the state of food and agriculture 1977

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

THE STATE OF FOOD AND AGRICULTURE 1977

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THE STATE OF FOOD AND AGRICULTURE 1977

World Review

Some factors affecting progress in food and agriculture in developing countries

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

Food and Agriculture Organization of the United Nations
Rome 1978

The statistical material in this publication has been prepared from the information available to FAO up to December 1977.

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This year this annual report is for the first time printed in typescript, and as many as possible of the annex tables are computer printouts. In this transitional year there have again been publication delays, but now that the necessary experiece has been gained the change should make it possible to issue the report more rapidly in the future.

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FOREWORD

The year 1977 witnessed a slowing down in the rate of growth of world food and agricultural production as compared with the two previous years. Viewed in a longer-run perspective, the average annual increase in production since the beginning of the 1970s has been less than that in the 1960s, and far behind the DD2 annual target of 4% for the decade. In many countries, comprising about half the population of the developing world, the rate of growth of population outpaced the rate of increase in food and agricultural production. A disquieting aspect is that the slowest rate of expansion in production has occurred in the poorest developing countries, particularly those in Africa, where it is most urgently needed.

Due to these unsatisfactory trends in production and little or no progress in the reduction of poverty, the number of people suffering from severe undernourishment is estimated in 1972-74 at 455 million, i.e. a quarter of the total population of the developing countries.

The present state of food and agriculture, as analyzed in this annual report, therefore provides no grounds for complacency. Instead, it heightens the need for an urgent reexamination of the constraints which persistently inhibit progress. It calls for renewed efforts to accelerate growth, to overcome poverty, and to integrate the rural poor in the development process. This report analyzes some of the factors which have affected recent performance in each of the four developing regions. The forthcoming FAO World Conference on Agrarian Reform and Rural Development in July 1979 will indeed provide an occasion for review and analysis of past experience and to derive lessons for concrete future action, both national and international.

In many ways, 1977 has been a year of missed opportunities. Two previous years of good harvests had led to a high level of cereal stocks, amounting to more than 18% of world consumption. Large stocks, especially of wheat, have accumulated mostly in a few developed countries, threatening to depress prices. They encourage unilateral actions in the surplus-producing countries to cut back production. This is an ideal opportunity, which is yet to be seized, to establish the system of reserves that is essential to world food security. Although food aid has increased, it is unlikely in 1977/78 to reach the minimum target of 10 million tons of cereals. Supplies and prices of fertilizer have eased, but many developing countries, especially the poorest, have faced great difficulties in obtaining their requirements. The agricultural export earnings of the developing countries fall far short of their requirements; they continue to be plagued by instability and inhibited by protectionism in developed countries. The commitments of official external assistance for the food and agricultural sectors of the developing countries actually declined in 1976. In spite of some recovery in 1977, the flow of assistance is considerably below what is required for the necessary acceleration of production. However, the commencement of operations by IFAD, with its $ 1,000 million capital, is particularly welcome.

In recent years there have been signs of an emerging understanding on what needs to be done within the framework of a New International Economic Order to overcome these external constraints, and to create a positive, beneficial international framework. However, this general understanding has yet to be crystallized in specific international action. Discussions on a wide range of problems have continued in 1977 in many fora, not only in the FAO Committee on World Food Security and the WFP/FAO Committee on Food Aid Policies and Programmes, but also in the World Food Council, UNCTAD, GATT and the International Wheat Council. The negotiations in the UNCTAD, with close technical support of FAO, on the Integrated Programme for Commodities and the Common Fund have so far proved intractable. A new International Sugar Agreement has, however, been successfully negotiated. I hope this agreement, which marks an advance, will soon be ratified by all the participants.

The protracted negotiations on the International Grains Agreement have yet to come to a satisfactory conclusion. Indirectly related to it, as both cause and effect, are the negotiations in the GATT on the liberalization of trade in agricultural products. The FAO Committee on World Food Security has recently reconfirmed the criteria by which an International Grains Agreement should meet the objectives of food security. The pledges under the World Food Programme, though higher this year than before, have not reached their target. There are delays in agreement on the guidelines for improved food aid policies. The endorsement by the World Food Council in its recent Mexico session of the proposal that the International Emergency Food Reserve of 500,000 tons should be established on a continuing basis, with regular replenishments, is a step forward. In general, however, the disappointingly little concrete progress achieved so far in international action highlights the enormity of the tasks yet to be accomplished for greater food security, as well as for improved conditions of trade in agricultural commodities.

This annual report discusses these and other aspects of the world food and agricultural situation. It also contains FAO's first preliminary benchmark survey of the state of natural resources and the human environment for food and agriculture. In many developing countries the rapid growth of population places great strains on natural resources and has in some cases led to their degradation or depletion. In the developed countries, the problems relate mainly to the pollution of land, water and air, and the contamination of food and feed. Such considerations will assume greater importance in the developing countries in the future, especially if the desired massive rate of expansion in production is to be achieved.

An important event in the life of FAO during this year was the Nineteenth Session of the FAO Conference. It confirmed the initiatives I have taken since 1976 to make the Organization more responsive to the needs of the Member Countries, through decentralization and increased focus on action at the country level. The Conference endorsed the new dimensions of FAO's activities. Important among them is the Action Programme for the Prevention of Food Losses, with a minimum target of $20 million. This programme, combined with the FAO Food Security Assistance Scheme, which assists the food priority countries in building up food reserves, storage and related facilities, can make a major contribution to their food security. FAO's Technical Cooperation Programme has successfully entered its third year with its accent on flexibility and quick response to the urgent needs of Member Countries.

The Nineteenth FAO Conference indeed strengthened FAO as a global forum for food and agriculture, in support of the continuing struggle of Member Countries to overcome hunger and poverty, through national effort as well as favourable international action.

EDOUARD SAOUMA
DIRECTOR-GENERAL

EXPLANATORY NOTE

The following symbols are used in statistical tables:

- none or negligible,

... not available.

1976/77 signifies a crop, marketing or fiscal year running from one calendar year to the next; 1976-77 signifies the average for two calendar years.

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

Production index numbers [1/]

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

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

Trade index numbers [2/]

The indices of trade in agricultural products include all the commodities and countries shown in the 1976 issue of the FAO Trade yearbook. Indices of total food products include those edible products generally classified as "food". Coffee, tea, wine and beer, which were previously considered as food are no longer included in this group but in the "beverage" commodity group. Consequently indices of trade in food products are not comparable with those published earlier.

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

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

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

1/ For full details, including a list of weights, see FAO, Production yearbook 1976, Rome, 1977.

2/ For full details see FAO, Trade yearbook 1975, Rome, 1977.

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 U.S.S.R., and "developing countries" to cover both the developing market economies and the Asian centrally-planned economies. Israel, Japan and South Africa 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 Sudan.

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

1. WORLD REVIEW

INTRODUCTION

Following two years of generally good harvests in 1975 and 1976, there were much smaller increases in food and agricultural production in 1977. World cereal production declined slightly from the record level of 1976, although remaining close to the long-term upward trend. A number of countries, especially in the Sahelian zone of Africa and in parts of southeast Asia, again faced large food deficits.

The long-term trends in production have remained unsatisfactory in the developing countries. In the three years 1974-76 the developing market economies achieved the target of a 4% average annual increase called for in the International Development Strategy for the Second United Nations Development Decade (DD2) and reaffirmed by the World Food Conference. However, in the longer period since the beginning of the 1970s the rate of increase was considerably below this target, and less than that achieved in the previous decade. Progress in production has been slowest in Africa, and in general in the poorest developing countries where it is most needed. The gap has continued to widen not only between the developed and developing countries, but also between the better and worse-off developing countries.

The recent increases in production in the developing countries are due in part to favourable weather, as well as being in response to increased attention to agriculture in government programmes. The recurrence of widespread unfavourable weather could quickly reverse the present improved situation.

FAO's first preliminary estimates of world and regional food and agricultural production for 1977 indicate that world food production rose by only 1.0 to 1.5%, while total agricultural production is estimated to have risen slightly more (1.5 to 2.0%) because of large increases for some non-food crops.

World fishery production, after the large expansion that occurred in 1976 (Table 1-1), is expected to increase only slightly, if at all, in 1977, Fish meal production will be much lower, but that of fish for direct human consumption can be expected to increase mainly as a result of the continued growth in catches by the developing countries. The general recovery in the output of forest products begun in 1976 is largely being sustained, but in only a few countries have production and trade regained the peak levels reached in 1973-74.

At the global level, the immediate food supply and demand situation would have been less favourable than it was a year ago, but for the replenishment of stocks that began in 1975/76 . FAO's preliminary forecast indicates that cereal stocks (excluding China and the U.S.S.R.) would reach 167 million tons, or 18% of annual consumption, by the close of the current 1977/78 seasons. Although food aid in cereals in 1977/78 is likely to be considerably higher than in the previous year, with commitments of 9.6 million tons, this would still be below the World Food Conference minimum target of 10 million tons. Contributions to the International Emergency Food Reserve of 500,000 tons of cereals have now risen to about 423,000 tons for 1977/78.

