production and so the sale of even one or two litres of milk each day markedly increases a small farmer's cash income. A substantial part of this increment, commonly as much as 50%, is spent on fertilizer, improved seed and the purchase of irrigation water 44/.

Dairy Development in Kenya

Another example of dairy development based upon an integrated approach, although less centrally directed, has occurred in Kenya where smallholder dairy production has undergone a remarkable expansion and development in the short period since Independence 45/. Although increasing demand for milk has been a major force in this development, this is not the sole explanation.

The implementation of the Swynnerton Plan of 1954 laid the ground for an orderly land reform after independence. The Plan called for: (a) African landholdings to be consolidated and adjudicated under individual ownership; (b) small farms to be encouraged to grow cash crops such as coffee, tea and pyrethrum, the income of which was partly used to buy grade cattle; (c) credit to be provided for the purchase of dairy cattle; and (d) support services such as tick control, milk collection and artificial insemination, to be built up and made available for small-scale dairy production. Immediately after Independence, a number of additional development schemes were implemented. Through the Million Acre Settlement Scheme farmland previously owned by European farmers was distributed to 35 000 African families. By 1975 the area allocated to smallholders had doubled. In many cases, grade cattle were also distributed to them.

In 1960, the total number of grade dairy cattle kept by smallholders was about 80 thousand while by 1975 it had increased to about 550 thousand. During the same period, the number of dairy cattle on large farms decreased from 600 thousand to about 250 thousand head, since when it has remained relatively stable. In 1976 large dairy farms supplied about 20% of the total milk but supplied about 40% of the urban markets and they thus continued to play an important and stabilizing role for the supply of milk to the processing industry. At the same time, these farms continued to be an important source of dairy animals for small farmers who wanted to start dairying.

A major reason for the rapid expansion of smallholder dairy development has been and continues to be the increased demand caused by the rapid growth in population and urbanization,and increased incomes in both urban and rural areas. In higher altitude areas where dairy production with crossbred and grade cattle is concentrated, families have an income from cash crops such as coffee, tea and pyrethrum, and the local market for milk is expanding quickly. Important decisions influencing expansion were made including the abolition of the quota system which had previously restricted access by smallholder dairy

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44/ Brumby, P.J. Milk production in India. Intensive animal production in developing countries. British Society of Animal Production, 4: 325-330, 1981.

45/ Stotz, D. Smallholder dairy development in the past, present and future in Kenya. University of Hohenheim, 1979.

producers to the Kenya Cooperative Creameries (KCC) and the establishment of a price system which did not discriminate against those farmers - typically small scale - who produced milk mainly from unirrigated pastures.

Milk collection is now organized so that the large producers deliver directly to the KCC, while the small producers (if they do not market all surplus milk locally) deliver their milk to cooperative collection societies of which about 300 existed in 1975, typically with about 250 members each. The societies, in turn, sell milk on the local markets and dispose of their surplus to the KCC. The direct on-the-farm sale of milk to neighbours is generally handled by housewives who also participate in or are responsible for the management of the cows. Although no data are available, the growth in small-scale dairying is assumed to have strengthened the economic power of women.

The income from smallholder milk production is good in comparison to alternate uses of family labour. A recent study of modernization in the Kenya dairy industry showed that for a herd of 2 to 4 milking cows kept on grass the income from dairying increased by a third with a shift from zebus and their crosses to European-type cattle, and by over a half following a shift from grazing to stall-feeding. Economic forces have thus accelerated the introduction of dairying: the change from zebu to grade cows; the increase in herd size; and lately, the cultivation of forage crops, particularly Napier grass and the use of stall-feeding based on green fodder and agricultural by-products. Dairying thus plays a role in the progressive intensification of smallholder agriculture.

One of the key factors in facilitating this process has been the role of the KCC in providing a stable market outlet for smallholders. Another factor of importance has been the control of tickborne disease. Without the introduction of dipping against ticks, smallholder dairy production with grade cattle would have been impossible. Artificial insemination services have been an important technical innovation in smallholder areas, making it possible to expand the numbers of grade cattle. In 1968, 162 thousand inseminations were performed. By 1980 the number had increased to 537 thousand. It is estimated that the services now cover about 400 thousand cows, of which about 10% are zebus 46/.

The examples given in this chapter all indicate change through a move towards intensification as well as integration. Such change always incurs costs that have to be funded in some way. The contribution of the WFP played a significant catalytic role in schemes such as Operation Flood and the Syrian sheep fattening programme. When the whole farming system is involved, such an approach involving food or feed aid may take time. But over the long term it may be one of the better ways of bringing about livestock development in a manner that also promotes equitable rural development.

46/ Oscarsson, G. and R. Israelsson. The Kenya National Insemination Service (KNAIS), Swedish University of Agricultural Sciences, Uppsala, 1981.

CONCLUSIONS, POLICY ISSUES AND IMPLICATIONS FOR ACTION

Policy issues relating to the livestock sector can be differentiated between developing and developed countries. In the developing countries, the issues revolve around the apparent failure of the livestock sector to exploit its undeniable opportunities to promote development. Issues in developed country policies concern the adjustment of the sector to shifting demand patterns. The latter has implications for the developing countries as well. Failure to adjust to changes in demand results in the creation of surpluses of livestock products in developed countries which, in turn, creates problems for those developing countries whose domestic markets are open to competition from overseas.

The livestock industry in developing countries has a dual role. On the one hand, it is a means of satisfying the rising demand for livestock products; on the other it is an effective instrument of social and economic change. Improvements in livestock production in most situations can only come about within the context of the total farming system of which they are an integral part. An holistic approach can, of course, create administrative problems unless the agencies promoting livestock development possess interdisciplinary capability.

The relative importance of the various livestock policy issues, improvement approaches and technological challenges which have been discussed, will be tempered greatly by the particular setting provided by each country. While many gradients exist, both developed and developing countries often have contrasts that can usefully be noted.

Pastoral Situations in Developing Countries

The major regions of the world where livelihoods centre on traditional, extensive animal grazing patterns are often characterized by nomadic life styles. The livestock in these areas are utilized in a variety of ways for basic living needs. Few, if any, purchased inputs are employed: market sales seldom occur except on an as needed basis and efforts to manage available grazing and water resources are often inadequate. There is strong dependency on the vicissitudes of nature, and human well-being is very fragile from season to season.

Such traditional pastoral systems are deceptively simple in appearance, but have deep social roots. The husbandry skills and human relationships evolved over the centuries are very intricate and functional in certain ways. In most situations, development undertakings would do well to build on these skills and relationships, rather than be too ready to remove them.

Efforts to help people in these pastoral settings can be attuned to either of two directions. One might be to help them improve their husbandry while continuing their pastoral way of life, either because of their own desire to do so or because no better alternative seems to be available. This development orientation may be very appropriate where the populations concerned are relatively stable and where intrusions of the modern world are unlikely to be significant in the foreseeable future. Some basic steps to improve animal health and productivity, as well as management of grazing lands and water supplies, should be included. Ideas for reducing the drudgery of their daily tasks and for meeting their fuel needs might be well received. Basic human rights and legal protections might be defined more clearly and enforced. Provision could be made to help prevent or buffer unusual hardhsips: emergency food and feed, temporary work, guaranteed markets in times of forced sales, access to new stock to replace depleted herds, animal

disease monitoring and control, and breeding and selection to improve the tolerance of the animals to harsh conditions.

In working with tradition-oriented groups, it is important to consider carefully the delicate land-livestock balances, human relationships and intangible aspects of the quality of life that may be adversely affected by the proposed interventions. At the same time, it would be a disservice to these people if it were assumed that their lifestyle could continue indefinitely without change. The younger persons especially need to be prepared to meet the unaccustomed demands of the outside world.

The second path that pastoral people can take is to move toward a modernized set of husbandry practices, with emphasis on marketing and, perhaps, a more settled existence. This is already happening to some pastoral groups. Intensification may or may not be part of it because a modernized grazing livestock system may use broad expanses of range land and still be productive and scientific. But introduction of new feeding and health practices would probably need to be accompanied by more conscious management of land and water, together with a clear or revised definition of land, water and livestock ownership rights. New credit and finance arrangements may be called for to meet herd and land improvement costs. Especially if sales to distant cities or overseas markets are involved, help in evolving new marketing and processing arrangements will be important. These transitions will tend to break down traditional relationships with local leaders, traders and money-lenders. New concentrations of power are likely to emerge and needs may arise for the typical family or pastoral group to have help in maintaining its equitable bargaining position.

Mixed Crop-Livestock Systems in Developing Countries

The emerging agricultures of many nations revolve around labour-intensive systems that combine crop and livestock production in closely integrated fashion. Often these are smallholdings that utilize animal power, produce crops for sale, domestic consumption and for animal feed, and have livestock products for home use and sale. Sometimes these are large collective, state-operated, or commercial units. Sometimes one would not find crops and livestock combined on any one unit but, in the locality as a whole, there would be a diversity of crop and livestock operations that add up to a highly self-contained system.

The animals are multi-purpose, making use of untillable land, cropping by-products and waste from local agro-processing operations. They in turn can provide power and manure for crop production. Having a combination of crops and livestock creates more flexibility when it comes to marketing, so that farmers are not completely dependent on the variations in prices for a single commodity. The combination is also a way to utilize labour more fully and evenly throughout the year.

From the regional or national viewpoint, a localized mixture of crops and livestock can lead to more self-sufficiency with respect to feed, fuel, fertilizer and human food needs. Also, there can be less need for infrastructure to transport these items over long distance.

Such crop-livestock combinations may be traditional and oriented to family living needs, or they may be very technologically advanced and sales oriented. But common to both extremes are some characteristics that carry important implications for policymakers, programme administrators and specialists.

When it comes to policy and programme design, integrated crop-livestock farming systems create special challenges. An action intended to affect certain crops, such as grain price subsidies, can have important indirect effects on farmers' livestock operations, and vice versa. Conventional research, extension and credit programmes that focus on single types of crops or livestock will not be appropriate. Interdisciplinary, interagency approaches that address needs in a broader context of resource use, farm management and consumer wants are required.

Highly Commercialized Livestock Operations in Developing Countries

Whereas most rural people in developing countries are part of the nomadic or mixed farming systems just discussed, in some situations high-technology commercial livestock operations are being rapidly introduced. Broiler production and cattle fattening operations are examples. Often these are associated with large investors or multinational agribusiness. Characteristically they are mechanized and utilize relatively little labour, and they frequently depend on large imports of grain and feed supplements.

Such operations are beneficial from the viewpoint of certain consumer and business groups. They are a way to bring outside capital and managerial capacity into the economy. They can also help agricultural development by demonstrating that investment and scientific innovation in that sector is feasible and often has a high economic pay-off. But they may be at cross-purposes with some other concerns. If the products are mostly consumed domestically and are not substitutes for previously imported foods, the input needs associated with these commercial operations could create large drains on foreign exchange. Profits may be taken out of the country and not reinvested locally. The domestic multiplier effects on income and employment may also be low. Sometimes competition from these highly commercial operations may drive smallholder producers out of business. In addition, harmful environmental effects may result from large-scale land clearing, or from waste disposal problems associated with large feedlots and processing plants.

This does not necessarily imply that commercial operations should be discouraged by developing countries. Indeed, they can make valuable contributions to national development if ways can be found to link them more closely with the rural sector, local entrepreneurship and wise long-run natural resource use patterns. To catalyze such linking, it may be appropriate to consider such actions as: encouragement of joint-venture investment and managerial arrangements; incentives and organizational help to make it feasible to involve smallholders and other rural people in some of the input-supply and production steps; help to potential livestock investors in identifying needs and latent opportunities that would be complementary to development objectives; reasonable constraints to encourage better land-use and waste-disposal practices.

Livestock System Adjustments in Developed Countries

The industrialized countries that already have their own livestock systems in place face challenges too. There is continual need to be responsive to changes in technology, domestic and foreign consumer demand patterns, competition from abroad and from substitutes for animal products, land availability in an urbanizing setting and access to labour and capital amidst competition from other seekers of these resources.

In at least two respects the task of forming policies is more difficult than that facing developing countries:

1) There are many well organized interest groups to be reconciled - livestock producers, crop producers, small farmers, the grain trade, urban consumers, environmentalists and humanitarian groups concerned about nutrition problems of the poor in their own country and in others.

2) Developed countries are not starting from the beginning: changes in policies have to take into account the repercussions of making some groups worse off than before.

One of the major issues now confronting policy makers in the industrialized countries is to what extent to foster the continued existence of small livestock producers facing increasing competition from large agribusinesses. In animal husbandry it is not necessarily true that bigger is always better. Indeed, the careful daily attention that some livestock require puts large commercial operations at a disadvantage relative to the family farmer. Of course, it is true that some countries have artificially helped small livestock producers through such measures as price support and stabilization programmes, protective tariffs and export subsidies. These measures have benefited large-scale producers as well. An especially notable example is the extent to which dairy farmers in Western Europe and North America have been aided and the over-supply that has resulted from it.

These countries, being highly urbanized, face considerable pressure to take consumer and taxpayer interests into account. Resistance to costly producer subsidies and import protections that increase food prices is likely to be encountered, especially during times of recession and austerity.

Instead of high-cost supports and protections one answer is to help marginal livestock producers adjust to these changes by finding new ways to achieve cost economies by cooperating together; shifting to new crop or livestock enterprises; moving into a part-time farm occupational pattern; or, in the case of some, shifting out of agriculture altogether.

Leaders in developing countries could well observe these problems and policy responses closely, for they too may be facing similar challenges as their own economies develop. On the one hand, they cannot afford to set in place farmer subsidies and protection that are costly and that lead to inefficient livestock systems. On the other, to go to extremes in yielding to consumer interest by holding down producer prices or permitting uncontrolled imports could jeopardize the development of their livestock sector.

Annex tables

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
WORLD												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	1134215	1271808	1380528	1342382	1372353	1480082	1470313	1600185	1553100	1561687	1650292	2.70
WHEAT	299029	348308	376196	364206	359392	425769	387571	451304	428704	444866	452389	3.03
RICE PADDY	277768	307988	335965	332981	358722	350428	371564	386925	376914	397684	412316	2.90
BARLEY	104683	135520	151066	152712	137464	172245	160330	179463	157722	159827	154615	1.51
MAIZE	272649	308821	326873	310046	343900	350214	370084	392594	418601	394049	450334	4.12
MILLET AND SORGHUM	86566	80260	95542	87207	89824	90852	94389	96189	92407	84207	101406	1.07
ROOT CROPS	541648	526173	566620	550872	541840	546572	568185	596274	583969	525548	545953	.26
POTATOES	291292	261901	293886	273132	260882	264101	268179	278850	288630	229942	254215	- .90
CASSAVA	88661	99856	100512	103446	107613	110778	115251	122339	116687	119381	126290	2.67
TOTAL PULSES	39997	41676	42138	42353	39738	44667	42339	43953	40055	39746	42679	- .14
CITRUS FRUIT	33751	41945	45303	46220	48182	48905	51364	49952	50819	55727	55239	2.80
BANANAS	27029	31965	32408	33060	32856	35002	36563	37397	38161	39861	39933	2.83
APPLES	27187	26093	29802	28320	31917	32321	30769	32762	36312	34461	31955	2.52
VEGETABLE OILS,OIL EQUIV	135948	156823	170328	163512	180647	172047	195651	201870	217384	209858	223582	4.04
SOYBEANS	37442	47773	58175	52558	64401	57341	73780	75292	88945	81021	88466	7.03
GROUNDNUTS IN SHELL	17190	15709	16742	16995	18763	17058	17427	18303	18293	17129	19944	1.60
SUNFLOWER SEED	9993	9607	12080	10969	9613	10284	12155	13175	15317	13560	13879	4.27
RAPESEED	5380	6766	7204	7169	8641	7606	7914	10568	10536	10590	12340	6.68
COTTONSEED	21039	24589	25701	26149	22649	22079	25706	24377	26405	26572	28762	1.26
COPRA	3499	4553	3888	3483	4565	5286	4750	4892	4449	4683	4914	2.03
PALM KERNELS	967	1221	1189	1370	1397	1427	1507	1441	1714	1829	1890	5.10
SUGAR (CENTRIFUGAL,RAW)	65305	71827	76382	75681	79138	83705	89833	90427	88964	83951	92225	2.57
COFFEE GREEN	4341	4572	4198	4753	4611	3554	4418	4806	5067	4818	5983	2.48
COCOA BEANS	1388	1510	1401	1553	1556	1348	1438	1475	1656	1625	1652	1.26
TEA	1147	1394	1455	1490	1551	1591	1749	1791	1825	1863	1859	3.62
COTTON LINT	11311	13429	14017	13986	12340	11947	13977	13238	13935	13898	15148	.84
JUTE AND SIMILAR FIBRES	3605	3489	3846	3030	3122	3373	3736	4522	4373	4024	4168	3.06
SISAL	634	672	638	692	614	420	457	404	431	450	451	- 5.64
TOBACCO	4872	4858	4956	5291	5423	5702	5552	5980	5388	5299	5637	1.32
NATURAL RUBBER	2436	3032	3455	3458	3562	3795	3632	3713	3862	3840	3685	1.92
TOTAL MEAT	94450	111023	112223	118674	120802	124262	128973	132842	137101	140277	142359	2.98
TOTAL MILK	387476	409899	416113	424946	429986	438842	451299	457915	465431	469927	471798	1.70
TOTAL EGGS	19316	22726	22941	23642	24356	24746	25733	26939	27801	28651	29553	3.12
WOOL GREASY	2778	2792	2642	2615	2713	2667	2646	2641	2727	2800	2822	.38
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	6497	7046	7348	7301	7690	7475	7707	7452	7756	8111	5173	- 1.11
MARINE FISH	46083	48928	48887	52858	51963	55134	53350	54858	54842	55193	25430	- 2.82
CRUST+ MOLLUS+ CEPHALOP	5043	5965	6129	6280	6679	7045	7594	7866	8142	8541	3729	- .03
AQUATIC MAMMALS	23	17	11	11	12	13	13	13	22	20		
AQUATIC ANIMALS	111	154	257	140	139	143	232	211	200	186	98	- 1.65
AQUATIC PLANTS	1392	2134	2177	2469	2331	2392	2936	3072	3093	3006	785	- 2.74
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	512411	565000	589834	566002	542523	597265	612579	628972	635142	611547	562081	.76
SAWLOGS NONCONIFEROUS	192938	222391	240587	229414	213855	232463	241246	251356	250415	255219	241964	1.30
PULPWOOD+PARTICLES	267425	303542	326171	358182	322668	323349	313847	329291	355807	370435	372547	1.67
FUELWOOD	1247625	1335774	1352081	1387844	1414784	1452000	1481927	1525872	1568865	1634403	1673555	2.59
SAWNWOOD CONIFEROUS	292815	332487	339049	321531	304792	329492	338897	341195	337646	323525	307520	- .25
SAWNWOOD NONCONIFEROUS	86595	97954	101854	100743	96880	103184	103085	105426	109123	113349	107729	1.38
WOOD-BASED PANELS	54533	87555	95322	88166	84614	95501	101679	104428	106081	101198	97515	1.84
PULP FOR PAPER	80701	103001	109310	112487	98093	110528	112044	116669	118654	121691	120673	1.82
PAPER+PAPERBOARD	106874	138895	148428	150854	132476	149087	153888	160743	173355	175145	174862	2.79
WESTERN EUROPE												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	131779	147969	150821	158844	146859	142300	153342	167814	164369	176838	165487	1.69
WHEAT	52170	56002	55535	62735	52959	57132	53568	63894	60271	69877	65098	2.00
RICE PADDY	1487	1411	1784	1729	1703	1533	1322	1650	1825	1702	1527	.25
BARLEY	37950	44117	45046	47514	45665	42575	51206	55362	52830	56793	50529	2.54
MAIZE	17886	25442	28940	26299	27412	24098	29598	28202	32385	31155	32119	2.42
MILLET AND SORGHUM	265	453	523	497	498	475	602	761	644	614	686	4.76
ROOT CROPS	69502	56449	56385	58565	47536	45123	55026	53123	51961	49146	48303	- 1.46
POTATOES	69342	56302	56245	58421	47397	44972	54875	52979	51816	48997	48160	- 1.47
TOTAL PULSES	2674	2038	1962	2058	1903	1573	1676	1763	1722	1735	1722	- 2.06
CITRUS FRUIT	4925	6480	6537	6666	6737	6799	6668	6211	6425	6565	6626	- .13
BANANAS	409	406	480	426	385	362	422	430	435	505	475	1.42
APPLES	12155	8959	11591	9908	11473	10200	7695	10559	10629	10650	7737	- 1.26
VEGETABLE OILS,OIL EQUIV	7760	8580	9337	8584	10300	8125	10256	10433	10035	11975	10723	2.95

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
SOYBEANS	9	9	26	59	47	58	78	85	102	65	119	23.45
GROUNDNUTS IN SHELL	20	16	18	16	19	17	19	20	21	19	19	1.95
SUNFLOWER SEED	299	666	842	692	858	774	1011	1150	1268	1125	1139	6.91
RAPESEED	937	1462	1456	1608	1334	1388	1329	1728	1688	2526	2566	6.18
COTTONSEED	318	379	333	365	335	303	341	330	272	294	346	- 1.86
SUGAR (CENTRIFUGAL,RAW)	10162	11606	12262	11181	12923	13809	15435	15592	15826	15731	19048	5.36
COTTON LINT	167	192	171	187	169	152	178	170	142	164	191	- .94
TOBACCO	369	333	350	329	401	446	391	409	446	403	418	2.76
TOTAL MEAT	19057	22171	22765	24682	24628	25116	25760	26653	27909	28771	28985	3.03
TOTAL MILK	117137	122551	124312	125486	126660	129261	132259	136242	139068	142465	143143	1.90
TOTAL EGGS	4154	4925	4826	4860	4988	5049	5142	5238	5286	5330	5428	1.31
WOOL GREASY	190	160	163	167	150	154	152	157	155	158	160	- .28
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	170	165	172	175	178	179	178	193	201	244	170	2.26
MARINE FISH	10339	10009	10157	10142	9775	10881	10924	10264	10028	9886	5565	- 3.21
CRUST+ MOLLUS+ CEPHALOP	709	961	1014	970	1034	960	967	974	919	1051	627	- 2.41
AQUATIC MAMMALS	7	7	6	5	7	7	8	8	17	17		
AQUATIC ANIMALS	4	2	5	5	2	4	3	5	2	1	1	-12.28
AQUATIC PLANTS	119	134	120	147	117	109	185	190	180	176		
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	74080	85502	96406	93756	74687	83972	87161	89561	96073	97713	90774	.81
SAWLOGS NONCONIFEROUS	22797	22507	24973	23841	20797	20736	21885	24084	23882	24392	24456	.66
PULPWOOD+PARTICLES	74315	77170	78597	88077	86604	79816	73403	75913	83932	83788	86010	.43
FUELWOOD	59658	42338	38605	37713	36264	36247	34687	33285	34739	36353	37819	- 1.29
SAWNWOOD CONIFEROUS	41923	49779	53441	51772	42943	47397	49022	48776	53617	54880	50702	.57
SAWNWOOD NONCONIFEROUS	10905	12499	13173	12323	10525	11656	12385	12568	12724	12437	11563	- .21
WOOD-BASED PANELS	13243	22404	25369	24365	22713	25170	25153	25578	26627	26845	25882	1.52
PULP FOR PAPER	19432	23914	25780	26442	22255	23201	22499	24268	26084	26098	26032	.61
PAPER+PAPERBOARD	28143	36686	40032	41271	33366	38628	39223	41479	45174	44736	44654	2.25
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	200049	235182	287585	263322	208374	293762	265986	312619	250767	264083	233934	.14
WHEAT	98063	111857	136681	111876	90542	126017	121253	151590	113476	127692	106366	.39
RICE PADDY	1075	1826	1961	2096	2231	2129	2384	2271	2586	2938	2595	4.47
BARLEY	32385	47886	66993	68374	49605	83290	67038	78108	62925	59219	54330	.61
MAIZE	22266	29089	29998	28228	27701	30859	30865	28977	32803	30592	29663	.73
MILLET AND SORGHUM	3382	2229	4573	3180	1330	3514	2231	2408	1744	2078	1700	- 5.67
ROOT CROPS	169233	149907	181029	153757	151141	152743	145245	154421	163134	111290	135260	- 2.41
POTATOES	169229	149904	181025	153754	151137	152741	145242	154419	163131	111288	135256	- 2.41
TOTAL PULSES	7954	7917	9202	9587	6153	9327	8227	8617	5048	7127	6421	- 3.57
CITRUS FRUIT	38	56	58	126	158	132	231	200	335	150	279	17.92
APPLES	6139	6934	8196	7348	8744	10436	10946	8967	11301	8565	9499	3.34
VEGETABLE OILS,OIL EQUIV	14255	13113	16067	15592	14283	14824	15543	15039	15072	15328	15067	.58
SOYBEANS	585	457	711	710	1111	834	862	1012	1042	1118	918	6.97
GROUNDNUTS IN SHELL	3	3	3	3	5	4	4	5	5	6	8	10.02
SUNFLOWER SEED	7903	6546	8768	7978	6328	6652	7385	6784	7196	6354	6566	- 1.46
RAPESEED	1030	834	966	983	1312	1531	1285	1306	574	1224	1108	.81
COTTONSEED	3693	4495	4714	5170	4843	5066	5364	5209	5617	6102	5905	3.05
SUGAR (CENTRIFUGAL,RAW)	13464	12746	13758	11817	12112	11597	13881	13641	12411	10974	10939	- 1.31
TEA	57	71	75	81	86	92	106	111	118	130	135	7.79
COTTON LINT	2067	2382	2496	2497	2667	2597	2708	2743	2515	2817	2763	1.43
JUTE AND SIMILAR FIBRES	53	56	45	39	36	49	47	44	48	52	45	-.37
TOBACCO	540	611	616	606	646	712	608	567	622	544	595	- .92
TOTAL MEAT	17694	21220	21517	23328	24150	22309	23869	25089	25444	25030	24835	1.89
TOTAL MILK	113017	119028	125523	129953	128577	127494	134455	135187	133979	131156	128039	.80
TOTAL EGGS	3099	4105	4341	4642	4823	4768	5172	5395	5484	5601	5776	3.77
WOOL GREASY	483	513	527	558	566	534	567	578	588	578	571	1.21
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	1164	1177	1200	1072	1338	1068	1088	1037	1143	1085	82	-14.10
MARINE FISH	5239	7597	8505	9393	9997	10333	9223	8725	8625	9044	323	-16.09
CRUST+ MOLLUS+ CEPHALOP	136	102	105	131	158	109	248	219	491	512	2	- 8.19
AQUATIC ANIMALS		5	5									
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	154636	167416	164877	163360	171306	166669	164533	158643	154849	155724	155368	- .95
SAWLOGS NONCONIFEROUS	33160	35650	35065	34896	36349	35247	35079	34599	33545	33594	33426	- .74
PULPWOOD+PARTICLES	37373	47240	59446	62358	58856	57328	57068	55415	54820	55870	55658	.13
FUELWOOD	113072	101333	98240	98601	95793	96373	94107	91309	90531	91647	92793	- 1.13

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
SAWNWOOD CONIFEROUS	110174	119356	117331	116371	117612	114640	110883	108564	102847	101476	100933	- 2.05
SAWNWOOD NONCONIFEROUS	19267	20772	20524	20382	20492	20031	19507	19234	18543	18106	17904	- 1.74
WOOD-BASED PANELS	7861	11274	12499	13731	14897	15565	16552	17125	17019	17476	16919	4.68
PULP FOR PAPER	7064	9048	9456	10192	10546	11094	11348	11654	11041	11105	11034	2.23
PAPER+PAPERBOARD	9115	11648	12288	12814	13495	14079	14428	14520	13989	14103	14041	2.04
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	238246	263644	274332	235557	286555	303124	308339	318215	338921	310954	384642	3.97
WHEAT	57168	56596	62720	61800	74967	82068	75533	69468	75265	83776	100828	4.90
RICE PADDY	4054	3875	4208	5098	5826	5246	4501	6040	5985	6629	8408	6.84
BARLEY	13644	20466	19312	15293	17765	18852	21112	20289	16794	19117	24138	1.46
MAIZE	125341	144262	146845	122040	152006	163522	169431	188646	206638	174221	215055	5.04
MILLET AND SORGHUM	19186	20355	23451	15817	19161	18055	19837	18575	20546	14712	22360	- .67
ROOT CROPS	16618	15869	16220	18652	17398	19179	19181	19733	18905	16746	18574	1.27
POTATOES	16002	15312	15665	18042	16810	18573	18638	19134	18296	16247	17993	1.32
TOTAL PULSES	975	1115	1015	1303	1146	1115	946	1293	1278	1647	1848	4.99
CITRUS FRUIT	10374	11031	12604	12167	13237	13415	13827	12932	12092	14954	13754	1.90
BANANAS	4	3	3	3	3	2	3	3	3	2	3	- 2.51
APPLES	2898	3059	3216	3391	3876	3345	3468	3898	4129	4557	3919	3.52
VEGETABLE OILS,OIL EQUIV	32654	44210	51539	41646	50733	42721	60074	63687	77924	59986	67687	5.64
SOYBEANS	26795	34956	42514	33383	42507	35293	48678	51375	62393	49485	55043	5.71
GROUNDNUTS IN SHELL	1124	1485	1576	1664	1745	1696	1690	1793	1800	1047	1809	- .37
SUNFLOWER SEED	120	411	394	280	571	487	1409	1937	3627	1914	2273	30.55
RAPESEED	561	1300	1207	1164	1840	838	1974	3498	3412	2484	1838	10.40
COTTONSEED	2912	4892	4550	4091	2919	3739	5009	3873	5242	4056	5803	1.90
SUGAR (CENTRIFUGAL,RAW)	4934	5898	5329	5048	6443	6170	5403	5482	5167	5437	5748	- .36
COFFEE GREEN	2	1	1	1	1	1	1	1	1	1	1	- 4.78
COTTON LINT	1621	2984	2825	2513	1807	2304	3133	2364	3185	2422	3406	1.47
TOBACCO	989	878	907	1019	1096	1051	973	1034	771	917	1051	.03
TOTAL MEAT	21766	23983	23000	24482	23870	25819	26015	25865	26152	27036	27434	1.79
TOTAL MILK	62123	62468	60052	60062	60095	62205	63376	62708	63828	66218	68186	1.17
TOTAL EGGS	4391	4404	4214	4191	4128	4115	4124	4289	4413	4459	4459	.54
WOOL GREASY	105	81	73	65	55	51	50	48	49	50	52	- 5.07
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	319	319	338	309	264	329	356	396	434	476	484	5.71
MARINE FISH	2270	2488	2485	2449	2491	2685	2579	3030	3102	3075	1037	- 2.78
CRUST+ MOLLUS+ CEPHALOP	1057	1022	1013	1057	1075	1130	1272	1347	1376	1350	193	- 6.36
AQUATIC MAMMALS	7	4										
AQUATIC ANIMALS	8	2	4	6	6	9	9	11	10	2		
AQUATIC PLANTS	47	182	180	224	198	189	195	196	195	191	28	- 9.88
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	214821	239166	255365	237683	222108	267372	278553	299879	298266	263149	223000	1.01
SAWLOGS NONCONIFEROUS	39664	41002	41472	37932	32125	34953	36846	40908	42727	42586	40345	.86
PULPWOOD+PARTICLES	126181	142366	149291	165000	132931	139779	135003	144889	157282	165353	165353	1.25
FUELWOOD	29202	18693	19551	20419	21790	22842	34520	49985	69950	93881	104445	24.03
SAWNWOOD CONIFEROUS	89130	104867	109561	96191	87609	106334	113629	116369	113841	100326	91596	- .04
SAWNWOOD NONCONIFEROUS	18859	17346	17896	17626	14831	16373	16614	17282	18432	18650	17483	.64
WOOD-BASED PANELS	23679	34656	36275	31038	26739	33860	37274	37288	36649	31026	29815	- .45
PULP FOR PAPER	44493	55448	58004	59139	49977	59449	60716	63280	63106	64451	64451	1.92
PAPER+PAPERBOARD	50821	62859	64974	64617	54963	62913	64946	66682	72393	72847	72847	2.02
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	10385	11672	17795	16974	18419	18374	15312	26084	24140	17163	24582	5.65
WHEAT	7894	6979	12363	11572	12162	12213	9724	18415	16483	11162	16740	6.21
RICE PADDY	214	248	309	409	388	417	530	490	692	613	728	11.56
BARLEY	969	2062	2655	2755	3442	3132	2655	4265	3967	2940	3834	5.35
MAIZE	208	330	257	194	291	316	355	305	348	307	360	3.21
MILLET AND SORGHUM	340	1254	1044	1096	923	1151	975	747	1162	936	1231	- .87
ROOT CROPS	883	1074	1003	888	1007	984	1037	1099	1070	1196	1131	1.80
POTATOES	876	1064	991	876	997	975	1028	1081	1059	1177	1115	1.75
TOTAL PULSES	53	129	93	127	157	189	106	120	175	218	249	7.62
CITRUS FRUIT	274	435	401	434	458	428	461	495	510	564	504	2.97
BANANAS	131	124	125	118	103	115	98	113	125	124	125	.26
APPLES	475	510	574	487	527	447	447	444	525	510	529	- .39
VEGETABLE OILS,OIL EQUIV	109	355	278	308	332	246	289	455	530	442	474	6.04
SOYBEANS	1	34	38	64	74	45	55	77	99	82	73	9.45
GROUNDNUTS IN SHELL	42	46	38	29	32	35	32	39	62	39	43	2.32

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
SUNFLOWER SEED	2	148	102	84	113	80	75	158	186	142	139	4.11
RAPESEED		25	11	9	12	9	16	24	41	18	18	6.61
COTTONSEED	30	73	53	50	54	41	46	72	87	136	161	11.22
SUGAR (CENTRIFUGAL,RAW)	2372	2835	2526	2848	2855	3296	3318	2902	2963	3329	3434	2.40
COTTON LINT	17	44	31	31	33	25	28	44	53	83	99	11.50
TOBACCO	17	19	20	20	18	18	19	19	18	19	17	- 1.18
TOTAL MEAT	2584	3563	3638	3185	3519	4030	4089	4298	4096	3797	3823	1.71
TOTAL MILK	14033	13853	12973	12561	12819	13025	12476	11348	12232	12332	11904	- 1.36
TOTAL EGGS	218	267	265	259	268	263	264	274	267	274	289	.72
WOOL GREASY	1121	1202	1044	986	1088	1066	1005	988	1026	1066	1081	- .58
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	1	4	4	4	5	4	5	5	5	2	2	- 4.05
MARINE FISH	80	93	116	122	97	110	131	146	152	156	62	.58
CRUST+ MOLLUS+ CEPHALOP	70	79	70	77	70	72	74	72	83	75	65	- .45
AQUATIC PLANTS		6	6	4		1						
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	6413	7912	8339	6537	6356	7595	7178	6913	7021	8443	8598	.84
SAWLOGS NONCONIFEROUS	7553	6984	6902	7240	6490	6631	6518	6336	5846	5881	5986	- 2.20
PULPWOOD+PARTICLES	2727	3640	5374	5006	7613	7191	8596	8335	8330	9890	10266	10.58
FUELWOOD	3050	2765	2447	2894	1912	1295	1292	1277	1077	1077	1227	-10.99
SAWNWOOD CONIFEROUS	2307	2515	2836	2882	2821	3067	2917	2559	2743	3101	3371	1.63
SAWNWOOD NONCONIFEROUS	2505	2497	2482	2533	2505	2430	2340	2063	1986	4096	2144	.18
WOOD-BASED PANELS	574	748	933	988	920	1054	1043	1059	1073	1166	1215	4.18
PULP FOR PAPER	842	1127	1326	1505	1524	1660	1712	1695	1693	1819	1909	4.90
PAPER+PAPERBOARD	1208	1546	1686	1732	1697	1761	1890	1867	1942	2104	2151	3.36
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	40226	45293	39408	45930	44607	47987	43244	46678	44387	46242	46647	.76
WHEAT	4265	5877	4672	4944	4705	5696	3817	4735	4556	5255	4341	- 1.62
RICE PADDY	4410	4803	4977	5383	5561	5504	5495	5459	5752	6037	6189	2.40
BARLEY	2636	4133	2634	3611	2862	4646	2468	3660	3450	4182	2929	.01
MAIZE	12191	13916	12013	14298	14492	14584	14097	14447	12850	12943	14757	.29
MILLET AND SORGHUM	15279	15058	13512	16138	15732	16050	16015	16959	16296	16241	16827	1.56
ROOT CROPS	60797	68204	70374	73179	75019	75912	75712	77199	78217	80298	82012	1.83
POTATOES	1571	2065	2181	2314	2567	2577	2544	2890	3048	3162	3173	5.09
CASSAVA	36166	39228	39954	41310	42734	43466	43766	44382	44851	45840	47253	1.94
TOTAL PULSES	3675	4316	4102	4503	4779	5050	4396	4638	4579	4564	4497	.59
CITRUS FRUIT	1989	2416	2599	2616	2402	2384	2475	2687	2493	2581	2647	.55
BANANAS	3055	3334	3502	3801	3717	3942	3894	3941	3973	4067	4122	2.04
APPLES	41	43	47	49	56	53	58	57	61	68	68	4.88
VEGETABLE OILS,OIL EQUIV	10449	10555	10429	10864	11618	11182	10176	10336	10330	10666	11066	- .07
SOYBEANS	65	81	83	85	95	112	135	136	166	182	208	11.95
GROUNDNUTS IN SHELL	4861	4095	3589	3971	4295	4479	3388	3830	3572	3328	3982	- 1.16
SUNFLOWER SEED	31	79	78	84	100	122	148	156	149	148	145	9.08
RAPESEED	20	21	21	21	21	22	22	22	21	22	22	.40
COTTONSEED	847	1050	1019	989	871	930	960	918	878	905	853	- 1.86
COPRA	143	143	152	149	144	163	155	158	161	172	177	2.09
PALM KERNELS	620	691	637	744	730	706	703	599	707	731	735	.41
SUGAR (CENTRIFUGAL,RAW)	2241	2883	2928	2934	2742	3122	3066	3390	3541	3613	3835	3.45
COFFEE GREEN	1085	1296	1384	1252	1312	1186	1236	1072	1175	1156	1254	- 1.47
COCOA BEANS	981	1035	963	1021	998	854	917	890	1016	986	1015	- .18
TEA	84	149	155	152	151	159	194	201	203	188	191	3.74
COTTON LINT	433	542	536	525	470	503	514	495	474	500	470	- 1.27
JUTE AND SIMILAR FIBRES	16	12	12	11	11	8	7	8	8	8	8	- 5.32
SISAL	392	332	330	350	256	218	204	175	168	184	176	- 8.50
TOBACCO	175	185	193	195	221	250	229	224	260	282	219	3.45
NATURAL RUBBER	166	221	229	241	221	202	203	203	205	198	197	- 1.88
TOTAL MEAT	3336	3662	3663	3660	3781	3924	4075	4232	4352	4479	4615	2.91
TOTAL MILK	6344	6768	6637	6649	7028	7292	7523	7832	7884	7909	8144	2.52
TOTAL EGGS	358	407	419	438	465	501	532	555	590	624	655	5.70
WOOL GREASY	57	60	66	63	63	67	58	60	62	64	65	.16
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	878	1221	1260	1255	1293	1322	1400	1352	1366	1421	519	- 3.71
MARINE FISH	1228	2023	2012	1884	1623	1593	1658	1715	1609	1644	608	- 7.48
CRUST+ MOLLUS+ CEPHALOP	23	43	44	57	56	63	57	71	62	81	17	- 2.00
AQUATIC ANIMALS	1	1	1	1	1	1	1	1	1	1	1	- 4.67
AQUATIC PLANTS	4	6	7	5	6	51	5	5	5	5		

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICUL...