Table 1-1. Indices of world production of agricultural, fishery and forest products, 1972 to 1976

	1972	1973	1974	1975	1976[1/]	Change 1975 to 1976[2/]
	..... 1961-65 average = 100					%
TOTAL PRODUCTION	123	129	129	132	137	+ 3
Agriculture	122	128	130	133	137	+ 3
Fisheries	146	156	160	160	164	+ 3
Forestry	117	120	120	118	121	+ 3
POPULATION	118	121	123	125	128	+ 2
PER CAPUT PRODUCTION	104	107	105	106	107	+ 1
Agriculture	103	106	106	106	108	+ 1
Fisheries	124	129	130	128	128	-
Forestry	99	99	98	92	95	+ 3

Note: For details of the methodology and coverage of these indices see the explanatory note preceding this chapter.

1/ Preliminary. - 2/ Calculated from unrounded figures.

Little or no progress has been made towards the basic goal of the eradication of hunger and malnutrition, and the number of malnourished people has in fact increased. Recent improvements in per caput food production have had very little effect on the nutritional situation of large numbers of poor people. The relatively high level of stocks in 1977/78 partly reflects the inability of both countries and individuals to purchase adequate supplies of food. Moreover, the opportunity offered by these stocks for the establishment of a coordinated system of world food security has not yet been taken.

Prices of many agricultural products, particularly cereals, continued to decline in 1977. However, the recent sharp fluctuations in supplies and prices of such commodities as cocoa, coffee, cotton and sugar and the persistent surplus of dairy products illustrate the very small margin that separates a situation of surplus from one of shortage in relation to market demand. This points to the need for finely modulated and selective policies for the expansion of production if the instability of world markets is to be reduced and farm incomes are to be maintained at remunerative levels. With the recent marked improvement in supplies, the major cereal exporting countries face new problems in determining appropriate production policies for the immediate future.

Fertilizer consumption has moved closer to the long-term upward trend and international prices are well below the earlier high levels, although beginning to rise again in late 1977. Pesticide supplies now appear to be adequate and prices remained fairly stable in 1977. The main problem for some intending purchasers continues to be shortage of foreign exchange.

Export earnings from crop and livestock products rose by about 6% in the world as a whole in 1976 and 12% in the developing market economies. The value of world fishery exports rose by about 22%, largely because of sharp price increases. Exports of forest products also showed marked gains, with a 20% increase at the world level, based on a larger trade volume and higher prices.

The terms of trade for agricultural products as a whole have shown limited gains for the developing market economies. As these gains have been confined to a few commodities, the situation of producers of a number of major commodities has become particularly difficult. The prices of most commodities in international trade over recent years have been very unstable. Discussions and negotiations on trade and related matters continued during 1977 in fora such as the UNCTAD negotiations on an Integrated Programme for Commodities, the GATT Multilateral Trade Negotiations and the negotiations for a new International Wheat Agreement. A new International Sugar Agreement has been concluded.

After a large increase in 1974 and a smaller one in 1975, commitments of official development assistance (ODA) to agriculture declined in 1976, both in absolute terms and as a share of total ODA. The conditions of such aid have become harder, and the debt position of the developing countries has deteriorated still further. Poorer countries have been receiving smaller per caput commitments for agriculture than the relatively better-off ones. Despite the establishment of the International Fund for Agricultural Development (IFAD), a wide gap is likely to remain between the flow of development assistance and requirements for the necessary acceleration of the increase in agricultural production.

Very preliminary prospects for 1978 indicate a good beginning for main winter wheat crops in the northern hemisphere. Perhaps more important is that the United States, the world's biggest agricultural exporter, where stocks are now very large, has announced a programme for reducing the wheat area in 1978.

FOOD AND AGRICULTURAL PRODUCTION

PRODUCTION IN 1976 AND 1977

The generally good production performances in 1975 and 1976 led to relatively plentiful supplies of most agricultural commodities in 1977, especially cereals, and to a considerable improvement in the current world food situation. World food production rose in 1976 by 3%, with comparable gains in the developing countries, following the 5% increase in 1975, and in the developed countries, where it was the first major increase in three years (Table 1-2). World agricultural production rose slightly less than food production in 1976, which may indicate a shift of resources to the latter.

The outstanding performance among the developing regions in 1976 was in Latin America, where two successive good years in 1974 and 1975 were followed by an increase of 8% in food production in 1976. The Near East also had its third consecutive good crop year, with an increase of 5% in food production. Africa achieved its first major gain of this decade, after a recovery in 1974 and a small improvement in 1975. In the Far East, however, production rose by less than 1% in 1976, following the very large rise of the previous year. The summer monsoon ended much earlier than usual, while there were tropical storms and floods in some countries. The increase in China's production was held back because of long spells of bad weather and losses from severe earthquakes.

The main factor behind the large rise in production in the developed countries in 1976 was the sharp recovery in the U.S.S.R.. There were large expansions in North America and Oceania for the second year in succession. In eastern and western Europe, however, production fell slightly in 1976 as a result of a long period of drought and other unfavourable weather.

Large cereal crops made a major contribution to the generally encouraging production results in 1976. The substantial expansion in production of wheat and coarse grains also increased the availability of cereals for livestock feeding in 1976/77. The record grain harvest in the U.S.S.R., Europe's drought and improved livestock/feed price relationships were the main factors leading to expanded grain feeding in the developed countries. However, livestock/feed price ratios did not improve as anticipated in the United States, limiting the rate of increase in feeding grain to below the rate of growth in livestock production. On the whole, however, the feeding of grain to livestock increased but was still below the peak reached in 1972/73.

The preliminary estimates for 1977 indicate that world food production rose by only 1.0 to 1.5%, while the increase in total agricultural production was somewhat higher, at 1.5 to 2.0% (Table 1-3). Food and agricultural production in the developing countries rose slightly more than in the developed countries.

Among the developing regions, the largest increase in food production in 1977 was in the developing market economies of the Far East, where the monsoon developed favourably and autumn crops were good in most of the region. There was a record wheat harvest in the region, and larger rice crops in Bangladesh, Burma, India, Indonesia, the Republic of Korea, the Philippines and Sri Lanka. Sugar production continued to expand and there was a recovery in groundnuts and larger crops of cotton and tea, but copra production declined. In the Asian centrally planned economice production is estimated to have increased by about 1%, with a smaller wheat crop and only small gains in rice and coarse grains.

Table 1-2. Indices of world and regional food and agricultural production

	1971	1972	1973	1974	1975	1976	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	1961-65 average = 100						%		
FOOD PRODUCTION									
Developing market economies 1/	125	125	129	132	140	145	+ 3	3.0	2.7
Africa	119	117	113	120	123	127	+ 4	2.6	1.2
Far East	126	122	133	131	143	143	-	2.7	2.6
Latin America	128	128	132	139	144	154	+ 8	3.5	3.2
Near East	127	137	130	141	151	158	+ 5	3.2	4.2
Asian centrally-planned economies	126	125	130	134	138	140	+ 2	2.9	2.4
TOTAL DEVELOPING COUNTRIES	125	125	130	133	139	143	+ 3	2.9	2.6
Developed market economies 1/	123	122	125	129	133	135	+ 2	2.4	2.5
Western Europe	120	119	123	129	128	126	- 1	2.3	1.6
North America	124	122	124	126	135	141	+ 4	2.4	3.1
Oceania	127	126	139	132	141	150	+ 7	3.4	3.2
Eastern Europe and the U.S.S.R.	125	122	141	136	130	140	+ 8	3.1	2.0
TOTAL DEVELOPED COUNTRIES	124	122	129	131	132	136	+ 3	2.6	2.3
WORLD	124	123	129	131	135	139	+ 3	2.8	2.5
AGRICULTURAL PRODUCTION									
Developing market economies 1/	124	124	128	131	137	141	+ 3	2.8	2.5
Africa	119	119	115	122	123	128	+ 4	2.7	1.1
Far East	125	122	133	131	141	141	-	2.7	2.4
Latin America	123	124	126	134	136	144	+ 6	2.9	2.8
Near East	128	138	131	142	148	156	+ 5	3.3	3.8
Asian centrally-planned economies	127	126	132	135	139	142	+ 2	3.0	2.5
TOTAL DEVELOPING COUNTRIES	125	125	129	133	138	142	+ 3	2.9	2.5
Developed market economies 1/	120	119	122	125	128	131	+ 2	2.1	2.3
Western Europe	120	118	123	129	127	126	- 1	2.2	1.7
North America	119	118	120	121	128	134	+ 4	1.7	2.9
Oceania	124	122	126	120	129	135	+ 4	3.1	1.4
Eastern Europe and the U.S.S.R.	125	123	140	135	131	140	+ 7	3.1	2.1
TOTAL DEVELOPED COUNTRIES	121	120	127	128	129	133	+ 3	2.4	2.2
WORLD	123	122	128	130	133	137	+ 3	2.6	2.3

Note: Crops and livestock only. In addition to other non-food products, the index numbers of food production now also exclude coffee, tea, linseed and hempseed, and are therefore not completely comparable with those published in earlier years.

1/ Including countries in other regions not specified.