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	737	1014	1042	1051	1046	1085	1240	1169	913	1252	1271	1.88
SAWLOGS NONCONIFEROUS	11672	14982	16703	14409	13707	15513	16474	17240	17974	19322	19461	3.22
PULPWOOD+PARTICLES	785	1428	1375	1498	2137	2213	2255	2402	1934	1900	1909	4.03
FUELWOOD	220865	251744	259501	266597	273916	281728	290509	298964	307380	316829	326147	2.91
SAWNWOOD CONIFEROUS	338	411	405	431	456	517	542	482	508	537	568	3.66
SAWNWOOD NONCONIFEROUS	2127	2586	3048	3391	3537	3465	3677	4437	4627	5408	5395	8.15
WOOD-BASED PANELS	368	695	776	796	648	740	822	845	861	910	894	2.87
PULP FOR PAPER	150	211	244	251	262	292	281	297	322	611	652	11.64
PAPER+PAPERBOARD	128	184	186	196	217	219	258	273	333	339	344	8.43
LATIN AMERICA												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	64186	67892	74854	78388	80593	86263	86143	85360	84299	89161	103777	3.44
WHEAT	11804	12433	12094	13474	14971	19336	11541	14969	15084	14840	14779	1.86
RICE PADDY	10408	10917	11792	12241	14059	15426	15108	13426	14415	16444	15491	3.79
BARLEY	1358	1778	1665	1249	1556	1883	1376	1716	1330	1395	1263	- 2.41
MAIZE	35127	35121	37842	39561	38298	37386	43738	40360	40277	45475	55213	3.55
MILLET AND SORGHUM	4100	6035	9891	10780	10510	10984	13242	13582	11974	9919	16006	6.43
ROOT CROPS	44845	48751	45060	44973	45598	45053	45920	46434	45482	43648	46590	- .30
POTATOES	8263	8385	8583	9969	9260	9741	10140	10935	11013	10256	11669	3.24
CASSAVA	31888	35528	32034	30928	32106	31325	31985	31641	30970	29964	31369	- .97
TOTAL PULSES	4785	4886	4547	4653	4712	3913	4600	4722	4592	4501	5526	.69
CITRUS FRUIT	7368	9227	10422	11117	11883	12796	13419	13859	14366	16882	17559	6.87
BANANAS	13840	17623	17254	17402	17030	17701	18454	18249	17890	18737	19016	1.00
APPLES	908	978	680	1297	1090	1207	1328	1439	1630	1686	1744	8.61
VEGETABLE OILS,OIL EQUIV	10469	13497	15716	18970	20295	21507	25289	23662	26488	30549	29931	8.93
SOYBEANS	969	3886	6100	9180	11410	12643	14960	12927	15476	20000	20320	17.32
GROUNDNUTS IN SHELL	1293	1445	1244	979	1049	1058	1159	1014	1387	1052	888	- 2.29
SUNFLOWER SEED	1229	923	970	1033	804	1192	955	1717	1550	1777	1378	7.50
RAPESEED	67	85	46	41	68	111	91	61	75	93	59	2.51
COTTONSEED	2774	2927	3246	3428	2771	2356	3375	3220	3116	2910	2804	- .50
COPRA	264	236	232	220	224	229	239	242	212	243	236	- .26
PALM KERNELS	242	280	277	291	279	303	321	314	349	348	356	3.14
SUGAR (CENTRIFUGAL,RAW)	20047	21032	23281	24518	23817	25966	27282	26934	26668	26435	26622	2.36
COFFEE GREEN	2909	2909	2446	3136	2858	1918	2680	3103	3271	2946	4020	3.08
COCOA BEANS	373	431	397	476	497	434	459	519	569	555	544	3.41
TEA	23	41	40	44	51	44	52	39	44	51	39	- .36
COTTON LINT	1585	1661	1839	1954	1565	1339	1893	1809	1740	1598	1566	- .79
JUTE AND SIMILAR FIBRES	70	81	113	90	108	127	114	100	108	107	123	2.42
SISAL	220	328	293	323	340	187	241	218	251	254	263	- 3.18
TOBACCO	519	573	567	670	677	727	740	768	796	724	663	2.62
NATURAL RUBBER	27	32	28	24	25	26	30	31	33	36	38	3.50
TOTAL MEAT	9413	10661	10881	11189	11736	12542	13169	13700	13905	14236	14749	3.96
TOTAL MILK	23170	27039	27203	28856	31061	32874	32163	33178	34191	33789	34105	2.85
TOTAL EGGS	1178	1529	1627	1696	1805	1877	1953	2129	2304	2549	2671	6.40
WOOL GREASY	358	309	303	300	300	298	315	301	317	323	326	.77
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	235	199	200	257	272	247	267	297	264	311	239	3.20
MARINE FISH	12053	6843	4559	6806	5940	7528	6074	7993	9049	8691	5387	2.74
CRUST+ MOLLUS+ CEPHALOP	352	457	438	421	427	488	475	580	633	552	299	.42
AQUATIC MAMMALS	7											
AQUATIC ANIMALS	24	60	49	38	51	25	61	52	54	50	20	- 4.20
AQUATIC PLANTS	93	79	81	90	80	92	112	90	128	124	57	1.50
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	12991	16815	16359	16315	19171	21673	23837	22865	25661	31745	30343	8.09
SAWLOGS NONCONIFEROUS	15499	18706	19604	19933	21948	23044	23700	23913	26142	29061	28579	5.10
PULPWOOD+PARTICLES	6223	9056	9080	9866	11556	12913	13667	19804	26631	29264	29115	16.60
FUELWOOD	182345	206814	212354	217000	221721	228279	234433	241014	249046	254566	260207	2.64
SAWNWOOD CONIFEROUS	6229	7692	7063	7430	9059	9748	10541	11289	12149	11443	10989	6.11
SAWNWOOD NONCONIFEROUS	7271	8110	8477	8807	9747	10854	11725	11770	12340	13832	13832	6.61
WOOD-BASED PANELS	1199	2400	2536	2629	2795	3132	3377	3521	3723	4316	4403	7.34
PULP FOR PAPER	1336	1977	2185	2423	2299	2701	3068	3520	3695	5017	4999	11.31
PAPER+PAPERBOARD	2897	4246	4700	5231	4818	5276	5654	6243	6934	7300	7326	6.41

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	42047	46926	40690	44852	51879	56212	51513	53985	55172	56006	58225	3.23
WHEAT	20118	25956	21221	24341	28405	31335	29200	30513	30995	31128	32437	3.73
RICE PADDY	4189	4583	4447	4304	4602	4741	4564	4557	5033	4559	4800	.79
BARLEY	7223	7275	5197	6271	7859	8952	7415	7932	7965	9312	9937	4.92
MAIZE	4069	4265	4536	4842	5026	5441	5097	5563	5400	5632	5073	2.37
MILLET AND SORGHUM	4726	3403	3950	3920	4588	4360	3947	4209	4580	4303	4943	2.69
ROOT CROPS	3458	4372	4634	4628	4855	5683	5821	5646	6211	6665	6597	5.09
POTATOES	3015	3956	4250	4252	4426	5276	5428	5238	5734	6207	6132	5.37
CASSAVA	160	134	140	92	130	99	95	103	127	122	122	- .57
TOTAL PULSES	1554	1804	1493	1718	1604	1852	1872	1707	1663	1827	1865	1.06
CITRUS FRUIT	2077	2750	2884	3123	3104	3157	3328	3448	3742	3670	3669	3.42
BANANAS	221	275	276	296	296	290	314	292	290	321	328	1.56
APPLES	960	1286	1245	1335	1393	1626	1585	1850	2162	2227	2050	7.22
VEGETABLE OILS,OIL EQUIV	4339	6262	5181	6413	5458	6081	5655	6287	5467	6721	5360	- .01
SOYBEANS	8	24	30	47	82	123	119	199	195	145	258	29.10
GROUNDNUTS IN SHELL	415	684	656	1039	905	878	1151	911	1004	924	928	3.24
SUNFLOWER SEED	235	613	616	487	541	612	506	524	628	786	618	1.69
RAPESEED	8	1	1	1		6	14	13	43	12	15	
COTTONSEED	2229	2941	2780	3037	2523	2339	2627	2446	2320	2277	2210	- 3.16
SUGAR (CENTRIFUGAL,RAW)	1729	2193	2221	2323	2455	2846	2667	2592	2546	2193	2922	1.86
COFFEE GREEN	5	5	5	5	4	4	4	5	5	5	5	- .62
TEA	38	69	66	67	77	82	98	113	130	115	62	4.74
COTTON LINT	1299	1699	1608	1763	1453	1363	1521	1446	1376	1353	1327	- 2.74
JUTE AND SIMILAR FIBRES	7	15	15	12	14	14	13	13	13	13	13	- 1.24
TOBACCO	246	242	215	240	245	379	300	345	273	300	211	1.52
TOTAL MEAT	2088	2471	2584	2712	2820	2950	3113	3223	3451	3555	3736	4.72
TOTAL MILK	10857	11598	12008	12448	12885	13316	13421	14166	14627	14962	15531	3.24
TOTAL EGGS	286	383	401	469	543	595	679	721	674	703	764	8.16
WOOL GREASY	144	143	148	158	163	165	166	169	174	179	179	2.39
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	127	130	130	128	135	134	133	139	159	168	100	.37
MARINE FISH	405	443	410	674	634	606	487	491	629	695	107	- 6.14
CRUST+ MOLLUS+ CEPHALOP	30	29	35	27	26	42	38	25	31	34	10	- 5.40
AQUATIC MAMMALS		3	3	2	2	2	2	2	2	2		
AQUATIC PLANTS	1											
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	2858	3624	4259	4569	4770	4796	5265	5216	4718	4965	5218	3.00
SAWLOGS NONCONIFEROUS	1047	1775	1626	1805	1287	1314	1442	1859	1523	1315	1366	- 2.10
PULPWOOD+PARTICLES	207	960	1133	1363	869	907	1004	1003	1043	672	714	- 4.23
FUELWOOD	52386	60395	55094	62587	64730	70501	61145	62003	50483	57429	56531	- 1.00
SAWNWOOD CONIFEROUS	1781	2163	2297	2281	2278	2916	2932	2959	2968	2982	2963	4.19
SAWNWOOD NONCONIFEROUS	557	711	750	733	693	646	816	824	822	1126	1116	5.12
WOOD-BASED PANELS	223	391	409	430	512	615	761	798	844	845	740	10.01
PULP FOR PAPER	77	234	311	268	247	228	252	166	276	272	277	- .22
PAPER+PAPERBOARD	258	515	595	606	671	582	623	554	732	592	655	1.58
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	175958	199877	224940	211254	238597	233608	251790	266829	250347	273505	291171	3.71
WHEAT	16213	33840	32734	29942	32405	38298	38914	41023	46470	44085	49491	5.24
RICE PADDY	122538	132623	150725	143459	162660	152730	171296	181096	162277	186718	194795	3.71
BARLEY	4036	4334	3979	3947	5021	5219	3373	3864	3871	2694	3315	- 3.84
MAIZE	13114	13691	15465	15175	17374	16163	15445	17667	16994	19085	20468	3.49
MILLET AND SORGHUM	19988	15320	21779	18482	21055	21131	22689	23114	20673	20861	23037	2.63
ROOT CROPS	31645	38137	41149	43733	46814	49965	51888	58524	55123	55238	60544	5.02
POTATOES	5317	6837	6533	6927	8667	9750	9443	10272	12444	10835	12265	7.68
CASSAVA	17769	21497	24734	27411	28811	31281	33942	39819	34207	36605	40517	6.64
TOTAL PULSES	10533	12732	12725	11485	12443	14628	13780	13909	13637	10856	13046	.15
CITRUS FRUIT	2204	2207	2331	2446	2604	2674	3526	3019	3026	3124	3212	4.47
BANANAS	7236	8262	8707	9001	9445	10616	11292	12271	13200	13699	13469	6.46
APPLES	339	676	763	805	827	889	987	1068	1206	1230	1447	8.25
VEGETABLE OILS,OIL EQUIV	34843	40788	40889	39666	46419	47824	47718	49034	47601	47636	52070	2.67
SOYBEANS	685	843	931	1107	1158	1077	1119	1317	1417	1450	1612	6.64
GROUNDNUTS IN SHELL	6801	5240	7127	6409	8126	6574	7480	7698	7148	6460	7855	2.12
SUNFLOWER SEED	1	1	1	1	1	1	3	13	47	76	97	73.70
RAPESEED	1553	1869	2221	2131	2651	2351	1996	2042	2273	1822	2643	.67

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
COTTONSEED	3445	3813	3780	3933	3405	3072	3711	3739	4229	4224	4415	1.79
COPRA	2783	3863	3203	2788	3849	4566	4000	4121	3690	3897	4108	2.08
PALM KERNELS	87	212	234	293	341	365	431	472	595	686	730	15.21
SUGAR (CENTRIFUGAL,RAW)	5365	7199	8596	9585	10535	11178	12507	13442	12826	9664	12199	4.88
COFFEE GREEN	311	321	314	312	385	387	438	566	551	643	631	9.67
COCOA BEANS	9	12	16	20	22	25	30	34	40	49	57	17.57
TEA	709	767	790	807	813	827	891	896	894	912	925	2.18
COTTON LINT	1722	1908	1891	1966	1704	1539	1856	1870	2115	2113	2208	1.78
JUTE AND SIMILAR FIBRES	3145	2890	3137	2283	2262	2409	2660	3234	3077	2710	2679	-.58
SISAL	8											
TOBACCO	847	922	873	961	886	849	1000	1059	973	938	944	-.90
NATURAL RUBBER	2137	2705	3115	3092	3211	3443	3253	3317	3470	3446	3258	1.83
TOTAL MEAT	3156	3673	3769	3864	4015	4167	4312	4584	4894	5173	5304	4.42
TOTAL MILK	29476	32822	33427	35021	36565	38350	39801	40824	42101	43332	44643	3.62
TOTAL EGGS	713	1067	1145	1275	1371	1436	1563	1717	1819	1926	2009	7.46
WOOL GREASY	61	60	60	62	65	69	73	75	79	83	88	4.69
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	2179	2376	2422	2474	2493	2506	2569	2378	2419	2536	2173	- .43
MARINE FISH	4000	5640	6203	6761	6910	6931	7709	7814	7554	7503	5402	1.20
CRUST+ MOLLUS+ CEPHALOP	689	1133	1241	1219	1437	1681	1810	1815	1929	2043	1499	5.66
AQUATIC MAMMALS	1											
AQUATIC ANIMALS	8	26	89	28	25	50	106	87	74	76	26	5.18
AQUATIC PLANTS	89	144	238	351	260	297	347	354	372	258		
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1952	2707	2096	2771	3116	3091	4035	2975	3960	4191	4172	6.67
SAWLOGS NONCONIFEROUS	44658	63461	76599	71210	63440	76064	80003	82468	78084	78641	68591	1.33
PULPWOOD+PARTICLES	602	1847	2623	3058	2810	2851	3033	3027	2957	2988	2882	3.10
FUELWOOD	392028	443285	455035	466536	478685	490465	502476	514720	527582	539863	549959	2.45
SAWNWOOD CONIFEROUS	1263	1638	1547	1972	1857	1953	2810	3006	3454	3148	3704	10.80
SAWNWOOD NONCONIFEROUS	11462	15641	16404	16817	17990	20634	22073	22791	22330	23793	22453	5.00
WOOD-BASED PANELS	1747	3554	4027	3372	3864	4424	5340	6002	6130	5751	6205	7.35
PULP FOR PAPER	160	291	470	503	457	543	588	650	720	691	730	8.78
PAPER+PAPERBOARD	1107	1912	2023	2116	2081	2215	2760	3700	4399	4574	4716	12.50
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	198163	224864	246882	256796	266970	272388	264803	293420	313624	301100	309919	3.41
WHEAT	29038	36436	35861	41421	45999	51006	41704	54471	63343	54745	59166	6.09
RICE PADDY	110592	132227	139964	142276	144566	147385	149330	156172	163368	159817	164922	2.36
BARLEY	3342	3078	3319	3385	3395	3404	3391	3799	4035	3712	3830	2.43
MAIZE	32617	33182	46582	48272	52127	50501	51803	58472	62644	63823	62939	6.02
MILLET AND SORGHUM	18512	15580	16544	16558	15572	14820	14434	15198	14414	13820	14038	- 1.80
ROOT CROPS	134382	134814	142920	145170	144801	143867	160197	172274	155888	153402	139145	1.08
POTATOES	13455	13717	14264	14829	15481	14890	16343	17657	17792	17487	14430	2.01
CASSAVA	2504	3273	3451	3503	3626	4398	5250	6178	6313	6625	6801	10.09
TOTAL PULSES	7342	6358	6668	6572	6574	6757	6436	6905	7131	7066	7283	1.30
CITRUS FRUIT	883	1073	1140	1180	1157	1196	1191	1222	1256	1272	1310	1.86
BANANAS	1254	974	1063	999	837	923	1019	1010	1128	1252	1232	2.79
APPLES	1892	2303	2159	2494	2579	2771	2911	3148	3331	3480	3600	5.90
VEGETABLE OILS,OIL EQUIV	17938	16443	18104	17981	18046	16546	17144	19136	20382	22859	27195	4.33
SOYBEANS	8131	7353	7620	7771	7771	7029	7636	7938	7835	8281	9677	1.98
GROUNDNUTS IN SHELL	2036	2136	2172	2196	2224	2070	2154	2576	3000	3798	4002	7.28
SUNFLOWER SEED	70	65	70	70	80	100	170	279	340	900	1000	39.26
RAPESEED	1125	1152	1262	1201	1394	1345	1183	1871	2404	2386	4068	12.91
COTTONSEED	4721	3927	5135	4933	4772	4120	4112	4347	4425	5426	6012	2.08
COPRA	29	30	32	31	30	32	40	43	44	45	45	5.66
PALM KERNELS	18	37	38	39	39	41	40	42	46	48	46	2.84
SUGAR (CENTRIFUGAL,RAW)	2231	2535	2767	2777	2678	2781	3150	3300	3689	3745	4151	5.43
COFFEE GREEN	11	9	12	12	13	18	21	14	14	16	19	6.07
TEA	148	197	221	237	259	277	295	313	325	350	391	7.28
COTTON LINT	2360	1963	2567	2466	2386	2060	2055	2173	2213	2713	2975	2.02
JUTE AND SIMILAR FIBRES	313	433	523	594	690	766	893	1122	1118	1133	1299	12.94
SISAL	10	8	8	10	9	9	8	9	8	8	8	- 1.04
TOBACCO	930	918	1027	1064	1039	1060	1077	1338	1026	995	1350	2.36
NATURAL RUBBER	100	68	77	95	99	120	142	159	151	157	187	11.49
TOTAL MEAT	13265	16555	17274	18172	18871	19937	20782	21127	22547	23801	24545	4.49
TOTAL MILK	4641	5359	5639	5900	6154	6441	6759	7040	7712	7939	8145	4.94
TOTAL EGGS	3388	3633	3687	3788	3906	4038	4156	4393	4713	4923	5235	4.20
WOOL GREASY	125	144	148	151	154	155	156	157	174	196	200	3.49

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	1155	1205	1343	1349	1392	1398	1424	1370	1446	1555	1390	1.60
MARINE FISH	3112	4353	4280	4592	4749	4855	4952	4922	4713	4812	3694	- .24
CRUST+ MOLLUS+ CEPHALOP	535	711	872	937	1007	1082	1207	1280	1162	1211	975	4.37
AQUATIC MAMMALS			1	1	1	2	2	2	2			
AQUATIC ANIMALS		17	59	22	17	16	13	14	14	14	15	- 8.45
AQUATIC PLANTS	502	978	833	899	997	943	1397	1572	1555	1543		
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	14269	16133	16725	18340	19145	19993	20768	21717	22706	23744	23744	4.60
SAWLOGS NONCONIFEROUS	9197	10160	10531	11702	12088	12999	13546	14108	14708	15308	15308	4.94
PULPWOOD+PARTICLES	1920	2810	2930	4000	4291	4476	4671	4876	5089	5313	5313	7.24
FUELWOOD	176628	195262	198541	202753	207186	211490	215913	220451	225089	229645	231142	2.00
SAWNWOOD CONIFEROUS	8637	10354	10604	11074	11166	11697	12256	12814	13400	14016	11089	2.44
SAWNWOOD NONCONIFEROUS	5588	6571	6753	6734	6739	7039	7354	7685	8032	8396	8396	3.11
WOOD-BASED PANELS	656	1572	1579	1328	1340	1510	1531	1096	1922	2095	1875	4.00
PULP FOR PAPER	988	1348	1403	1649	1691	1795	1926	2047	2199	2364	2364	6.76
PAPER+PAPERBOARD	3616	4817	5027	5619	6638	7010	7308	7792	8359	8976	8976	7.65

1/ NOMINAL CATCH (LIVE WEIGHT) EXCLUDING WHALES
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 2. INDICES OF FOOD PRODUCTION

	TOTAL						PER CAPUT					
	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981
	1969-71=100					PERCENT	1969-71=100					PERCENT
FOOD PRODUCTION												
WORLD	119	124	125	125	129	2.75	104	107	106	104	105	1.02
DEVELOPED COUNTRIES	116	120	120	119	121	1.78	109	112	111	109	110	1.04
WESTERN EUROPE	111	115	118	123	121	- 1.51	107	111	113	117	115	- 1.88
EUROPEAN ECON COMMUNITY	109	113	117	121	121	- .64	106	110	113	117	116	- .92
BELGIUM-LUXEMBOURG	105	106	109	110	115	5.09	103	104	107	107	113	5.02
DENMARK	110	109	115	116	117	1.55	107	105	110	111	113	1.57
FRANCE	106	114	121	125	124	- .82	102	109	115	118	117	- 1.28
GERMANY FED.REP. OF	106	110	110	113	111	- 2.14	105	110	109	112	109	- 2.30
GREECE	121	132	127	137	140	2.19	115	124	118	125	127	1.48
IRELAND	134	136	129	140	118	- 15.71	124	124	117	125	104	- 16.65
ITALY	107	110	115	122	120	- 1.09	102	104	109	114	113	- 1.36
NETHERLANDS	116	118	121	122	132	7.90	109	110	113	113	121	7.12
UNITED KINGDOM	114	116	119	126	124	- 1.81	113	115	119	125	122	- 1.87
OTHER WESTERN EUROPE	117	122	124	127	121	- 4.31	111	114	115	117	111	- 4.92
AUSTRIA	108	110	111	119	113	- 5.07	107	109	109	117	111	- 5.08
FINLAND	99	102	107	110	104	- 4.85	97	99	104	106	100	- 5.24
ICELAND	109	124	117	121	126	3.35	100	112	105	107	110	2.47
MALTA	127	144	117	120	120	.42	124	139	112	113	113	- .44
NORWAY	117	124	119	122	129	6.50	113	119	114	115	122	6.14
PORTUGAL	80	80	93	86	71	- 16.78	72	72	83	76	63	- 17.38
SPAIN	127	140	138	144	133	- 7.78	118	129	126	130	119	- 8.61
SWEDEN	118	120	118	120	124	3.20	115	117	114	116	120	3.10
SWITZERLAND	112	114	120	123	119	- 2.65	111	113	119	121	117	- 2.87
YUGOSLAVIA	127	120	127	128	129	.78	119	112	117	117	117	- .01
USSR AND EASTERN EUROPE	116	124	118	115	113	- 1.36	109	116	110	106	104	- 2.10
EASTERN EUROPE	120	125	124	122	121	- .65	115	119	117	115	113	- 1.22
ALBANIA	131	129	134	133	136	2.50	111	106	108	104	105	.20
BULGARIA	110	115	123	118	121	3.21	106	110	118	113	116	2.89
CZECHOSLOVAKIA	125	130	115	127	121	- 4.73	120	123	109	119	113	- 4.93
GERMAN DEMOCRATIC REP.	117	121	125	125	131	4.61	120	124	127	127	133	4.62
HUNGARY	129	132	130	141	139	- 1.48	126	128	126	136	134	- 1.49
POLAND	108	116	114	102	99	- 3.09	102	108	105	93	90	- 3.96
ROMANIA	155	157	164	158	158	.01	145	146	150	144	143	- .83
USSR	113	124	115	111	109	- 1.79	106	115	106	101	99	- 2.60
NORTH AMERICA DEVELOPED	122	121	126	123	134	8.84	114	112	115	111	120	7.80
CANADA	122	125	116	123	132	7.31	112	114	104	109	115	6.09
UNITED STATES	122	121	127	123	134	8.96	114	112	116	111	120	7.96
OCEANIA DEVELOPED	125	141	138	123	132	7.15	112	125	121	107	114	5.96
AUSTRALIA	127	152	147	124	135	8.85	114	135	128	108	116	7.59
NEW ZEALAND	118	112	115	119	122	2.53	107	102	104	108	110	1.71
DEVELOPING COUNTRIES	123	129	131	134	139	3.92	105	108	108	108	110	1.82
AFRICA DEVELOPING	109	113	115	119	122	2.01	89	90	89	90	89	- 1.05
NORTH WESTERN AFRICA	99	113	114	125	113	- 9.44	82	90	88	93	82	- 12.32
ALGERIA	90	97	103	119	116	- 2.46	73	76	77	86	81	- 5.80
MOROCCO	91	114	115	116	95	- 17.88	75	91	89	86	69	- 20.52
TUNISIA	142	140	134	164	161	- 1.73	124	119	111	133	127	- 4.13
WESTERN AFRICA	108	113	117	123	127	3.32	88	89	89	91	91	.12
BENIN	116	125	130	129	126	- 2.19	95	100	100	97	92	- 5.16
GAMBIA	86	105	85	83	103	23.80	69	82	65	62	75	20.60
GHANA	91	92	99	100	100	.81	74	72	76	74	72	- 2.39
GUINEA	111	110	108	112	113	1.48	94	91	87	87	86	- 1.16
IVORY COAST	136	144	154	166	178	7.30	100	103	106	110	115	3.90
LIBERIA	129	130	133	135	133	- 1.46	102	99	98	95	91	- 4.90
MALI	105	116	114	108	120	11.80	88	95	91	83	90	8.71
MAURITANIA	88	92	99	99	107	8.96	73	74	78	75	79	5.92
NIGER	111	118	123	127	122	- 3.70	91	94	95	95	89	- 6.53
NIGERIA	110	114	119	126	130	2.62	89	89	90	92	92	- .74
SENEGAL	83	130	95	85	123	44.92	67	103	74	64	90	41.19
SIERRA LEONE	109	103	105	109	101	- 7.73	92	84	83	84	76	- 10.25
TOGO	100	114	116	119	119	- .34	83	93	92	91	88	- 3.30
UPPER VOLTA	104	116	119	114	127	11.02	88	96	96	89	97	8.09
CENTRAL AFRICA	113	110	112	115	117	2.41	96	91	90	90	90	- .26
ANGOLA	100	101	101	102	102	- .31	85	84	82	81	79	- 2.83
CAMEROON	129	118	121	128	130	1.96	111	100	99	103	102	- .49
CENTRAL AFRICAN REP	117	118	122	126	129	2.54	101	100	101	102	102	.17
CHAD	103	111	116	117	119	1.69	89	95	97	96	95	- .40
CONGO	107	104	103	104	107	2.75	90	85	83	81	81	.09
GABON	96	100	103	103	104	.64	90	94	95	94	94	- .63
ZAIRE	113	109	111	113	116	3.53	94	89	88	86	87	.62
EASTERN AFRICA	113	114	112	114	119	4.62	93	91	87	86	87	1.47
BURUNDI	118	119	119	122	123	.74	104	103	100	101	99	- 1.75
ETHIOPIA	101	100	103	105	106	.90	86	84	85	85	84	- 1.25
KENYA	126	125	121	121	129	6.87	97	92	86	83	85	2.63
MADAGASCAR	115	113	118	121	124	2.94	96	92	95	94	94	.17
MALAWI	122	133	127	130	136	4.96	98	104	97	95	97	1.57
MAURITIUS	113	116	117	90	107	19.23	102	103	103	78	91	17.16

ANNEX TABLE 2. INDICES OF FOOD PRODUCTION

	TOTAL						PER CAPUT					
	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981
	1969-71=100					PERCENT	1969-71=100					PERCENT
FOOD PRODUCTION												
MOZAMBIQUE	94	92	93	93	94	1.02	79	76	74	73	71	- 1.65
RWANDA	128	136	136	140	144	2.73	105	108	105	104	104	- .43
SOMALIA	107	108	104	107	108	.75	81	75	67	65	62	- 4.58
TANZANIA	118	121	122	122	124	1.71	96	95	93	90	89	- 1.45
UGANDA	111	120	115	115	118	2.91	90	95	88	85	85	- .28
ZAMBIA	130	130	117	123	134	9.08	106	102	89	91	96	5.52
ZIMBABWE	137	134	112	117	157	33.84	109	103	83	84	109	29.29
SOUTHERN AFRICA	104	106	105	104	118	13.20	88	87	84	81	89	10.09
BOTSWANA	96	78	88	70	93	33.00	81	64	70	54	70	29.03
LESOTHO	112	119	107	103	116	11.95	95	99	87	82	90	9.25
SWAZILAND	115	129	122	139	148	6.45	97	106	97	107	111	3.29
SOUTH AFRICA	125	132	128	132	149	12.80	104	106	101	101	111	9.63
LATIN AMERICA	127	132	136	138	144	4.19	107	108	108	108	110	1.71
CENTRAL AMERICA	128	139	136	142	149	4.94	103	109	103	105	107	1.92
COSTA RICA	138	139	142	139	140	.86	116	114	114	109	107	- 1.50
EL SALVADOR	126	144	146	139	134	- 3.44	102	114	112	104	97	- 6.22
GUATEMALA	138	141	153	157	162	2.74	111	110	116	116	116	- .27
HONDURAS	104	112	107	112	116	3.63	83	86	80	80	80	.08
MEXICO	128	140	135	145	153	5.70	103	109	102	107	109	2.66
NICARAGUA	131	144	142	105	112	6.78	104	111	106	76	78	3.33
PANAMA	125	128	125	129	137	6.47	104	105	100	101	105	4.16
CARIBBEAN	109	118	119	111	114	2.51	95	101	100	92	92	.67
BARBADOS	93	91	98	112	94	- 16.15	88	85	91	102	85	- 17.10
CUBA	106	119	128	115	119	3.80	96	107	113	101	104	3.18
DOMINICAN REPUBLIC	122	125	126	131	135	2.67	100	100	98	100	100	.18
HAITI	107	113	115	109	112	2.07	92	94	93	87	86	- .40
JAMAICA	114	131	109	105	104	- 1.68	101	115	94	90	87	- 3.11
SOUTH AMERICA	130	132	139	141	147	4.11	110	109	112	112	114	1.75
ARGENTINA	118	131	136	127	134	6.12	108	118	121	111	117	4.84
BOLIVIA	128	130	129	135	131	- 2.92	107	106	103	105	99	- 5.46
BRAZIL	147	141	149	164	168	2.49	123	115	119	128	128	.13
CHILE	112	105	113	112	119	6.46	100	91	97	95	99	4.66
COLOMBIA	131	143	150	148	157	6.38	113	120	123	119	124	4.11
ECUADOR	122	119	121	133	139	4.48	99	94	93	99	100	1.27
GUYANA	110	117	113	113	114	.39	95	98	92	91	89	- 1.83
PARAGUAY	131	128	146	159	155	- 2.63	105	99	109	115	109	- 5.63
PERU	111	106	109	102	118	15.11	92	86	86	78	87	12.00
URUGUAY	99	99	96	105	122	15.85	98	96	94	101	116	15.02
VENEZUELA	130	136	149	151	142	- 5.81	101	102	108	106	97	- 8.94
NEAR EAST DEVELOPING	125	131	134	138	140	1.14	103	105	105	104	103	- 1.68
NEAR EAST IN AFRICA	115	118	122	123	124	.87	96	96	97	95	94	- 1.77
EGYPT	108	112	114	116	115	- .96	91	92	91	91	88	- 3.36
LIBYA	161	158	221	213	202	- 5.09	121	113	152	141	129	- 8.77
SUDAN	127	128	131	131	139	6.47	106	104	103	100	104	3.48
NEAR EAST IN ASIA	128	135	138	142	143	1.21	104	107	106	106	105	- 1.70
AFGHANISTAN	109	117	120	125	130	3.65	91	95	95	97	98	1.07
CYPRUS	98	96	99	107	106	- .84	97	94	97	104	103	- 1.32
IRAN	142	150	147	144	161	11.93	116	119	113	107	116	8.52
IRAQ	107	110	125	127	122	- 3.89	85	85	93	91	84	- 7.13
JORDAN	97	110	81	131	104	- 20.62	76	84	59	93	71	- 23.44
LEBANON	76	106	105	133	115	- 13.02	68	97	97	123	106	- 13.89
SAUDI ARABIA	135	128	92	39			99	90	62	25		
SYRIA	170	203	191	262	251	- 4.34	132	153	138	182	168	- 7.96
TURKEY	129	135	142	144	145	.60	109	111	113	113	111	- 1.83
YEMEN ARAB REPUBLIC	109	109	114	116	118	2.25	97	95	97	96	96	.04
YEMEN DEMOCRATIC	126	124	125	129	126	- 2.00	109	105	103	104	99	- 4.46
ISRAEL	132	133	137	134	130	- 3.28	109	107	108	103	98	- 5.06
FAR EAST DEVELOPING	127	132	129	134	142	6.15	109	111	106	107	111	3.96
SOUTH ASIA	123	127	122	128	135	5.91	105	106	100	102	106	3.67
BANGLADESH	112	116	115	124	123	- .32	94	95	92	96	93	- 3.10
INDIA	125	129	121	126	135	7.24	107	108	100	102	107	5.15
NEPAL	105	108	100	111	105	- 5.49	90	90	82	89	82	- 7.62
PAKISTAN	127	127	134	137	144	4.73	104	102	104	104	106	1.76
SRI LANKA	126	136	163	179	183	2.11	112	119	141	152	152	.11
EAST SOUTH-EAST ASIA	138	147	148	150	160	6.74	118	123	121	121	126	4.60
BURMA	114	121	122	131	141	7.56	96	99	98	102	107	4.98
INDONESIA	127	131	133	144	151	4.71	110	112	112	119	122	2.98
KOREA REP	152	161	164	138	152	9.90	132	138	138	115	124	8.06
LAO	88	106	123	140	153	8.72	75	89	100	112	119	6.15
MALAYSIA	151	151	170	180	188	4.31	126	122	135	139	142	1.80
PHILIPPINES	148	154	154	160	167	4.45	123	124	121	122	124	1.73
THAILAND	146	172	154	163	181	10.60	121	139	122	127	137	8.17
JAPAN	110	107	108	98	100	1.78	101	97	97	88	88	1.03
ASIAN CENT PLANNED ECON	122	130	136	136	141	3.07	107	112	116	115	117	1.69
CHINA	121	130	137	136	140	3.08	106	113	117	115	117	1.77
KAMPUCHEA,DEMOCRATIC	68	58	38	45	49	8.31	68	59	39	47	50	7.01
KOREA DPR	160	161	170	171	176	2.74	134	131	135	133	133	.35
MONGOLIA	114	128	127	121	122	.25	93	101	97	91	89	- 2.50
VIET NAM	122	127	133	140	145	3.08	105	107	110	113	114	.78
OTHER DEVELOPING MRKT	116	119	125	124	131	5.15	97	97	100	97	100	2.66