Table 1-3. Annual changes in world and regional food and agricultural production, 1970 to 1977

	1972 to 1973	1973 to 1974	1974 to 1975	1975 to 1976	1976 to 1977 1/
	..... %				
FOOD PRODUCTION					
Developing market economies 2/	3.6	2.4	6.2	3.3	2.0 to 2.5
Africa	-3.6	6.5	1.9	3.8	-0.5 to 0.0
Far East	9.3	-2.0	9.1	0.2	3.5 to 4.0
Latin America	2.5	5.4	3.4	7.7	0.5 to 1.0
Near East	-4.9	8.2	6.6	5.0	0.5 to 1.0
Asian centrally-planned economies	4.4	2.5	3.0	1.9	0.5 to 1.0
TOTAL DEVELOPING COUNTRIES	3.9	2.4	5.1	2.8	1.5 to 2.0
Developed market economies 2/	2.6	3.0	3.3	1.6	2.0 to 2.5
Western Europe	3.8	5.0	-1.2	-1.4	1.5 to 2.0
North America	1.8	1.5	7.0	4.1	2.0 to 2.5
Oceania	10.2	-4.7	6.6	6.6	-3.0 to-3.5
Eastern Europe and the U.S.S.R.	15.0	-3.6	-4.2	7.7	-0.5 to 0.0
TOTAL DEVELOPED COUNTRIES	6.3	0.9	1.0	3.4	1.0 to 1.5
WORLD	5.2	1.6	2.7	3.1	1.0 to 1.5
AGRICULTURAL PRODUCTION					
Developing market economies 2/	3.2	2.5	4.8	2.8	2.5 to 3.0
Africa	-2.8	5.5	1.3	3.7	0.0 to 0.5
Far East	8.8	-1.9	7.6	0.4	3.5 to 4.0
Latin America	1.6	6.2	1.9	5.6	2.0 to 2.5
Near East	-5.0	8.3	4.8	5.1	1.0 to 1.5
Asian centrally-planned enonomies	4.9	2.4	2.8	1.8	0.5 to 1.0
TOTAL DEVELOPING COUNTRIES	3.8	2.5	4.1	2.5	2.0 to 2.5
Developed market economies 2/	2.1	2.6	2.8	1.8	2.5 to 3.0
Western Europe	3.8	5.0	-1.1	-1.4	1.5 to 2.0
North America	1.5	1.2	5.6	4.3	2.5 to 3.0
Oceania	3.4	-4.8	7.3	4.3	-3.0 to-3.5
Eastern Europe and the U.S.S.R.	13.9	-3.3	-3.4	7.0	-0.5 to 0.0
TOTAL DEVELOPED COUNTRIES	5.6	0.7	0.9	3.3	1.5 to 2.0
WORLD	4.8	1.5	2.3	2.9	1.5 to 2.0

Note: See note to Table 1-2.

1/ Preliminary.- 2/ Including countries in other regions not specified.

Once again, there were very disappointing results in Africa, where production stagnated in 1977. Drought caused poor cereal crops in north Africa and the Sahel, and there was little progress elsewhere in the region. Some 12 of the 45 most seriously affected (MSA) countries were suffering abnormal food shortages in October 1977, and eight of these were in Africa. In the Sahel, after two generally good years, the rains were late and very irregular in 1977, and the Sahelian countries face a food deficit considerably higher than in 1975 and 1976, although well below the level of the crisis period of 1972-74.

In Latin America there were only small gains in food production in 1977, following the very large increases of the last few years. There was a drop in cereal production and (mainly because of marketing difficulties) only a marginal rise in meat production, but the production of both groundnuts and soybeans increased. The region's total agricultural production is estimated to have risen by 2.0 to 2.5%, reflecting a recovery in coffee production and a large increase for cotton.

After three very good years, food production in the Near East is estimated to have increased by less than 1% in 1977. Cereal crops were lower than in 1976 in most countries except Iran and Turkey, where they were at record levels. Sugar production was almost as good as in 1976. The very good cotton crop was reflected in a significantly larger increase (2.0 to 2.5%) in total agricultural production than in food production.

In the developed regions, there was a recovery in western Europe in 1977 after two relatively bad years, with marked gains in cereals, potatoes and sugar, but only moderate increases in meat and milk production. In North America the production of cereals was unchanged, while the output of potatoes and sugar declined; meat production rose by 1% and milk by 2 to 3%, but rapeseed and soybeans recovered sharply and there was a large rise in cotton production. The latest indications for Oceania are for a significant drop in 1977, reflecting lower production of wheat and milk and only small increases in meat and sugar. There was some decrease in production in eastern Europe and the U.S.S.R., following the sharp recovery in 1976; cereal production was down by 10% but meat and milk production continued to make a good recovery.

LONGER-TERM TRENDS

The average annual increase during 1970-76 in agricultural production (crops and livestock) in the developing countries was 2.5%, which is less than the 2.9% achieved in the previous decade, and a long way behind the DD2 target of 4% a year. The comparable rate for food production was only slightly better at 2.6%.

In the developed countries, the average growth rate in agricultural production (2.2% in 1970-76) has dropped behind that of the developing countries, and the tendency earlier in the decade for the developed countries to increase their share of world agricultural production has thus been reversed. In North America, however, production rose by 2.9% a year in 1970-76, which is considerably more than in the previous decade, and the already large share of this region in world production has grown further in DD2 so far.

The Near East is the only region where agricultural production increased faster than in North America in 1970-76, and the only other region where the growth rate in DD2 is higher than in the previous decade. At 3.8% a year in 1970-76, the Near East's production increase was in striking distance of the DD2 target, although this would now require large annual increases during the rest of the decade as production rose by only 1 to 1.5% in 1977. In Latin America there were large increases in both 1974 and 1976, and the DD2 growth rate rose to 2.8%. In the Far East, following a drop of 2% in 1974, there was an impressive rise of 8% in 1975 and a slight gain in 1976, leading to an average growth rate for 1970-76 of 2.4%. In Africa, after stagnating in 1971 and 1972 and falling sharply in 1973, production subsequently improved in 1974 and 1976, but even the increase of almost 4% in 1976 brought the DD2 growth rate to only 1.1%. In the Asian centrally-planned economies, the rate of growth declined slightly in 1974-76 to bring the DD2 growth rate to 2.5%, or the average for all developing countries.

Preliminary indications are that the relatively disappointing production results in 1977, except in the Far East region, will lead to a slight reduction of the average growth rate in the agricultural production of the developing countries during DD2 so far. If this were then followed by an average annual growth of 4% during the remaining three years of the decade, which would be a very impressive achievement indeed, the growth rate for DD2 as a whole would reach about 3%, or roughly the same as in the previous decade. This must perhaps be regarded as the maximum performance that can be expected from the agriculture of the developing countries during DD2. To reach the 4% target for the whole of DD2 would now require an average growth of about 6% a year during the rest of the decade.

The 4% target is of course an average for the developing countries as a whole. National targets will be higher or lower, depending on differences in such things as the growth of population and demand, and the possibilities for increasing production. Nevertheless, it is noteworthy that the increase in production in 1970-76 averaged 4% or more in only 21 of the 93 developing countries for which FAO index numbers of agricultural production are available. In as many as 14 of these countries, production actually declined in 1970-76.

Although, as noted above, agricultural production has now increased faster in the developing than in the developed countries during DD2 so far, the picture is changed if it is viewed in relation to their very different rates of population growth. Data on per caput food production are shown in Table 1-4. In spite of the lower rate of production increase in the developed countries, their per caput food production still rose by 1.5% a year in 1970-76. In the developing market economies the average margin of food production over population growth in 1970-76 was only 0.1% a year, and in all developing countries only 0.3% a year. Per caput food production in Africa dropped by 1.5% a year during 1970-76. Food production failed to match population growth in 1970-76 in no less than 50 of the individual developing countries for which FAO calculates production index numbers, or more than half the total.

Table 1-4. Indices of world and regional food production per caput

	1971	1972	1973	1974	1975	1976	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	..... 1961-65 average = 100						.....	%	
Developing market economies 1/	102	99	100	100	103	104	+ 1	0.4	0.1
Africa	98	94	88	91	91	91	+ 1	-	-1.5
Far East	103	98	104	99	106	103	- 2	0.2	0.2
Latin America	103	101	101	103	104	109	+ 5	0.8	0.4
Near East	103	108	100	105	109	111	+ 2	0.5	1.3
Asian centrally-planned economies	111	108	111	112	113	114	-	1.1	0.6
TOTAL DEVELOPING COUNTRIES	105	102	104	104	107	107	-	0.6	0.3
Developed market economies 1/	113	111	113	115	118	119	+ 1	1.4	1.6
Western Europe	114	111	115	120	118	116	- 2	1.5	1.1
North America	113	110	111	112	119	123	+ 3	1.1	2.3
Oceania	110	107	116	109	115	121	+ 6	1.5	1.7
Eastern Europe and the U.S.S.R.	116	112	128	123	116	124	+ 7	2.5	1.2
TOTAL DEVELOPED COUNTRIES	114	112	118	118	118	121	+ 3	1.6	1.5
WORLD	107	104	108	107	108	109	+ 1	0.8	0.5

Note: See note to Table 1-2.