ANNEX TABLE 3. INDICES OF AGRICULTURAL PRODUCTION

	TOTAL						PER CAPUT					
	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981
	1969-71=100					PERCENT	1969-71=100					PERCENT
AGRICULTURAL PRODUCTION												
WORLD	118	123	124	124	128	2.99	104	106	105	104	105	1.25
DEVELOPED COUNTRIES	115	119	119	118	120	2.08	109	111	111	108	110	1.33
WESTERN EUROPE	111	115	115	123	121	- 1.44	107	111	113	117	115	- 1.80
EUROPEAN ECON COMMUNITY	109	113	117	122	121	- .60	106	110	113	117	116	- .87
BELGIUM-LUXEMBOURG	105	105	109	109	115	5.29	103	103	107	107	112	5.21
DENMARK	110	109	115	116	117	1.62	107	105	110	111	113	1.64
FRANCE	106	114	122	125	124	- .81	102	109	115	118	117	- 1.27
GERMANY FED.REP. OF	106	110	110	113	111	- 2.13	105	110	109	112	109	- 2.29
GREECE	121	132	126	135	139	2.90	115	124	117	123	126	2.19
IRELAND	133	136	129	140	118	- 15.62	123	124	117	125	104	- 16.54
ITALY	107	110	116	122	121	- 1.13	102	104	109	115	113	- 1.39
NETHERLANDS	116	118	122	123	133	8.04	109	110	113	113	122	7.26
UNITED KINGDOM	113	115	119	126	123	- 1.81	113	115	118	125	122	- 1.87
OTHER WESTERN EUROPE	117	121	123	126	121	- 4.17	110	114	115	117	111	- 4.78
AUSTRIA	108	110	111	119	113	- 5.06	107	109	109	117	111	- 5.06
FINLAND	99	102	107	110	104	- 4.87	97	99	104	106	100	- 5.26
ICELAND	109	122	116	120	124	3.54	99	111	104	106	109	2.65
MALTA	127	143	117	120	120	.42	124	139	111	113	113	- .46
NORWAY	117	124	119	121	129	6.47	112	118	113	115	122	6.11
PORTUGAL	80	81	93	86	72	- 16.45	73	73	83	76	63	- 17.04
SPAIN	127	139	137	144	133	- 7.56	118	128	125	130	119	- 8.39
SWEDEN	118	120	118	120	124	3.21	115	117	114	116	120	3.11
SWITZERLAND	112	114	120	122	119	- 2.65	111	113	119	121	117	- 2.87
YUGOSLAVIA	127	120	127	127	128	.95	119	112	117	116	116	.16
USSR AND EASTERN EUROPE	116	124	118	115	113	- 1.28	109	116	109	106	104	- 2.01
EASTERN EUROPE	119	125	124	121	121	- .48	114	118	117	114	113	- 1.04
ALBANIA	129	128	133	132	135	2.46	109	105	107	104	104	.13
BULGARIA	109	115	124	116	120	3.58	105	111	119	111	114	3.25
CZECHOSLOVAKIA	124	129	115	126	120	- 4.70	119	123	108	119	113	- 4.89
GERMAN DEMOCRATIC REP.	118	122	125	125	131	4.59	120	124	128	128	134	4.59
HUNGARY	129	132	130	140	138	- 1.30	125	127	125	135	133	- 1.30
POLAND	108	115	113	102	99	- 2.74	101	107	104	93	89	- 3.62
ROMANIA	155	157	163	158	157	- .15	145	145	149	144	142	- .99
USSR	113	123	114	111	109	- 1.74	106	115	105	102	99	- 2.55
NORTH AMERICA DEVELOPED	122	120	125	122	134	9.78	113	111	114	110	119	8.74
CANADA	120	124	114	121	130	7.23	110	113	102	107	114	6.00
UNITED STATES	122	120	126	122	134	10.01	114	111	115	110	120	8.97
OCEANIA DEVELOPED	116	128	126	116	123	6.22	104	114	111	101	106	5.06
AUSTRALIA	116	135	132	115	124	7.40	104	119	115	99	106	6.16
NEW ZEALAND	114	109	112	117	121	2.96	103	99	101	106	109	2.14
DEVELOPING COUNTRIES	122	128	130	133	138	4.07	104	107	107	106	108	1.95
AFRICA DEVELOPING	109	112	114	118	120	1.88	89	89	88	89	88	- 1.18
NORTH WESTERN AFRICA	99	113	114	125	113	- 9.27	82	90	88	93	82	- 12.16
ALGERIA	90	98	103	119	116	- 2.39	73	76	77	86	82	- 5.71
MOROCCO	91	113	115	115	95	- 17.67	75	90	88	86	69	- 20.33
TUNISIA	143	141	135	164	162	- 1.59	125	120	112	133	128	- 4.00
WESTERN AFRICA	109	113	117	122	126	3.49	88	88	89	90	91	.29
BENIN	114	122	128	126	125	- .71	93	98	99	94	91	- 3.71
GAMBIA	86	105	85	83	103	23.82	70	83	65	62	75	20.61
GHANA	91	92	99	100	100	.82	74	72	76	74	72	- 2.39
GUINEA	111	111	108	112	114	1.46	94	91	87	88	87	- 1.16
IVORY COAST	133	131	147	154	171	10.84	98	93	101	103	110	7.32
LIBERIA	122	122	125	129	125	- 2.57	96	93	92	91	86	- 5.96
MALI	110	119	119	114	123	8.46	92	97	94	88	93	5.48
MAURITANIA	88	92	99	99	107	8.96	73	74	78	75	79	5.92
NIGER	110	117	122	126	121	- 3.65	90	93	94	95	88	- 6.49
NIGERIA	110	113	118	125	129	2.56	89	88	89	92	91	- .78
SENEGAL	84	131	96	85	123	45.04	68	104	74	64	91	41.26
SIERRA LEONE	110	102	107	109	101	- 7.75	92	84	85	85	76	- 10.26
TOGO	100	112	115	119	118	- .65	83	91	91	92	88	- 3.58
UPPER VOLTA	106	116	121	117	129	9.70	90	96	97	92	98	6.80
CENTRAL AFRICA	108	105	107	109	110	1.28	91	87	86	85	84	- 1.36
ANGOLA	76	74	76	74	72	- 2.68	64	62	61	59	56	- 5.17
CAMEROON	124	118	120	126	127	.34	107	100	99	102	100	- 2.05
CENTRAL AFRICAN REP	116	116	120	123	125	1.56	100	99	99	99	99	- .82
CHAD	104	113	113	114	115	.86	90	96	95	93	92	- 1.19
CONGO	108	104	104	105	108	2.99	91	86	83	82	82	.32
GABON	95	100	102	103	104	.76	90	93	94	94	94	- .51
ZAIRE	113	109	110	112	115	2.79	94	88	87	86	86	- .07
EASTERN AFRICA	113	113	112	114	118	3.87	93	90	87	86	86	.77
BURUNDI	116	119	121	122	125	2.81	103	103	102	100	100	.28
ETHIOPIA	102	101	103	105	107	1.31	87	85	85	85	85	- .87
KENYA	139	135	132	134	141	5.12	107	100	94	92	93	.95
MADAGASCAR	117	113	118	121	124	2.98	99	93	95	94	94	.21
MALAWI	131	141	137	139	144	4.08	106	111	104	102	102	.70
MAURITIUS	113	117	118	92	108	17.00	103	104	104	80	92	14.97

ANNEX TABLE 3. INDICES OF AGRICULTURAL PRODUCTION

	TOTAL						PER CAPUT					
	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981	1977	1978	1979	1980	1981	CHANGE 1980 TO 1981
	1969-71=100					PERCENT	1969-71=100					PERCENT
AGRICULTURAL PRODUCTION												
MOZAMBIQUE	90	89	89	90	91	.78	76	73	71	70	69	- 1.86
RWANDA	129	135	141	144	147	1.75	105	107	109	108	106	- 1.38
SOMALIA	107	108	104	107	108	.74	81	75	67	65	62	- 4.58
TANZANIA	113	115	116	116	119	2.92	92	91	89	86	86	- .27
UGANDA	97	101	95	95	99	4.15	79	79	72	70	71	.95
ZAMBIA	129	128	116	123	134	8.39	105	101	89	91	95	4.83
ZIMBABWE	137	137	126	133	152	13.86	109	105	94	96	105	9.99
SOUTHERN AFRICA	105	107	105	106	119	12.25	88	88	84	82	90	9.16
BOTSWANA	96	78	85	70	93	32.33	81	64	70	54	70	28.35
LESOTHO	105	111	101	98	109	11.13	89	93	82	78	84	8.43
SWAZILAND	121	138	127	149	157	5.15	102	113	101	115	117	2.03
SOUTH AFRICA	122	130	126	130	145	11.41	102	105	99	99	107	8.28
LATIN AMERICA	125	130	134	135	142	5.25	105	106	107	105	108	2.74
CENTRAL AMERICA	127	137	134	138	144	4.49	102	107	102	101	103	1.47
COSTA RICA	133	135	137	138	142	2.95	112	111	110	108	108	.55
EL SALVADOR	120	135	140	132	116	- 11.84	98	107	108	98	84	- 14.35
GUATEMALA	141	145	153	155	159	2.43	114	114	116	114	114	- .57
HONDURAS	108	118	119	123	127	3.58	86	91	89	88	88	.03
MEXICO	126	137	132	140	148	5.45	101	107	100	103	105	2.43
NICARAGUA	135	149	143	96	112	16.14	108	115	107	69	78	12.40
PANAMA	124	128	125	129	138	6.68	104	105	100	101	105	4.35
CARIBBEAN	110	118	119	111	114	3.12	95	101	100	91	92	1.26
BARBADOS	93	91	99	112	94	- 16.17	88	85	91	102	85	- 17.12
CUBA	106	119	127	113	119	5.17	96	106	113	99	104	4.53
DOMINICAN REPUBLIC	124	128	130	133	136	1.99	102	103	101	101	101	- .49
HAITI	107	111	115	108	110	2.72	91	93	93	85	86	.21
JAMAICA	113	130	109	105	104	- 1.39	101	114	95	90	87	- 2.81
SOUTH AMERICA	127	129	136	137	145	5.82	107	107	110	108	112	3.42
ARGENTINA	119	130	135	125	131	4.79	109	117	120	110	114	3.52
BOLIVIA	130	133	132	135	131	- 2.77	110	109	106	105	99	- 5.33
BRAZIL	136	133	141	151	162	7.76	114	109	113	117	123	5.27
CHILE	112	104	112	112	119	6.35	99	91	96	95	99	4.56
COLOMBIA	132	140	146	146	155	6.43	113	118	120	118	122	4.15
ECUADOR	123	120	124	133	140	5.58	100	95	95	99	101	2.34
GUYANA	111	117	113	114	114	.38	95	98	93	91	90	- 1.85
PARAGUAY	140	135	150	162	159	- 1.74	112	105	112	117	112	- 4.78
PERU	109	106	111	104	117	12.76	90	86	87	79	87	9.68
URUGUAY	96	95	94	102	116	13.69	95	93	91	99	112	12.88
VENEZUELA	128	133	146	149	138	- 7.13	100	100	106	104	94	- 10.20
NEAR EAST DEVELOPING	123	129	131	134	134	.49	101	103	102	101	99	- 2.31
NEAR EAST IN AFRICA	107	112	115	116	116	- .15	90	91	91	90	87	- 2.76
EGYPT	102	107	110	114	112	- 1.65	86	88	88	89	85	- 4.06
LIBYA	161	155	217	209	199	- 4.80	120	111	150	139	127	- 8.49
SUDAN	114	118	115	113	118	4.54	95	96	91	86	88	1.61
NEAR EAST IN ASIA	127	133	135	139	140	.65	104	106	104	104	102	- 2.24
AFGHANISTAN	110	117	119	122	127	3.92	92	95	95	95	96	1.33
CYPRUS	98	96	99	106	106	- .81	96	94	97	104	102	- 1.29
IRAN	139	145	141	137	153	11.88	114	115	108	102	110	8.47
IRAQ	106	109	123	125	120	- 3.74	84	83	91	89	83	- 6.97
JORDAN	97	110	81	131	105	- 20.12	76	84	59	93	71	- 22.94
LEBANON	74	102	102	127	112	- 12.38	67	94	95	118	103	- 13.26
SAUDI ARABIA	135	128	93	41			99	90	63	26		
SYRIA	157	184	172	228	220	- 3.68	122	138	124	159	147	- 7.32
TURKEY	130	135	140	143	142	- .58	109	111	112	112	108	- 2.98
YEMEN ARAB REPUBLIC	109	110	114	116	118	2.16	97	95	97	97	96	- .05
YEMEN DEMOCRATIC	122	121	122	125	123	- 1.88	106	102	101	101	96	- 4.33
ISRAEL	135	138	142	139	138	- 1.38	111	111	111	107	104	- 3.20
FAR EAST DEVELOPING	126	131	129	133	140	5.66	108	110	105	106	110	3.46
SOUTH ASIA	122	126	122	127	134	5.67	104	105	100	101	105	3.45
BANGLADESH	111	116	115	121	120	- .23	94	95	91	93	91	- 3.01
INDIA	124	129	121	126	135	6.93	106	108	100	102	107	4.86
NEPAL	105	108	100	111	105	- 5.83	90	90	82	89	82	- 7.94
PAKISTAN	123	122	132	135	141	4.63	101	98	103	102	104	1.69
SRI LANKA	112	118	136	144	148	2.77	100	103	117	122	123	.77
EAST SOUTH-EAST ASIA	137	145	146	148	156	5.66	117	121	120	119	123	3.52
BURMA	114	121	123	131	139	6.32	96	100	99	103	107	3.75
INDONESIA	124	129	132	142	147	3.08	108	111	111	118	119	1.39
KOREA REP	153	161	163	138	151	9.54	134	138	138	114	123	7.70
LAO	90	105	123	139	151	8.79	77	87	100	111	118	6.21
MALAYSIA	142	142	155	159	164	2.71	118	115	122	123	123	.24
PHILIPPINES	149	155	156	162	169	4.51	123	125	122	124	126	1.78
THAILAND	142	166	152	160	175	9.20	118	135	120	124	132	6.77
JAPAN	109	106	107	97	98	1.39	100	96	96	87	87	.64
ASIAN CENT PLANNED ECON	121	130	136	136	141	3.65	106	112	116	115	117	2.24
CHINA	121	130	136	136	141	3.71	106	112	116	115	118	2.40
KAMPUCHEA,DEMOCRATIC	68	59	38	45	49	8.23	68	60	39	46	50	6.91
KOREA DPR	158	159	168	169	174	2.81	132	130	133	132	132	.43
MONGOLIA	112	124	124	119	120	.57	92	99	95	89	87	- 2.17
VIET NAM	122	128	134	141	146	3.18	105	108	110	113	114	.87
OTHER DEVELOPING MRKT	117	121	127	127	133	4.92	99	99	102	99	102	2.44

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
WORLD												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	51215	63462	79879	63657	72054	67293	72298	82373	78784	96459	102292	4.43
RICE MILLED	8246	8652	8583	8349	7800	9124	11044	9765	11876	13136	13519	6.01
BARLEY	7272	13989	12445	11693	12604	13927	13112	14586	14111	16215	19299	3.75
MAIZE	27714	37582	48352	49753	52051	62377	57764	68743	76087	80280	78930	8.27
MILLET	330	168	226	216	207	303	273	318	286	204	226	2.77
SORGHUM	7314	6168	9050	10766	10155	11161	11954	10923	11389	11152	14421	6.04
POTATOES	3362	5128	3912	3877	3931	4406	4697	4035	4626	4920	4909	1.36
SUGAR,TOTAL (RAW EQUIV.)	19798	21730	22762	22969	21484	22680	28417	25537	25858	26768	28937	3.11
PULSES	1670	1936	2013	1655	1788	1906	1976	2120	2366	2770	3103	5.49
SOYBEANS	8142	13794	15629	17233	16479	19766	20025	24058	25488	26875	26569	8.07
SOYBEAN OIL	670	1103	1053	1546	1365	1839	2106	2610	2953	3196	3483	15.26
GROUNDNUTS SHELLED BASIS	1528	966	1000	884	935	1077	886	800	794	749	881	- 2.42
GROUNDNUT OIL	422	522	498	368	395	561	581	421	501	482	329	- 1.57
COPRA	1213	1355	1043	527	1082	1147	941	685	434	450	404	-11.04
COCONUT OIL	473	867	737	667	1043	1374	1110	1337	1142	1216	1356	6.74
PALM NUTS KERNELS	366	397	302	360	308	391	279	181	168	204	139	-10.31
PALM OIL	574	1382	1514	1691	2043	2188	2332	2401	2839	3590	3323	10.90
OILSEED CAKE AND MEAL	9300	13168	14573	14719	14487	18817	19105	21883	23343	25802	27613	9.00
BANANAS	5217	6749	6786	6626	6371	6343	6660	6981	7097	7050	6782	.59
ORANGES+TANGER+CLEMEN	3871	4631	5036	4999	5194	5210	5410	5204	4949	5106	5158	.64
LEMONS AND LIMES	663	733	782	832	814	964	894	985	930	998	986	3.34
COFFEE GREEN+ROASTED	3188	3579	3804	3410	3575	3659	2938	3443	3800	3717	3763	.30
COCOA BEANS	1094	1250	1109	1194	1161	1153	969	1088	1017	1090	1171	- 1.13
TEA	696	781	803	812	828	865	913	886	927	968	958	2.50
COTTON LINT	3858	4096	4728	3818	3994	4049	3929	4458	4374	4815	4296	.94
JUTE AND SIMILAR FIBRES	1093	757	906	890	590	670	569	515	571	524	592	- 5.22
TOBACCO UNMANUFACTURED	1004	1213	1240	1389	1252	1317	1289	1440	1372	1355	1490	1.71
NATURAL RUBBER	2393	2849	3359	3191	3006	3249	3292	3317	3422	3327	3129	.87
WOOL GREASY	1169	1204	1119	834	853	1010	1103	891	938	908	957	- 1.64
BOVINE CATTLE 1/	5505	7742	6860	6018	6839	6890	6687	7592	7437	6933	7202	.47
SHEEP AND GOATS 1/	8964	10999	10825	10397	11874	10775	12472	14853	15142	18165	19440	7.18
PIGS 1/	3193	6096	5927	6071	6428	6943	6940	7945	8416	10736	9929	6.78
TOTAL MEAT	3853	5389	5681	5191	5502	6258	6809	7070	7838	8128	8772	6.11
MILK DRY	161	294	381	358	376	442	571	585	657	877	891	13.19
TOTAL EGGS IN SHELL	333	437	461	514	543	518	573	605	655	753	786	6.48
FISHERY PRODUCTS												
FISH FRESH FROZEN	1741	2498	2855	2788	2967	3025	3460	3827	4226	3938	3175	4.58
FISH CURED	549	557	531	459	449	456	443	428	464	469	432	- 1.96
SHELLFISH	343	690	712	706	761	879	844	990	1128	973	725	3.53
FISH CANNED AND PREPARED	540	677	739	747	721	831	792	839	872	941	846	3.00
SHELLFISH CANNED+PREPAR	67	91	93	89	88	94	102	116	117	99	78	.84
FISH BODY AND LIVER OIL	812	749	550	558	597	565	566	694	743	752	673	1.89
FISH MEAL	3020	3008	1631	1951	2188	2113	2041	2107	2464	2340	2160	.34
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	16778	25489	28793	26238	23898	28411	28657	29893	31870	28072	22968	.33
SAWLOGS NONCONIFEROUS	25216	42618	51864	44885	36366	45481	47174	48449	46058	42140	33361	- 1.58
PULPWOOD+PARTICLE	19537	23071	29208	32980	31876	33851	35120	32665	36412	40914	41575	5.14
FUELWOOD	1283	1049	1291	1288	1040	783	1066	632	720	865	594	- 7.02
SAWNWOOD CONIFEROUS	42830	57094	60913	51822	43250	56294	61793	65962	68826	66058	60789	2.40
SAWNWOOD NONCONIFEROUS	5691	8413	10648	8928	7956	11461	11240	12046	13438	12616	10970	4.24
WOOD-BASED PANELS	7140	12700	14674	12963	12436	14383	14690	16132	16303	15732	15940	2.75
PULP FOR PAPER	11811	14580	16666	17192	13525	15309	15401	17311	18491	19634	18763	2.78
PAPER AND PAPERBOARD	18214	25247	27522	29962	22867	27092	28294	30327	33328	35114	35567	3.84
WESTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	5431	9457	11857	11587	13472	13635	11782	12485	14505	18221	21927	7.10
RICE MILLED	359	525	405	616	625	670	751	850	889	968	1000	9.36
BARLEY	4085	5311	5586	5966	5686	5075	4408	8634	7199	8057	9880	6.38
MAIZE	2782	4593	5613	6012	5666	5876	4458	4869	5050	5474	4821	- .81
MILLET	2	5	9	7	15	11	12	12	13	14	19	10.53
SORGHUM	176	195	276	711	736	771	384	262	308	206	241	- 4.79
POTATOES	1864	2763	2485	2358	2589	2337	2708	2798	3016	3455	3557	3.82
SUGAR,TOTAL (RAW EQUIV.)	1079	2604	2615	2439	2082	2839	3628	4124	4280	5210	5680	10.82
PULSES	238	291	288	253	323	226	302	353	450	457	436	6.45
SOYBEANS		269	113	16	111	189	120	237	353	327	160	12.99
SOYBEAN OIL	123	395	470	720	719	744	767	1099	1208	1204	1272	13.58
GROUNDNUTS SHELLED BASIS	17	18	18	18	14	24	22	29	15	19	23	2.18
GROUNDNUT OIL	35	32	54	51	74	49	44	45	64	79	68	5.62
COPRA	3	7	6		1	17	3	4	1			

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
COCONUT OIL	50	143	117	78	203	269	163	119	61	43	56	-10.69
PALM NUTS KERNELS		1	1	5	1	1	1	1	2	1	1	- .17
PALM OIL	18	77	80	68	86	98	111	97	92	123	112	5.23
OILSEED CAKE AND MEAL	1254	2150	2710	2875	2257	2630	2519	3437	3957	4247	4925	8.47
BANANAS	76	30	23	27	35	25	31	41	43	43	48	7.29
ORANGES+TANGER+CLEMEN	1506	1837	1943	1933	1999	2056	2113	1921	1906	1799	1808	- .51
LEMONS AND LIMES	431	424	384	444	461	525	464	505	483	512	486	2.34
COFFEE GREEN+ROASTED	21	47	62	76	86	92	78	102	124	106	120	9.53
COCOA BEANS	4	2	3	6	11	15	30	34	32	44	48	44.27
TEA	40	47	58	61	43	46	60	50	46	43	44	- 1.99
COTTON LINT	126	74	101	79	65	89	70	71	60	57	55	- 4.81
JUTE AND SIMILAR FIBRES	42	29	28	25	21	18	17	19	16	17	16	- 6.69
TOBACCO UNMANUFACTURED	129	148	141	196	177	179	153	223	234	197	208	4.23
NATURAL RUBBER	21	24	30	40	29	32	27	21	21	16	16	- 7.32
WOOL GREASY	57	66	55	43	55	64	57	60	65	69	63	2.16
BOVINE CATTLE 1/	2003	3094	2566	2312	3416	3121	2979	3322	3340	3412	3544	3.03
SHEEP AND GOATS 1/	724	790	619	575	1152	1183	1318	1732	1384	1418	1079	9.08
PIGS 1/	881	2445	2552	2576	2596	3112	3106	3421	4004	4777	4763	8.47
TOTAL MEAT	1224	1823	1933	2215	2434	2394	2652	2825	3173	3673	3868	8.60
MILK DRY	133	221	289	272	285	334	432	450	514	660	681	13.37
TOTAL EGGS IN SHELL	125	237	262	308	326	335	349	382	445	505	539	9.06
FISHERY PRODUCTS												
FISH FRESH FROZEN	863	1061	1095	1017	1054	1115	1151	1394	1685	1622	1293	4.92
FISH CURED	330	349	327	283	278	288	267	255	276	281	258	- 2.54
SHELLFISH	115	243	196	225	250	274	232	263	277	311	200	1.51
FISH CANNED AND PREPARED	181	198	235	226	207	243	240	259	261	258	237	2.24
SHELLFISH CANNED+PREPAR	12	26	28	24	27	32	34	36	38	40	36	5.27
FISH BODY AND LIVER OIL	391	196	271	196	249	319	328	270	295	330	331	5.23
FISH MEAL	811	840	797	803	864	948	1019	882	951	924	903	1.63
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1549	1380	2236	2784	1704	2428	2590	1899	2395	2937	2737	4.78
SAWLOGS NONCONIFEROUS	1166	1549	1850	1943	1665	1833	2077	2017	2055	2262	2149	3.29
PULPWOOD+PARTICLE	4930	6089	7114	7920	8627	8166	7573	6843	8457	10717	11102	4.86
FUELWOOD	727	604	881	888	735	512	740	314	442	554	342	- 8.16
SAWNWOOD CONIFEROUS	12836	17929	20295	17248	12640	17061	16554	18051	20349	19783	17144	.78
SAWNWOOD NONCONIFEROUS	1232	1766	2274	1858	1607	2801	2494	2756	2514	2395	2039	2.87
WOOD-BASED PANELS	3220	5270	6337	5854	5171	6151	6194	6737	7386	7057	6730	3.02
PULP FOR PAPER	6400	6623	8036	7436	5179	5670	5559	6689	6837	6635	6218	- .95
PAPER AND PAPERBOARD	7788	12032	13708	14964	10655	13098	13753	15658	17387	17427	18199	4.56
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	7568	5801	6852	8008	5109	3912	5149	3659	4691	3916	4131	- 6.09
RICE MILLED	6	92	90	149	16	11	11	14	25	36	28	-14.91
BARLEY	608	847	570	1158	1040	943	1725	222	232	308	238	-15.50
MAIZE	1595	946	1570	1727	983	1536	1318	1493	554	1325	1367	- 1.48
POTATOES	704	1510	534	648	490	442	682	371	655	322	310	-10.41
SUGAR,TOTAL (RAW EQUIV.)	2241	888	754	724	403	527	743	877	660	679	794	.28
PULSES	213	127	118	115	119	112	117	135	145	122	120	-.76
SOYBEANS	4	10	34	31	11	10	32	6	30	5	4	-12.71
SOYBEAN OIL	1	3	6	8	2	12	13	7	10	17	14	16.23
GROUNDNUTS SHELLED BASIS	2	1		1					1	1		
OILSEED CAKE AND MEAL	404	79	75	47	49	14	61	53	20	27	8	-16.79
ORANGES+TANGER+CLEMEN	5									1	1	
TEA	10	12	13	14	17	15	22	17	17	20	18	5.15
COTTON LINT	566	662	734	740	801	887	976	865	807	863	927	3.03
JUTE AND SIMILAR FIBRES	1	2	3									
TOBACCO UNMANUFACTURED	118	88	97	100	102	101	99	89	102	103	93	.31
NATURAL RUBBER	25											
WOOL GREASY	3	1	1	1	1	1	1	2	3	3	2	15.70
BOVINE CATTLE 1/	525	817	783	630	686	498	540	544	676	577	446	- 4.64
SHEEP AND GOATS 1/	1596	3183	3168	2875	3457	3025	3504	3800	4609	4522	4602	5.35
PIGS 1/	366	787	412	628	944	720	720	1158	1152	1143	1818	11.74
TOTAL MEAT	492	395	433	527	627	547	658	620	744	736	777	7.33
TOTAL EGGS IN SHELL	112	108	103	111	121	101	120	114	104	90	66	- 3.46
FISHERY PRODUCTS												
FISH FRESH FROZEN	209	345	379	494	606	607	540	569	605	619	556	5.25
FISH CURED	36	16	15	13	19	12	11	15	21	16	16	1.31
SHELLFISH	11	4	7	3	1	1	1	2	1	2	1	-12.41
FISH CANNED AND PREPARED	24	29	31	32	45	47	48	40	36	39	37	2.50
SHELLFISH CANNED+PREPAR	5	3	2	2	3	2	1	1	1	2	2	- 7.07
FISH BODY AND LIVER OIL	58	17	6	6	4	2	1	1	1	1	1	-25.77
FISH MEAL	38	18	13	11	19	18	14	21	20	22	23	5.46

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	5005	7982	10195	9829	8884	9534	9919	10281	8763	7445	7110	- 2.00
SAWLOGS NONCONIFEROUS	176	290	334	397	354	201	315	296	404	384	285	-.48
PULPWOOD+PARTICLE	8432	8021	11019	12480	12146	12401	12155	11375	12066	12206	12128	2.49
FUELWOOD	254	108	141	127	95	40	63	92	46	31	18	-17.29
SAWNWOOD CONIFEROUS	10882	11059	11085	9865	10362	11009	10592	10782	9956	9513	9370	- 1.47
SAWNWOOD NONCONIFEROUS	793	827	825	767	749	714	702	752	600	597	539	- 4.35
WOOD-BASED PANELS	906	1247	1476	1457	1588	1702	1791	1875	1842	1827	1673	3.61
PULP FOR PAPER	472	599	618	592	601	728	754	851	753	889	892	5.23
PAPER AND PAPERBOARD	634	1180	1264	1304	1095	1480	1653	1779	1664	1715	1755	5.28
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	28523	36693	50900	36371	43188	38493	40151	50193	46586	53756	60776	4.12
RICE MILLED	1851	2038	1630	1726	2139	2107	2345	2342	2323	3065	3197	6.47
BARLEY	2017	5749	5168	3547	4068	5432	4343	4249	4654	4195	6831	-.83
MAIZE	12938	22409	33215	29875	33526	44692	40580	50550	59414	63923	56063	11.13
SORGHUM	5832	3858	5629	5722	5848	5797	6139	5184	5950	8050	8032	5.60
POTATOES	292	300	313	356	369	857	503	282	289	344	395	-.47
SUGAR,TOTAL (RAW EQUIV.)	21	18	65	97	268	112	153	137	124	602	1092	36.93
PULSES	295	359	416	339	390	400	374	390	470	912	1141	11.17
SOYBEANS	7234	12034	13250	13953	12506	15361	16234	20794	20952	21882	21980	7.90
SOYBEAN OIL	532	618	439	766	355	506	768	916	1110	1081	809	8.75
GROUNDNUTS SHELLED BASIS	78	196	192	262	244	132	306	393	368	292	153	2.85
GROUNDNUT OIL	3	28	47	21	12	48	45	40	5	18	20	- 7.67
COCONUT OIL	5	6	11	5	8	26	17	9	5	19	14	7.36
OILSEED CAKE AND MEAL	3082	4084	5075	5260	4113	5370	4740	6793	6845	8009	7472	7.11
BANANAS	61	188	188	195	187	201	199	201	197	205	217	1.33
ORANGES+TANGER+CLEMEN	303	303	292	328	481	461	410	356	318	482	443	3.56
LEMONS AND LIMES	117	157	201	202	183	225	236	237	173	171	176	- .01
COFFEE GREEN+ROASTED	28	34	72	85	55	69	106	59	79	79	70	4.62
COCOA BEANS	7	4	9	23	9	10	14	9	9	7	14	2.78
TEA	2	3	3	3	4	3	4	5	5	5	4	5.36
COTTON LINT	906	701	1246	1172	871	779	1017	1347	1527	1823	1269	6.83
JUTE AND SIMILAR FIBRES	1	1	1	1	1	1	2	1				
TOBACCO UNMANUFACTURED	285	314	313	335	293	293	314	364	299	293	300	- .43
NATURAL RUBBER	44	21	27	26	29	29	25	20	21	28	18	- 2.05
WOOL GREASY	1	1	1		1						1	
BOVINE CATTLE 1/	319	405	699	360	421	684	651	592	436	424	441	- .49
SHEEP AND GOATS 1/	134	174	214	293	344	250	214	153	135	144	225	- 4.08
PIGS 1/	33	101	107	213	47	56	54	201	145	254	171	8.33
TOTAL MEAT	254	369	441	403	472	693	700	721	777	973	1073	12.69
MILK DRY	6	18	23	21	17	17	16	7	5	36	55	2.02
TOTAL EGGS IN SHELL	16	11	18	21	22	22	38	39	30	61	87	20.49
FISHERY PRODUCTS												
FISH FRESH FROZEN	213	234	264	200	236	250	352	383	413	418	376	8.14
FISH CURED	49	52	49	49	47	62	65	65	64	75	71	5.11
SHELLFISH	24	36	47	39	42	48	71	119	133	114	85	15.33
FISH CANNED AND PREPARED	43	43	52	39	36	46	51	63	64	78	67	6.93
SHELLFISH CANNED+PREPAR	11	9	10	8	8	9	9	11	10	10	9	1.34
FISH BODY AND LIVER OIL	47	95	121	101	93	91	60	110	101	137	137	2.67
FISH MEAL	49	42	63	85	35	63	61	82	43	108	30	- .04
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	9247	14104	14248	12118	12196	14842	14362	15565	17865	15135	11676	-.83
SAWLOGS NONCONIFEROUS	522	497	567	622	328	470	481	522	630	784	751	4.64
PULPWOOD+PARTICLE	5837	6768	7837	8402	6867	8337	8710	8216	9463	9887	10576	4.22
FUELWOOD		15	19	18	34	27	33	28	16	11	18	- 2.04
SAWNWOOD CONIFEROUS	17250	25705	27339	22944	18553	26379	32305	34492	35407	33612	31770	4.70
SAWNWOOD NONCONIFEROUS	808	1006	1072	705	807	814	847	1341	1025	1190	1209	3.59
WOOD-BASED PANELS	775	1225	1558	1518	1507	1567	1500	1781	1608	1772	2021	3.80
PULP FOR PAPER	4564	6578	7162	8011	6621	7603	7657	8051	8787	9704	9141	3.79
PAPER AND PAPERBOARD	9065	10981	11255	12255	9726	10935	11232	11124	12326	13675	13134	2.10
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	6840	8641	5592	5270	8105	7787	8130	11082	6903	14933	10642	6.95
RICE MILLED	90	181	158	137	174	218	256	277	241	457	281	10.08
BARLEY	425	1828	844	808	1760	2022	2157	1375	1757	3047	1650	7.07
MAIZE	2	38	19	3	1	88	79	32	75	37	52	22.29
MILLET	18	40	25	31	21	20	23	15	18	14	11	-10.88
SORGHUM	45	993	736	748	856	815	829	385	516	580	463	- 7.45
POTATOES	20	16	21	16	21	25	29	20	18	23	21	2.17

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
SUGAR,TOTAL (RAW EQUIV.)	1665	2009	2085	1782	1996	2000	2556	2478	1840	2201	2561	2.22
PULSES	24	37	44	42	36	33	40	36	45	72	64	5.53
SOYBEANS			1	2	4	32						
GROUNDNUTS SHELLED BASIS		1	7	7	2	2	4	2	2	12	6	9.18
OILSEED CAKE AND MEAL	2	2	1		1	3	2	1	1	1		
ORANGES+TANGER+CLEMEN	26	34	32	24	15	18	11	22	25	38	32	1.08
LEMONS AND LIMES	1	1	1	1	1	1	1			4	1	
COCOA BEANS		1	1	1								
TEA	1	1	1	1	1	1		1				
COTTON LINT		2	22	3	8	16	6	10	24	49	59	30.58
TOBACCO UNMANUFACTURED								1		1	1	
NATURAL RUBBER										1		
WOOL GREASY	811	905	859	634	588	750	826	630	705	650	680	- 2.22
BOVINE CATTLE 1/	6	7	17	34	13	33	45	71	107	74	109	32.43
SHEEP AND GOATS 1/	351	891	1145	1159	1456	1847	3409	4143	3898	6173	5763	26.21
PIGS 1/	1	2	1	1	1	1		1	1	2		
TOTAL MEAT	897	1367	1542	1208	1183	1446	1643	1667	1815	1494	1601	2.70
MILK DRY	19	37	48	51	56	53	100	109	123	161	137	17.94
TOTAL EGGS IN SHELL	3	4	4	2	2	2	1	1	1	1	1	-11.43
FISHERY PRODUCTS												
FISH FRESH FROZEN	4	14	14	13	12	19	28	32	54	32	32	15.35
SHELLFISH	10	18	17	16	16	14	17	20	32	22	23	5.20
FISH CANNED AND PREPARED			2		1	1			1			
SHELLFISH CANNED+PREPAR	1	4	3	2	2	2	2	2	2	2	2	- 8.43
FISH BODY AND LIVER OIL	4	6	8	8	4	8	5	4	5	5	5	- 4.10
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	796	1844	1916	1302	534	958	1027	936	1236	971	529	- 8.41
SAWLOGS NONCONIFEROUS	1	14	9	12	3	1	3	2	1	4	4	-17.23
PULPWOOD+PARTICLE		1047	2199	2931	3061	3866	5326	5074	5357	7064	6676	19.72
FUELWOOD					1							
SAWNWOOD CONIFEROUS	97	266	248	245	160	232	295	367	509	617	546	12.39
SAWNWOOD NONCONIFEROUS	29	27	54	51	32	23	31	30	41	54	36	1.00
WOOD-BASED PANELS	39	75	93	52	61	28	32	52	104	142	138	7.25
PULP FOR PAPER	74	114	142	232	335	375	452	435	464	475	518	17.43
PAPER AND PAPERBOARD	148	202	189	214	204	269	302	332	359	418	447	10.77
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	68	74	66	36	22	17	17	35	25	15	4	-19.77
RICE MILLED	63	53	45	31	18	57	57	13	12	24	12	-13.31
BARLEY	6		65	2	5		1		2			
MAIZE	864	726	807	626	1009	472	434	646	359	63	244	-17.57
MILLET	65	10	29	59	10	79	13	31	68	36	32	9.21
SORGHUM	8	5	5	5	10	2			53			
POTATOES	134	121	104	83	97	91	82	58	50	56	38	-10.83
SUGAR,TOTAL (RAW EQUIV.)	1303	1476	1590	1466	1132	1355	1460	1302	1619	1658	1518	.93
PULSES	272	464	465	357	319	410	261	154	172	177	103	-14.90
SOYBEANS	8	8	9	2	21	3	13	36	1		1	
GROUNDNUTS SHELLED BASIS	1058	375	384	198	169	296	197	71	89	88	44	-19.90
GROUNDNUT OIL	272	315	239	155	226	290	258	98	158	90	38	-15.81
COPRA	74	59	69	62	42	60	55	34	37	24	18	-11.98
COCONUT OIL	14	11	17	18	9	11	6	12	15	17	19	2.46
PALM NUTS KERNELS	298	334	254	319	269	353	239	152	131	145	106	-11.85
PALM OIL	167	151	135	196	209	157	117	93	61	121	88	- 8.25
OILSEED CAKE AND MEAL	804	909	725	617	677	755	709	464	664	488	369	- 6.85
BANANAS	384	462	438	465	354	320	312	347	295	221	192	- 8.70
ORANGES+TANGER+CLEMEN	703	794	914	729	592	664	744	873	672	841	763	- .03
LEMONS AND LIMES	9	4	6	3	1	1	1	2	1	1	1	-16.54
COFFEE GREEN+ROASTED	911	1087	1187	1177	1109	1151	880	927	1017	892	912	- 3.05
COCOA BEANS	838	977	889	864	819	866	688	780	688	785	813	- 2.42
TEA	79	137	141	137	135	149	165	178	185	167	154	2.86
COTTON LINT	338	397	410	318	271	351	300	308	329	331	289	- 2.37
JUTE AND SIMILAR FIBRES	2	2	1									
TOBACCO UNMANUFACTURED	82	114	131	131	113	141	129	139	131	174	186	4.27
NATURAL RUBBER	161	191	197	203	186	159	153	145	142	135	135	- 4.96
WOOL GREASY	6	5	5	6	4	3	4	5	5	4	4	- 3.50
BOVINE CATTLE 1/	1116	1500	1407	1265	1025	1129	1026	1091	1126	1276	1413	- 1.04
SHEEP AND GOATS 1/	3113	3684	3368	3161	3515	2548	2461	3066	3080	3304	3395	- .87
PIGS 1/	1	22	17	13	13	15	4	1	3	2	2	-26.68
TOTAL MEAT	79	110	130	119	104	113	118	100	98	50	51	- 8.42
MILK DRY	1	2	3	1		1		2	2			
TOTAL EGGS IN SHELL	1	1	1	1	1	1	1					

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
FISHERY PRODUCTS												
FISH FRESH FROZEN	17	63	106	106	76	75	94	105	104	113	77	2.00
FISH CURED	56	62	49	42	45	35	36	37	36	36	36	- 5.02
SHELLFISH	5	19	23	29	39	43	44	49	46	46	18	4.36
FISH CANNED AND PREPARED	52	61	83	80	59	76	68	61	76	76	77	.80
FISH BODY AND LIVER OIL	13	25	31	18	12	7	7	7	8	8	7	-15.19
FISH MEAL	63	150	142	95	83	43	19	37	30	28	15	-21.87
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS		13	14	14	15	11	2	2	2			
SAWLOGS NONCONIFEROUS	5603	7174	8260	6580	5139	6435	6547	6416	6312	6144	5189	- 2.70
PULPWOOD+PARTICLE		1	2	69	70	127	100	75	112	84	173	59.00
FUELWOOD	71	11	28	27	9	8	9	9	9	1		
SAWNWOOD CONIFEROUS	64	73	103	107	98	113	119	116	126	103	94	2.29
SAWNWOOD NONCONIFEROUS	693	738	933	813	662	701	749	750	722	679	624	- 2.33
WOOD-BASED PANELS	212	327	340	300	207	219	237	257	227	241	232	- 3.66
PULP FOR PAPER	130	187	201	219	155	255	190	233	259	259	259	3.99
PAPER AND PAPERBOARD	21	17	18	30	21	24	22	18	27	49	48	9.86
LATIN AMERICA												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR, WHEAT EQUIV.	2370	1771	3098	1836	2000	3304	5991	1765	4382	4587	3955	9.22
RICE MILLED	336	195	330	348	439	536	997	733	578	551	660	12.37
BARLEY	65	111	161	110	28	43	130	18	58	74	33	-11.40
MAIZE	6051	3645	4113	6666	5088	4560	6864	5927	5990	3541	9135	4.68
MILLET	213	81	118	78	94	124	172	196	139	63	133	3.38
SORGHUM	930	635	2108	3169	2180	3499	4313	4625	3923	1544	5031	12.87
POTATOES	13	36	11	21	50	96	106	67	76	49	41	11.90
SUGAR, TOTAL (RAW EQUIV.)	10175	10851	11942	12048	11021	10437	12928	12309	12527	11884	12854	1.36
PULSES	137	163	166	175	233	312	424	465	390	340	290	10.59
SOYBEANS	306	1079	1841	2831	3435	3934	3441	2841	3813	4493	4280	12.50
SOYBEAN OIL		60	116	42	285	562	544	570	609	840	1354	41.49
GROUNDNUTS SHELLED BASIS	21	62	57	56	68	30	59	60	115	107	97	7.80
GROUNDNUT OIL	70	114	124	101	38	140	181	155	209	207	80	5.31
COPRA	12	2	1	2	2	2			2			
COCONUT OIL	3	11	9	5	5	5	5	9	8	4	4	- 6.85
PALM NUTS KERNELS	2	5	6	5	4	2	3	9	7	5	2	- 3.79
PALM OIL	4	3	6	6	3	5	3	4	5	2		
OILSEED CAKE AND MEAL	1555	2698	2869	3130	4299	5798	7352	7676	7469	8985	10952	17.72
BANANAS	4194	5329	5345	5055	4779	4839	5232	5454	5513	5474	5288	.61
ORANGES+TANGER+CLEMEN	172	216	218	210	190	173	224	269	313	311	300	5.42
LEMONS AND LIMES	1	8	11	14	22	25	29	47	74	54	51	26.88
COFFEE GREEN+ROASTED	1940	2165	2232	1826	2055	2032	1547	1962	2188	2205	2235	.42
COCOA BEANS	216	226	174	255	270	210	187	211	225	183	200	- 1.34
TEA	15	24	25	30	23	32	34	41	39	44	31	5.92
COTTON LINT	796	862	829	664	806	607	689	896	734	641	632	- 2.18
JUTE AND SIMILAR FIBRES	4	4	4	3	1	1		1				
TOBACCO UNMANUFACTURED	121	184	186	244	244	255	238	274	276	256	264	3.94
NATURAL RUBBER	12	9	8	5	6	6	5	6	4	4	5	- 8.01
WOOL GREASY	148	78	81	64	108	92	108	107	80	105	133	4.92
BOVINE CATTLE 1/	1068	1487	1026	1037	960	1103	1093	1662	1403	796	864	- 2.11
SHEEP AND GOATS 1/	92	81	48	65	93	106	110	126	94	64	309	10.79
PIGS 1/	40	42	31	33	42	65	31	24	17	2		
TOTAL MEAT	723	1039	890	504	449	775	787	834	855	806	1022	2.25
MILK DRY	1	12	15	9	14	34	18	10	4	3	9	-10.98
TOTAL EGGS IN SHELL	2	1	1	1	1	3	3	1	3	12	13	30.78
FISHERY PRODUCTS												
FISH FRESH FROZEN	40	64	107	131	146	197	301	361	409	332	122	14.66
FISH CURED	1	3	7	9	5	3	9	3	12	14	13	12.66
SHELLFISH	71	98	94	90	93	100	99	142	178	135	125	5.86
FISH CANNED AND PREPARED	9	21	20	20	16	28	48	73	77	125	108	26.89
SHELLFISH CANNED+PREPAR	3	2	1	1	3	3	5	2	5	3	1	4.91
FISH BODY AND LIVER OIL	211	318	10	93	148	39	46	69	129	98	5	-12.35
FISH MEAL	1728	1711	402	749	909	842	733	843	1146	1005	921	1.59
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	14	9	14	9	15	23	167	689	968	1029	384	84.90
SAWLOGS NONCONIFEROUS	394	217	524	202	55	86	49	60	86	114	60	-15.00
PULPWOOD+PARTICLE	331	382	284	183	107	115	53	53	53	53	53	-20.97
FUELWOOD	3	1	2	2	3	4	18	26	37	29	13	51.12
SAWNWOOD CONIFEROUS	1520	1718	1530	1131	1134	1050	1429	1477	1678	1718	1268	.70
SAWNWOOD NONCONIFEROUS	341	622	870	835	590	629	838	727	1121	1130	837	4.26
WOOD-BASED PANELS	110	266	295	265	252	326	374	487	488	606	619	11.39
PULP FOR PAPER	89	262	296	314	328	377	433	706	1014	1306	1362	22.54
PAPER AND PAPERBOARD	92	110	186	213	146	199	222	268	331	376	479	14.45

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	113	616	599	23	12	21	627	2079	825	494	485	22.26
RICE MILLED	456	518	341	181	130	256	276	223	211	259	226	- 4.11
BARLEY	65	142	17	7	12	366	302	50	88	229	421	31.16
MAIZE	3	7	3	2	1	14	8	43	111	155	22	50.57
MILLET	14	7	9	4	4	6	3	4	2	2		
SORGHUM	2	61	104	98	48	75	137	66	196	286	256	16.34
POTATOES	245	284	326	299	208	380	437	289	311	462	345	3.40
SUGAR,TOTAL (RAW EQUIV.)	100	147	50	54	54	43	59	51	34	41	47	- 8.04
PULSES	160	143	170	105	109	121	176	256	303	298	494	15.18
GROUNDNUTS SHELLED BASIS	130	149	166	145	223	321	184	120	56	59	120	- 9.41
COCONUT OIL							1					
OILSEED CAKE AND MEAL	598	751	545	401	452	368	252	225	214	265	137	-14.55
BANANAS	16	16	10	6	10	9	4	2	5	17	6	- 6.46
ORANGES+TANGER+CLEMEN	257	527	766	722	724	720	754	645	608	632	751	.40
LEMONS AND LIMES	78	108	150	138	119	159	131	153	152	201	203	5.45
COFFEE GREEN+ROASTED	4	10	8	6	4	3	3	4	3	2	2	-16.01
TEA	10	19	26	19	4	8	7	10	16	16	12	- 3.10
COTTON LINT	895	1049	1097	706	856	1004	710	765	677	616	533	- 6.46
TOBACCO UNMANUFACTURED	100	137	120	123	75	86	71	84	77	94	141	- 2.21
WOOL GREASY	17	21	25	10	8	7	12	9	7	7	3	-14.86
BOVINE CATTLE 1/	120	92	52	77	18	11	16	12	21	9	58	-13.47
SHEEP AND GOATS 1/	1231	932	987	980	765	828	724	1300	1424	2028	3660	13.35
TOTAL MEAT	1	13	30	22	14	9	11	15	15	21	40	3.97
TOTAL EGGS IN SHELL	11	21	15	17	12	1	3	7	10	7	7	-10.60
FISHERY PRODUCTS												
FISH FRESH FROZEN	10	12	20	16	6	4	3	3	4	4	3	-17.52
FISH CURED	18	21	17	13	12	10	12	2	3	2	2	-24.33
SHELLFISH	4	13	16	10	7	10	10	8	8	8	3	-10.33
FISH CANNED AND PREPARED	1	1	1	1	1	3	2	2	2	2	1	8.90
SHELLFISH CANNED+PREPAR	1		1	2	2	2	3	2	2			
FISH BODY AND LIVER OIL		1	1			1	2	2	1	1		
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1	14	7	5	4	3		1	1	1	2	
SAWLOGS NONCONIFEROUS	20	22	24	8	17	10	9	5	3	4	36	- 9.65
FUELWOOD	9	9	9	7	8	8	6	5	8	10	8	- .33
SAWNWOOD CONIFEROUS	2	37	37	61	49	60	69	60	103	98	112	13.05
SAWNWOOD NONCONIFEROUS	19	28	23	21	1	1	1		2	3	6	
WOOD-BASED PANELS	13	26	32	31	27	29	26	26	24	25	25	- 2.33
PULP FOR PAPER				3	1							
PAPER AND PAPERBOARD	1	3	10	22	9	10	11	10	16	14	20	11.97
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	185	325	520	107	92	64	234	873	670	288	244	6.58
RICE MILLED	2931	3228	2293	2018	1911	3720	4830	3131	5085	5437	6212	11.73
BARLEY		1	19	95		32	39	13	73	268	246	64.30
MAIZE	1327	1952	1630	2554	2243	2483	1768	2152	2143	2340	2704	2.53
MILLET	2	1	4	2	1	1	8	4	7	2	2	10.21
SORGHUM	99	134	135	189	213	182	138	166	170	208	289	5.23
POTATOES	23	35	40	36	46	95	73	55	99	110	81	12.97
SUGAR,TOTAL (RAW EQUIV.)	1215	1816	1989	2557	2804	3556	4475	2765	3118	2616	2836	4.40
PULSES	191	216	219	167	170	191	181	245	291	313	339	6.49
SOYBEANS	25	20	59	18	32	38	47	30	27	26	21	- 2.10
SOYBEAN OIL		9	8	7	4	2	4	7	6	27	27	13.10
GROUNDNUTS SHELLED BASIS	30	51	65	111	89	177	45	32	46	55	134	- .76
GROUNDNUT OIL	7	6	10	7	9	10	5	6	16	5	5	- 2.24
COPRA	922	1109	800	285	834	878	683	445	193	233	173	-16.34
COCONUT OIL	363	642	525	508	760	1004	845	1112	976	1060	1192	9.33
PALM NUTS KERNELS	66	57	42	29	33	33	30	13	23	45	23	- 6.78
PALM OIL	384	1147	1284	1411	1726	1897	2067	2168	2634	3295	3061	12.42
OILSEED CAKE AND MEAL	1418	2166	2243	2006	2060	3353	2870	2597	3456	3061	2974	5.15
BANANAS	27	461	503	705	872	846	738	832	921	972	920	7.48
ORANGES+TANGER+CLEMEN	19	33	41	39	137	86	113	65	81	75	43	5.11
COFFEE GREEN+ROASTED	265	204	206	203	226	262	267	339	335	375	369	8.41
COCOA BEANS	3	7	10	14	15	18	18	24	32	41	65	24.01
TEA	485	464	457	455	507	513	499	459	475	525	553	1.49
COTTON LINT	213	310	248	96	244	218	56	128	134	375	468	3.04
JUTE AND SIMILAR FIBRES	1037	716	867	860	566	646	544	473	522	467	529	- 6.02

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
TOBACCO UNMANUFACTURED	135	181	196	211	198	210	232	215	212	200	259	2.27
NATURAL RUBBER	2035	2565	3051	2868	2737	2967	3027	3080	3179	3102	2922	1.33
WOOL GREASY	7	2	2	3	1	2		1				
BOVINE CATTLE 1/	90	148	123	114	74	73	98	78	66	55	37	-11.63
SHEEP AND GOATS 1/	27	47	20	28	28	80	215	57	54	60	74	11.54
PIGS 1/	39	7	13	5	10	22	7	10	12	8	4	- 3.21
TOTAL MEAT	5	15	19	26	33	44	60	68	87	94	106	25.31
MILK DRY	2	3	2	3	4	4	5	7	10	16	9	21.15
TOTAL EGGS IN SHELL	3	7	4	3	5	6	10	6	5	3	5	- .38
FISHERY PRODUCTS												
FISH FRESH FROZEN	111	229	302	285	418	289	541	556	557	473	489	9.38
FISH CURED	42	42	54	36	32	30	29	33	30	30	26	- 5.34
SHELLFISH	68	172	218	212	228	291	295	313	348	246	196	3.35
FISH CANNED AND PREPARED	4	7	11	18	18	25	36	47	43	20	19	13.17
SHELLFISH CANNED+PREPAR	11	20	23	26	27	21	26	37	39	24	11	- 1.26
FISH BODY AND LIVER OIL				1	1	1	1	3	2	1	1	
FISH MEAL	26	65	78	63	57	84	113	139	167	161	162	13.70
FOREST PRODUCTS 2/												
SAWLOGS NONCONIFEROUS	17072	32177	39605	34240	28203	35758	37017	38458	35843	31534	23869	- 1.85
PULPWOOD+PARTICLE	7	763	754	986	930	697	1033	860	736	772	772	- .63
FUELWOOD	217	301	212	215	154	179	190	145	142	210	174	- 4.26
SAWNWOOD CONIFEROUS	11	109	188	117	134	251	258	425	481	410	283	16.07
SAWNWOOD NONCONIFEROUS	1586	3120	4352	3661	3298	5551	5374	5463	7236	6398	5544	8.04
WOOD-BASED PANELS	746	2573	3076	2424	2512	3110	3195	3358	3237	2933	3343	2.68
PULP FOR PAPER		1	11	5		1				1	2	
PAPER AND PAPERBOARD	52	99	173	114	104	175	139	156	171	325	346	11.99
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	69	4	9	4	3	4	5	6	7	3	8	2.74
RICE MILLED	2155	1637	2743	2832	2336	1547	1498	2094	1902	1644	1042	- 5.88
BARLEY	1		16		6	2		1	2	1		
MAIZE	147	110	65	130	315	430	356	230	240	104	123	3.85
MILLET	15	24	33	30	56	52	37	30	20	5	1	-24.35
POTATOES	50	52	54	49	50	55	53	62	81	77	80	5.91
SUGAR,TOTAL (RAW EQUIV.)	925	641	632	705	619	660	757	481	501	634	374	- 4.24
PULSES	135	128	115	86	83	97	89	76	90	70	106	- 3.14
SOYBEANS	565	373	321	375	355	199	130	113	306	140	124	-11.75
SOYBEAN OIL	3					1	2	6	4	4		
GROUNDNUTS SHELLED BASIS	96	53	47	38	48	54	32	37	51	80	244	11.24
GROUNDNUT OIL	24	15	13	16	15	16	5	13	18	19	64	9.70
COPRA			1									
COCONUT OIL	2											
PALM OIL				1								
OILSEED CAKE AND MEAL	38	27	43	31	29	36	30	30	49	88	184	15.89
BANANAS	410	245	270	165	127	96	140	101	117	109	103	- 9.33
ORANGES+TANGER+CLEMEN	67	90	83	74	79	56	80	70	76	68	56	- 3.31
COFFEE GREEN+ROASTED	5	4	6	6	4	12	4	5	5	6	5	.54
TEA	52	72	74	84	87	90	112	115	133	137	131	8.28
COTTON LINT	4	22	22	22	43	65	71	33	22	2	1	-23.32
JUTE AND SIMILAR FIBRES	5	2	2	1	1	4	7	20	32	40	46	56.74
TOBACCO UNMANUFACTURED	19	32	43	41	43	43	45	45	35	30	34	- 1.40
NATURAL RUBBER	88	32	40	49	17	49	50	41	50	39	29	.79
WOOL GREASY	23	22	23	22	24	25	21	22	24	23	20	- .45
BOVINE CATTLE 1/	242	171	162	166	204	195	196	172	221	270	251	4.91
SHEEP AND GOATS 1/	1626	1186	1220	1225	1030	873	482	443	463	448	330	-14.84
PIGS 1/	1833	2689	2794	2601	2775	2953	3016	3129	3079	4548	3170	3.78
TOTAL MEAT	130	185	192	141	158	196	139	183	220	221	202	2.53
TOTAL EGGS IN SHELL	42	41	47	46	46	38	35	42	51	71	66	4.57
FISHERY PRODUCTS												
FISH FRESH FROZEN	47	176	193	153	182	174	207	129	134	49	35	-14.35
FISH CURED	7	4	5	4	5	4	3	6	9	2	1	- 8.19
SHELLFISH	10	41	45	45	44	54	51	56	68	62	49	4.12
FISH CANNED AND PREPARED		3	6	6	6	14	13	21	31	31	22	27.78
SHELLFISH CANNED+PREPAR	2	8	8	7	7	11	11	14	10	8	8	1.82
FISH MEAL	2	3	3	3	1			1				
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	88	119	129	157	177	128	128	128	123	117	117	- 1.83
SAWLOGS NONCONIFEROUS	56	28	5	3	17	12	12	12	15	8	8	.02
SAWNWOOD CONIFEROUS	58	139	53	66	95	103	102	111	102	93	93	1.82
SAWNWOOD NONCONIFEROUS	46	177	160	118	133	136	91	115	63	52	52	-12.86
WOOD-BASED PANELS	320	953	959	687	770	872	949	1244	1096	885	885	1.60
PULP FOR PAPER	4	54	18	23	30	22	22	33	35	33	33	1.39

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
PAPER AND PAPERBOARD	89	115	116	107	132	122	122	121	95	158	158	2.54

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 5. WORLD AVERAGE EXPORT UNIT VALUES OF SELECTED AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	.....	.....	.....	.....	US $ PER METRIC TON	.....	.....	.....	.....	.....	.....	.....
AGRICULTURAL PRODUCTS												
WHEAT	68	69	106	171	169	153	125	131	163	184	187	7.30
WHEAT FLOUR	86	93	135	210	237	215	191	199	224	283	293	9.64
RICE MILLED	157	137	226	401	377	280	268	353	330	392	445	8.36
BARLEY	68	59	94	135	140	138	132	137	145	175	175	9.11
MAIZE	56	63	92	128	135	123	111	117	128	150	152	6.78
POTATOES	64	71	114	111	149	246	197	157	188	185	177	8.97
SUGAR CENTRIFUGAL RAW	100	150	189	399	556	376	295	340	356	542	510	10.25
SOYBEANS	109	126	216	246	225	216	272	250	271	264	279	5.98
SOYBEAN OIL	272	288	358	701	695	456	586	617	675	625	541	5.79
GROUNDNUTS SHELLED	173	245	339	511	513	467	592	660	668	684	978	12.68
GROUNDNUT OIL	320	373	444	937	804	723	814	942	964	762	993	8.41
COPRA	163	118	210	507	237	183	312	372	572	398	303	9.82
COCONUT OIL	262	207	358	929	418	361	550	627	939	652	537	9.16
PALM NUTS KERNELS	126	107	179	363	178	160	266	262	331	269	242	7.16
PALM OIL	197	188	255	529	462	362	514	554	617	563	530	10.54
PALM KERNEL OIL	253	238	342	826	455	402	538	617	853	660	551	8.54
OLIVE OIL	680	806	1168	1793	1860	1307	1259	1341	1632	1919	1710	5.45
CASTOR BEANS	117	158	384	329	207	251	334	333	367	367	347	5.62
CASTOR BEAN OIL	321	453	967	838	575	557	883	801	802	970	848	4.27
COTTONSEED	78	75	100	136	139	147	167	177	169	183	187	9.11
COTTONSEED OIL	292	317	355	602	675	555	599	607	682	627	626	6.56
LINSEED	121	121	258	426	336	291	273	216	281	311	324	4.15
LINSEED OIL	174	196	316	900	762	520	500	373	542	611	626	6.47
BANANAS	93	89	94	99	128	138	144	151	168	183	201	9.64
ORANGES	124	137	153	164	202	201	220	267	347	361	332	11.97
APPLES	153	186	249	241	317	274	352	412	399	445	412	9.37
RAISINS	326	362	726	907	716	677	965	1080	1539	1673	1488	14.82
DATES	110	154	166	213	245	242	323	417	431	479	613	16.54
COFFEE GREEN	711	902	1137	1259	1180	2285	4245	3176	3153	3321	2231	15.54
COCOA BEANS	542	567	841	1327	1400	1507	2811	3136	3271	2811	1803	17.36
TEA	1048	974	933	1098	1268	1236	2204	2072	1996	2056	1964	10.77
COTTON LINT	599	774	879	1295	1120	1295	1537	1361	1530	1629	1716	8.25
JUTE	286	228	250	243	238	266	277	356	380	378	305	5.60
JUTE-LIKE FIBRES	141	205	193	170	203	210	250	245	248	260	184	2.29
SISAL	136	151	320	716	469	342	380	379	482	587	521	8.12
TOBACCO UNMANUFACTURED	1276	1371	1501	1756	2079	2176	2357	2639	2741	2823	2952	9.08
NATURAL RUBBER	426	336	552	825	556	749	806	919	1208	1310	1126	13.17
RUBBER NATURAL DRY	357	309	573	714	545	720	794	915	1180	1313	1067	13.66
WOOL GREASY	1170	932	2057	2803	1765	1797	2160	2220	2460	2822	2949	8.07
CATTLE 1/	138	231	284	265	305	287	310	352	417	443	426	7.15
BEEF AND VEAL	722	1256	1661	1521	1725	1651	1851	2171	2431	2527	2378	7.43
MUTTON AND LAMB	492	586	872	1223	1071	1009	1143	1388	1590	1731	1847	11.09
PIGS 1/	36	57	78	81	90	90	100	104	111	106	109	6.31
BACON HAM OF SWINE	829	1027	1507	1620	2069	1979	1849	2223	2608	2849	2714	10.00
MEAT CHICKENS	632	745	1045	1033	1138	1183	1233	1316	1397	1470	1370	6.16
MEAT PREPARATIONS	871	1272	1537	1734	1499	1540	1521	1615	2148	2619	2565	7.10
EVAP COND WHOLE COW MILK	321	432	482	560	682	638	658	757	854	930	919	8.76
MILK OF COWS SKIMMED DRY	360	579	660	842	992	812	638	744	842	1073	1116	5.10
BUTTER OF COWMILK	791	1223	991	1315	1724	1670	1726	2236	2271	2467	2639	10.75
CHEESE OF WHOLE COWMILK	857	1255	1461	1713	2021	1969	2146	2509	2750	2905	2652	9.28
FISHERY PRODUCTS												
FISH FRESH FROZEN	338	539	664	668	745	896	1050	1129	1231	1218	1284	10.53
FISH CURED	443	652	874	1190	1256	1438	1582	1740	1953	2212	2214	13.61
SHELLFISH	983	1386	1787	1838	2078	2555	2796	3191	3617	3999	4265	13.24
FISH CANNED AND PREPARED	743	958	1186	1342	1330	1447	1709	2037	2282	2200	2199	10.12
SHELLFISH CANNED+PREPAR	1423	1718	2240	2620	2861	3133	3616	3722	4296	4706	4982	11.65
FISH BODY AND LIVER OIL	128	158	272	467	338	362	429	433	416	430	419	7.75
FISH MEAL	119	166	401	377	243	324	428	419	390	427	438	7.06
FOREST PRODUCTS												
SAWLOGS CONIFEROUS 2/	19	27	46	53	52	52	59	63	84	90	85	11.54
SAWLOGS NONCONIFEROUS 2/	24	26	40	48	39	50	54	57	93	102	90	14.44
PULPWOOD+PARTICLE 2/	10	14	17	22	25	23	24	25	26	36	38	9.59
FUELWOOD 2/	14	18	21	37	43	59	48	64	84	106	114	22.16
SAWNWOOD CONIFEROUS 2/	38	53	74	96	89	93	101	108	131	138	126	9.10
SAWNWOOD NONCONIF. 2/	62	80	105	133	128	134	151	163	215	242	219	11.63
WOOD-BASED PANELS 2/	110	132	167	187	183	197	214	230	286	321	302	9.46
PULP FOR PAPER	117	147	174	279	351	336	313	280	360	440	444	10.83
PAPER AND PAPERBOARD	170	207	245	348	415	406	421	451	504	570	567	10.93