1/ Including countries in other regions not specified.

PROBLEM AREAS

Africa clearly remains a special problem. Despite better results in 1976, when only five of its 47 developing countries failed to increase production, compared to ten in 1975, this region continues to lag far behind the others. Part of the explanation is that 15 of the 29 least developed countries (LDCs) and 26 of the 45 most seriously affected (MSA) countries are in Africa.

The MSAs have generally failed to do as well as the rest of the developing countries. Table 1-5 shows average annual changes in food production in the MSA countries during 1970-76. It indicates clearly that performance in the MSAs in Africa was generally far below that achieved in those in the other developing regions, particularly in Latin America and the Near East. Although Senegal (8.7%) and Cape Verde Islands (6.8%) had exceptionally high rates of growth, largely due to improved weather conditions in the latter years of the period under review, most MSAs in Africa had growth rates below 1.2%, and in 10 (out of 26) production actually declined.

The gap between the rates of increase in food production in the MSAs and in other developing countries has widened considerably from 1961-70 to 1970-76 (Table 1-6). In the MSA countries the annual growth in food production declined from 2.6% in 1961-70 to only 1.8% (less than their population growth) in 1970-76, whereas in the other developing countries it declined only slightly from 3.1 to 2.9%.

The largest difference between the MSAs and the other developing countries has been in the Far East, where in 1970-76 production in the MSAs rose at only one third the rate achieved in the rest of the region (Table 1-7). There was little significant difference between the two groups in Africa and Latin America, but a wide margin in the Near East.

Table 1-5. Average annual changes in food production in the most seriously affected (MSA) countries, 1970-76

Africa	Annual change %
Senegal	8.7
Cape Verde Islands	6.8
Gambia	5.1
Ivory Coast	4.9
Tanzania	3.7
Rwanda	2.9
Burundi	2.2
Sierra Leone	1.4
Upper Volta	1.3
Guinea Bissau	1.3
Uganda	1.2
Cameroon	1.1
Central African Empire	1.1
Madagascar	1.0
Kenya	0.4
Lesotho	0.0
Ghana	-0.2
Guinea	-0.2
Mali	-0.4
Somalia	-0.8
Mozambique	-1.0
Chad	-1.2
Ethiopia	-1.4
Niger	-1.7
Benin P.D.R.	-2.6
Mauritania	-4.8

Far East	Annual change %
Pakistan	2.7
Bangladesh	2.2
Burma	2.2
Western Samoa	2.2
Nepal	1.9
Lao P.D.R.	1.7
Sri Lanka	1.7
India	1.6
Dem. Kampuchea	-11.0
Near East	
Sudan	5.0
Afghanistan	4.4
Yemen A.R.	4.0
Yemen D.R.	3.7
Egypt	2.1
Latin America	
El Salvador	3.9
Guatemala	3.9
Honduras	2.1
Guyana	2.0
Haiti	2.0

Table 1-6. Average annual changes in food and agricultural production in MSA and other developing countries, 1961 to 1970 and 1970 to 1976

	1961 to 1970	1970 to 1976
	..... % per year	
Food production		
MSAs	2.6	1.8
Other developing countries	3.1	2.9
All developing countries	2.9	2.6
Agricultural production		
MSAs	2.5	1.6
Other developing countries	3.0	2.9
All developing countries	3.0	2.5

Table 1-7. Average annual changes in food production in MSA and other developing countries, by region, 1961 to 1970 and 1970 to 1976

	MSAs	Other developing countries	All developing countries
	..... % per year		
Africa			
1961 to 1970	2.9	1.7	2.6
1970 to 1976	1.1	1.3	1.2
Far East			
1961 to 1970	2.4	3.9	2.7
1970 to 1976	1.7	5.1	2.6
Latin America			
1961 to 1970	3.6	3.5	3.5
1970 to 1976	3.0	3.2	3.2
Near East			
1961 to 1970	2.6	3.3	3.2
1970 to 1976	3.4	4.5	4.2

The trends discussed above underline the need to determine why the growth of production has been so unsatisfactory in the MSA countries, and what action can be taken to improve it. These countries are generally particularly vulnerable to natural hazards and weather instability. But other causes include inadequate investment; a decline in the growth rate of the use of production requisites, which is only now beginning to return to the previous long-term trend; inadequate foreign exchange earnings; lower levels (on a per caput basis) of external assistance than in the other developing countries; and, in some cases, domestic policy and structural constraints.

MAIN COMMODITIES [1]

World cereal production in 1977 was estimated by FAO in late November at 1,342 million tons [2], or slightly below the record crop of 1976. In developed countries production was estimated to be almost 2% less than in 1976, while it is likely to be at or close to the 1976 level in the developing countries. The production of cereals increased in western Europe, Japan, South Africa and the Far East, remained practically unchanged in eastern Europe, North America and China, but declined in Africa, the Near East, Latin America, Oceania and particularly in the U.S.S.R.. Although world coarse grain production was estimated to have increased by some 1% in 1977 and rice production by 4%, wheat production declined by 8%.

Wheat production in 1977 was estimated by FAO at 385 million tons, and below trend. The world crop is less than earlier expectations, as a result of unfavourable weather in major producing areas. Smaller harvests than in 1976 are probable in all major producers, except India and Pakistan, which had very good crops. The largest reductions are expected in Argentina, Australia, Canada, China, the United States and the U.S.S.R.. In Argentina the crop, sown on a reduced area (-20%) and affected by drought, may be more than a third less than in 1976. In Canada, smaller plantings and bad weather have led to a crop which is probably some 27% or more below last year's record. A reduction in the area planted to wheat in the United States contributed to a drop in production of more than 3 million tons (-5.5%). The U.S.S.R. wheat crop is provisionally estimated at 90 million tons, 9% down on last year's large crop, and the Australian crop is likely to be 2.5 million tons (21%) lower than in 1976.

Coarse grain production in 1977 was estimated in late November at 723 million tons, or about 1% above the 1976 record. This larger world crop particularly reflects higher production in the EEC, Latin America, South Africa and the United States, which more than offsets lower output in the U.S.S.R..

World rice production in 1977 is expected to be about 234 million tons (milled). This is a new record, and some 4% above the 1976 crop. Larger crops are forecast in Bangladesh, Burma, India, Indonesia, Republic of Korea, the Philippines and Sri Lanka as a result of the favourable development of the monsoon over most of the Far East, but reduced harvests are in prospect in Lao, Thailand and Viet Nam. Moderate to heavy rain fell over most of the major rice-growing areas of southern China in the autumn, which have benefited the main rice crop, but total rice production in China is likely to show only a moderate rise. Japan's rice crop is officially estimated at 17 million tons (paddy), or 1.7 million tons above 1976. Production will again be lower in the United States (-15%), mainly as a result of reduced plantings. Lower rice harvests are likely in west Africa because of dry conditions. Brazil's and Colombia's crops are much lower, although Venezuela's output is estimated to be far above last year's depressed level.

A considerable increase (15 to 20 million tons) is expected in the world potato crop over the 1976 level of 290 million tons, with larger crops in Europe, Latin America and the U.S.S.R., and little change in the other regions. Production of cassava is expected to increase by 3% in 1977 to about 105 million tons, the largest increase in the last 10 years. There has been a good recovery in Brazil, and further increases in Thailand, where output (mostly for export) has quadrupled in the last decade.

1/ For a more detailed review of the commodity situation, see FAO Commodity Review and Outlook 1976-77, Rome, 1977.

2/ Including rice in milled equivalent.

World production of pulses is expected to be about 48 million tons, a reduction of 5% from 1976. This reflects decreases in the main producing areas: the Far East (-8%), U.S.S.R. (-19%) and North America (-6%). However, some improved harvests were obtained in western Europe and Latin America.

Milk production in 1977 is expected to have risen by about 2%, with only moderate gains in western Europe, and larger gains in eastern Europe and the U.S.S.R., the United States, and the developing countries as a whole. Milk production may decline in Oceania. In the developed countries, generally better pasture conditions and lower prices of concentrates have more than outweighed small reductions in numbers of dairy cows. In eastern Europe and the U.S.R.R. there has been an improvement in average yields and an increase in cow numbers.

World meat production will increase by almost 3% over 1976, with reductions in the production of beef and veal and mutton and lamb more than offset by increases in poultry and pigmeat. The decline in beef production was partly caused by the cyclical decline in North America and western Europe which is expected to continue into 1978. Beef and veal output in these two regions may be some 3% below 1976 levels. Beef production is also likely to be somewhat below the record 1976 level in Argentina. Drought in Oceania affected mutton and lamb production in the first half of 1977. Despite a cyclical downward trend, pigmeat production is expected to increase by 4 or 5%, reflecting favourable livestock/feed price ratios in several major producing countries. Production of poultry meat may expand by as much as 4%. Total meat production in the U.S.S.R. is expected to increase by about one tenth.