1/ U.S. DOLLARS PER HEAD
2/ U.S. DOLLARS PER CUBIC METRE

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
WORLD												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	50745	59423	74392	65832	72165	70314	69411	77527	84071	95735	101164	4.95
RICE MILLED	8253	8803	9154	8448	7620	9248	10121	10262	12292	12966	13636	5.76
BARLEY	7037	13989	12096	12422	12512	13703	12355	14790	14824	15198	18723	3.39
MAIZE	27364	37861	46849	48902	51657	61681	54931	67768	74532	79676	79370	8.32
MILLET	338	292	468	464	322	353	405	395	300	239	244	- 4.57
SORGHUM	7236	5294	7286	10184	9224	10441	10681	10369	10121	10896	13102	7.10
POTATOES	3228	4878	3836	3829	3765	4327	4728	3913	4581	4695	4779	1.42
SUGAR,TOTAL (RAW EQUIV.)	19614	21365	22777	22292	21568	22175	26915	23927	25259	26449	28071	2.85
PULSES	1734	2061	2021	1684	1866	1883	2053	2030	2264	2811	2976	4.61
SOYBEANS	8273	13846	14675	17503	16313	19983	19623	23401	26123	26997	26364	8.28
SOYBEAN OIL	559	1116	1051	1503	1369	1615	2078	2379	2530	3143	3327	14.27
GROUNDNUTS SHELLED BASIS	1442	879	988	889	927	1062	840	823	802	728	884	- 1.92
GROUNDNUT OIL	464	518	537	387	428	513	596	476	477	512	342	- 1.53
COPRA	1246	1309	1061	545	1033	1215	919	804	465	481	406	-10.27
COCONUT OIL	464	848	764	625	953	1415	1081	1263	1204	1134	1400	6.98
PALM NUTS KERNELS	373	398	295	343	278	349	292	169	161	182	147	-10.24
PALM OIL	626	1372	1549	1559	1884	2018	2471	2306	2707	3269	2886	9.84
OILSEED CAKE AND MEAL	9320	14337	15395	14830	14910	18562	19255	22081	23928	25467	27652	8.22
BANANAS	5083	6415	6384	6345	6307	6357	6576	6858	7014	6799	6752	1.03
ORANGES+TANGER+CLEMEN	3697	4716	4951	4870	4991	5117	5276	4964	5110	5261	4987	.72
LEMONS AND LIMES	651	733	778	836	829	934	910	959	965	1003	962	3.29
COFFEE GREEN+ROASTED	3015	3474	3654	3463	3676	3776	3126	3435	3916	3799	3780	.76
COCOA BEANS	1104	1250	1171	1155	1192	1159	1006	1094	1040	1092	1265	- .79
TEA	691	752	758	822	806	846	899	828	886	913	929	2.28
COTTON LINT	3894	3959	4731	4125	4058	4103	4018	4504	4518	5030	4339	1.22
JUTE AND SIMILAR FIBRES	1019	796	884	804	569	658	557	488	580	578	599	- 4.62
TOBACCO UNMANUFACTURED	1016	1204	1239	1286	1303	1301	1260	1429	1396	1415	1448	1.98
NATURAL RUBBER	2409	2950	3259	3310	3107	3272	3378	3344	3473	3350	3283	1.00
WOOL GREASY	1102	1200	950	749	847	1033	869	868	914	844	857	- 1.78
BOVINE CATTLE 1/	5646	7941	7090	5967	6423	6695	6778	7324	7254	6848	7123	.10
SHEEP AND GOATS 1/	8545	11900	11151	10298	11213	10704	13143	14338	16430	18192	19498	6.99
PIGS 1/	3178	5973	5779	5985	6377	6802	6704	7761	8149	10620	9753	6.76
TOTAL MEAT	3707	5278	5489	5044	5536	6016	6616	6927	7552	7857	8372	5.89
MILK DRY	182	245	247	260	259	326	438	428	466	549	500	10.68
TOTAL EGGS IN SHELL	313	433	444	505	528	516	574	637	675	740	772	6.83
FISHERY PRODUCTS												
FISH FRESH FROZEN	1664	2439	2770	2864	2797	2916	3127	3467	3829	3815	3434	4.64
FISH CURED	514	480	413	377	377	363	333	338	365	350	328	- 3.08
SHELLFISH	406	686	716	769	820	938	893	1050	1203	1114	1001	5.88
FISH CANNED AND PREPARED	542	684	735	767	713	831	765	843	877	883	874	2.82
SHELLFISH CANNED+PREPAR	90	115	134	130	129	144	153	156	160	156	152	3.28
FISH BODY AND LIVER OIL	847	739	631	624	631	613	569	653	734	783	729	1.36
FISH MEAL	2913	3114	1720	1908	2288	2193	2211	2027	2345	2277	2121	- .49
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	16414	26420	29838	26831	24329	27655	29218	29809	31486	27930	23057	- .14
SAWLOGS NONCONIFEROUS	25717	41834	49430	45228	35757	44222	46205	47605	48213	42178	33999	- 1.06
PULPWOOD+PARTICLE	18635	22879	28801	33914	31445	31875	36146	33903	38638	42197	39147	5.29
FUELWOOD	1538	1105	1679	1816	1684	1550	1627	1337	1383	1399	976	- 2.63
SAWNWOOD CONIFEROUS	42255	56773	60799	52077	42284	54359	60623	65094	67158	62801	57893	1.88
SAWNWOOD NONCONIFEROUS	5566	7804	10562	9563	8069	10438	11411	11867	13553	12702	11594	4.87
WOOD-BASED PANELS	6879	13116	16063	13710	12377	14543	14538	15856	16758	15398	15783	1.91
PULP FOR PAPER	11903	14881	16568	17387	13504	15258	15337	17380	18562	18852	18028	2.28
PAPER AND PAPERBOARD	17955	25176	27010	28939	23003	26556	27734	30354	32332	33699	33353	3.40
WESTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	10378	13410	13527	12488	12394	13109	12521	13300	12885	14024	13171	.25
RICE MILLED	586	770	804	806	809	1225	1352	1567	1392	1335	1496	9.08
BARLEY	4955	5694	5364	6345	5477	6329	6136	6567	5105	5255	6065	- .09
MAIZE	19374	20166	22641	24324	25301	26440	26733	24757	24817	23438	21787	.60
MILLET	222	114	138	108	112	90	182	195	150	98	109	.71
SORGHUM	2034	578	1139	2800	2669	2893	2146	1425	1166	1251	1090	- .11
POTATOES	1945	2549	2390	2235	2372	3149	2999	2565	2811	3051	2979	2.73
SUGAR,TOTAL (RAW EQUIV.)	4709	4823	4804	5165	5096	4467	4112	3431	3346	3096	3069	- 6.21
PULSES	831	1098	1103	786	794	828	888	907	1054	1013	910	- .21
SOYBEANS	4762	8323	8327	11275	10524	11719	11612	14201	15311	16217	14340	7.53
SOYBEAN OIL	155	368	316	545	575	532	502	559	580	675	663	6.75
GROUNDNUTS SHELLED BASIS	1188	610	712	628	621	749	577	556	545	428	383	- 5.34
GROUNDNUT OIL	390	435	422	327	338	351	355	325	407	446	289	- 1.38
COPRA	711	822	630	354	816	961	670	515	294	252	183	-12.81

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
COCONUT OIL	153	287	277	177	281	427	331	395	390	414	540	8.35
PALM NUTS KERNELS	318	350	251	329	260	327	271	153	137	147	128	-10.86
PALM OIL	394	693	752	698	797	860	829	781	856	833	722	1.23
OILSEED CAKE AND MEAL	7484	10383	11039	9927	10101	12778	12860	15320	16705	17392	18046	7.55
BANANAS	2279	2554	2556	2427	2329	2256	2430	2525	2460	2239	2196	- 1.15
ORANGES+TANGER+CLEMEN	2806	3309	3459	3200	3198	3176	3322	3143	3227	3222	2978	- .85
LEMONS AND LIMES	380	368	378	386	398	432	408	428	432	429	408	1.55
COFFEE GREEN+ROASTED	1284	1606	1674	1642	1747	1810	1543	1703	1955	1929	1991	2.18
COCOA BEANS	546	602	584	574	564	565	561	590	569	616	658	.77
TEA	319	289	298	313	289	297	336	250	278	297	273	- .88
COTTON LINT	1449	1281	1543	1145	1188	1318	1135	1216	1150	1258	1015	- 2.15
JUTE AND SIMILAR FIBRES	561	398	353	356	177	232	216	157	182	132	124	-12.02
TOBACCO UNMANUFACTURED	561	646	681	661	677	695	677	785	743	701	669	.92
NATURAL RUBBER	724	910	947	958	875	941	950	861	925	892	841	- .81
WOOL GREASY	596	597	423	370	391	528	418	425	437	389	382	- 2.25
BOVINE CATTLE 1/	2557	3933	3305	2691	3444	3306	3175	3472	3529	3416	3222	- .14
SHEEP AND GOATS 1/	1745	3017	2529	1968	2570	2370	2354	2724	2913	2920	2161	.08
PIGS 1/	1144	3000	2819	3009	3314	3629	3284	3870	4382	5202	5454	7.49
TOTAL MEAT	2437	3350	3446	2876	3104	3311	3461	3765	3787	3760	3504	1.84
MILK DRY	88	118	102	85	92	117	98	115	127	146	124	3.37
TOTAL EGGS IN SHELL	176	247	270	318	311	307	327	366	400	430	433	6.27
FISHERY PRODUCTS												
FISH FRESH FROZEN	821	1026	1143	1231	1147	1132	1229	1332	1470	1567	1339	3.72
FISH CURED	214	233	186	181	158	158	161	168	194	188	184	- .93
SHELLFISH	142	249	245	261	295	328	275	347	368	386	284	3.93
FISH CANNED AND PREPARED	259	283	310	288	274	307	294	287	313	326	322	1.22
SHELLFISH CANNED+PREPAR	33	46	57	56	60	63	68	73	80	82	78	6.09
FISH BODY AND LIVER OIL	739	665	569	551	558	537	510	584	666	675	675	1.44
FISH MEAL	1722	1855	1106	1086	1204	1187	1084	1074	1221	1192	1195	- 1.97
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	2511	2767	4316	4756	3221	4417	4890	4094	4547	5103	4497	3.79
SAWLOGS NONCONIFEROUS	6295	9070	10952	8928	6985	8858	8746	7671	8011	8396	6878	- 2.76
PULPWOOD+PARTICLE	11258	11882	14941	18155	17920	17241	16706	15282	17866	20831	21810	4.46
FUELWOOD	1014	837	1413	1597	1470	1343	1379	1106	1129	1167	728	- 3.07
SAWNWOOD CONIFEROUS	22088	25396	28214	23709	17177	23111	22096	23684	27274	25507	21703	- .30
SAWNWOOD NONCONIFEROUS	2647	3995	5677	4033	3620	5435	5521	5620	6831	6088	5091	4.11
WOOD-BASED PANELS	3991	6274	8157	6952	6076	7564	7524	8440	9652	8940	8763	3.87
PULP FOR PAPER	6948	8380	9305	9594	7234	8370	8217	9369	9949	9943	9524	1.56
PAPER AND PAPERBOARD	6978	11433	12502	13523	9907	12368	12631	13596	15064	15099	15231	3.33
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	6090	12986	19997	7294	13297	12920	11783	12915	15817	20886	23824	5.90
RICE MILLED	645	503	419	441	544	647	726	710	940	995	1579	13.59
BARLEY	776	5487	3416	2368	3283	4118	2225	4137	4559	4311	6025	3.59
MAIZE	1101	6090	7816	6927	9131	17664	7493	17809	20175	18863	21512	15.67
POTATOES	503	1365	584	642	514	368	664	301	512	297	337	-11.13
SUGAR,TOTAL (RAW EQUIV.)	3178	2757	3504	2863	3915	4531	5566	4637	4878	5708	6275	8.98
PULSES	28	34	32	49	59	39	33	39	41	54	70	4.96
SOYBEANS	145	478	914	265	520	2089	1544	1409	2360	1768	1656	19.52
SOYBEAN OIL	38	87	34	38	31	72	94	103	122	137	173	16.88
GROUNDNUTS SHELLED BASIS	65	69	52	66	59	54	59	57	46	54	62	- 1.49
GROUNDNUT OIL	2	1	1	4	4	2	2	1	2	1		
COPRA	3	35	28	29	29	25	38	26	25	30	20	- 3.02
COCONUT OIL	23	38	24	27	42	93	48	66	58	89	77	12.98
PALM NUTS KERNELS	20	6	13	3	4	4	4	4	3	4		
PALM OIL	5	13	10	22	17	28	67	58	113	112	134	36.10
OILSEED CAKE AND MEAL	1212	2764	3009	3404	3541	3678	3733	3786	4098	4681	5874	6.91
BANANAS	75	174	189	198	267	224	281	299	282	260	236	4.54
ORANGES+TANGER+CLEMEN	395	686	680	762	715	693	727	719	690	750	695	.22
LEMONS AND LIMES	199	253	273	308	310	330	314	327	309	344	308	2.15
COFFEE GREEN+ROASTED	118	185	171	183	205	199	201	178	201	228	202	1.74
COCOA BEANS	156	239	215	250	280	256	175	202	212	225	227	- 1.39
TEA	34	64	54	69	88	82	80	71	79	102	116	6.14
COTTON LINT	678	744	710	748	769	679	720	681	718	743	645	- .89
JUTE AND SIMILAR FIBRES	90	88	85	67	83	80	68	70	78	92	111	1.67
TOBACCO UNMANUFACTURED	134	160	151	142	147	126	133	135	133	178	205	1.72
NATURAL RUBBER	439	450	495	548	473	485	409	433	437	441	418	- 1.82
WOOL GREASY	106	143	148	151	162	162	161	182	188	182	184	3.17
BOVINE CATTLE 1/	114	61	90	232	506	195	224	84	176	180	167	4.54
SHEEP AND GOATS 1/	2071	1601	1907	1918	1520	1401	1103	1243	1251	1276	1167	- 5.10
PIGS 1/	74	145	126	103	185	59	306	523	502	604	973	28.02
TOTAL MEAT	315	277	265	597	545	416	754	265	644	956	1221	13.68

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
MILK DRY	12	30	22	28	23	28	43	29	42	71	78	12.95
TOTAL EGGS IN SHELL	52	63	51	51	50	37	43	43	47	43	32	- 4.67
FISHERY PRODUCTS												
FISH FRESH FROZEN	142	128	120	132	141	159	147	222	239	306	257	10.94
FISH CURED	23	20	18	18	24	28	18	16	17	18	10	- 4.76
FISH CANNED AND PREPARED	27	27	27	26	41	52	41	38	39	41	39	4.93
FISH BODY AND LIVER OIL	28	21	15	28	34	4	7	6	5	9	3	-18.83
FISH MEAL	294	453	287	458	498	445	407	390	430	435	370	- .02
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	744	780	1188	1248	830	787	885	960	720	1050	960	- .71
SAWLOGS NONCONIFEROUS	441	480	577	541	588	556	556	442	416	454	487	- 2.22
PULPWOOD+PARTICLE	1419	1397	1208	1533	1722	1548	1440	1345	1446	1529	1204	- .48
FUELWOOD	199	6	5	5	5	5	5	5	4	4	4	- 3.64
SAWNWOOD CONIFEROUS	2650	2999	2841	3438	3599	2702	3157	3228	2643	2663	2620	- 1.89
SAWNWOOD NONCONIFEROUS	484	371	354	441	442	366	363	326	270	277	386	- 2.84
WOOD-BASED PANELS	398	819	923	1117	1245	1386	1314	1132	1045	1109	1064	1.82
PULP FOR PAPER	598	857	913	859	1106	1041	1029	1036	1005	1155	1129	2.89
PAPER AND PAPERBOARD	814	1440	1417	1507	1713	1706	1712	1709	1784	2046	1920	3.70
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	11	3	4	83	17	23	35	1	5	6	1	-17.32
RICE MILLED	56	94	92	71	74	80	80	82	91	94	106	1.67
BARLEY	156	360	181	328	307	195	180	108	157	140	127	-10.40
MAIZE	760	448	825	1320	818	838	623	476	849	1228	1276	5.02
POTATOES	178	141	175	239	208	213	301	235	242	213	340	6.30
SUGAR,TOTAL (RAW EQUIV.)	5175	5650	5706	6137	4475	5034	6330	4821	5399	4594	5447	- 1.23
PULSES	18	29	32	66	44	34	53	43	39	43	61	3.98
SOYBEANS	438	309	232	391	385	422	318	325	351	483	382	3.54
SOYBEAN OIL	10	17	19	34	23	31	28	35	22	12	9	- 5.57
GROUNDNUTS SHELLED BASIS	54	55	62	61	62	64	56	68	64	56	231	7.91
GROUNDNUT OIL	12	7	7	6	7	8	7	6	5	5	4	- 5.21
COPRA	277	209	159	27								
COCONUT OIL	215	374	280	271	435	603	495	503	527	422	476	5.35
PALM OIL	39	226	196	217	483	416	282	173	163	137	138	- 6.95
OILSEED CAKE AND MEAL	262	238	216	300	301	386	374	426	491	431	443	8.80
BANANAS	1817	2146	2169	2268	2179	2411	2410	2543	2659	2669	2794	3.13
ORANGES+TANGER+CLEMEN	225	259	265	259	264	339	380	303	294	320	333	2.94
LEMONS AND LIMES	17	18	19	20	23	24	27	34	36	38	43	10.57
COFFEE GREEN+ROASTED	1363	1343	1405	1246	1324	1290	986	1195	1277	1190	1104	- 2.02
COCOA BEANS	305	308	268	238	248	252	186	226	179	162	264	- 4.10
TEA	86	93	102	105	96	106	117	91	101	107	107	.84
COTTON LINT	140	93	86	72	61	73	53	59	61	65	63	- 3.97
JUTE AND SIMILAR FIBRES	48	16	33	31	23	25	14	17	23	10	16	- 6.30
TOBACCO UNMANUFACTURED	123	153	158	163	177	161	142	173	188	191	176	1.89
NATURAL RUBBER	516	685	727	759	747	818	903	846	862	695	759	1.04
WOOL GREASY	59	30	18	8	13	17	12	15	11	14	20	- 2.04
BOVINE CATTLE 1/	783	1260	1264	716	516	1183	1184	1308	760	758	849	- 2.42
SHEEP AND GOATS 1/	38	58	71	33	61	71	52	40	27	42	41	- 5.41
PIGS 1/	21	90	88	197	30	46	44	204	138	247	146	9.81
TOTAL MEAT	491	797	785	637	719	862	755	875	913	854	766	1.52
TOTAL EGGS IN SHELL	9	6	12	15	12	13	19	18	21	12	12	6.26
FISHERY PRODUCTS												
FISH FRESH FROZEN	386	728	792	689	611	709	727	800	776	699	734	.38
FISH CURED	33	32	33	31	30	37	30	34	31	26	26	- 2.09
SHELLFISH	116	149	140	148	139	157	158	146	155	146	144	.24
FISH CANNED AND PREPARED	82	108	104	131	82	103	78	89	95	99	90	- 2.19
SHELLFISH CANNED+PREPAR	25	31	32	33	27	35	41	38	41	39	42	4.08
FISH BODY AND LIVER OIL	46	10	11	8	7	11	8	9	9	12	12	2.21
FISH MEAL	595	357	63	62	108	128	74	40	82	45	45	-13.05
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1298	2387	1954	1737	1728	2025	2174	2043	2458	2146	1674	- .14
SAWLOGS NONCONIFEROUS	587	459	459	492	318	291	294	409	502	471	417	.12
PULPWOOD+PARTICLE	3536	2081	1863	2187	1859	2039	2273	2516	2504	2249	2348	2.52
FUELWOOD	17	31	26	32	35	30	51	59	63	45	23	3.98
SAWNWOOD CONIFEROUS	11693	21522	21750	16639	14175	19583	25061	28675	26582	22839	22542	3.37
SAWNWOOD NONCONIFEROUS	1198	1429	1732	1412	963	1287	1351	1431	1571	1422	1557	.71
WOOD-BASED PANELS	1879	4666	4147	3245	3147	3645	3546	3956	3336	2378	2851	- 4.46
PULP FOR PAPER	2622	3239	3497	3533	2687	3243	3344	3477	3818	3502	3538	1.22
PAPER AND PAPERBOARD	6401	7143	7546	7602	6165	6982	7017	8387	8322	8118	7595	1.49

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	100	47		50	134	112			32	54	53	
RICE MILLED	5	5	6	7	7	6	9	8	8	8	9	5.00
MAIZE	2	1	1	1	1	1	2	3	3	4	5	27.74
POTATOES				1								
SUGAR,TOTAL (RAW EQUIV.)	130	186	171	153	192	174	185	166	172	151	120	- 2.73
PULSES	18	16	12	16	20	13	12	13	12	14	13	- 2.48
SOYBEANS				33	16	10	21	15		13	41	
SOYBEAN OIL	6	4	6	10	18	38	33	29	26	32	29	24.14
GROUNDNUTS SHELLED BASIS	4	6	5	6	5	8	5	12	4	5	9	1.86
GROUNDNUT OIL	9	5	3	4	4	2	4	2	3		1	
COPRA	38	26	24	20	12	10	11	5	7	4	6	-18.69
COCONUT OIL	1	8	9	13	11	18	20	18	19	17	16	9.31
PALM OIL	3	8	7	14	16	17	23	23	28	26	24	15.73
OILSEED CAKE AND MEAL	20	24	12	21	15	3	6	30	9	13	23	- .54
BANANAS	30	24	33	37	43	29	35	38	35	37	36	2.34
ORANGES+TANGER+CLEMEN	16	16	18	18	18	15	17	18	14	16	16	- 1.13
LEMONS AND LIMES									1	1	1	
COFFEE GREEN+ROASTED	21	29	29	32	35	32	34	26	35	41	38	2.76
COCOA BEANS	21	18	21	21	25	16	20	17	15	14	15	- 4.50
TEA	37	37	36	34	35	33	35	30	30	32	28	- 2.57
COTTON LINT	9	9	4	9	4	4	5	4	2	2	2	-13.98
JUTE AND SIMILAR FIBRES	10	19	16	26	17	14	12	11	12	9	11	- 8.66
TOBACCO UNMANUFACTURED	15	15	14	17	17	17	13	16	13	15	15	- .62
NATURAL RUBBER	46	52	55	74	53	61	55	52	53	54	50	- 1.40
WOOL GREASY	2	4	5	6	1	1	1	1	1		1	
BOVINE CATTLE 1/		3	3	3	1	1	2	1	1	1		
SHEEP AND GOATS 1/		1	1					1	1	8	1	
TOTAL MEAT	1	1	2	4	2	2	2	1	2	4	4	11.49
MILK DRY			1	1	1	1	1	1	1		1	
FISHERY PRODUCTS												
FISH FRESH FROZEN	20	22	18	22	19	19	20	21	22	20	19	- .16
FISH CURED	3	4	3	5	4	4	5	3	5	5	5	1.70
SHELLFISH	1	1	2	1	1	3	3	2	4	3	4	14.04
FISH CANNED AND PREPARED	14	15	25	27	23	19	25	26	22	24	25	2.43
SHELLFISH CANNED+PREPAR	2	3	4	6	5	6	7	7	6	6	6	6.45
FISH BODY AND LIVER OIL	4	1	1	1	1	1	1	1	1			
FISH MEAL	14	27	14	14	24	13	8	3	4	4	4	-20.50
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	18	5	1	3		5	2	2				
SAWLOGS NONCONIFEROUS	70	95	101	106	41	46	26	17	11	2	1	-39.34
FUELWOOD					2	1						
SAWNWOOD CONIFEROUS	647	672	793	886	637	693	754	638	682	697	773	- .52
SAWNWOOD NONCONIFEROUS	169	254	338	449	282	346	445	311	304	317	304	- .15
WOOD-BASED PANELS	45	73	92	131	123	137	121	89	99	88	104	.15
PULP FOR PAPER	265	242	315	352	301	232	276	239	279	279	284	- .66
PAPER AND PAPERBOARD	462	492	563	678	683	470	652	584	671	739	745	3.35
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	2900	3518	3818	4566	5138	5054	6086	7314	7607	8506	9305	11.64
RICE MILLED	590	791	976	976	602	878	1547	1829	2122	2201	2394	15.26
BARLEY	115	76	106	114	173	68	219	647	418	300	539	24.76
MAIZE	199	480	480	830	859	678	878	1035	1210	2391	2809	19.82
MILLET	95	133	240	234	140	162	158	132	72	83	80	-10.39
SORGHUM	20	40	84	179	39	77	45	97	81	69	129	4.56
POTATOES	132	131	192	208	188	148	210	239	300	241	309	7.70
SUGAR,TOTAL (RAW EQUIV.)	1260	1338	1363	1289	1274	1419	1779	1950	2005	2110	2378	7.51
PULSES	68	77	78	53	89	77	91	88	155	135	156	9.96
SOYBEANS	1	1	13	10	9	16	50	23	32	25	17	26.63
SOYBEAN OIL	51	100	93	147	155	121	255	294	334	329	331	17.41
GROUNDNUTS SHELLED BASIS	21	21	24	19	44	18	27	20	14	17	15	- 5.48
GROUNDNUT OIL	12	24	39	6	8	30	23	13	12	15	8	- 6.84
COPRA	4	5	6	2	3	3	3	4	4	3	4	- 1.36
COCONUT OIL	8	15	14	13	9	18	20	10	9	10	16	- 1.64
PALM NUTS KERNELS	2				1							
PALM OIL	9	27	41	38	29	68	81	94	95	132	186	22.81
OILSEED CAKE AND MEAL	18	41	36	50	58	54	102	122	154	183	245	24.36
BANANAS	35	52	55	43	37	52	46	29	12	15	17	-14.97
ORANGES+TANGER+CLEMEN	9	10	10	10	12	10	12	12	11	10	10	.28

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
LEMONS AND LIMES			1	1		1	1	1	1	1	1	
COFFEE GREEN+ROASTED	41	34	42	61	65	77	59	83	70	81	81	8.47
COCOA BEANS	2	2	2	2	2	1	3	1	1	1		
TEA	37	41	35	42	45	42	46	55	70	58	69	7.23
COTTON LINT	30	33	41	50	54	46	51	42	48	43	54	2.35
JUTE AND SIMILAR FIBRES	34	58	74	94	80	61	73	56	64	65	57	- 2.34
TOBACCO UNMANUFACTURED	35	41	45	57	53	46	48	62	63	54	47	2.03
NATURAL RUBBER	9	16	18	21	17	18	22	21	20	20	26	3.67
WOOL GREASY		1	1	1	1	3	3	4	3	1	1	9.15
BOVINE CATTLE 1/	825	983	899	756	626	632	688	787	811	832	929	.04
SHEEP AND GOATS 1/	1623	1384	1263	1246	1229	1113	1167	1144	1249	1330	1420	.27
PIGS 1/	1	7	2		1	1	1	1	1			
TOTAL MEAT	39	51	40	43	57	84	110	132	129	142	189	19.11
MILK DRY	6	9	15	25	20	22	22	24	25	36	43	13.54
TOTAL EGGS IN SHELL	1	2	3	4	8	13	21	44	36	51	56	50.05
FISHERY PRODUCTS												
FISH FRESH FROZEN	77	196	234	315	305	294	298	354	448	450	305	6.78
FISH CURED	86	53	50	40	46	52	41	39	43	43	41	- 2.21
SHELLFISH	1	3	4	3	11	14	18	17	17	16		
FISH CANNED AND PREPARED	25	56	66	64	62	89	85	127	121	121	125	10.71
FISH BODY AND LIVER OIL		2	3	4	1	3	2	2	3	3	1	- 2.57
FISH MEAL	11	18	13	18	12	13	20	23	32	31	5	- .26
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1	20	8	17	38	43	31	32	53	21	21	7.92
SAWLOGS NONCONIFEROUS	128	191	215	311	153	172	286	197	244	341	342	5.31
PULPWOOD+PARTICLE	5	5										
FUELWOOD	21	12	5	1	5							
SAWNWOOD CONIFEROUS	539	621	603	954	764	829	1251	764	1019	904	901	4.28
SAWNWOOD NONCONIFEROUS	124	132	115	218	153	168	158	205	208	225	233	6.50
WOOD-BASED PANELS	100	129	138	198	185	195	314	276	331	324	323	11.85
PULP FOR PAPER	9	31	46	65	56	76	80	80	77	79	79	8.98
PAPER AND PAPERBOARD	276	406	502	584	477	478	521	551	600	610	609	3.50
LATIN AMERICA												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR, WHEAT EQUIV.	6072	6661	8102	8336	6893	8707	7939	10529	10306	11886	11672	6.23
RICE MILLED	365	417	391	621	565	489	433	436	1325	1092	827	10.34
BARLEY	93	116	186	319	262	207	203	358	302	468	450	12.40
MAIZE	374	797	2334	2583	3897	2438	3590	4714	3975	8925	6658	21.11
MILLET		3	2	4	4	6	2	4	6	3		
SORGHUM	30	615	450	1048	1348	554	1316	1459	1902	2783	3302	21.38
POTATOES	201	448	241	192	198	173	198	202	249	336	245	- .96
SUGAR, TOTAL (RAW EQUIV.)	255	354	427	254	110	275	625	844	678	1290	1751	22.86
PULSES	202	220	252	274	307	299	401	291	283	823	831	13.25
SOYBEANS	64	134	184	590	127	444	628	960	949	1201	2286	33.33
SOYBEAN OIL	72	109	149	242	138	242	252	345	368	445	430	16.31
GROUNDNUTS SHELLED BASIS	33	13	6	13	55	40	9	17	13	14	14	.59
GROUNDNUT OIL	11	16	33	12	41	64	136	84	9	2	3	-19.13
COPRA	41	1		1	21	1						
COCONUT OIL	6	19	33	26	40	88	26	39	14	25	23	- 2.63
PALM NUTS KERNELS				2	2	2	1		2	1		
PALM OIL	5	9	23	9	3	16	16	8	14	13	6	- 1.23
OILSEED CAKE AND MEAL	95	224	257	398	339	413	593	635	684	939	1045	18.39
BANANAS	271	242	237	286	233	184	228	287		496	417	7.85
ORANGES+TANGER+CLEMEN	17	14	19	18	17	19	26	25	41	58	47	16.58
LEMONS AND LIMES	3	2	1	2	1	1	2	2	2	2	2	5.22
COFFEE GREEN+ROASTED	46	67	75	96	82	86	54	58	103	59	62	- 2.18
COCOA BEANS	22	20	16	20	15	7	3	1	2	3	1	-29.03
TEA	11	12	12	18	10	13	14	15	20	16	15	3.62
COTTON LINT	74	83	87	67	69	56	85	71	93	75	88	.92
JUTE AND SIMILAR FIBRES	15	14	34	55	45	30	15	12	18	36	39	- .45
TOBACCO UNMANUFACTURED	14	11	14	23	16	18	19	17	18	29	24	6.99
NATURAL RUBBER	80	138	139	168	144	166	171	186	181	187	181	3.51
WOOL GREASY	17	14	5	4	6	8	6	7	9	13	13	6.15
BOVINE CATTLE 1/	611	664	590	633	578	626	604	695	971	557	537	-.21
SHEEP AND GOATS 1/	114	137	65	226	316	41	55	54	122	124	220	.47
PIGS 1/	37	48	38	42	48	59	36	34	25	9	28	-10.83
TOTAL MEAT	95	151	126	232	160	182	197	373	364	337	379	12.90
MILK DRY	34	32	50	49	50	71	175	124	109	143	123	17.90
TOTAL EGGS IN SHELL	6	7	6	6	6	9	14	11	17	19	26	17.95

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
FISHERY PRODUCTS												
FISH FRESH FROZEN	23	40	58	69	126	97	92	94	130	135	74	8.74
FISH CURED	92	73	75	59	67	56	49	44	45	43	41	- 7.00
SHELLFISH	4	4	7	9	5	3	4	4	7	7	4	- .61
FISH CANNED AND PREPARED	24	42	35	39	41	44	49	61	70	66	64	7.83
SHELLFISH CANNED+PREPAR	1	1	1	2	1	1	1	1	2	1		
FISH BODY AND LIVER OIL	20	29	19	23	20	44	27	36	36	78	33	9.24
FISH MEAL	105	187	44	61	143	75	71	106	115	99	100	1.31
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	4	16	25	27	7	43	26	34	54	120	121	25.03
SAWLOGS NONCONIFEROUS	308	179	134	128	134	73	69	105	65	57	41	-13.23
FUELWOOD	7	9	8	8	3	2	2	1	1	1	3	-20.78
SAWNWOOD CONIFEROUS	1355	1497	1458	1235	1235	1639	1613	1710	1505	2000	2056	4.34
SAWNWOOD NONCONIFEROUS	88	187	202	685	742	427	520	679	684	910	729	14.77
WOOD-BASED PANELS	83	148	142	181	165	180	229	293	380	448	464	15.68
PULP FOR PAPER	419	636	649	807	543	534	461	576	643	726	700	-.33
PAPER AND PAPERBOARD	1283	1805	1746	2061	1630	1719	2066	1809	1775	2343	2391	2.66
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	4076	4387	5044	8294	8180	6983	8530	9558	10658	11481	13151	11.23
RICE MILLED	343	575	501	946	941	1111	1455	1550	1958	1805	1976	16.71
BARLEY	205	297	595	530	473	465	990	892	1570	2554	3086	26.94
MAIZE	335	460	423	803	807	1025	1506	1866	2286	3111	3428	27.57
MILLET		2	3	30	3	10	6	4	3	2	2	- 8.14
SORGHUM	10	3	5	4	77	197	189	254	102	202	207	63.75
POTATOES	127	123	123	178	171	160	233	234	298	379	396	14.45
SUGAR,TOTAL (RAW EQUIV.)	1291	1151	1601	1693	1975	1590	2124	2176	2654	3465	3386	11.49
PULSES	147	151	109	128	243	234	200	205	228	251	379	10.45
SOYBEANS	6	14	28	62	28	29	63	138	180	94	118	26.62
SOYBEAN OIL	63	181	108	232	270	332	230	280	379	442	574	14.60
GROUNDNUTS SHELLED BASIS	12	10	7	8	10	9	15	7	7	12	9	.71
GROUNDNUT OIL	3	2	2	1	1	2	2	1	1	3		
COPRA	2	1			8	7		1				
COCONUT OIL	5	8	5	8	22	31	8	11	9	17	12	5.35
PALM NUTS KERNELS					1	5						
PALM OIL	59	91	89	78	137	76	148	164	187	232	158	10.99
OILSEED CAKE AND MEAL	42	136	88	117	100	237	379	459	441	417	640	24.79
BANANAS	44	108	135	167	255	308	272	276	317	298	297	11.48
ORANGES+TANGER+CLEMEN	98	225	284	408	532	634	543	462	555	570	569	8.98
LEMONS AND LIMES	23	13	14	27	32	54	52	46	79	81	79	23.53
COFFEE GREEN+ROASTED	55	59	55	56	49	51	53	42	40	45	54	- 2.57
COCOA BEANS	2	3	2	2	4	4	2	4	1	1	3	- 5.08
TEA	98	122	114	144	132	157	148	202	183	173	186	5.73
COTTON LINT	9	8	9	12	26	7	37	21	37	20	14	11.27
JUTE AND SIMILAR FIBRES	33	18	27	31	31	40	33	24	45	31	35	4.89
TOBACCO UNMANUFACTURED	22	28	29	32	44	45	45	52	56	50	61	9.01
NATURAL RUBBER	32	52	49	57	51	50	49	46	35	50	46	- 2.23
WOOL GREASY	21	29	20	23	26	27	32	17	19	19	19	- 3.68
BOVINE CATTLE 1/	154	178	154	153	160	184	389	389	383	504	636	18.30
SHEEP AND GOATS 1/	2386	5022	4695	4317	4921	5135	7856	8641	10379	12031	14051	14.50
PIGS 1/			1		2		5					
TOTAL MEAT	30	75	90	142	251	331	483	586	678	942	1241	37.46
MILK DRY			1	2	1	2	5	6	6	2	8	
TOTAL EGGS IN SHELL	21	54	44	56	81	77	84	85	76	107	133	10.20
FISHERY PRODUCTS												
FISH FRESH FROZEN	21	22	23	30	41	60	54	71	89	90	78	18.52
FISH CURED	4	5	3	4	3	3	3	2	3	2		
SHELLFISH		1	1	1	1	1	1	1	1	1	1	4.27
FISH CANNED AND PREPARED	9	16	23	27	33	44	43	44	45	49	46	11.62
SHELLFISH CANNED+PREPAR									1	1		
FISH BODY AND LIVER OIL	1	2	2	2	2	2	3	2	2	1		
FISH MEAL	6	13	12	28	27	51	136	56	57	44	47	18.06
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	40	154	135	59	165	144	166	145	135	150	136	2.18
SAWLOGS NONCONIFEROUS	48	43	40	37	68	132	112	94	34	76	113	8.43
PULPWOOD+PARTICLE	51		29	26	8	9	13	36	40	14	4	16.18
FUELWOOD	53	29	62	34	35	37	38	39	31	24	26	- 4.41
SAWNWOOD CONIFEROUS	1050	1638	1589	1685	1634	2088	2792	2245	2493	2951	3533	9.16
SAWNWOOD NONCONIFEROUS	117	103	80	350	381	445	827	816	664	813	732	27.40
WOOD-BASED PANELS	81	233	331	419	465	582	740	792	916	935	1064	17.56
PULP FOR PAPER	36	63	69	64	71	69	81	80	85	86	85	3.76
PAPER AND PAPERBOARD	457	591	539	572	696	724	866	889	848	977	1057	7.72