Total production of the main oilseeds and vegetable oils (measured in oil equivalent) is estimated to have increased by 10% in 1977, following the sharp fall in 1976. World production of soybeans, in particular, may be as much as 24% above last year's reduced crop. The United States soybean crop, at an estimated 46 million tons, could be some 11.4 million tons above 1976. Soybean plantings in Latin America have again increased, with large advances in Brazil and Argentina. In southeast Asia fairly good harvests are forecast for palm oil (+7%), but copra production may decrease by more than 10%. World groundnut production is likely to be higher than in 1976, on account of expected increases in India, Latin America and South Africa, although production could be lower in west Africa. In the U.S.S.R. more favourable growing conditions for sunflowerseed and a 5% rise in plantings are expected to provide a crop well above the poor level of 1976. World production of cottonseed is expected to be about 12% higher than in 1976. Rapeseed production could also be somewhat larger, as the expected increase in Canada is likely to compensate for lower crops elsewhere, particularly in Europe and India. Some increase in olive oil production is expected, with a good harvest in Italy only partly offset by lower production in Turkey.

Production of sugar is expected to exceed last year's record crop of 86 million tons by more than 4 million tons. Production is likely to be significantly higher in Europe, India and south America. In the United States both beet and cane crops are forecast to be lower than in 1976. Cuba's production may also be below last year, while the U.S.S.R. crop is likely to be considerably above 1976 and more in line with production in earlier years.

Coffee production in 1977 may increase by as much as 20% over the poor crop of 1976. Brazil's output is expected to increase from 355,000 to 945,000 tons. Production in both Africa and Asia is likely to be only marginally higher. Production of cocoa is expected to show a fairly good recovery after a 12% reduction in the 1976 crop. In Africa very good to excellent pod formation was reported from Cameroon and Nigeria, and to a smaller extent from the Ivory Coast. The Latin American crop might also be larger. A further rise of almost 9% is expected in tea production, with a record crop likely in India and Japan, and good crops in Africa and Sri Lanka.

An increase of more than 12% is expected in the world production of cotton (lint), with considerably larger plantings and better yields in both the United States and the U.S.S.R.. Good harvests are likely in many Latin American countries, including Argentina, Brazil and Mexico, and also in India, Pakistan, Sudan, Turkey and Europe. Output of raw jute will probably continue to expand significantly. Rubber may increase somewhat in 1977, but not as much as the rise of 8% in 1976 .

AGRICULTURAL PRODUCTION REQUISITES

FERTILIZERS

Between 1969/70 and 1975/76, the annual production of fertilizers increased at an average annual rate of 5.7%, rising from 66 million tons of nutrients in 1969/70 to 92 million tons in 1975/76. As a result of high prices, fertilizer consumption declined by 3.2% in 1974/75 (Table 1-8). There was a decline of about 4.4 million tons in the developed market economies, and only a small increase in the rest of the world. International fertilizer prices began to drop rapidly after January 1975. Consequently, consumption started rising again and in 1975/76 increased to a new record level of more than 88 million tons, but still below the longer-term trend. The developing market economies surpassed their previous peak of consumption by 8%, and even the MSA countries exceeded it by 6%, with an increase of 10% in 1975/76. Significant increases in fertilizer output capacity occurred in some of the developing countries, e.g. India and Bangladesh, while some others are approaching the point at which they may have some export availabilities.

Table 1-8. Fertilizer consumption and growth rates, 1969/70 to 1975/76

	Consumption					Annual growth			
	1969/70	1972/73	1973/74	1974/75	1975/76	1972/73 to 1973/74	1973/74 to 1974/75	1974/75 to 1975/76	1969/70 to 1975/76
	million tons					%			
Developed market economies	35.84	40.45	43.36	38.93	41.83	7.2	-10.2	7.4	2.6
Developing market economies	7.82	11.10	12.04	12.17	13.12	8.5	1.1	7.8	9.0
Centrally-planned economies	19.29	25.36	28.17	29.79	33.73	11.1	5.6	13.2	9.7
World	62.95	76.91	83.57	80.89	88.68	8.7	- 3.2	9.6	5.9

Preliminary indications are that world fertilizer consumption has continued the recovery begun in 1975/76, with an increase in 1976/77 that was back in line with the average annual growth rate of earlier years. This was mainly due to increased consumption in the developing and centrally-planned economies, while in the developed countries it appears so far that consumption in 1976/77 was only slightly above the previous peak of 1973/74.

The increase in 1976/77 consumption, particularly in the developing market economies, was favoured by lower international prices for fertilizers and by better crop/fertilizer price relationships. International prices for nitrogen and phosphate fertilizers, after falling in 1975, stabilized in 1976 at levels comparable to those of the second half of 1973, with minor fluctuations in narrow ranges. Changes in the prices for potash fertilizers were much smaller, and they remained fairly stable in 1976 and 1977.

In 1977 the recovery of demand led to a strengthening of international prices for nitrogen and phosphate fertilizers. Their current levels are similar to those of mid-1975. The price of urea (f.o.b. western Europe) increased from $110 - $120 a ton at the end of 1976 to $127 - $132 a ton in November 1977, while corresponding

prices for triple superphosphate (f.o.b. Gulf) rose from $76 - $80 to $89 - $94 a ton. Prices of potassium chloride (f.o.b. Vancouver) have remained in the range of $43-$55 a ton during this period. Price developments in the next few months will largely depend on spring demand in major producing and consuming countries.

Taking into account planned expansions in fertilizer production capacity and expected growth in demand, the FAO/UNIDO/World Bank Working Group on Fertilizers anticipates that supplies will be adequate at least up to 1981/82. Annual production may somewhat exceed demand, giving rise to the expectation that fertilizer prices would be relatively free from upward pressure in the near future. This assessment depends, however, on the assumption of stable relations between supply and demand, and no abrupt shortfalls in supplies such as occurred in 1972 and 1974.

The situation with regard to each nutrient is somewhat different. For nitrogen the excess of world supply capability relative to demand is forecast to grow steadily up to 1981/82, if plants come into production as anticipated. The supply capability of the developing market economies is expected to more than double and their import requirements to decline. The Far East and Latin America are expected to nearly double their supply capability, and Africa and the Near East to treble theirs.

The surplus supply capability for phosphate fertilizer is expected to become lower. Although the supply capability of the developed market economies (particularly in North America and western Europe) is expected to increase, the surplus or potential export availability will become less as demand in these regions continues to grow. By 1981/82 supply and demand in the developing market economies is expected to be nearly in balance because of the more than doubling of the supply capability of Africa and the Near East regions. The small surplus of the centrally-planned economies in Asia, however, is expected to change to a small deficit, and the deficit of eastern Europe and the U.S.S.R. to become larger.

The forecast of supply capability and demand for potash indicates a surplus until 1981/82. Although the exportable surplus of the developed market economies is expected to remain much the same, that of the centrally-planned economies is forecast to grow. The growth in demand is expected to be highest in the developing market economies, and their import requirements to become larger because their production of potash is expected to increase only marginally.

Price trends may well be influenced by the general increase in the cost of production and the escalation of investment costs, in spite of the economies of scale of large new plants. Other factors which could affect future supplies and prices are the rate at which existing capacity is operated, and the extent to which old plants are taken out of production.

The fertilizer demand projections of the Working Group imply a rate of increase in the agricultural production of the developing countries that is considerably below the DD2 target of 4% a year. They indicate an average increase in fertilizer consumption of about 10% a year in these countries from 1975/76 to 1981/82, which is close to the growth rate during the first half of the 1970s but lower than that in the 1960s. The ratio between the rate of growth of agricultural production and fertilizer consumption in the developing countries has remained remarkably stable suring the last 20 years at about 0.23. Thus the projected increase in the effective demand of these countries for fertilizers (that is, what they could afford to buy) would be sufficient for a rate of growth of production of only 2.3% a year.

To bridge the gap between this projected demand and the requirements for the achievement of the 4% target, a substantial increase in fertilizer assistance would be necessary. Such assistance has, however, declined from 1.6 million tons of nutrients in 1973/74 to only 0.57 million tons in 1974/75, 0.54 million in 1975/76, and 0.49 million in 1976/77. Thus the level of fertilizer assistance to the MSA

countries has remained well below the 1 million nutrient tons (about 40% of the total estimated requirements of the importing MSA countries in 1977/78) called for by the Seventh Special Session of the United Nations General Assembly.

The improvement in the general fertilizer supply situation during 1977 and the decline in world market prices should therefore not be regarded as ending the problems of the developing countries in obtaining adequate fertilizer supplies. Because of their balance-of-payments problems, the MSA countries especially will continue to need assistance in obtaining the fertilizer supplies required for expanding their agricultural production.

The First UNIDO Consultation Meeting on the Fertilizer Industry was held in January 1977. On the basis of a worldwide study of the industry prepared by UNIDO, the meeting considered the expansion of fertilizer production capacity now taking place in developing countries, the further expansion that would be needed up to the year 2000, the constraints to be overcome, and the international cooperation that would be needed. It recommended that a second consultation meeting be held in 1978, and that in the interim period UNIDO should examine the following topics: the infrastructure required by fertilizer plants; contract procedures intended to ensure the successful construction and operation of fertilizer plants; the high cost of fertilizer plants and the large investments thus required; opportunities for regional cooperation among developing countries; and continuous monitoring of the growth of fertilizer production capacity at the national, regional and global level in order to facilitate the balanced growth of the world fertilizer industry. The last topic will be considered by the FAO/UNIDO/World Bank Working Group on Fertilizers, which will prepare a report for the second consultation meeting.