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	.....	.....	.....	.....	THOUSAND METRIC TONS	.....	.....	.....	.....	.....	.....	
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	12039	6490	10713	11313	14942	13386	7241	7708	8783	8924	8660	- 1.53
RICE MILLED	3708	4482	4730	3082	3067	3778	3986	3541	3497	4511	4440	-.43
BARLEY	5	349	494	497	539	8	327	107	106	206	275	- 9.83
MAIZE	781	1174	1337	1250	1428	1971	2517	3117	4114	3873	4410	18.43
MILLET			26	43	13	29	10	1	2	2	2	
SORGHUM	2107		1188	727	204	398	21	49	144	62	160	20.46
POTATOES	105	90	96	100	89	95	106	119	145	157	152	6.88
SUGAR,TOTAL (RAW EQUIV.)	1005	1086	1398	1069	1100	1087	1395	1800	1874	2387	2442	9.90
PULSES	158	191	127	100	98	90	91	171	200	187	228	5.90
SOYBEANS	82	146	168	135	153	433	370	489	728	867	1105	28.59
SOYBEAN OIL	124	184	178	184	87	194	527	583	530	912	994	26.36
GROUNDNUTS SHELLED BASIS	34	24	24	26	19	45	25	31	43	72	96	15.34
GROUNDNUT OIL	23	25	27	24	23	48	64	42	36	38	33	5.82
COPRA	51	79	34	19	55	96	99	163	74	121	116	14.62
COCONUT OIL	33	36	58	41	34	55	74	162	91	58	163	14.66
PALM NUTS KERNELS	13	20	19	4	4	5	5	6	10	15	6	- 4.39
PALM OIL	88	240	315	358	277	372	842	847	1058	1571	1340	24.63
OILSEED CAKE AND MEAL	103	233	151	272	334	534	725	839	1002	1040	1053	24.90
BANANAS	44	46	55	50	56	45	48	57	69	59	51	1.95
ORANGES+TANGER+CLEMEN	126	179	193	170	208	199	215	222	208	238	259	3.74
LEMONS AND LIMES								4	6	7	8	
COFFEE GREEN+ROASTED	26	25	45	34	31	42	32	19	27	19	36	- 3.29
COCOA BEANS	8	12	11	9	9	9	8	12	17	27	45	14.93
TEA	38	49	54	52	64	70	81	77	85	86	97	7.92
COTTON LINT	510	538	672	577	790	794	843	860	827	882	746	4.31
JUTE AND SIMILAR FIBRES	43	96	112	71	80	123	57	64	78	108	122	.52
TOBACCO UNMANUFACTURED	51	50	51	74	54	61	70	64	69	82	93	5.72
NATURAL RUBBER	111	92	114	125	123	142	160	193	215	182	211	9.44
WOOL GREASY	16	21	14	16	26	27	32	29	31	33	39	9.66
BOVINE CATTLE 1/	269	328	303	286	286	282	299	339	376	342	417	3.03
SHEEP AND GOATS 1/	264	352	244	224	253	296	273	258	234	209	184	- 3.99
PIGS 1/	1900	2680	2700	2629	2796	3004	3023	3123	3095	4552	3146	3.86
TOTAL MEAT	66	100	109	125	149	173	212	279	297	226	279	13.37
MILK DRY	34	53	53	60	62	78	84	118	141	138	107	12.40
TOTAL EGGS IN SHELL	47	52	56	54	58	57	64	68	75	75	75	4.69
FISHERY PRODUCTS												
FISH FRESH FROZEN	91	121	140	132	148	156	162	189	217	188	157	4.73
FISH CURED	52	55	42	32	32	21	19	25	19	20	18	-10.70
SHELLFISH	36	61	68	80	68	89	95	102	163	157	135	11.44
FISH CANNED AND PREPARED	71	86	91	97	114	112	83	84	76	65	65	- 4.39
SHELLFISH CANNED+PREPAR	21	18	17	15	14	16	15	14	14	9	7	- 8.00
FISH BODY AND LIVER OIL	5	5	6	2	2	7	3	4	4	2	1	-10.18
FISH MEAL	55	86	53	60	99	84	90	95	119	103	106	6.24
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	299	373	827	773	461	750	1200	2426	2128	1536	1187	16.56
SAWLOGS NONCONIFEROUS	3103	5854	6481	5686	6164	7491	8544	9345	9337	6507	5980	2.50
FUELWOOD	211	141	115	110	110	114	138	117	141	140	139	1.74
SAWNWOOD CONIFEROUS	20	38	41	65	179	214	228	235	80	86	92	9.64
SAWNWOOD NONCONIFEROUS	392	662	1207	1108	981	1463	1741	1829	2345	1850	1903	11.72
WOOD-BASED PANELS	139	262	348	339	393	472	495	575	610	740	849	12.88
PULP FOR PAPER	199	476	466	465	282	406	545	678	714	703	758	7.64
PAPER AND PAPERBOARD	885	1271	1418	1320	1133	1459	1494	1774	2141	2244	2291	7.74
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	4254	6394	7428	7621	4954	3640	9114	10004	11387	13645	14836	10.76
RICE MILLED	1282	948	963	1241	737	784	214	215	619	592	379	-11.48
BARLEY	27	452	279	321	174	333	265	336	704	402	407	4.49
MAIZE	290	2090	3079	2797	1679	1950	2092	3064	5412	4410	3261	7.34
SORGHUM		5	41	73	152	255	394	473	517	417	484	53.13
SUGAR,TOTAL (RAW EQUIV.)	902	1165	1259	660	691	929	1872	1564	1355	1159	1363	4.69
PULSES	22	40	40	32	33	39	49	68	58	72	72	9.37
SOYBEANS	351	712	799	1181	854	829	985	1172	1696	1529	1751	9.90
SOYBEAN OIL	19	44	123	34	42	27	149	137	143	136	61	10.32
GROUNDNUTS SHELLED BASIS		7	6	6				4	1			
COPRA	5	4	4	4					1	3	1	
COCONUT OIL	13	38	20	20	44	33	18	20	29	35	28	- .24
PALM OIL	1	9	13	11	12	3	30	14	48	59	31	21.45
OILSEED CAKE AND MEAL		1	2	1	1	29	41	55	1	9	8	35.17
BANANAS			15	4	10	15						

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	THOUSAND METRIC TONS											
COFFEE GREEN+ROASTED	1					7	6	6	5	6	8	
COCOA BEANS	2	2	8	6	8	11	12	15	17	17	16	21.66
TEA	6	4	6	7	6	5	5	6	5	5	4	- 1.54
COTTON LINT	201	327	676	616	386	428	421	819	836	1210	991	11.40
JUTE AND SIMILAR FIBRES	72	27	97	14	22	20	34	37	36	51	54	5.25
TOBACCO UNMANUFACTURED	18	24	20	23	11	13	15	23	26	36	58	9.63
NATURAL RUBBER	174	219	301	235	274	246	305	288	316	313	224	1.39
WOOL GREASY	19	25	23	18	17	21	20	25	51	59	80	15.29
BOVINE CATTLE 1/		1	1	4	8	1				2		
SHEEP AND GOATS 1/	4	4	5	6	6				3	1	1	
PIGS 1/		1	1	3		2	1	4	3	3	4	
TOTAL MEAT		2	2	2	29	10	4	11	18	16	21	31.53
FISHERY PRODUCTS												
FISH FRESH FROZEN	1		1	8	4	4	6	5	4			
FISH CURED				2	7	1	1	1	1			
SHELLFISH	1	1		3	4	4	8	9	14	2	2	
FISH CANNED AND PREPARED	1	11	3	4	2	4	4	3	4	4	4	- 5.06
FISH BODY AND LIVER OIL		1	3	3	3	2	2	3	3	1		
FISH MEAL	13	48	33	40	95	129	124	145	170	169	151	20.19
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	15	122	492	610	614	618	400	370	403	611	1052	10.80
SAWLOGS NONCONIFEROUS	779	4000	3990	3801	3887	4437	6231	7123	6764	6463	4536	5.96
PULPWOOD+PARTICLE		7	7	7	88	199	199	199	56	56	153	39.48
SAWNWOOD CONIFEROUS	2	2			21	29	29	29	29	31	31	
SAWNWOOD NONCONIFEROUS	4	8	9	27	23	30	38	56	96	139	139	39.50
WOOD-BASED PANELS	12	5	1	1	3	12	13	24	36	51	51	55.19
PULP FOR PAPER	249	242	243	248	217	228	169	201	209	285	285	-.72
PAPER AND PAPERBOARD	87	212	167	189	174	217	294	405	425	703	703	18.33

1/ THOUSAND HEAD
2/ EXCEPT FOR PULP FOR PAPER AND PAPER AND PAPERBOARD, ALL FOREST PRODUCTS ARE EXPRESSED IN THOUSAND CUBIC METRES

ANNEX TABLE 7. INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
WORLD												
AGRICULTURAL PRODUCTS	86	127	189	237	246	260	297	330	386	447	443	13.37
FOOD	84	131	195	258	280	273	297	343	405	482	493	13.72
FEED	78	127	270	251	215	310	388	407	479	550	615	16.01
RAW MATERIALS	95	113	170	200	166	197	228	242	277	302	290	9.83
BEVERAGES	82	125	165	167	175	270	389	372	421	438	342	15.04
FISHERY PRODUCTS	61	118	159	171	181	230	274	332	402	391	334	14.23
FOREST PRODUCTS	64	113	162	213	189	229	248	277	360	406	375	13.64
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	85	134	206	253	267	272	298	349	415	494	500	13.78
FOOD	83	136	208	259	286	283	300	357	425	517	528	14.09
FEED	73	123	276	280	202	267	310	383	448	516	532	14.24
RAW MATERIALS	107	116	179	221	181	204	257	266	308	338	330	10.81
BEVERAGES	69	159	219	229	252	289	373	428	545	559	514	15.18
FISHERY PRODUCTS	66	119	164	176	174	215	252	306	362	379	336	13.35
FOREST PRODUCTS	66	112	155	213	192	226	244	273	344	394	370	13.44
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	73	143	202	238	274	282	318	390	470	547	531	15.20
FOOD	72	141	198	237	280	281	316	387	463	553	540	15.45
FEED	74	152	369	379	273	350	428	511	631	716	812	15.87
RAW MATERIALS	112	123	176	218	204	236	232	297	353	310	269	9.22
BEVERAGES	67	165	230	231	257	294	362	440	568	578	531	15.14
FISHERY PRODUCTS	65	119	169	186	184	227	271	309	376	403	347	13.55
FOREST PRODUCTS	65	112	161	232	199	236	251	287	370	431	393	14.05
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	101	114	150	193	190	186	225	216	251	262	255	8.22
FOOD	100	110	149	194	183	173	205	195	233	243	236	7.26
FEED	198	59	95	115	115	265	266	231	224	192	124	10.85
RAW MATERIALS	109	128	151	192	210	231	298	276	294	318	320	10.62
BEVERAGES	73	135	159	187	224	218	260	300	346	343	321	11.05
FISHERY PRODUCTS	73	109	138	173	220	223	213	246	310	309	273	10.97
FOREST PRODUCTS	73	108	151	203	204	219	247	260	286	306	295	10.52
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	92	134	248	316	313	321	327	398	467	567	603	14.29
FOOD	92	138	264	337	350	351	338	418	495	605	660	14.48
FEED	68	112	249	246	169	232	253	330	376	450	434	13.27
RAW MATERIALS	101	122	173	242	195	207	273	312	354	416	386	12.92
BEVERAGES	83	130	265	376	285	515	1168	790	992	1156	1002	25.44
FISHERY PRODUCTS	66	116	182	161	173	227	296	439	510	484	431	18.16
FOREST PRODUCTS	65	113	149	190	178	218	235	259	327	371	359	13.35
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	96	128	187	223	218	226	253	247	298	391	418	11.37
FOOD	89	145	180	223	259	254	262	272	323	454	479	12.37
FEED	63	112	235	274	205	219	499	476	506	294	397	12.47
RAW MATERIALS	111	96	201	221	142	174	234	198	250	278	307	9.28
BEVERAGES	93	147	151	204	228	234	222	240	255	331	462	10.85
FISHERY PRODUCTS	40	129	148	142	147	168	236	259	370	334	348	13.90
FOREST PRODUCTS	46	121	188	244	226	252	301	328	465	590	625	18.02

ANNEX TABLE 7. INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	86	117	163	213	215	242	296	302	343	378	359	12.60
FOOD	87	120	165	255	268	251	289	311	362	407	417	12.79
FEED	84	134	263	208	235	373	502	443	526	600	738	18.48
RAW MATERIALS	85	110	162	182	152	190	202	222	249	270	256	8.83
BEVERAGES	87	114	146	145	149	263	394	353	379	396	283	14.91
FISHERY PRODUCTS	51	116	148	161	196	261	321	387	484	416	330	15.95
FOREST PRODUCTS	55	117	210	214	167	247	271	302	462	488	409	14.86
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	83	112	145	185	172	207	269	259	282	281	226	9.18
FOOD	84	111	137	194	186	186	221	249	264	270	208	8.20
FEED	104	126	177	146	133	169	214	130	217	170	145	1.92
RAW MATERIALS	85	114	154	196	142	130	186	186	210	242	248	7.14
BEVERAGES	79	114	157	165	160	265	410	322	358	332	257	12.17
FISHERY PRODUCTS	62	123	157	214	209	220	232	261	332	376	265	9.10
FOREST PRODUCTS	72	114	206	214	153	207	217	236	271	315	270	8.37
LATIN AMERICA												
AGRICULTURAL PRODUCTS	83	122	174	221	242	274	340	350	389	435	422	14.06
FOOD	82	127	181	271	303	277	323	341	397	450	477	13.37
FEED	74	146	325	247	329	543	790	738	820	989	1316	24.67
RAW MATERIALS	88	110	150	168	158	179	214	250	245	258	265	9.59
BEVERAGES	83	116	153	139	141	286	387	375	396	429	280	15.40
FISHERY PRODUCTS	59	101	87	119	120	159	172	249	316	347	290	17.31
FOREST PRODUCTS	59	110	163	217	190	191	235	286	474	650	625	20.40
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	83	124	163	179	161	198	201	213	222	246	271	7.45
FOOD	82	129	173	186	178	221	252	303	324	379	448	13.72
FEED	94	123	144	114	93	85	84	58	70	110	52	- 7.87
RAW MATERIALS	84	120	158	178	155	189	173	161	160	164	166	1.63
BEVERAGES	58	133	179	182	121	159	226	274	345	283	259	9.62
FISHERY PRODUCTS	59	124	185	153	164	191	255	208	214	229	176	4.56
FOREST PRODUCTS	56	120	180	271	181	216	244	201	342	340	509	12.25
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	91	107	155	229	217	246	304	306	382	435	429	15.36
FOOD	90	115	155	311	313	305	357	358	463	536	587	16.97
FEED	85	125	262	222	200	337	380	306	421	416	394	11.64
RAW MATERIALS	83	96	165	185	146	196	214	249	315	357	315	13.18
BEVERAGES	15	106	105	124	149	197	381	316	331	375	306	17.30
FISHERY PRODUCTS	47	132	218	230	322	416	584	644	824	606	541	18.96
FOREST PRODUCTS	50	116	232	227	173	287	312	338	554	544	423	15.76
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	108	127	193	257	258	222	214	252	284	315	292	7.11
FOOD	117	119	184	278	283	221	193	234	263	313	293	6.80
FEED	108	95	192	151	171	253	229	161	253	480	1182	20.93
RAW MATERIALS	81	153	242	196	181	224	243	266	300	255	211	4.10
BEVERAGES	82	138	155	192	193	225	401	444	512	534	480	18.41
FISHERY PRODUCTS	7	140	224	146	280	498	573	674	804	427	138	9.99
FOREST PRODUCTS	44	138	163	132	134	175	194	256	313	296	296	11.11

ANNEX TABLE 8. INDICES OF VOLUME OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
WORLD												
AGRICULTURAL PRODUCTS	90	113	122	116	118	128	131	140	147	156	162	4.13
FOOD	89	114	125	121	123	134	140	150	158	169	177	4.97
FEED	78	112	126	127	122	156	156	179	187	207	220	7.99
RAW MATERIALS	96	106	112	100	96	104	104	108	108	109	108	.40
BEVERAGES	90	113	120	113	120	124	114	123	139	137	141	2.43
FISHERY PRODUCTS	81	107	108	101	104	111	117	125	132	131	123	2.75
FOREST PRODUCTS	76	106	120	118	97	116	120	128	136	137	134	2.83
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	88	116	130	126	128	138	144	157	168	183	187	5.45
FOOD	87	117	132	127	132	141	147	162	172	190	196	5.88
FEED	73	107	133	138	116	141	133	174	185	205	203	7.17
RAW MATERIALS	103	109	116	109	101	109	118	120	123	128	122	1.73
BEVERAGES	76	135	145	149	159	172	183	180	214	209	224	5.83
FISHERY PRODUCTS	88	107	111	103	105	110	112	123	129	132	123	2.50
FOREST PRODUCTS	78	105	118	120	97	115	119	128	136	139	136	3.02
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	79	117	129	133	138	146	149	162	180	193	205	6.14
FOOD	78	115	127	132	136	143	147	161	178	193	205	6.36
FEED	74	137	175	191	159	184	180	233	262	285	320	8.67
RAW MATERIALS	108	110	109	117	114	121	107	127	132	123	123	1.57
BEVERAGES	74	140	148	148	161	176	180	178	216	205	223	5.38
FISHERY PRODUCTS	86	108	109	101	105	113	111	116	126	129	116	2.01
FOREST PRODUCTS	76	106	125	127	94	115	117	130	142	142	141	3.06
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	105	96	100	110	103	99	110	99	104	103	103	-.37
FOOD	105	90	93	105	93	85	96	85	92	88	88	-.81
FEED	208	57	66	81	85	143	128	124	103	100	65	-3.88
RAW MATERIALS	109	115	124	124	133	142	153	137	132	139	144	2.01
BEVERAGES	78	114	114	132	137	137	159	157	170	172	178	5.47
FISHERY PRODUCTS	97	101	101	114	141	140	122	116	120	124	120	1.59
FOREST PRODUCTS	86	102	113	109	107	117	121	126	116	115	113	1.16
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	94	124	153	138	140	156	162	192	197	224	225	6.78
FOOD	92	129	160	140	150	169	172	203	210	240	247	7.34
FEED	68	95	118	119	94	122	109	151	153	179	163	6.50
RAW MATERIALS	111	111	132	133	107	105	124	146	146	161	138	3.02
BEVERAGES	94	121	216	258	213	252	376	321	397	475	451	13.68
FISHERY PRODUCTS	86	103	124	96	101	114	149	189	181	185	181	8.33
FOREST PRODUCTS	78	106	113	114	96	114	119	124	132	139	133	3.09
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	88	114	112	92	97	116	128	124	125	135	126	2.81
FOOD	88	119	119	103	110	129	142	147	142	161	143	3.93
FEED	65	113	144	94	116	177	208	200	221	96	121	2.43
RAW MATERIALS	87	104	99	73	73	92	101	81	93	89	94	-.04
BEVERAGES	103	128	111	129	135	131	109	120	121	145	171	2.24
FISHERY PRODUCTS	61	111	106	98	97	92	110	116	142	142	146	4.38
FOREST PRODUCTS	57	113	149	162	159	195	245	247	281	340	325	12.61

ANNEX TABLE 8. INDICES OF VOLUME OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	93	108	111	102	102	113	112	115	118	116	124	1.62
FOOD	94	110	112	106	104	117	126	124	126	124	135	2.44
FEED	84	118	116	110	130	179	191	185	190	209	245	9.24
RAW MATERIALS	90	103	109	93	92	99	92	98	94	93	96	- .95
BEVERAGES	95	105	112	100	106	107	91	104	113	112	113	.61
FISHERY PRODUCTS	68	108	100	99	104	112	127	129	139	128	123	3.27
FOREST PRODUCTS	63	110	129	106	96	118	121	128	131	128	119	1.59
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	93	109	110	102	93	98	85	85	85	83	82	- 3.46
FOOD	97	111	105	99	89	93	82	80	77	77	75	- 4.37
FEED	105	114	94	74	80	91	78	47	67	46	32	-10.69
RAW MATERIALS	90	105	111	99	85	98	87	91	90	100	99	- .98
BEVERAGES	87	105	120	113	106	109	90	95	101	89	91	- 2.62
FISHERY PRODUCTS	65	112	134	126	117	117	114	114	122	121	104	- 1.01
FOREST PRODUCTS	81	105	121	103	81	101	99	99	100	99	88	- 1.49
LATIN AMERICA												
AGRICULTURAL PRODUCTS	91	104	107	99	103	112	119	124	127	122	136	3.17
FOOD	90	105	109	105	102	116	135	129	132	121	141	3.35
FEED	75	123	128	139	183	253	314	324	311	372	455	16.52
RAW MATERIALS	91	90	87	79	88	78	83	101	87	83	85	.08
BEVERAGES	95	107	110	92	104	102	80	102	114	114	114	.95
FISHERY PRODUCTS	83	100	54	64	69	65	70	75	91	97	91	3.35
FOREST PRODUCTS	79	108	127	107	89	97	116	136	170	199	199	7.82
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	90	113	115	86	83	98	93	108	90	86	97	- 1.47
FOOD	85	119	128	101	91	112	134	169	132	124	154	3.45
FEED	89	109	78	58	63	49	33	30	27	34	18	-15.83
RAW MATERIALS	93	109	109	78	80	91	69	72	67	63	64	- 5.84
BEVERAGES	57	110	127	95	56	73	75	63	70	53	58	- 7.58
FISHERY PRODUCTS	78	110	137	161	93	86	105	83	85	84	60	- 7.14
FOREST PRODUCTS	57	106	113	101	95	99	104	91	133	126	177	4.09
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	91	110	114	109	114	135	136	131	142	150	157	4.22
FOOD	90	122	117	116	130	164	174	161	183	196	207	7.17
FEED	84	118	125	108	101	166	127	105	135	111	112	- .19
RAW MATERIALS	86	102	116	107	100	111	106	108	110	114	118	.88
BEVERAGES	111	99	100	98	110	114	113	114	117	129	133	3.39
FISHERY PRODUCTS	60	119	162	147	177	209	257	264	261	219	234	7.88
FOREST PRODUCTS	56	109	137	112	102	132	133	136	137	126	113	.99
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	112	113	129	120	114	111	107	114	120	118	108	- .62
FOOD	118	105	127	120	112	99	92	99	106	110	97	- 1.66
FEED	96	71	82	64	64	56	44	42	64	118	311	9.06
RAW MATERIALS	100	141	143	113	114	148	148	155	150	117	117	- .51
BEVERAGES	80	112	118	134	135	148	176	181	208	218	206	8.22
FISHERY PRODUCTS	10	116	141	107	81	95	95	83	103	69	46	- 7.76
FOREST PRODUCTS	52	125	105	78	96	100	103	129	112	98	98	.03

ANNEX TABLE 9. INDICES OF VALUE OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
WORLD												
AGRICULTURAL PRODUCTS	85	126	183	234	251	260	297	331	389	449	445	13.68
FOOD	84	130	187	254	285	274	295	343	408	484	496	14.07
FEED	76	132	264	250	221	296	379	386	463	524	590	15.15
RAW MATERIALS	94	114	166	198	171	200	226	246	281	308	285	9.86
BEVERAGES	81	122	159	167	184	259	396	379	422	445	358	15.75
FISHERY PRODUCTS	62	118	156	176	178	222	259	312	386	373	362	14.23
FOREST PRODUCTS	65	111	162	214	187	224	251	281	358	398	363	13.45
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	84	127	181	218	235	250	283	311	364	401	384	12.23
FOOD	81	132	186	234	267	263	278	321	380	425	422	12.41
FEED	78	132	268	246	216	289	359	364	435	492	550	14.11
RAW MATERIALS	96	113	163	189	161	188	206	222	253	266	242	8.06
BEVERAGES	80	123	162	168	183	261	401	379	424	450	355	15.58
FISHERY PRODUCTS	61	119	158	177	176	222	260	311	388	375	371	14.29
FOREST PRODUCTS	66	112	163	211	184	220	241	270	347	381	341	12.66
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	85	129	180	210	223	235	277	309	356	383	340	11.42
FOOD	83	133	182	222	248	241	270	314	362	392	353	11.14
FEED	82	127	248	219	197	272	331	349	426	477	506	14.47
RAW MATERIALS	98	112	157	180	151	184	199	221	246	257	221	7.77
BEVERAGES	80	126	171	175	189	263	413	389	448	471	371	15.72
FISHERY PRODUCTS	68	112	154	175	171	196	229	279	348	372	327	13.49
FOREST PRODUCTS	65	111	162	225	188	231	249	269	353	412	373	13.46
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	82	132	195	234	324	250	352	385	485	595	666	17.45
FOOD	85	144	217	253	424	463	419	492	640	810	947	20.76
FEED	63	170	365	395	349	390	501	466	548	635	869	13.72
RAW MATERIALS	85	106	150	200	180	175	204	199	240	262	242	8.03
BEVERAGES	63	131	140	176	215	258	377	340	366	428	358	14.48
FISHERY PRODUCTS	64	104	133	179	182	203	205	210	222	252	204	7.63
FOREST PRODUCTS	65	106	133	181	242	219	228	241	247	302	282	10.28
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	82	117	156	195	181	208	243	263	297	311	299	10.64
FOOD	75	120	158	215	193	189	196	221	259	278	294	8.48
FEED	73	118	216	202	200	271	309	338	400	353	381	12.27
RAW MATERIALS	113	100	146	188	166	220	230	252	308	299	301	12.01
BEVERAGES	86	116	153	149	158	248	363	368	383	395	308	15.01
FISHERY PRODUCTS	59	126	141	153	142	194	215	229	276	275	282	10.47
FOREST PRODUCTS	70	120	148	160	153	191	220	277	297	278	287	11.04
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	91	112	129	223	241	216	274	315	309	368	354	13.13
FOOD	84	119	137	263	343	273	313	373	381	430	440	14.29
FEED	84	88	58	186	111	29	52	225	70	121	228	7.21
RAW MATERIALS	96	99	124	223	155	174	179	202	205	255	244	8.55
BEVERAGES	95	118	129	154	188	184	355	378	341	433	364	16.59
FISHERY PRODUCTS	69	109	145	217	197	185	253	269	298	303	317	11.25
FOREST PRODUCTS	76	97	139	218	220	196	248	238	288	353	386	13.40

ANNEX TABLE 9. INDICES OF VALUE OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	91	121	188	302	318	301	352	412	492	650	699	18.35
FOOD	92	122	194	323	346	312	353	420	508	688	752	18.61
FEED	55	130	204	314	294	408	686	723	828	1023	1200	26.94
RAW MATERIALS	85	121	181	243	221	261	329	370	425	524	506	16.28
BEVERAGES	90	107	125	161	189	243	348	376	405	397	389	17.40
FISHERY PRODUCTS	65	109	136	168	192	222	250	317	375	356	291	13.70
FOREST PRODUCTS	61	108	151	229	212	254	322	356	434	513	517	18.28
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	87	128	180	290	353	313	388	456	518	668	720	18.92
FOOD	86	130	188	307	375	320	388	468	541	719	788	19.42
FEED	51	121	192	282	289	336	651	868	1107	1384	1903	34.89
RAW MATERIALS	86	142	181	302	307	293	367	392	458	461	447	12.84
BEVERAGES	94	102	123	154	218	277	398	390	360	394	342	16.63
FISHERY PRODUCTS	70	110	133	175	220	289	287	384	453	459	331	16.28
FOREST PRODUCTS	60	96	144	273	254	267	336	331	387	404	406	14.93
LATIN AMERICA												
AGRICULTURAL PRODUCTS	87	125	192	308	284	289	314	382	469	661	667	17.60
FOOD	89	127	199	323	304	302	316	396	470	705	715	17.87
FEED	51	127	281	387	304	395	690	655	834	1064	1233	24.73
RAW MATERIALS	85	113	146	235	171	190	236	267	343	388	363	13.40
BEVERAGES	75	127	165	204	201	273	339	333	634	436	409	16.17
FISHERY PRODUCTS	66	99	112	135	162	147	163	204	249	262	200	10.19
FOREST PRODUCTS	65	104	120	205	175	192	217	222	258	377	390	14.21
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	80	130	179	408	503	446	536	640	755	1055	1210	24.74
FOOD	77	130	188	450	561	479	560	671	824	1182	1355	25.65
FEED	48	149	183	329	241	525	909	1027	1020	1072	1681	31.15
RAW MATERIALS	91	130	150	253	321	335	425	404	410	448	530	15.39
BEVERAGES	97	123	136	191	205	252	396	537	441	504	521	19.72
FISHERY PRODUCTS	66	115	163	293	319	446	671	764	864	851	572	23.21
FOREST PRODUCTS	65	120	153	252	328	372	542	531	549	676	751	21.90
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	102	105	172	231	262	261	274	303	346	425	470	14.46
FOOD	108	105	184	249	284	265	259	299	345	434	489	14.00
FEED	57	124	158	266	297	360	574	587	727	901	871	25.32
RAW MATERIALS	84	111	145	183	204	257	323	320	348	399	409	15.37
BEVERAGES	88	73	94	101	127	170	230	209	238	242	272	16.06
FISHERY PRODUCTS	67	114	151	169	184	213	240	290	346	318	297	12.16
FOREST PRODUCTS	58	104	179	226	188	254	299	377	542	553	532	19.38
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	85	137	247	375	262	245	363	434	579	731	732	17.60
FOOD	86	138	231	387	275	229	359	398	560	663	701	16.65
FEED	122	149	169	188	477	831	1200	1640	564	1278	1495	30.95
RAW MATERIALS	82	136	289	345	226	284	361	520	628	913	810	19.82
BEVERAGES	156	116	149	190	126	375	836	560	697	696	752	26.98
FISHERY PRODUCTS	30	140	189	197	343	426	508	817	1030	614	634	22.07
FOREST PRODUCTS	49	131	192	247	185	282	431	590	671	841	761	23.66

ANNEX TABLE 10. INDICES OF VOLUME OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
WORLD												
AGRICULTURAL PRODUCTS	89	112	121	116	119	128	129	139	147	154	157	3.99
FOOD	89	114	124	120	123	133	137	147	157	166	171	4.74
FEED	76	119	128	122	126	156	160	182	192	201	212	7.40
RAW MATERIALS	94	106	109	101	100	104	102	109	110	111	107	.61
BEVERAGES	87	110	119	114	121	125	118	124	138	137	141	2.57
FISHERY PRODUCTS	82	109	107	108	108	116	118	125	135	134	132	3.00
FOREST PRODUCTS	75	107	120	117	96	113	118	127	136	135	127	2.49
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	89	113	120	112	115	125	121	128	134	135	137	2.32
FOOD	88	115	123	116	119	131	129	135	142	143	146	2.77
FEED	77	119	129	121	122	152	153	173	185	191	199	6.60
RAW MATERIALS	95	105	105	96	95	99	94	99	99	96	93	- .85
BEVERAGES	86	111	121	113	120	122	113	121	136	136	138	2.29
FISHERY PRODUCTS	82	110	109	108	108	116	118	125	136	134	134	2.99
FOREST PRODUCTS	76	107	121	117	94	111	115	124	132	128	120	1.82
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	90	111	115	110	112	121	119	126	131	130	128	2.02
FOOD	90	113	116	115	117	124	125	131	134	135	132	2.18
FEED	82	114	121	109	112	143	143	167	180	185	192	7.12
RAW MATERIALS	97	101	101	90	88	98	92	98	96	91	84	- 1.09
BEVERAGES	86	111	125	115	122	123	115	119	140	134	139	2.08
FISHERY PRODUCTS	88	107	98	97	101	104	102	109	122	129	119	2.62
FOREST PRODUCTS	77	106	122	118	90	113	113	121	135	133	126	2.27
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	84	124	139	119	140	150	137	146	166	183	201	4.95
FOOD	88	137	166	125	156	180	158	175	204	229	260	6.73
FEED	63	151	164	189	196	207	208	212	227	244	270	5.71
RAW MATERIALS	89	102	99	103	105	96	96	98	104	109	106	.54
BEVERAGES	57	114	103	114	132	127	122	112	121	137	139	2.20
FISHERY PRODUCTS	82	94	72	88	99	102	88	104	114	137	129	5.43
FOREST PRODUCTS	72	100	103	109	123	118	119	117	113	128	122	2.10
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	92	109	114	108	103	115	110	116	120	114	119	.97
FOOD	87	110	114	109	99	116	112	112	114	107	114	.28
FEED	76	104	103	107	116	139	136	161	169	148	147	5.53
RAW MATERIALS	107	107	106	105	107	112	110	113	117	107	111	.64
BEVERAGES	97	108	117	107	111	115	103	126	132	133	133	2.52
FISHERY PRODUCTS	82	113	110	108	96	112	111	111	114	105	108	- .01
FOREST PRODUCTS	80	113	116	105	89	107	114	130	128	116	114	1.39
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	94	106	103	126	123	115	116	112	109	114	113	.15
FOOD	101	106	108	138	151	126	136	131	129	128	130	1.42
FEED	80	88	40	75	45	5	20	100	20	38	55	- 4.42
RAW MATERIALS	90	106	97	124	95	107	89	95	83	89	85	- 2.62
BEVERAGES	89	107	107	112	120	114	124	104	117	127	121	1.36
FISHERY PRODUCTS	84	99	94	119	113	113	134	127	119	124	128	2.92
FOREST PRODUCTS	86	98	115	143	125	104	127	110	125	130	136	1.83

ANNEX TABLE 10. INDICES OF VOLUME OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1967	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	ANNUAL RATE OF CHANGE 1972-81 PERCENT
	1969-71=100											
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	91	109	124	132	134	141	164	184	201	234	242	9.39
FOOD	93	109	124	134	135	141	166	189	210	247	257	10.14
FEED	52	122	105	148	181	211	275	329	302	365	419	16.66
RAW MATERIALS	89	110	131	127	126	132	144	160	169	189	183	5.86
BEVERAGES	90	104	108	117	131	152	168	147	153	148	167	5.12
FISHERY PRODUCTS	80	100	95	103	111	116	116	123	131	130	116	3.10
FOREST PRODUCTS	70	106	113	124	111	125	144	153	164	179	180	6.61
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	91	111	115	128	136	145	182	195	202	228	247	9.88
FOOD	89	112	118	130	132	140	177	207	216	248	269	10.98
FEED	55	116	98	124	118	147	229	253	292	298	406	17.08
RAW MATERIALS	98	123	128	145	150	147	149	156	165	159	151	2.56
BEVERAGES	106	93	90	100	155	185	241	126	116	117	138	3.56
FISHERY PRODUCTS	73	97	98	110	102	143	140	142	156	162	121	5.12
FOREST PRODUCTS	64	90	104	132	109	111	145	134	147	146	145	5.04
LATIN AMERICA												
AGRICULTURAL PRODUCTS	88	111	125	146	135	142	166	200	216	269	268	10.57
FOOD	90	111	127	148	140	147	174	213	227	291	289	11.53
FEED	50	109	110	166	141	171	223	240	273	323	364	14.79
RAW MATERIALS	83	109	110	125	103	105	118	122	135	144	145	3.37
BEVERAGES	83	122	130	147	133	148	134	149	191	169	180	4.28
FISHERY PRODUCTS	83	93	77	77	96	79	79	93	110	108	90	2.29
FOREST PRODUCTS	76	101	101	127	99	101	105	107	116	156	155	4.22
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	80	111	113	156	174	185	223	239	276	324	364	14.33
FOOD	78	109	115	162	183	193	238	255	301	360	401	15.69
FEED	43	139	107	152	121	223	323	380	377	335	533	18.81
RAW MATERIALS	91	127	103	130	164	166	163	143	151	163	198	4.67
BEVERAGES	90	108	105	124	114	136	134	172	157	154	173	5.82
FISHERY PRODUCTS	76	111	143	174	209	272	335	284	296	309	284	11.29
FOREST PRODUCTS	75	113	112	123	135	154	192	184	189	209	234	9.02
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	103	100	122	110	122	130	136	144	151	172	173	5.91
FOOD	108	99	126	112	121	129	132	143	151	178	178	6.05
FEED	53	122	94	132	147	140	179	205	219	251	234	10.58
RAW MATERIALS	93	101	112	99	122	130	147	145	146	145	147	4.79
BEVERAGES	74	96	113	105	125	138	152	143	158	158	185	6.76
FISHERY PRODUCTS	36	103	104	102	111	109	101	109	110	106	107	.44
FOREST PRODUCTS	67	107	127	116	108	137	155	181	200	184	184	7.50
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	82	123	156	147	114	112	145	186	222	246	237	8.14
FOOD	82	125	140	137	105	98	139	164	209	208	211	7.10
FEED	119	210	243	252	1810	2000	2381	3419	1652	3186	3571	39.58
RAW MATERIALS	83	118	157	175	126	135	146	226	246	326	284	9.53
BEVERAGES	127	116	159	170	130	200	209	211	355	289	305	11.55
FISHERY PRODUCTS	41	122	79	235	230	233	294	290	274	245	254	10.34
FOREST PRODUCTS	53	135	135	139	134	152	187	227	226	268	236	8.87

ANNEX TABLE 11. THE IMPORTANCE OF AGRICULTURE IN THE ECONOMY

COUNTRY	AGRICULTURAL GDP AS % TOTAL GDP 1979	AGRIC. POPULATION AS % TOTAL POPULATION 1981	AGRIC. EXPORTS AS % TOTAL EXPORTS 1981	AGRIC. IMPORTS AS % TOTAL IMPORTS 1981	SHARE OF TOTAL IMPORTS FINANCED BY AGR. EXPORTS % 1981
ALGERIA	6	48	1	17	1
ANGOLA		57	10	23	13
BENIN	47	45	98	32	14
BOTSWANA	12	79	21	11	11
BRIT. INDIAN OCEAN TERRIT		50			
BURUNDI	57	83	94	16	40
CAMEROON	32	80	33	7	28
CAPE VERDE		56	35	42	3
CENTRAL AFRICAN REPUBLIC	34	87	35	30	50
CHAD		83	78	9	79
COMOROS		63	82	44	49
CONGO	14	33	3	23	5
DJIBOUTI		48		31	
EGYPT	23	50	22	36	8
EQUATORIAL GUINEA		74			
ETHIOPIA	52	79	86	10	44
GABON	6	76	1	14	1
GAMBIA	38	78	62	27	13
GHANA		50	45	15	37
GUINEA	40	80	7	17	7
GUINEA-BISSAU		82	54	34	15
IVORY COAST	25	79	58	17	52
KENYA	56	77	49	11	28
LESOTHO	31	83	30	25	4
LIBERIA	34	69	23	18	21
LIBYA	2	14		12	
MADAGASCAR	36	82	85	17	46
MALAWI	43	83	86	13	68
MALI	42	86	91	19	49
MAURITANIA	23	82	17	37	16
MAURITIUS	15	28	64	30	37
MOROCCO	18	51	18	25	10
MOZAMBIQUE	44	63	33	16	14
NAMIBIA		48			
NIGER	33	87	24	18	22
NIGERIA	22	52	2	15	2
REUNION		27	84	24	11
RWANDA	41	89	78	9	25
ST. HELENA				31	
SAO TOME AND PRINCIPE		52	50	23	61
SENEGAL	24	74	14	34	7
SEYCHELLES		48	18	19	3
SIERRA LEONE	33	64	15	21	8
SOMALIA	60	79	83	92	83
SOUTH AFRICA	7	28	11	4	10
SPANISH NORTH AFRICA		16			
SUDAN	39	76	76	20	32
SWAZILAND		72	56	4	26
TANZANIA	53	80	73	9	31
TOGO	27	67	18	16	11
TUNISIA	16	40	8	15	5
UGANDA	8	80	87	8	40
UPPER VOLTA	40	81	79	18	20
WESTERN SAHARA		39			
ZAIRE	31	74	14	33	25
ZAMBIA	14	66	1	7	1
ZIMBABWE	12	58	35	3	45
ANTIGUA AND BARBUDA		9	6	25	1
BAHAMAS		9		2	
BARBADOS	9	16	18	16	7
BELIZE		28	65	26	52
BERMUDA		7		20	
BRITISH VIRGIN ISLANDS		7		23	
CANADA	4	5	11	7	12
CAYMAN ISLANDS		11			
COSTA RICA	19	34	66	10	56
CUBA		23	82	14	61
DOMINICA		33	95	23	20
DOMINICAN REPUBLIC	19	56	66	17	57
EL SALVADOR	30	51	72	17	58
GREENLAND		6	2	18	1
GRENADA		33	83	21	28
GUADELOUPE		16	86	26	14
GUATEMALA		54	56	9	46
HAITI		66	27	42	16
HONDURAS	32	62	86	11	46
JAMAICA	7	20	11	17	7
MARTINIQUE		14	32	20	6
MEXICO	10	35	8	14	6
MONTSERRAT		9		21	
NETHERLANDS ANTILLES		9	1	4	1
NICARAGUA	29	41	80	27	99
PANAMA	14	34	51	8	10

ANNEX TABLE 11. THE IMPORTANCE OF AGRICULTURE IN THE ECONOMY

COUNTRY	AGRICULTURAL GDP AS % TOTAL GDP 1979	AGRIC. POPULATION AS % TOTAL POPULATION 1981	AGRIC. EXPORTS AS % TOTAL EXPORTS 1981	AGRIC. IMPORTS AS % TOTAL IMPORTS 1981	SHARE OF TOTAL IMPORTS FINANCED BY AGR. EXPORTS % 1981
PUERTO RICO	6	3			
ST. KITTS-NEVIS		9	60	26	43
ST. LUCIA		33	71	20	16
ST. PIERRE AND MIQUELON				14	
ST. VINCENT		34	72	21	23
TRINIDAD AND TOBAGO	3	16	2	11	2
TURKS AND CAICOS IS.		17			
UNITED STATES	3	2	20	7	16
US VIRGIN ISLANDS		9		2	
ARGENTINA	12	13	69	5	58
BOLIVIA	43	49	4	10	4
BRAZIL	13	37	42	9	41
CHILE	7	18	9	10	6
COLOMBIA	29	27	73	8	41
ECUADOR	13	44	20	9	23
FRENCH GUIANA		21	3	19	
GUYANA	22	21	45	18	47
PARAGUAY	31	49	114	22	55
PERU	9	39	8	21	9
SURINAME	10	17	12	10	12
URUGUAY	13	12	61	7	47
VENEZUELA	6	17		16	
AFGHANISTAN	53	77	45	12	28
BAHRAIN		61		6	1
BANGLADESH	54	83	21	16	6
BHUTAN		93			
BRUNEI		8		14	
BURMA	45	51	64	12	79
CHINA		59	12	28	11
CYPRUS	11	34	38	16	19
EAST TIMOR		58			
GAZA STRIP (PALESTINE)		3	25	8	15
HONG KONG	1	2	4	14	4
INDIA	36	62	36	12	21
INDONESIA	29	58	8	13	14
IRAN		37	2	20	1
IRAQ	8	40	1	14	
ISRAEL	7	7	16	13	11
JAPAN	4	10	1	13	1
JORDAN	8	25	17	15	4
KAMPUCHEA, DEMOCRATIC		73	28	20	2
KOREA DPR		45	19	19	11
KOREA REP	20	37	3	17	2
KUWAIT	3	2	1	16	1
LAOS		73	1	34	
LEBANON		9	17	30	6
MACAU		3	1	18	1
MALAYSIA	25	46	31	13	30
MALDIVES		79		50	
MONGOLIA		48	45	12	28
NEPAL	58	92	19	16	15
OMAN	3	61	1	13	1
PAKISTAN	3	53	42	14	23
PHILIPPINES	25	45	32	8	23
QATAR		61		14	
SAUDI ARABIA KINGDOM OF	2	60		14	
SINGAPORE	1	2	7	7	6
SRI LANKA	27	53	59	20	34
SYRIA	17	47	11	14	5
THAILAND	26	75	56	6	40
TURKEY	23	53	54	4	29
UNITED ARAB EMIRATES	1	61		9	1
VIET NAM		70	26	31	8
YEMEN ARAB REPUBLIC	30	74	10	31	
YEMEN DEMOCRATIC		58	1	38	2
ALBANIA		60			
ANDORRA		22			
AUSTRIA	4	9	5	8	3
BELGIUM-LUXEMBOURG	6	3	11	12	10
BULGARIA	19	32	11	7	11
CZECHOSLOVAKIA	7	10	4	13	4
DENMARK	16	7	32	13	29
FAEROE ISLANDS		5	4	13	3
FINLAND	8	13	6	7	6
FRANCE	47	8	18	11	15
GERMAN DEMOCRATIC REP.		9	3	11	3
GERMANY, FED. REP. OF		4	6	14	6
GIBRALTAR		21			
GREECE	16	36	30	13	15

ANNEX TABLE 11. THE IMPORTANCE OF AGRICULTURE IN THE ECONOMY

COUNTRY	AGRICULTURAL GDP AS % TOTAL GDP 1979	AGRIC. POPULATION AS % TOTAL POPULATION 1981	AGRIC. EXPORTS AS % TOTAL EXPORTS 1981	AGRIC. IMPORTS AS % TOTAL IMPORTS 1981	SHARE OF TOTAL IMPORTS FINANCED BY AGR. EXPORTS % 1981
HUNGARY	13	17	26	11	25
ICELAND		11	3	10	3
IRELAND	7	20	33	14	25
ITALY	7	11	8	14	6
LIECHTENSTEIN		4			
MALTA	4	5	6	19	3
MONACO		4			
NETHERLANDS	4	5	23	16	24
NORWAY	5	7	2	7	2
POLAND	16	30	6	21	5
PORTUGAL	14	26	10	18	4
ROMANIA		46	10	11	10
SAN MARINO		24			
SPAIN	8	16	17	12	11
SWEDEN	3	5	3	7	3
SWITZERLAND		5	3	10	3
UNITED KINGDOM	2	2	7	12	7
YUGOSLAVIA	13	36	8	7	6
AMERICAN SAMOA		56	6	25	8
AUSTRALIA		6	42	4	43
CHRISTMAS ISLAND (AUST.)		50			
COCOS (KEELING) ISLANDS		100			
COOK ISLANDS		58	60	22	9
FIJI	22	39	58	13	29
FRENCH POLYNESIA		55	19	20	1
GUAM		56		6	
JOHNSTON ISLAND		100			
KIRIBATI		56	6	33	8
MIDWAY ISLANDS		50			
NAURU		57		24	
NEW CALEDONIA		60	1	20	1
NEW ZEALAND	13	9	64	6	65
NIUE		50	20	23	2
NORFOLK ISLAND		50			
PACIFIC IS. (TRUST TR.)		56	38	22	18
PAPUA NEW GUINEA	34	82	29	18	24
SAMOA		56	46	19	13
SOLOMON ISLANDS		60	27	11	27
TOKELAU		50			
TONGA		56	68	36	18
TUVALU		50		48	
VANUATU		60	54	13	30
WAKE ISLAND		100			
WALLIS AND FUTUNA IS.		60			
USSR	16	16	4	29	4

ANNEX TABLE 12A. RESOURCES AND THEIR USE IN AGRICULTURE

COUNTRY	ARABLE LAND AS % OF TOTAL LAND 1980	IRRIGATED LAND AS % OF ARABLE LAND 1980	FOREST LAND AS % OF TOTAL LAND 1980	AGRIC. POPULATION PER HA OF ARABLE LAND 1980	AGRIC. LAB. FORCE AS % OF AGRIC. POPULATION 1981
ALGERIA	3	5	2	1.2	22
ANGOLA	3		43	1.2	26
BENIN	16	1	36	.9	46
BOTSWANA	2		2	.5	46
BURUNDI	51		2	2.7	47
CAMEROON	15		55	1.0	46
CAPE VERDE	10	5		4.6	32
CENTRAL AFRICAN REPUBLIC	3		64	1.0	54
CHAD	3		16	1.2	38
COMOROS	42		16	2.5	36
CONGO	2		63	.8	34
DJIBOUTI				152.0	31
EGYPT	3	100		7.4	28
EQUATORIAL GUINEA	8		61	1.2	29
ETHIOPIA	13		24	1.8	41
GABON	2		78	.9	47
GAMBIA	27	12	22	1.7	49
GHANA	12	1	38	2.2	37
GUINEA	6	1	43	2.6	44
GUINEA-BISSAU	10		38	1.7	30
IVORY COAST	12	1	31	1.6	50
KENYA	4	2	4	5.6	38
LESOTHO	10			3.8	52
LIBERIA	4	1	39	3.7	36
LIBYA	1	11		.2	25
MADAGASCAR	5	16	23	2.4	48
MALAWI	25		48	2.2	44
MALI	2	5	7	2.9	53
MAURITANIA		5	15	6.9	30
MAURITIUS	58	15	31	2.5	36
MOROCCO	17	7	12	1.3	26
MOZAMBIQUE	4	2	20	2.2	37
NAMIBIA	1	1	13	.7	32
NIGER	3	1	2	1.4	31
NIGERIA	33		16	1.4	37
REUNION	21	10	41	2.8	30
RWANDA	39		11	4.4	52
ST. HELENA	6		3		
SAO TOME AND PRINCIPE	38			1.3	24
SENEGAL	27	3	28	.8	41
SEYCHELLES	19		19	6.4	31
SIERRA LEONE	25		29	1.3	37
SOMALIA	2	15	14	3.5	38
SOUTH AFRICA	11	8	4	.6	36
SPANISH NORTH AFRICA					34
SUDAN	5	14	21	1.1	31
SWAZILAND	12	15	6	2.0	45
TANZANIA	6	1	48	2.8	41
TOGO	26	1	31	1.3	41
TUNISIA	30	3	3	.5	24
UGANDA	28		30	1.9	41
UPPER VOLTA	9		26	2.2	53
WESTERN SAHARA				27.0	24
ZAIRE	3		78	3.3	42
ZAMBIA	7		28	.8	36
ZIMBABWE	7	4	62	1.7	33
ANTIGUA AND BARBUDA	18		16	.9	43
BAHAMAS	2		32	1.4	36
BARBADOS	77			1.3	42
BELIZE	2	2	44	.9	30
BERMUDA			20		50
BRITISH VIRGIN ISLANDS	20		7	.3	
CANADA	5	1	35		43
CAYMAN ISLANDS			23		50
COSTA RICA	10	5	36	1.6	34
CUBA	28	30	17	.7	31
DOMINICA	23		41	1.6	32
DOMINICAN REPUBLIC	25	12	13	2.7	26
EL SALVADOR	35	15	7	3.4	31
GREENLAND					67
GRENADA	41		9	2.7	32
GUADELOUPE	28	4	40	1.1	37
GUATEMALA	17	4	42	2.2	30
HAITI	32	8	4	4.3	50
HONDURAS	16	5	36	1.3	29
JAMAICA	24	12	28	1.7	35
MARTINIQUE	25	19	26	1.9	36
MEXICO	12	22	25	1.1	29
MONTSERRAT	10		40	1.0	
NETHERLANDS ANTILLES	8			2.9	39
NICARAGUA	13	5	38	.8	30
PANAMA	8	5	55	1.2	34
PUERTO RICO	16	28	20	.9	33

ANNEX TABLE 12A. RESOURCES AND THEIR USE IN AGRICULTURE

COUNTRY	ARABLE LAND AS % OF TOTAL LAND 1980	IRRIGATED LAND AS % OF ARABLE LAND 1980	FOREST LAND AS % OF TOTAL LAND 1980	AGRIC.POPULATION PER HA OF ARABLE LAND 1980	AGRIC.LAB.FORCE AS % OF AGRIC.POPULATION 1981
ST.KITTS-NEVIS	39		17	.5	29
ST. LUCIA	28	6	18	2.4	33
ST.PIERRE AND MIQUELON	13		4		
ST. VINCENT	50	6	41	1.9	30
TRINIDAD AND TOBAGO	31	13	45	1.2	39
TURKS AND CAICOS IS.	2			1.0	
UNITED STATES	21	11	31		46
US VIRGIN ISLANDS	21		6	1.4	40
ARGENTINA	13	4	22	.1	38
BOLIVIA	3	4	52	.8	33
BRAZIL	7	3	68	.8	31
CHILE	7	23	21	.4	33
COLOMBIA	5	5	51	1.2	30
ECUADOR	9	20	53	1.4	32
FRENCH GUIANA			82	3.3	38
GUYANA	2	33	92	.5	33
PARAGUAY	5	3	52	.8	32
PERU	3	35	55	2.1	28
SURINAME		65	96	1.3	25
URUGUAY	11	4	3	.2	39
VENEZUELA	4	8	40	.7	31
AFGHANISTAN	12	33	3	1.5	33
BAHRAIN	3	50		96.5	25
BANGLADESH	68	18	16	8.1	34
BHUTAN	2		69	13.0	48
BRUNEI	2		79	2.1	26
BURMA	15	10	49	1.8	40
CHINA	11	46	13	5.9	46
CYPRUS	47	22	19	.5	44
EAST TIMOR	5		74	5.6	30
GAZA STRIP (PALESTINE)					29
HONG KONG	7	57	13	18.4	47
INDIA	57	23	23	2.6	38
INDONESIA	11	28	67	4.5	34
IRAN	10	37	11	.9	28
IRAQ	13	32	3	1.0	25
ISRAEL	20	49	6	.6	36
JAPAN	13	67	67	2.6	52
JORDAN	14	6	1	.6	24
KAMPUCHEA,DEMOCRATIC	17	3	76	1.6	38
KOREA DPR	19	47	74	3.7	45
KOREA REP	22	52	67	6.8	38
KUWAIT		100		23.0	25
LAOS	4	13	56	3.1	47
LEBANON	34	24	7	.8	26
MACAU					33
MALAYSIA	13	9	68	1.5	35
MALDIVES	10		3	41.0	43
MONGOLIA	1	3	10	.7	37
NEPAL	17	10	33	5.7	47
OMAN		93		13.4	26
PAKISTAN	26	70	4	2.3	27
PHILIPPINES	33	13	41	2.3	35
QATAR				73.0	26
SAUDI ARABIA KINGDOM OF	1	36	1	4.9	26
SINGAPORE	14		5	6.5	39
SRI LANKA	33	24	37	3.7	35
SYRIA	31	9	3	.8	26
THAILAND	35	15	31	2.0	45
TURKEY	37	7	26	.9	41
UNITED ARAB EMIRATES		38		49.5	26
VIET NAM	19	28	32	6.3	45
YEMEN ARAB REPUBLIC	14	9	8	1.6	28
YEMEN DEMOCRATIC	1	34	7	5.3	26
ALBANIA	27	51	45	2.2	43
ANDORRA	2		22	7.0	43
AUSTRIA	20		40	.4	45
BELGIUM-LUXEMBOURG	27		21	.4	39
BULGARIA	38	29	35	.7	52
CZECHOSLOVAKIA	41	2	36	.3	50
DENMARK	63	15	12	.1	48
FAEROE ISLANDS	2			.7	50
FINLAND	8	3	76	.3	46
FRANCE	34	6	27	.2	43
GERMAN DEMOCRATIC REP.	47	3	28	.3	53
GERMANY, FED. REP. OF	31	4	30	.3	47
GIBRALTAR					33
GREECE	30	24	20	.9	42
HUNGARY	58	5	17	.4	44

ANNEX TABLE 12A. RESOURCES AND THEIR USE IN AGRICULTURE

COUNTRY	ARABLE LAND AS % OF TOTAL LAND 1980	IRRIGATED LAND AS % OF ARABLE LAND 1980	FOREST LAND AS % OF TOTAL LAND 1980	AGRIC.POPULATION PER HA OF ARABLE LAND 1980	AGRIC.LAB.FORCE AS % OF AGRIC.POPULATION 1981
ICELAND			1	3.4	42
IRELAND	14		5	.7	38
ITALY	42	23	22	.5	37
LIECHTENSTEIN	25		19	.3	
MALTA	44	7		1.2	35
NETHERLANDS	25	32	9	.9	39
NORWAY	3	9	27	.4	38
POLAND	49	1	29	.7	56
PORTUGAL	39	18	40	.7	39
ROMANIA	46	22	28	1.0	55
SAN MARINO	17			5.0	40
SPAIN	41	15	31	.3	36
SWEDEN	7	2	64	.2	39
SWITZERLAND	10	6	26	.8	50
UNITED KINGDOM	29	2	9	.2	46
YUGOSLAVIA	31	2	36	1.1	46
AMERICAN SAMOA	40		50	2.3	33
AUSTRALIA	6	3	14		43
CHRISTMAS ISLAND (AUST.)					50
COOK ISLANDS	26			1.8	27
FIJI	13		65	1.1	34
FRENCH POLYNESIA	20		31	1.1	33
GUAM	22		18	4.8	36
KIRIBATI	51		3	.9	36
NAURU					25
NEW CALEDONIA	1		51	8.6	38
NEW ZEALAND	2	37	26	.6	40
NIUE	65		23	.1	50
PACIFIC IS. (TRUST TR.)	33		22	1.3	36
PAPUA NEW GUINEA	1		71	7.1	49
SAMOA	43		47	.7	33
SOLOMON ISLANDS	2		93	2.7	38
TONGA	79		12	1.0	33
TUVALU					50
VANUATU	6		1	.8	38
WALLIS AND FUTUNA IS.	25			1.2	33
USSR	10	8	41	.2	50

ANNEX TABLE 12B. RESOURCES AND THEIR USE IN AGRICULTURE

COUNTRY	AGRICULTURAL GFCF $ PER HA ARABLE LAND 1979	AGRICULTURAL GFCF $ PER CAPUT OF AGRIC.LAB.FORCE 1979	FERTILIZER USE PER HA ARAB.LAND KG/HA 1980	NOS. OF TRACTORS PER 000 HA ARABLE LAND 1980	OFFICIAL COMMITM. TO AGRICULTURE $ PER CAPUT 1981
ALGERIA			32	6	
ANGOLA			5	3	1.9
BENIN			2		12.8
BOTSWANA			1	2	18.4
BURUNDI			1		15.3
CAMEROON			5		9.7
CAPE VERDE			3	1	37.7
CENTRAL AFRICAN REPUBLIC					3.0
CHAD					2.9
CONGO			1	1	
DJIBOUTI			1900	48	.6
EGYPT	134.1	65.5	232	9	5.8
ETHIOPIA			4		2.4
GABON				3	34.6
GAMBIA			12		11.3
GHANA			4	1	1.4
GUINEA					2.8
GUINEA-BISSAU			1		25.9
IVORY COAST			14	1	11.5
KENYA	49.6	24.1	26	3	6.7
LESOTHO			15	2	8.3
LIBERIA			9	1	5.8
LIBYA			37	7	
MADAGASCAR			3	1	8.9
MALAWI			11	1	3.2
MALI			6		9.9
MAURITANIA			11	1	22.7
MAURITIUS	230.8	257.3	249	3	3.7
MOROCCO			34	3	2.5
MOZAMBIQUE			9	2	7.8
NAMIBIA				4	
NIGER			1		6.4
NIGERIA			6		5.1
REUNION			206	23	
RWANDA					14.4
ST. HELENA				3	
SAO TOME AND PRINCIPE				3	36.0
SENEGAL			4		28.4
SEYCHELLES				6	
SIERRA LEONE			1		11.4
SOMALIA				2	16.9
SOUTH AFRICA	60.6	275.2	78	13	
SUDAN			6	1	8.1
SWAZILAND			71	13	15.3
TANZANIA			7	4	12.1
TOGO			3		8.9
TUNISIA			13	7	29.3
UGANDA					4.2
UPPER VOLTA			4		8.5
WESTERN SAHARA				6	
ZAIRE			1		2.3
ZAMBIA			16	1	14.4
ZIMBABWE	28.3	44.2	65	8	2.9
ANTIGUA AND BARBUDA				29	
BAHAMAS			75	5	2.0
BARBADOS			176	17	25.2
BELIZE			31	25	1.8
BRITISH VIRGIN ISLANDS				1	
CANADA	89.0	7336.2	43	15	
COSTA RICA	158.4	300.8	150	12	1.0
CUBA			165	21	
DOMINICA			176	5	39.3
DOMINICAN REPUBLIC			42	3	7.3
EL SALVADOR			89	5	8.2
GRENADA				2	68.8
GUADELOUPE			73	19	
GUATEMALA	41.7	64.1	51	2	5.0
HAITI				1	3.6
HONDURAS			14	2	15.7
JAMAICA			66	11	8.3
MARTINIQUE			335	33	
MEXICO			52	5	10.3
MONTSERRAT				13	
NETHERLANDS ANTILLES				15	
NICARAGUA			36	1	6.2
PANAMA			53	7	29.8
PUERTO RICO				26	
ST.KITTS-NEVIS			150	15	
ST. LUCIA			282	2	
ST. VINCENT			229	4	
TRINIDAD AND TOBAGO			51	15	
UNITED STATES	99.5	8254.1	112	25	
US VIRGIN ISLANDS			157	46	

ANNEX TABLE 12B. RESOURCES AND THEIR USE IN AGRICULTURE

COUNTRY	AGRICULTURAL GFCF $ PER HA ARABLE LAND 1979	AGRICULTURAL GFCF $ PER CAPUT OF AGRIC.LAB.FORCE 1979	FERTILIZER USE PER HA ARAB.LAND KG/HA 1980	NOS. OF TRACTORS PER 000 HA ARABLE LAND 1980	OFFICIAL COMMITM. TO AGRICULTURE $ PER CAPUT 1981
ARGENTINA			3	5	8.0
BOLIVIA			2		.9
BRAZIL			68	5	3.3
CHILE			21	6	1.8
COLOMBIA			54	5	3.9
ECUADOR			28	2	10.0
FRENCH GUIANA			25	20	
GUYANA			41	9	42.7
PARAGUAY			3	2	26.9
PERU			32	4	8.9
SURINAME			31	27	130.2
URUGUAY			42	15	.6
VENEZUELA	98.0	428.8	64	10	
AFGHANISTAN			6		
BANGLADESH			46		5.1
BHUTAN			1		2.7
BRUNEI				3	
BURMA			10	1	3.8
CHINA			150	7	
CYPRUS	107.2	497.8	34	25	22.5
EAST TIMOR				1	
HONG KONG				1	
INDIA			31	2	1.9
INDONESIA			63	1	3.9
IRAN			36	4	
IRAQ			17	4	
ISRAEL	375.5	1598.8	199	65	
JAPAN			372	224	
JORDAN			10	3	20.7
KAMPUCHEA,DEMOCRATIC			3		
KOREA DPR			326	13	
KOREA REP	617.5	241.6	376	1	1.3
KUWAIT			440	35	
LAOS			8	1	4.4
LEBANON			76	9	.7
MALAYSIA			105	2	11.8
MONGOLIA			9	8	
NEPAL			10		7.6
OMAN			79	2	
PAKISTAN			50	2	2.7
PHILIPPINES			34	2	4.8
QATAR			400		
SAUDI ARABIA KINGDOM OF			35	1	
SINGAPORE			550	6	
SRI LANKA			77	11	20.6
SYRIA	36.2	194.2	22	5	
THAILAND			16	2	6.0
TURKEY			41	15	3.6
UNITED ARAB EMIRATES			269		.7
VIET NAM			41	4	.9
YEMEN ARAB REPUBLIC			4	1	5.6
YEMEN DEMOCRATIC			10	6	7.0
ALBANIA			125	14	
AUSTRIA			249	191	
BELGIUM-LUXEMBOURG	646.6	4400.8	499	132	
BULGARIA			198	15	
CZECHOSLOVAKIA			335	26	
DENMARK			236	71	
FINLAND	384.5	2864.6	204	88	
FRANCE			301	81	
GERMAN DEMOCRATIC REP.			325	29	
GERMANY, FED. REP. OF	827.9	4991.6	471	195	
GREECE	127.1	330.4	134	36	
HUNGARY			262	10	
ICELAND			3648	1650	
IRELAND			618	144	
ITALY			170	86	
LIECHTENSTEIN				102	
MALTA			115	29	1.2
NETHERLANDS			789	207	
NORWAY	1228.8	7982.4	299	160	
POLAND			236	42	
PORTUGAL			73	20	2.1
ROMANIA			117	14	10.5
SPAIN			81	26	
SWEDEN	362.6	5568.6	162	61	
SWITZERLAND			441	230	
UNITED KINGDOM	337.6	4357.7	294	73	
YUGOSLAVIA			105	53	11.4
AMERICAN SAMOA				4	

ANNEX TABLE 12B. RESOURCES AND THEIR USE IN AGRICULTURE

COUNTRY	AGRICULTURAL GFCF $ PER HA ARABLE LAND 1979	AGRICULTURAL GFCF $ PER CAPUT OF AGRIC.LAB.FORCE 1979	FERTILIZER USE PER HA ARAB.LAND KG/HA 1980	NOS. OF TRACTORS PER 000 HA ARABLE LAND 1980	OFFICIAL COMMITM. TO AGRICULTURE $ PER CAPUT 1981
AUSTRALIA			28	7	
COOK ISLANDS				22	
FIJI			61	7	15.1
FRENCH POLYNESIA			10	2	20.0
GUAM				7	
NEW CALEDONIA			160	100	42.4
NEW ZEALAND			1018	204	
NIUE				1	
PACIFIC IS. (TRUST TR.)				1	
PAPUA NEW GUINEA			15	4	5.5
SAMOA					108.9
TONGA				1	96.0
VANUATU				1	
USSR			81	11	

ANNEX TABLE 13. MEASURES OF OUTPUT AND PRODUCTIVITY IN AGRICULTURE

COUNTRY	AGRICULTURAL GDP $ PER CAPUT AGRIC. POPULATION 1979	AGRICULTURAL GDP GROWTH RATE 1970-78 %	INDEX OF FOOD PRODUC. PER CAPUT 1969-71=100 1979-81	INDEX OF TOT. AGR. PRODUC. PER CAPUT 1969-71=100 1979-81	PER CAPUT DIETARY ENERGY SUPPLIES AS % OF REQUIREM. 1980	INDEX OF VALUE OF AGRIC. EXPORTS 1969-71=100 1979-81
ALGERIA	221	20.8	82	82	101	66
ANGOLA		15.9	80	58	89	98
BENIN	247	13.4	96	95	101	143
BOTSWANA	155	18.4	65	65	101	429
BURUNDI	115	11.9	100	101	94	435
CAMEROON	244	20.9	101	100	105	373
CAPE VERDE		32.5	88	88	121	212
CENTRAL AFRICAN REPUBLIC	123	17.8	102	99	96	202
CHAD		18.3	96	93	74	317
COMOROS		18.0	93	92	99	253
CONGO	328	10.0	82	82	98	133
DJIBOUTI						210
EGYPT	185	18.4	90	88	118	115
EQUATORIAL GUINEA		17.4				118
ETHIOPIA	72	6.4	85	85	75	306
GABON	406	19.5	94	94	122	523
GAMBIA	154	30.9	67	67	95	169
GHANA		24.8	74	74	87	245
GUINEA	158	18.3	87	87	83	155
GUINEA-BISSAU		16.8	89	89	99	292
IVORY COAST	372	23.9	110	105	116	560
KENYA	74	18.4	84	93	89	387
LESOTHO	70	25.4	86	81	107	152
LIBERIA	245	1.0	95	90	109	342
LIBYA	940	21.6	141	139	147	
MADAGASCAR	140	17.1	94	94	109	307
MALAWI	102	6.9	96	103	92	444
MALI	87	2.3	88	92	83	510
MAURITANIA	97	2400.0	77	77	90	239
MAURITIUS	672	24.5	90	92	121	399
MOROCCO	213	11.8	81	81	109	217
MOZAMBIQUE	155	21.9	73	70	80	92
NAMIBIA		27.2	83	83	96	173
NIGER	117	8.6	93	93	95	146
NIGERIA	369	21.1	91	91	100	151
REUNION		30.4	106	104	130	252
RWANDA	115	17.8	104	107	95	587
SAO TOME AND PRINCIPE		14.9	79	78	101	273
SENEGAL	157	27.9	76	76	100	185
SEYCHELLES		17.8				316
SIERRA LEONE	128	15.1	81	82	89	343
SOMALIA	194	9.2	64	64	92	486
SOUTH AFRICA	452	10.5	104	102	116	401
SUDAN	190	20.4	103	88	102	186
SWAZILAND		19.8	105	111	108	584
TANZANIA	149	22.9	91	87	86	221
TOGO	159	8.2	91	90	93	217
TUNISIA	379	14.7	124	124	116	313
UGANDA	1106	25.6	86	71	79	147
UPPER VOLTA	81	8.1	94	96	85	367
ZAIRE	97	22.5	87	86	96	201
ZAMBIA	126	10.8	92	92	91	109
ZIMBABWE	110	11.3	92	98	81	353
ANTIGUA AND BARBUDA			136	136	88	
BAHAMAS			85	85	98	
BARBADOS	1227	14.5	93	93	129	250
BELIZE		7.2	110	110	119	633
BRITISH VIRGIN ISLANDS		17.1				
CANADA	7230	12.3	109	108	127	411
COSTA RICA	965	19.9	110	109	120	407
CUBA			106	105	120	677
DOMINICA			91	91	90	124
DOMINICAN REPUBLIC	312	14.6	99	101	96	322
EL SALVADOR	428	19.5	104	97	94	479
GREENLAND						64
GRENADA		14.4	99	99	87	323
GUADELOUPE		19.3	83	82	115	241
GUATEMALA		9.6	116	115	93	439
HAITI		2.0	89	88	83	297
HONDURAS	266	11.3	80	88	96	423
JAMAICA	390	16.8	91	91	118	140
MARTINIQUE		21.7	87	88	117	170
MEXICO	487	14.0	106	103	120	229
NETHERLANDS ANTILLES			46	46	108	8930
NICARAGUA	393	15.5	87	85	97	333
PANAMA	611	10.0	102	102	98	196
PUERTO RICO	2776	8.9	80	79		
ST.KITTS-NEVIS						413
ST. LUCIA		13500.0	91	91	99	297
ST. VINCENT		20.0	106	106	91	359
TRINIDAD AND TOBAGO	656	12.6	70	69	113	166
UNITED STATES	14406	8.6	116	115	139	576
US VIRGIN ISLANDS						3

ANNEX TABLE 13. MEASURES OF OUTPUT AND PRODUCTIVITY IN AGRICULTURE

COUNTRY	AGRICULTURAL GDP $ PER CAPUT AGRIC.POPULATION 1979	AGRICULTURAL GDP GROWTH RATE 1970-78 %	INDEX OF FOOD PRODUC.PER CAPUT 1969-71=100 1979-81	INDEX OF TOT.AGR. PRODUC.PER CAPUT 1969-71=100 1979-81	PER CAPUT DIETARY ENERGY SUPPLIES AS % OF REQUIREM. 1980	INDEX OF VALUE OF AGRIC.EXPORTS 1969-71=100 1979-81
ARGENTINA	5886	10.3	116	115	128	422
BOLIVIA	314	21.7	102	103	87	505
BRAZIL	566	22.9	125	118	106	433
CHILE	711	8.0	97	97	114	1022
COLOMBIA	1023	19.0	122	120	109	453
ECUADOR	361	17.5	97	98	91	361
FALKLAND IS. (MALVINAS)						414
GUYANA	539	22.0	91	91	110	270
PARAGUAY	710	20.5	111	114	126	602
PERU	206	6.4	84	84	93	174
SURINAME	1188	16.7	187	186	108	646
URUGUAY	2203	3.8	104	100	109	329
VENEZUELA	1009	17.5	104	101	107	156
AFGHANISTAN	78	21.4	97	95	73	534
BAHRAIN						46
BANGLADESH	83	9.5	93	92	88	98
BHUTAN			107	107	41	243
BRUNEI			130	128	119	154
BURMA	118	15.8	103	103	107	266
CHINA			116	117	107	302
CYPRUS	873	2.8	101	101	128	294
GAZA STRIP (PALESTINE)						333
HONG KONG	1528	13.0	71	71	128	471
INDIA	97	6.3	103	103	86	370
INDONESIA	166	22.0	118	116	108	475
IRAN		22.9	112	107	124	130
IRAQ	454	15.7	89	88	111	154
ISRAEL	3896	15.8	103	107	118	355
JAPAN	3372	17.2	91	90	124	174
JORDAN	176	11.7	75	75	96	756
KAMPUCHEA, DEMOCRATIC		12.9	45	45	90	23
KOREA DPR			134	132	129	512
KOREA REP	817	23.2	126	125	127	635
KUWAIT	2818	31.1				490
LAOS			110	109	89	508
LEBANON		32.8	109	105	100	346
MACAU			64	64	106	423
MALAYSIA	787		139	123	119	496
MALDIVES			92	92	83	229
MONGOLIA			92	91	111	256
NEPAL	79	7.8	84	84	88	81
OMAN	173	9.5				6469
PAKISTAN	127	9.9	104	103	100	406
PHILIPPINES	337	16.6	122	124	103	374
SAUDI ARABIA KINGDOM OF	239	17.8	29	30	120	3212
SINGAPORE	2464	12.8	148	145	136	554
SRI LANKA	111	7.3	148	120	102	202
SYRIA	423	22.3	163	143	118	180
THAILAND	206	17.6	129	126	104	583
TURKEY	608	22.4	112	111	120	385
UNITED ARAB EMIRATES	282	29.9				4226
VIET NAM			112	113	91	488
YEMEN ARAB REPUBLIC	156	14.2	96	97	93	39
YEMEN DEMOCRATIC			102	99	86	119
ALBANIA			106	105	110	373
AUSTRIA	4053	13.2	113	113	135	488
BELGIUM-LUXEMBOURG	7910	9.6	109	109	154	567
BULGARIA	1283	15.6	116	115	146	245
CZECHOSLOVAKIA	1961	3.6	114	113	141	340
DENMARK	27855	15.1	111	112	133	390
FINLAND	4931	13.0	103	103	118	398
FRANCE	5496	9.7	117	117	134	538
GERMAN DEMOCRATIC REP.		50.6	129	130	144	505
GERMANY, FED. REP. OF		12.3	110	110	133	821
GREECE	1500	14.0	123	122	147	339
HUNGARY	1875	11.5	132	131	134	422
ICELAND			108	106	109	556
IRELAND	1601	14.2	116	115	148	490
ITALY	3292	10.0	112	112	148	459
MALTA	1778	10.8	113	113	124	165
NETHERLANDS	7855	14.6	115	116	131	478
NORWAY	7079	16.4	117	117	124	385
POLAND	898	1.6	96	96	134	193
PORTUGAL	980	14.9	74	74	128	302
ROMANIA			146	145	126	397
SPAIN	2277	14.0	125	125	136	479
SWEDEN	7117	13.5	117	117	119	331
SWITZERLAND			119	119	132	295
UNITED KINGDOM	6853	8.8	122	122	132	840
YUGOSLAVIA	930	15.6	117	116	140	258
AUSTRALIA		8.3	117	107	118	384