The Fourth Session of the FAO Commission on Fertilizers, held in September 1977, reviewed measures to stabilize prices (namely long-term contracts, a system of options, and a proposal for linking input and output prices). It acknowledged the value of long-term contracts, provided they include effective arrangements for a suitable base price and a price adjustment formula that is equitable to both producers and consumers, as well as suitable enforcement procedures. However, it felt that further work was required in the preparation of model long-term contracts, in order to ensure a proper balance of interests between producers and consumers. The option proposal has the general objective of ensuring that developing countries (and in particular the MSAs) obtain their fertilizer import requirements at prices equivalent to domestic prices in developed countries, and also of introducing an element of stability in international fertilizer prices. During 1973/74, international prices were almost twice as high as domestic prices in the developed countries. The Commission noted that the Director-General of FAO had initiated preliminary contacts with a number of fertilizer producers to ascertain their interest in providing fertilizer materials under such a system, and took note that they had responded favourably. It requested him to further develop this proposal in cooperation with the interested parties, with a view to the possible implementation of this system once commitments by fertilizer producers amounting to 10% of the estimated nitrogen fertilizer import requirements of the MSAs in 1977/78 had been obtained. The third proposal for linking prices of fertilizer raw materials, fertilizers and agricultural prices was regarded by the Commission as extremely complex and requiring further analysis.

The Commission generally held that the International Fertilizer Supply Scheme (IFS) should be continued and strengthened during the next biennium. It expressed concern at the sharp decline in the quantity of fertilizer material made available under the IFS, which in 1976/77 was only 8% of the total fertilizer aid to developing countries.

FAO's Fertilizer Data Centre was established in 1976 to meet the increasing requirements for fertilizer data by governments, international organizations, industries and other bodies concerned. Its main objectives are: to provide an integrated system of computerized data storage and processing that permits continuous updating of all

aspects of basic information and derived data relating to fertilizers; to serve as a focal point for data received from member countries in annual and quarterly fertilizer questionnaires, and other official or unofficial sources of data; and to disseminate data in a timely and efficient manner.

PESTICIDES

As a result of the concern about the future availability of pesticides to developing countries, the World Food Conference recommended the development of a pesticide supply and demand information system. Reliable demand estimates are not available in most countries, however, and there is little likelihood of their becoming available in the near future. FAO is therefore initiating pilot programmes in selected countries to generate the necessary information, particularly for food crops.

Negotiations with industry have not yet resulted in an agreement for reporting on pesticide supplies. This may reflect the industry view that supply is no longer a problem. In fact, further significant increases in the production capacity of the pesticide industry, mainly in developed but also in some developing countries, led in 1977 to an adequate supply of the most commonly used materials. For some items inventories were running at higher levels than usual. Prices remained fairly stable in 1977, and no significant changes are anticipated in the next few months. In a few isolated cases, government action to regulate the use of certain pesticides has temporarily disrupted supplies of particular items, but the main problem for some intending purchasers continues to be shortage of foreign exchange.

HIGH-YIELDING VARIETIES

The latest analysis of the progress of the high-yielding varieties (HYVs) of cereals goes up to 1974/75 3/. From this it appears that, although their rapid spread continued in 1973/74 and 1974/75, the pace slackened somewhat in the latter year, partly as a result of the shortage and high price of fertilizers. The study also points to a possible reduction in the rate of adoption of HYVs in some countries as the amount of suitable land diminishes. New varieties are being developed for different environments, however, and these could widen the potential for area expansion.

The area under HYVs of wheat in the developing market economies of Asia and north Africa increased from 11.2 million hectares in 1970/71 to 18.2 million in 1973/74 and 19.3 million in 1974/75, by which time it accounted for 38% of the total wheat area in these countries. If south and east Asia are considered alone, however, the HYVs covered as much as 62% of the total wheat area in 1974/75. For rice the increase was from 10.0 million hectares in 1970/71 to 19.7 million in 1973/74 and 21.6 million (26% of the area) in 1974/75. More recent evidence suggests that the progress of the HYVs has picked up again, especially in India, following the slight setback during the fertilizer crisis of 1974/75.

FARM MACHINERY

The number of agricultural tractors in the developing countries continued to grow by 7.4% a year in 1970-76, or only slightly less than in the 1960s (7.6%). It therefore appears that higher prices for farm machinery and for fuel have not been reflected in these countries by reductions in purchases of tractors and equipment. There was, however, a decline in the rate of increase to 5.8% in 1976.

3/ Dana G. Dalrymple. Development and spread of high-yielding varieties of wheat and rice in less developed nations, Washington, D.C., United States Department of Agriculture. Foreign Agricultural Economic Report No. 95, August 1976.

In the developed market economies, on the other hand, the already low rate of growth of 2.0% a year in the 1960s has remained unchanged. In North America the number of agricultural tractors has declined throughout the 1970s, although this partly reflects a trend towards larger and more powerful tractors. The share of the developing countries in the world total of four-wheel agricultural tractors rose slightly from 9% in 1970 to 11% in 1976.

CEREAL STOCKS AND WORLD FOOD SECURITY

Cereal stocks (excluding China and the U.S.S.R., for which no information is available) increased substantially in 1976/77. They are estimated to have reached 157 million tons by the end of the 1976/77 crop seasons, an increase of 35 million tons (29%) from the previous year (Table 1-9). A major qualitative improvement took place in the composition of the stocks, for the second year in succession, as wheat increased its share to about 53% compared to 48% in 1975/76 and an average of 43% during the previous five years. Larger wheat crops in all regions resulted in record closing stocks of 83 million tons (of which 55 million tons were held by the major exporters), and an increase in stocks of 24 million tons (41%), largely in Canada and the United States. Closing stocks of coarse grains, at 57 million tons, were about 11 million tons (24%) more than in 1975/76, although lower than in the early 1970s. Rice stocks were unchanged at 17 million tons. With the rise in wheat and coarse grain stocks in 1976/77, total cereal stocks were equivalent to 17% of annual consumption, and thus for the first time since the world food crisis reached the minimum requirement recommended by FAO to ensure world food security.

Table 1-9. Estimated total carry-over stocks of cereals, 1972/73 to 1977/78 [1]

	Closing stocks					
	1972/73	1973/74	1974/75	1975/76	1976/77 [2]	1977/78 [3]
	million metric tons					
WHEAT	47	43	49	59	83	74
Main exporting countries	33	29	32	38	55	51
Main importing countries	7	7	9	15	22)	23
Others	7	7	8	6	6)	
RICE [4]	13	14	13	17	17	18
Selected exporting countries	4	4	4	6	7	...
Selected importing countries	5	6	6	7)	110	...
Others	4	4	3	4)		
COARSE GRAINS	60	50	47	46	57	75
Main exporting countries	40	29	24	24	37	52
Main importing countries	11	12	15	13	11)	23
Others	9	9	8	9	9)	
Total cereal stocks	120	107	109	122	157	167
	%					
Share of total consumption	14	13	12	14	17	18

Note: Stock data are based on an aggregate of national carry-over levels at the end of national crop years, and should not be construed as representing world stock levels at a fixed point of time.

1/ Excluding China and the U.S.S.R. - 2/ Preliminary. - 3/ Forecast. - 4/ Milled.

On the basis of estimates of production and consumption at mid-November 1977, cereal stocks are expected to increase for the fourth consecutive year. They would rise by 10 million tons (6%) to 167 million tons by the end of the 1977/78 seasons, and represent 18% of annual consumption. This increase would be almost entirely the result of larger coarse grains inventories, particularly in the United States. Wheat stocks are expected to fall by 9 million tons (-11%) so that there would be some change in the qualitative composition of stocks. The reduction in wheat stocks partly reflects adjustments in output in the main exporting countries, where production in 1977 was not expected to cover both domestic and export requirements. Wheat stocks are also likely to decline in main importing countries, largely because of an expected fall in Indian wheat inventories, which were abnormally high in 1976/77. At 74 million tons, however, world wheat stocks would be at levels only exceeded in the previous year, and sufficient to cover anticipated needs even if 1978 crops were poor. A preliminary forecast of 1977/78 rice carryover stocks indicates an increase of 1 million tons (6%) to 18 million tons.

After some rebuilding in the previous season of record harvests, stocks in the U.S.S.R. are expected to decline in 1977/78 because of the reduced 1977 production.

The FAO Committee on World Food Security (CFS) held its second session in April 1977, and gave particular attention to the adequacy of world cereal stocks. It agreed that the immediate outlook for global food security had improved owing to the substantial increases in world cereal production and stocks in the past two years, but stressed that the improvement was fragile and not shared by all regions and drew attention to a number of disquieting trends. Although world cereal stocks now approached the FAO estimate of the minimum safe level required for food security, no formal international agreement on stocks had yet emerged as to their level, composition and management. Such an agreement would contribute significantly to the stability and growth of the world cereal economy. The committee noted that in estimating the safe level of world cereal stocks, the FAO Secretariat had in view the objectives agreed in the International Undertaking on World Food Security. This estimate (17 to 18% of consumption) consisted of a "reserve" element of 5 to 6%, the rest being "working" pipeline stocks. The CFS, pending further examination, agreed with this estimate as a reasonable basis for its assessment, although pointing out that it would carry no particular weight as to the desirable level of stocks in an international grains arrangement. It urged governments to expedite the conclusion of a new International Wheat Agreement, with appropriate economic provisions, which could make an important contribution to resolving the problems of world food security.

In view of the high level of stocks, the United States Government announced in August 1977 a set-aside programme aiming at a reduction of 20% in the acreage planted to wheat in 1978. In November this was extended to include a 10% set-aside for coarse grains. Participation in the programme will be voluntary, but only those producers complying with the set-aside will be eligible for target price payments, loans and purchases under this or other commodity programmes. Assuming full participation in the programme, the United States Department of Agriculture estimated in August that about 9 million hectares would be withdrawn from production, and that the 1978 crop of wheat would be reduced by 9 million tons and that of coarse grains by 11 million tons, amounting to a reduction of 8% in the total grain crop that would otherwise be harvested.

It may be tentatively estimated that, in the event of average crop yields in the United States and elsewhere in 1978, there would still be a further increase in United States stocks. In the event of an extreme world food shortage, such as that in 1972/73, coinciding with a poor United States crop, United States supplies would be sufficient to meet the likely demand on them, but stocks would be drastically reduced and world prices could rise sharply.

The United States plans to have in place by mid or late 1978 a grain reserve of 30 to 35 million tons, which would be equivalent to 33 to 39% of its forecast stock level at the close of the 1977/78 seasons. The reserve will consist of three separate components: a farmer-owned reserve of 25 to 28 million tons, a proposed special international emergency food reserve of up to 6 million tons, and some government-owned 1975-crop rice and 1976-crop wheat and coarse grains.

FOOD CONSUMPTION AND NUTRITION

FAO's Fourth World Food Survey [4/] reviews recent trends in food production and supply against the background of increasing population, and provides the most recent evidence regarding the nutritional situation on the basis of food balance sheets prepared for 162 countries.

The average daily amount of dietary energy available per person in various regions in relation to nutritional requirements from 1961-63 to 1972-74 is shown in Table 1-10. At the world level, the overall dietary energy supply is above requirements, the excess of 7% in 1972-74 being slightly higher than in 1961-63. However, the developed countries consumed 32% more than their requirement in 1972-74 (compared to 24% more in 1961-63). The dietary energy supply in the developing countries improved from 11% below requirements in 1961-63 to 4% below requirements in 1972-74.

In each of the developing regions there was an increase in 1972-74 over the dietary energy supply in 1961-63. However, between 1969-71 and 1972-74 the increase was very small in the Near East, Latin America and the Asian centrally planned economies, and there were decreases in Africa and in the developing market economies of the Far East. This was, no doubt, largely due to the very poor harvests in 1972. The improved harvests in 1975 and 1976 imply improved per caput food availability, and food supply analyses for these years are now in preparation.

The particularly unfavourable and deteriorating situation in the MSA countries is again demonstrated by the fact that their dietary energy supply was only 2,040 kilocalories per person per day in 1961-63, and was slightly lower in 1972-74, when it was 10% below requirements. In the other developing countries, on the other hand, there was an increase of 7% from 2,210 in 1961-63 to 2,360 kilocalories in 1972-74, which was approximately equal to nutritional requirements.

Data on protein supplies are shown in Table 1-11. The difference in the per caput availability of protein between developed and developing countries is even larger than for dietary energy. In the developing countries the per caput supply of protein was only 58% of that in the developed countries throughout the period from 1961-63 to 1972-74. The highest levels were in Latin America and the Near East, and the lowest in the Far East. The protein supply in MSA countries was 11% less than that in the other developing countries in 1972-74. The differences between the developed and the developing countries are almost entirely due to the much larger availability of proteins of animal origin in the former. The supply of vegetable protein was practically the same in both developed and developing countries. The share of animal protein in the developed countries rose from 49% in 1961-63 to 55% in 1972-74, but in the developing countries it remained stationary at one fifth.

At the world level cereals contribute about half of the total dietary energy supply. But their share in the diets of the developed countries is less than a third (Figure 1-1). This is in sharp contrast to the developing countries, where almost two thirds of the total dietary energy supply is obtained from cereals. This proportion is, however, much affected by the MSA countries, and in the other developing countries it is a little more than half.

In the developed countries, animal products contributed a quarter of dietary energy supplies and more than half of protein supplies in 1972-74 (Figures 1-1 and 1-2). In the developing countries, they contributed only about 8% of dietary energy supplies and about a fifth of total protein supplies.

The survey brings out clearly that the malnourished are found particularly in the poorest (mainly MSA) countries, in the poorest urban populations, and in rural areas where adverse ecological conditions, land tenure systems and other factors have led to the emergence of large numbers of landless and unemployed and underemployed people.

4/ FAO, The Fourth World Food Survey, Rome, 1977.

Table 1-10. Per caput daily supply of dietary energy in relation to nutritional requirements, world and regions, 1961-63 to 1972-74

Region	Dietary energy supply				Supply in relation to requirements			
	1961-63	1964-66	1969-71	1972-74	1961-63	1964-66	1969-71	1972-74
	..... Kilocalories per caput				..... %			
Developing market economies	2,100	2,130	2,190	2,180	92	93	96	95
MSA countries	2,040	2,030	2,080	2,030	91	90	92	90
Other countries	2,210	2,250	2,330	2,360	95	96	100	101
Africa	2,070	2,100	2,150	2,110	89	90	92	91
Far East	2,010	2,000	2,070	2,040	91	90	94	92
Latin America	2,400	2,470	2,530	2,540	101	104	106	107
Near East	2,290	2,340	2,410	2,440	93	95	98	100
Asian centrally-planned economies	1,960	2,110	2,220	2,290	83	90	94	97
TOTAL DEVELOPING COUNTRIES	2,060	2,120	2,200	2,210	89	92	95	96
Developed market economies	3,130	3,170	3,280	3,340	123	124	129	131
Western Europe	3,200	3,230	3,330	3,390	125	126	130	132
North America	3,320	3,360	3,500	3,530	126	127	133	134
Oceania	3,300	3,320	3,320	3,370	124	125	125	127
Eastern Europe and the U.S.S.R.	3,240	3,270	3,420	3,460	126	127	133	135
TOTAL DEVELOPED COUNTRIES	3,170	3,200	3,330	3,380	124	125	132	132
WORLD	2,410	2,460	2,540	2,550	101	103	106	107

Source: FAO The Fourth World Food Survey, op. cit., p. 16.

These people are unable to grow or buy enough food to meet their needs, and tend also to have the least access to health and other services, which further adds to their deprivation. Within these groups, it is the young children and pregnant and lactating women who are particularly vulnerable.

The country averages of food supplies derived from food balance sheets give no indication of the highly uneven distribution within countries of these supplies in relation to requirements. In estimating the numbers of people who are undernourished, it is necessary to make allowance for this maldistribution on the basis of the limited available evidence regarding the distribution of food intake, as well as clinical and anthropometric data.[5/] It is also necessary to establish a "critical minimum limit" for dietary energy intake. As in the earlier FAO estimates presented to the World Food Conference,[6/]

5/ For a description of the methodology used, see FAO, The Fourth World Food Survey, op. cit., p. 51-53.

6/ These estimates are shown in FAO, The State of Food and Agriculture 1974, p. 107-109, 149-151.

Table 1-11. Per caput daily supply of protein (total and animal), world and regions, 1961-63 to 1972-74

Region	Total protein				Animal protein			
	1961-63	1964-66	1969-71	1972-74	1961-63	1964-66	1969-71	1972-74
	grams							
Developing market economies	53	53	55	54	11	11	12	11
MSA countries	53	52	53	51	7	7	8	7
Other countries	54	55	57	57	15	15	16	16
Africa	52	53	54	53	10	10	11	10
Far East	49	48	50	49	7	7	7	7
Latin America	64	65	66	65	25	25	26	25
Near East	63	64	65	65	13	13	14	14
Asian centrally-planned economies	54	58	61	63	11	12	13	13
TOTAL DEVELOPING COUNTRIES	53	55	57	57	11	11	12	12
Developed market economies	90	91	94	95	48	50	55	56
Western Europe	88	89	92	93	44	46	50	52
North America	101	102	104	104	67	69	72	71
Oceania	98	100	100	101	64	66	67	67
Eastern Europe and the U.S.S.R.	95	95	101	103	38	39	47	50
TOTAL DEVELOPED COUNTRIES	91	92	97	98	45	47	52	54
WORLD	65	67	68	69	22	22	24	24