ANNEX TABLE 13. MEASURES OF OUTPUT AND PRODUCTIVITY IN AGRICULTURE

COUNTRY	AGRICULTURAL GDP $ PER CAPUT AGRIC. POPULATION 1979	AGRICULTURAL GDP GROWTH RATE 1970-78 ø %	INDEX OF FOOD PRODUC. PER CAPUT 1969-71=100 1979-81	INDEX OF TOT. AGR. PRODUC. PER CAPUT 1969-71=100 1979-81	PER CAPUT DIETARY ENERGY SUPPLIES AS % OF REQUIREM. 1980	INDEX OF VALUE OF AGRIC. EXPORTS 1969-71=100 1979-81
COCOS (KEELING) ISLANDS						250
COOK ISLANDS						179
FIJI	787	28.6	104	105	109	391
FRENCH POLYNESIA		16.8	87	87	100	208
KIRIBATI		58.1				202
NEW CALEDONIA		3.0	83	80	94	115
NEW ZEALAND	9116	5.8	107	105	132	335
NIUE						229
PACIFIC IS. (TRUST TR.)						572
PAPUA NEW GUINEA	301	20.7	97	100	85	487
SAMOA			97	97	86	232
SOLOMON ISLANDS			125	125	81	574
TONGA			114	114	120	209
VANUATU			92	92	94	282
USSR	2367	5.3	102	102	132	170

ANNEX TABLE 14. CARRY-OVER STOCKS OF SELECTED AGRICULTURAL PRODUCTS

Product / Country	Date	Crop year ending in 1976	1977	1978	1979	1980	1981	1982[a/]	1983[b/]
		million metric tons							
CEREALS									
Developed countries		100.8	146.6	146.2	176.8	156.2	133.9	177.3	227.2
Canada		12.4	18.3	19.5	22.0	14.3	12.9	14.9	18.3
United States		36.6	61.6	74.2	72.6	78.1	62.2	104.4	152.5
Australia		3.4	2.8	1.6	5.7	5.0	2.7	3.1	1.0
EEC		14.5	14.6	13.8	17.7	15.8	15.7	14.7	19.2
Japan		5.8	7.2	8.8	9.9	10.6	8.8	7.4	6.0
USSR		13.0	24.0	10.0	30.0	16.0	14.0	14.0	14.0
Developing countries		88.6	101.3	94.7	99.2	101.2	101.6	100.7	104.3
Far East		70.9	77.5	73.4	81.1	82.0	75.6	75.3	79.5
Bangladesh		0.6	0.4	0.6	0.2	0.8	1.3	0.7	0.5
China		39.3	43.0	39.0	46.0	53.0	45.5	43.0	44.0
India		10.0	15.5	14.7	14.9	10.9	7.4	7.5	10.2
Pakistan		1.0	0.6	0.6	0.7	1.1	1.5	2.3	2.5
Near East		7.8	10.0	8.7	6.7	9.4	10.6	10.6	9.4
Turkey		2.0	3.6	3.5	1.4	0.8	0.6	0.6	0.6
Africa		3.2	4.4	4.9	3.9	2.9	3.6	4.8	4.4
Latin America		6.7	9.4	7.7	7.5	6.8	11.8	10.0	11.0
Argentina		2.2	3.2	1.7	2.3	1.5	1.0	1.3	2.3
Brazil		1.4	2.1	2.1	0.7	1.3	3.8	2.6	3.5
World Total		189.4	247.9	240.0	276.0	257.4	235.5	277.9	331.6
of which:									
Wheat		77.3	116.2	97.8	117.8	105.0	97.6	102.8	121.7
Rice (milled basis)		37.4	37.7	40.1	44.1	41.9	43.0	42.7	41.8
Coarse grains		74.7	94.1	103.0	114.1	109.4	94.8	132.4	168.0
SUGAR (raw value)									
World total	1 Sept.	20.5	24.8	30.3	31.4	26.3	24.5	32.0	38.0
COFFEE									
Exporting countries[c/]		1.58	1.85	1.93	1.76	1.86	1.86	2.55	...
		thousand metric tons							
DRIED SKIM MILK									
United states	31 Dec.	220	308	265	220	266	420	606	...
EEC	31 Dec.	1243	1066	824	322	276	354	668	...
Total of above		1463	1374	1089	542	542	774	1274	...

a/ Estimate. - b/ Forecast. - c/ Excludes privately held stocks in Brazil.

ANNEX TABLE 15. ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1970 to 1975	1978 to 1979	1979 to 1980	1980 to 1981	1960 to 1965	1965 to 1970	1970 to 1975	1978 to 1979	1979 to 1980	1980 to 1981
	Percent per year											
Developed countries												
WESTERN COUNTRIES												
Austria	3.9	3.3[a]	7.4	3.6	6.3	6.8	4.4	2.1[a]	6.7	2.6	4.5	5.8
Belgium	2.5	3.5	8.3	4.5	6.7	7.6	2.9	3.5	7.5	0.5	3.6	6.0
Denmark	5.5	7.5	9.5	9.6	12.3	11.7	4.2	7.5	10.7	...	10.1	11.6
Finland	5.3	4.6[b]	2.0	7.3	11.5	12.0	5.9	5.2[b]	12.4	3.3	12.9	13.1
France	3.8	4.3	8.8	10.5	13.3	13.1	4.3	3.8	9.6	8.3	8.8	12.7
Germany, Fed. Rep. of	2.8	2.4	6.2	4.1	5.5	5.9	2.6	1.3	5.6	1.7	4.7	4.9
Greece	1.6	2.5	13.1	19.0	24.9	24.4	2.5	2.6	14.7	18.8	27.5	30.1
Iceland	11.0	12.8	24.8	44.1	58.5	50.8	15.2	13.3	28.3	33.0	65.2	55.3
Ireland	4.2	5.3	13.0	13.2	18.2	20.4	3.9	4.3	14.3	14.8	10.7	15.0
Italy	4.9	3.0	11.4	14.8	21.2	19.5	4.6	2.2	11.6	13.2	15.6	18.1
Netherlands	3.5	4.8	8.6	4.3	6.4	6.7	4.0	4.3	6.9	2.1	4.4	5.6
Norway	4.1	5.0	8.3	4.8	10.9	13.6	4.5	5.3	8.3	4.3	8.8	16.6
Portugal	2.6	6.4	15.3	24.2	16.5	20.0	2.8	5.2	16.3	28.0	11.1	19.5
Spain	7.0	5.1	12.0	15.7	15.5	14.6	7.7	3.7	12.1	10.2	9.0	13.6
Sweden	3.6	4.5	7.8	7.2	13.7	12.5	5.3	4.5	7.9	5.3	11.5	15.0
Switzerland	3.2	3.4	7.9	3.6	4.0	6.5	2.9	0.9	7.3	3.7	7.0	10.4
United Kingdom	3.6	4.6	12.3	13.4	18.0	11.9	3.6	4.6	15.1	12.0	12.1	8.4
Yugoslavia	13.6	10.5	19.3	19.4	31.6	40.9	17.3	9.0	19.1	17.4	30.3	42.8
NORTH AMERICA												
Canada	1.6	3.8	7.4	9.2	10.2	12.4	2.2	3.4	11.1	13.2	10.7	11.4
United States	1.3	4.2	6.7	11.5	13.5	10.2	1.4	4.0	9.5	10.9	8.7	7.7
OCEANIA												
Australia	1.8	3.1	10.2	9.1	10.2	9.7	2.0	2.1	9.8	14.0	12.6	9.2
New Zealand	2.7	4.1	9.8	13.7	17.1	15.4	2.4	4.1	9.4	17.3	20.5	16.7
OTHER DEVELOPED COUNTRIES												
Israel	7.1	4.0	23.9	83.4	131.0	117.0	5.6	3.1	25.1	78.3	154.0	199.0
Japan	6.0	5.4	12.0	3.6	8.0	4.9	7.2	6.1	13.0	2.2	6.0	5.3
South Africa	2.1	3.4	9.3	13.2	13.8	15.1	2.6	3.0	11.7	15.7	18.9	22.1

See notes at end of table

ANNEX TABLE 15. ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD (continued)

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1970 to 1975	1978 to 1979	1979 to 1980	1980 to 1981	1960 to 1965	1965 to 1970	1970 to 1975	1978 to 1979	1979 to 1980	1980 to 1981
	Percent per year											
Developing countries												
LATIN AMERICA												
Argentina	23.0	19.4	59.5	159.5	101.0	104.0	23.0	18.3	58.0	169.0	95.0	99.0
Barbados	...	...	18.6	13.2	14.2	14.6	...	...	21.0	11.1	12.0	14.9
Bolivia	5.1	5.9	23.7	19.7	47.2	32.1	2.1	7.8	27.2	18.6	47.6	35.2
Brazil	60.0	28.0	23.5 [c]	50.2	78.0	95.7	60.0	26.0	25.9 [c]	56.9	83.2	92.5
Chile	27.0	26.0	225.4	33.4	35.1	19.7	30.0	26.0	245.5	31.0	36.1	14.2
Colombia	12.4	10.1	19.5	24.2	27.9	29.4	13.4	9.2	24.0	23.5	36.6	25.1
Costa Rica	2.3	2.5	13.7	9.2	18.1	37.0	2.2	3.8	3.7	12.6	21.7	36.7
Dominican Republic	2.7	1.0	11.1	9.2	16.7	7.5	2.5	0.1	13.3	14.5	15.4	0.4
Ecuador	4.0	4.6	13.7	10.3	13.0	16.4	4.9	6.0	18.4	10.0	11.0	14.2
El Salvador	0.2	1.1	8.4	...	17.4	14.7	1.1	2.2	8.8	...	19.3	17.6
Guatemala	0.1	1.5	2.9	11.4	10.7	11.4	0.1	1.7	3.3	10.2	11.2	11.2
Guyana	1.9	1.5	8.2	17.8	14.1	22.2	2.3	2.8	12.2	18.9	12.1	27.6
Haiti	3.7	1.7	13.7	13.0	17.8	13.8	4.1	1.8	15.5	15.6	26.6	14.2
Honduras	2.7	1.6	6.5	9.0	18.1	9.4	3.2	1.8	8.0	7.6	17.1	7.3
Jamaica	2.9	4.3	14.9	29.1	26.9	...	2.4	4.7	17.2	33.2	33.7	...
Mexico	1.9	3.5	12.4	18.1	26.3	28.0	1.6 [d]	3.8	13.9	18.2	25.0	26.1
Panama	1.1 [d]	1.6	7.8	7.9	13.8	7.3	1.4 [d]	1.7	9.9	10.2	12.6	9.1
Paraguay	...	1.2	12.6	28.2	22.4	13.0	...	0.3	15.4	29.4	19.3	6.4
Peru	9.4	7.8 [e]	12.1	67.6	59.2	75.4	10.5	7.1 [e]	13.9	74.2	58.8	76.4
Puerto Rico	2.2	3.2	8.8	6.5	10.3	9.8	3.0	4.1	12.6	7.2	9.9	9.2
Suriname	...	...	8.2	14.9	14.0	9.0	...	...	9.5	12.8	12.2	14.9
Trinidad & Tobago	2.2	3.8	13.7	14.7	17.5	14.4	2.1	3.7	17.1	13.8	19.4	16.5
Uruguay	16.2 [f]	60.0	73.4	66.8	63.4	34.0	13.1 [f]	60.0	76.0	70.9	57.9	25.6
Venezuela	1.7	1.6	5.5	12.3	23.1	14.7	1.7	0.9	8.5	16.7	33.0	18.6
FAR EAST												
Afghanistan	...	... [b]	... [g]	...	2.5	4.3	...	... [b]	... [g]	...	8.8	...
Bangladesh	...	4.0 [b]	39.0	12.7	13.2	13.2	...	3.2 [b]	42.0	12.7	12.6	13.6
Burma	...	6.4 [b]	17.8	5.7	0.6	0.3	...	2.9 [b]	21.0	5.6	1.8	-4.6
Dem. Kampuchea	4.3	4.5	100.9	...	...	...	2.7	6.7	112.8	...	...	...
India	6.1	8.9 [h]	13.2	6.4	11.5	13.1	6.5	9.8 [h]	14.2	4.6	12.1	14.5
Indonesia	...	100.0	21.3	...	18.1	12.2	...	100.0	25.2	...	14.8	14.7
Korea, Rep. of	15.4	12.3	14.3	18.3	28.7	23.3	18.3	12.5	16.8	13.8	26.6	29.1
Lao, People's D.R.	38.0	6.0 [b]	35.2	...	...	...	39.0	4.0 [b]	40.9	...	...	...
Malaysia (peninsular)	0.5	0.4 [b]	6.7	3.6	6.7	9.6	0.6	0.4 [b]	10.4	2.3	3.6	10.3
Nepal	...	6.2	10.3	4.3	14.6	12.3	...	7.2	9.8	5.7	16.5	12.0
Pakistan	2.6	5.6	15.2	9.4	11.7	13.8	3.8	6.0	16.6	7.1	10.0	15.2
Philippines	4.8	3.6 [a]	18.7	16.5	17.6	12.3	6.8	5.2 [a]	20.1	15.1	15.2	12.2
Sri Lanka	1.7	4.2	8.0	10.8	26.1	18.0	1.3	4.9	9.1	10.8	29.0	17.6
Thailand	1.5	2.5	9.8	10.3	19.9	13.4	2.0	4.2	11.9	9.2	18.7	10.5

See notes at end of table

ANNEX TABLE 15. ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD (continued)

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1970 to 1975	1978 to 1979	1979 to 1980	1980 to 1981	1960 to 1965	1965 to 1970	1970 to 1975	1978 to 1979	1979 to 1980	1980 to 1981
	Percent per year											
AFRICA												
Algeria	...	...	5.1	11.4	9.6	...	...	...	7.2	13.5	10.8	...
Botswana	...	...k/	...	11.7	13.9	16.3	...	...k/	...	11.0	18.2	22.3
Cameroon	...	3.3k/	10.2	6.6	9.9	10.2i/	...	4.6k/	11.5	4.8	9.0	12.9i/
Ethiopia	...d/	3.0e/	3.7	16.0	4.5	4.3i/	...d/	3.5e/	2.7	18.0i/	5.2	3.4i/
Gabon	4.4d/	3.0	11.4	8.0	12.3	8.7	3.3d/	2.1	2.7	9.6i/	...	...
Gambia	...	...	10.5	6.1	6.7	6.1	...	...	12.8	5.8	5.2	5.3
Ghana	11.8	3.7	17.4	62.7	50.1	116.5	14.0	2.1	20.3	73.5	52.2	111.1
Ivory Coast	2.6	4.9	8.2g/	16.7	14.9	8.5	2.8	5.9	9.3g/	22.0	18.8	5.2
Kenya	2.0	1.7	13.9	7.2	11.6	13.8m/	1.9	2.0	14.7	5.6	14.3	12.9m/
Liberia	...	4.4	12.1	11.4	13.8	6.5m/	...	3.4	13.7	11.6	9.0	3.8m/
Madagascar	...	2.3b/	9.7	14.0	18.2	30.5	...	2.2b/	12.0	14.5	18.7	32.0
Malawi	...d/	2.0	8.9	11.3	18.3	9.5	...d/	3.4	10.7	13.9	24.7	11.1
Mauritius	1.0d/	3.0	13.1e/	14.5	41.9	12.5	0.6d/	3.0	14.7e/	14.4	51.2	14.5
Morocco	4.0n/	0.6	5.4	8.3	9.4	12.5	4.6n/	0.1	7.2	6.4	7.3	14.9
Mozambique	1.9n/	3.7	10.5	...	...	...	0.7n/	4.7	11.1	...	...	...
Niger	...	3.8	7.9	7.3	10.3	22.9	...	4.4	10.6	5.5	11.0	28.5
Nigeria	3.2	5.6	11.5	11.6	9.9	20.8	2.0	8.8	13.1	8.4	7.1	24.3
Senegal	...p/	...	13.0	9.5	8.7	5.8	...p/	...	16.5	8.3	9.8	0.8
Sierra Leone	3.9p/	4.3k/	8.4	21.3	11.0	23.2	0.6p/	4.8k/	11.0	23.5	9.1	23.6
Somalia	7.4	2.5b/	7.5	24.0	58.7	...	7.5	2.8b/	9.1	22.4	76.6	...
Swaziland	...	2.7	9.3	14.3	19.8	19.8	...	2.5	9.8	12.3	24.7	24.5
Tanzania	1.2	3.7e/	13.1	13.6	30.2	25.6i/	1.2	2.5e/	17.7	12.3	27.2	23.5i/
Togo	...	2.1e/	8.9	7.7	7.8	12.8i/	...	2.6e/	9.7	6.9	6.9	13.1i/
Tunisia	4.5	2.9	4.8	7.7	10.0	9.0	4.8	3.1	5.2	9.3	13.6	8.9
Uganda	5.4n/	4.0	23.4	...	...	...	7.3n/	3.5	24.3	...	...	...
Zaire	15.6	23.0h/	18.6	...	41.4	35.4	19.0	22.0h/	21.2	...	21.2	39.2
Zambia	2.4	8.7	7.1	9.7	11.7	14.0	2.4	8.8	7.4	8.9	14.4	15.0
Zimbabwe	...	...	...	13.2	5.4	13.1	...	...	...	12.1	3.7	12.0
NEAR EAST												
Cyprus	0.3	2.9a/	8.0	9.5	13.5	10.7	0.2	3.2a/	10.2	6.7	14.5	11.4
Egypt	3.2	3.2a/	5.8	9.9	20.7	10.4	6.5	6.2a/	8.6	7.5	26.7	14.1
Iran	2.0	1.4	9.6	10.4i/	20.7	24.2	3.1	0.9	10.0	22.4i/	28.5	29.6
Iraq	...	3.5b/	11.3	8.6i/	...	...	...	3.1b/	18.1	11.0i/	...	...
Jordan	...	2.8e/	6.0	14.2	11.1	11.1	...	3.1e/	9.2	19.4	10.9	7.5
Lebanon	...	1.8a/	4.5	...	...	...	...	2.0a/	15.9	...	...	...
Libya	...	6.1	16.4	...	...	...	...	8.3	...	...	...	...
Saudi Arabia	...	...a/	...	1.8	3.1j/	...	...	...	...	1.8	6.1j/	...
Sudan	3.3d/	3.4a/	11.6	30.8	36.9	...	4.2d/	2.8a/	12.0	31.8	38.7	...
Syria	1.3	4.2k/	16.7	4.4	19.2	18.2	1.3d/	4.7k/	18.2	5.7	19.2	19.3
Turkey	3.6	7.1	6.2	56.5	116.5	35.9	4.8	8.7	7.7	51.3	106.5	40.7

a/1965-69. b/1967-70. c/1972-75. d/1962-65. e/1966-70. f/1960-62. g/1973-75. h/1965-68. i/January-September. j/January-May. k/1968-70. m/January-June. n/1963-65. p/1961-65.

Source: International Labour Office. Bulletin of Labour Statistics. 1982-84.

ANNEX TABLE 16. PER CAPUT DIETARY ENERGY SUPPLIES IN RELATION TO NUTRITIONAL REQUIREMENTS IN SELECTED DEVELOPED AND DEVELOPING COUNTRIES

COUNTRY	1967-69	1970-72	1975-77	1978-80	REQUIREMENTS
	% OF REQUIREMENTS				KILOCAL/CAPUT /DAY
ALGERIA	77	80	94	100	2400
ANGOLA	83	88	91	90	2350
BENIN	95	97	92	100	2300
BOTSWANA	85	87	88	94	2320
BURUNDI	95	91	92	92	2330
CAMEROON	90	95	105	106	2320
CAPE VERDE	79	88	95	117	2350
CENTRAL AFRICAN REPUBLIC	93	98	96	96	2260
CHAD	97	86	75	76	2380
COMOROS	94	96	94	99	2340
CONGO	94	96	100	99	2220
EGYPT	101	101	114	118	2510
ETHIOPIA	87	85	77	74	2330
GABON	93	94	113	122	2340
GAMBIA	95	95	91	95	2380
GHANA	96	98	93	88	2300
GUINEA	88	87	87	84	2310
GUINEA-BISSAU	88	90	99	102	2310
IVORY COAST	111	111	107	114	2310
KENYA	97	98	93	89	2320
LESOTHO	90	89	94	107	2280
LIBERIA	98	99	102	107	2310
LIBYA	101	103	135	145	2360
MADAGASCAR	105	107	109	107	2270
MALAWI	92	101	97	96	2320
MALI	88	83	84	85	2350
MAURITANIA	89	81	81	89	2310
MAURITIUS	104	109	115	119	2270
MOROCCO	98	106	109	110	2420
MOZAMBIQUE	89	88	84	81	2340
NAMIBIA	100	101	98	98	2280
NIGER	90	89	86	94	2350
NIGERIA	92	94	95	99	2360
REUNION	108	108	119	128	2270
RWANDA	84	88	92	95	2320
SAO TOME AND PRINCIPE	93	93	83	99	2350
SENEGAL	99	97	97	100	2380
SIERRA LEONE	97	95	91	92	2300
SOMALIA	96	98	96	92	2310
SOUTH AFRICA	111	114	119	115	2450
SUDAN	84	90	95	101	2350
SWAZILAND	92	95	100	108	2320
TANZANIA	88	87	91	87	2320
TOGO	96	95	88	92	2300
TUNISIA	93	99	111	115	2390
UGANDA	95	97	84	80	2330
UPPER VOLTA	85	81	85	85	2370
ZAIRE	99	101	102	96	2220
ZAMBIA	93	94	95	86	2310
ZIMBABWE	87	91	88	80	2390
ANTIGUA AND BARBUDA	85	87	86	88	2420
BAHAMAS	102	102	93	96	2420
BARBADOS	113	122	121	126	2420
BELIZE	109	112	113	118	2260
CANADA	124	125	126	126	2660
COSTA RICA	104	109	111	118	2240
CUBA	105	114	116	118	2310
DOMINICA	89	90	89	91	2420
DOMINICAN REPUBLIC	85	86	94	94	2260
EL SALVADOR	80	81	91	94	2290
GRENADA	91	97	85	87	2420
GUADELOUPE	94	99	108	113	2420
GUATEMALA	92	93	93	94	2190
HAITI	82	83	79	83	2260
HONDURAS	93	92	92	96	2260
JAMAICA	104	115	116	115	2240
MARTINIQUE	97	99	111	116	2420
MEXICO	116	116	118	120	2330
NETHERLANDS ANTILLES	99	102	107	108	2420
NICARAGUA	113	108	109	102	2250
PANAMA	108	104	104	99	2310
ST. LUCIA	86	91	92	99	2420
ST. VINCENT	91	94	92	91	2420
TRINIDAD AND TOBAGO	96	99	104	112	2420
UNITED STATES	129	132	135	138	2640
ARGENTINA	125	126	127	128	2650
BOLIVIA	81	83	85	87	2390
BRAZIL	105	104	104	105	2390
CHILE	111	112	107	112	2440
COLOMBIA	90	93	101	107	2320
ECUADOR	85	87	91	91	2290
GUYANA	102	101	108	109	2270
PARAGUAY	116	119	120	126	2310
PERU	95	96	94	92	2350
SURINAME	106	106	109	109	2260
URUGUAY	107	112	109	107	2670
VENEZUELA	96	95	103	107	2470

ANNEX TABLE 16. PER CAPUT DIETARY ENERGY SUPPLIES IN RELATION TO NUTRITIONAL REQUIREMENTS IN SELECTED DEVELOPED AND DEVELOPING COUNTRIES

COUNTRY	1967-69	1970-72	1975-77	1978-80	REQUIREMENTS
	% OF REQUIREMENTS				KILOCAL/CAPUT /DAY
AFGHANISTAN	89	80	81	75	2440
BANGLADESH	89	88	81	85	2210
BHUTAN	40	40	41	41	2310
BRUNEI	102	108	117	119	2240
BURMA	100	100	102	106	2160
CHINA	89	91	99	105	2360
CYPRUS	116	126	124	129	2480
HONG KONG	113	119	117	126	2290
INDIA	86	92	86	90	2210
INDONESIA	89	90	96	106	2160
IRAN	89	94	122	121	2410
IRAQ	91	94	100	110	2410
ISRAEL	115	119	121	118	2570
JAPAN	115	119	120	123	2340
JORDAN	96	95	90	97	2460
KAMPUCHEA,DEMOCRATIC	100	100	84	81	2220
KOREA DPR	102	106	117	127	2340
KOREA REP	104	112	116	124	2350
LAOS	95	95	87	84	2220
LEBANON	101	102	103	101	2480
MACAU	85	88	89	101	2290
MALAYSIA	109	112	115	118	2240
MALDIVES	81	79	78	81	2210
MONGOLIA	98	99	108	112	2430
NEPAL	92	91	92	87	2200
PAKISTAN	90	95	96	100	2310
PHILIPPINES	85	87	94	102	2260
SAUDI ARABIA KINGDOM OF	86	84	88	119	2420
SINGAPORE	111	123	126	135	2300
SRI LANKA	104	103	95	101	2220
SYRIA	99	102	105	115	2480
THAILAND	101	101	101	104	2220
TURKEY	111	111	116	118	2520
VIET NAM	96	102	97	94	2160
YEMEN ARAB REPUBLIC	87	83	93	94	2420
YEMEN DEMOCRATIC	88	88	80	87	2410
ALBANIA	104	105	109	118	2410
AUSTRIA	128	131	131	133	2630
BELGIUM-LUXEMBOURG	134	141	141	149	2640
BULGARIA	139	141	144	146	2500
CZECHOSLOVAKIA	139	141	140	141	2470
DENMARK	124	127	124	130	2690
FINLAND	115	117	115	115	2710
FRANCE	134	134	133	134	2520
GERMAN DEMOCRATIC REP.	130	133	139	143	2620
GERMANY, FED. REP. OF	122	126	126	132	2670
GREECE	123	129	139	145	2500
HUNGARY	126	128	133	134	2630
ICELAND	106	113	112	113	2660
IRELAND	137	139	146	150	2510
ITALY	133	140	137	145	2520
MALTA	121	123	122	123	2480
NETHERLANDS	128	129	129	130	2690
NORWAY	115	118	118	123	2680
POLAND	128	130	136	135	2620
PORTUGAL	124	128	128	130	2450
ROMANIA	115	116	127	128	2650
SPAIN	115	120	134	136	2460
SWEDEN	112	113	117	117	2690
SWITZERLAND	126	130	125	131	2690
UNITED KINGDOM	132	133	129	132	2520
YUGOSLAVIA	131	131	139	139	2540
AUSTRALIA	122	126	124	120	2660
FIJI	92	92	98	108	2660
FRENCH POLYNESIA	106	106	99	100	2660
NEW CALEDONIA	110	112	106	98	2660
NEW ZEALAND	134	135	132	133	2640
PAPUA NEW GUINEA	80	83	83	86	2660
SAMOA	79	81	85	86	2660
SOLOMON ISLANDS	81	78	77	80	2660
TONGA	93	99	116	121	2660
VANUATU	90	92	89	93	2660
USSR	130	131	133	132	2560

ANNEX TABLE 17. ANNUAL SHARES OF AGRICULTURAL "BROAD" DEFINITION IN TOTAL OFFICIAL COMMITMENTS MADE TO ALL SECTORS BY MULTILATERAL AND BILATERAL SOURCES, 1974-81

	1974	1975	1976	1977	1978	1979	1980	1981 [a/]
	..... %							
CONCESSIONAL & NON-CONCESSIONAL COMMITMENTS								
Multilateral agencies [b/]	32	38	32	36	39	36	38	36
World Bank [c/]	33	40	31	39	41	37	33	33
Regional Development Banks [c/]	28	37	36	35	31	33	45	44
OPEC Multilateral [c/]	41	8	25	13	30	7	16	15
Bilateral sources	9	7	7	10	9	...	...	...
DAC/EEC	10	8	8	11	11	12	11	11
OPEC Bilateral	3	6	5	6	3	...	...	...
All sources (multilateral + bilateral)	15	14	14	17	17	...	...	...
CONCESSIONAL COMMITMENTS ONLY (ODA)								
Multilateral agencies [b/]	45	43	46	44	49	49	49	53
World Bank [c/]	46	43	44	54	52	52	45	58
Regional Development Banks [c/]	48	46	54	50	48	53	62	64
OPEC Multilateral [c/]	33	21	29	11	29	7	15	14
Bilateral sources	12	10	9	14	13	16	13	14
DAC/EEC	14	13	11	16	17	18	16	17
OPEC Bilateral	4	5	5	7	3	7	1	4
All sources (multilateral + bilateral)	16	14	15	18	19	21	19	21

[a/] Preliminary.

[b/] Including also UNDP, CGIAR, FAO/TF, FAO/TCP (from 1977) and IFAD (from 1978).

[c/] Excluding commitments to CGIAR.

Source: FAO and OECD.

ANNEX TABLE 18. PERCENTAGE DISTRIBUTION OF OFFICIAL COMMITMENTS TO AGRICULTURE "BROAD" DEFINITION BY MULTILATERAL AND BILATERAL SOURCES, 1974-1981

	1974	1975	1976	1977	1978	1979	1980	1981 a/
	..... %							
CONCESSIONAL & NON-CONCESSIONAL COMMITMENTS								
Multilateral agencies	52	58	57	57	58	52	59	58
World Bank b/	37	41	37	38	43	34	35	34
Regional Development Banks b/	11	13	14	14	10	12	15	17
OPEC Multilateral b/	1	-	2	2	2	-	1	1
Others c/	3	4	4	3	3	6	8	6
Bilateral sources	48	42	43	43	42	48	41	42
DAC/EEC	44	31	36	38	40	44	40	40
OPEC Bilateral	4	11	7	5	2	4	1	2
All sources (multilateral + bilateral)	100	100	100	100	100	100	100	100
CONCESSIONAL COMMITMENTS ONLY (ODA)								
Multilateral agencies	37	38	47	36	41	37	45	43
World Bank b/	22	21	23	19	26	18	21	21
Regional Development Banks b/	10	10	15	11	8	11	12	12
OPEC Multilateral b/	1	1	3	2	2	-	1	1
Others c/	4	6	6	4	5	8	11	9
Bilateral sources	63	62	53	64	59	63	55	57
DAC/EEC	59	50	47	56	56	59	53	54
OPEC Bilateral	4	12	6	8	3	4	2	3
All sources (multilateral + bilateral)	100	100	100	100	100	100	100	100

a/ Preliminary.

b/ Excluding commitments to CGIAR.

c/ Including UNDP, CGIAR, FAO/TF, FAO/TCP (from 1977) and IFAD (from 1978).

ANNEX TABLE 19. PERCENTAGE DISTRIBUTION OF OFFICIAL COMMITMENTS TO AGRICULTURE (EXCLUDING TECHNICAL ASSISTANCE GRANTS) BY PURPOSE, 1974-1981

	1974	1975	1976	1977	1978	1979	1980	1981[a/]
	..... %							
Land and water development[b/]	21	21	19	25	26	18	25	17
Agricultural services	6	7	7	12	12	10	13	7
Supply of inputs	12	7	7	4	5	3	6	5
Crop production	5	4	10	5	8	7	7	6
Livestock	5	3	5	3	4	3	2	2
Fisheries[c/]	3	2	2	3	3	3	3	3
Research, extension, training	-	3	3	4	4	3	5	5
Agriculture, unallocated	10	11	13	11	12	17	9	14
TOTAL NARROW DEFINITION	62	58	66	67	74	64	70	59
Rural development/infrastructure	13	16	16	16	15	16	19	22
Manufacturing of inputs[d/]	16	23	7	5	4	11	2	10
Agro-industries	3	2	10	9	5	6	7	5
Forestry	5	1	1	2	2	3	2	2
Regional development	1	-	-	1	-	-	-	2
TOTAL BROAD DEFINITION	100	100	100	100	100	100	100	100

a/ Preliminary.

b/ Including river development.

c/ Including inputs such as fishing trawlers, fishing gear.

d/ Mostly fertilizers.

ANNEX TABLE 20. DAC COUNTRIES: BILATERAL ODA COMMITMENTS FROM INDIVIDUAL COUNTRIES AND PROPORTION TO AGRICULTURE (BROAD DEFINITION)

	Bilateral ODA to all sectors					Proportion of ODA to agriculture				
	1977	1978	1979	1980	1981	1977	1978	1979	1980	1981
	..... million $					..... %				
Australia	460	453	453	522	590	19	17	14	8	14
Austria	88	115	70	140	265	13	44	20	47	10
Belgium	358	444	462	512	432	3	4	4	4	4
Canada	902	1 136	676	512	1 011	15	23	21	31	39
Denmark	155	395	288	260	225	30	19	32	37	44
Finland	23	35	85	112	111	4	29	8	15	19
France	2 453	2 977	3 746	4 766	4 430	8	6	7	6	8
Germany	1 718	2 446	3 972	4 617	3 467	19	21	21	16	13
Italy	78	63	63	138	443	6	9	15	24	6
Japan	1 900	2 272	2 528	3 369	3 437	18	23	25	16	24
Netherlands	910	1 272	1 327	1 592	1 066	29	29	35	24	27
New Zealand	35	47	53	54	52	41	20	18	24	33
Norway	168	226	234	247	255	25	33	25	28	27
Sweden	685	521	782	611	615	35	11	31	34	33
Switzerland	154	110	174	139	253	15	30	13	33	46
UK	694	1 530	1 964	1 459	1 000	15	8	11	7	8
USA	4 291	4 757	5 186	5 378	5 135	10	14	15	20	16
Total DAC countries	15 071	18 797	22 062	24 426	22 787	15	16	18	16	17

Source: OECD

ANNEX TABLE 21. REGIONAL DISTRIBUTION OF OFFICIAL COMMITMENTS (EXCLUDING TECHNICAL ASSISTANCE GRANTS) TO AGRICULTURE "BROAD" DEFINITION FROM ALL SOURCES, 1974-1981

	1974	1975	1976	1977	1978	1979	1980	1981[a/]
	..... %							
CONCESSIONAL & NON-CONCESSIONAL COMMITMENTS								
Far East and Pacific	42	50	36	39	49	46	46	42
Africa	22	18	23	29	22	24	22	28
Latin America	21	22	28	24	21	22	24	23
Near East	15	10	13	7	8	8	8	7
Total 4 developing regions	100	100	100	100	100	100	100	100
CONCESSIONAL COMMITMENTS								
Far East and Pacific	50	53	36	43	53	55	50	49
Africa	23	19	28	33	26	23	26	31
Latin America	16	14	23	14	14	13	14	12
Near East	11	14	13	10	7	9	10	8
Total 4 developing regions	100	100	100	100	100	100	100	100

a/ Preliminary.

Note: Data on bilateral (DAC and OPEC) commitments are incomplete.

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EDOUARD SAOUMA
Director-General
Food and Agriculture Organization
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