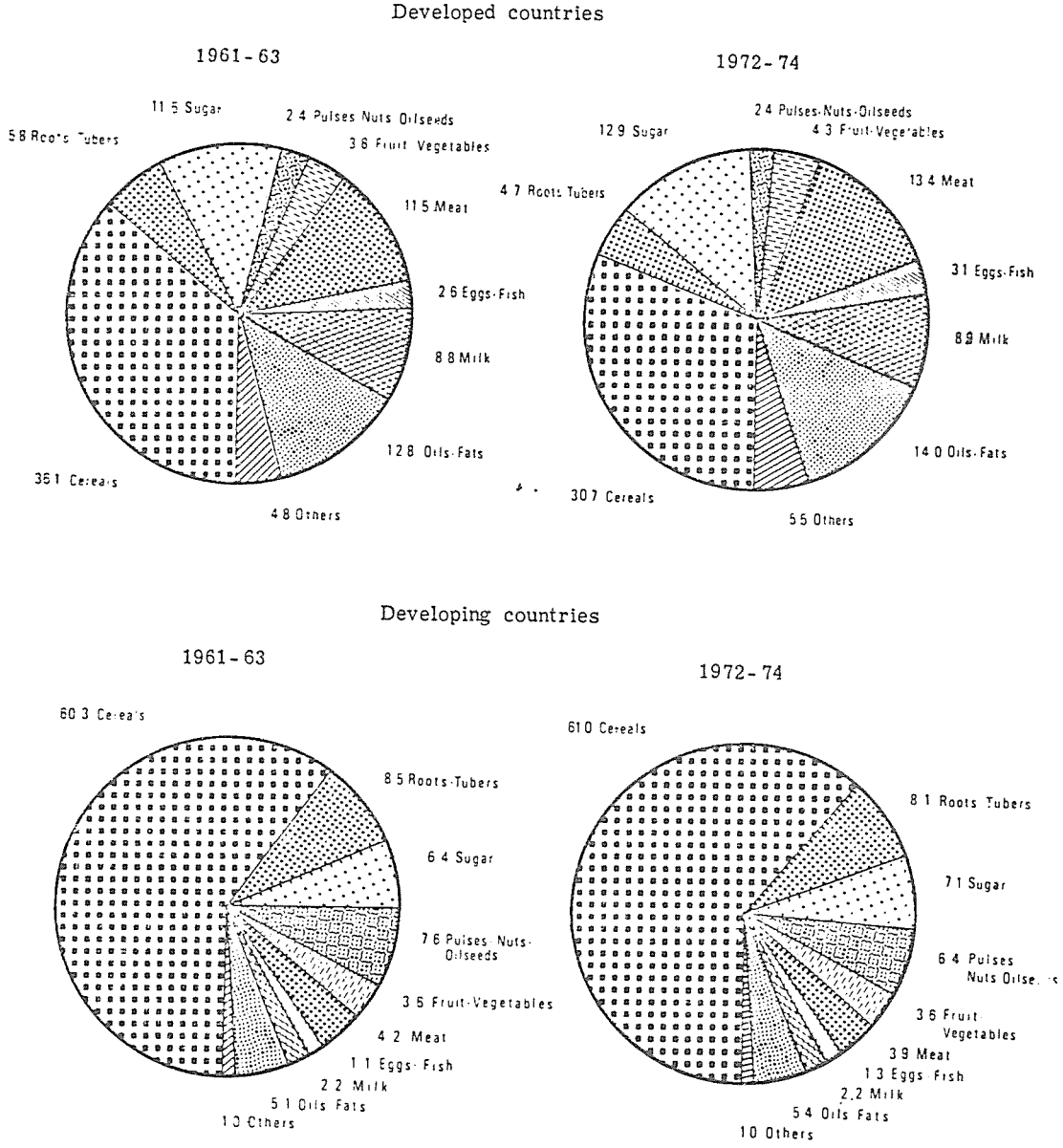
Source: FAO, The Fourth World Food Survey, op. cit., p. 18.

the Fourth World Food Survey derived this limit from basic physiological considerations. The limit was determined from the energy cost of human body maintenance, and established at 1.2 times the Basic Metabolic Rate (BMR).7/ Persons with food intake below 1.2 BMR are in all probability forced to subsist on quantities of food insufficient to lead a full, healthy, and active life. While the estimate is based on dietary energy, most of them are likely to be suffering from an insufficiency of proteins as well.

Estimates of the number of people below the critical minimum limit in 1969-71 and 1972-74 are shown in Table 1-12. The latter period includes years when food production fell in many countries due to adverse weather, and figures for 1975-76, when available, are expected to show some improvement.

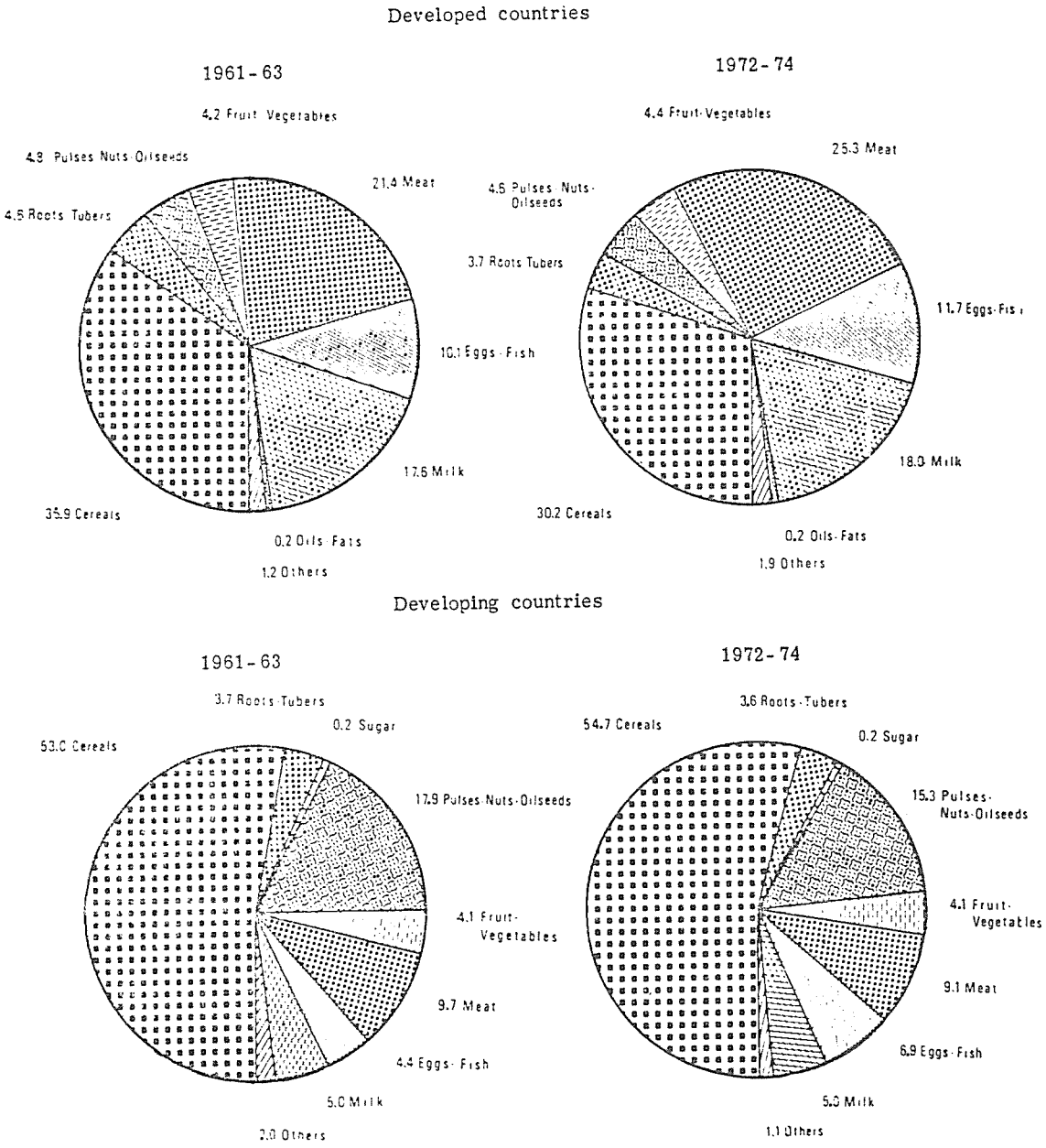
7/ The energy cost of human body maintenance is set at 1.5 BMR. The lower figure of 1.2 BMR allows for variations in the BMR of individual persons.

Figure 1-1. Percentage share of different food groups in dietary energy supply, developed and developing countries, 1961-63 and 1972-74



Source: FAO, The Fourth World Food Survey, op.cit., p.22.

Figure 1-2. Percentage share of different food groups in protein supply, developed and developing countries, 1961-63 and 1972-74



Source: FAO, The Fourth World Food Survey, op.cit., p.23.

Table 1-12. Estimated number of persons with food intake below the critical minimum limit in the developing market economies, 1969-71 and 1972-74 1/

Region	Total population		Percentage below 1.2 BMR		Total number below 1.2 BMR	
	1969-71	1972-74	1969-71	1972-74	1969-71	1972-74
	million		%		million	
Africa	278	301	25	28	70	83
Far East	968	1,042	25	29	256	297
Latin America	279	302	16	15	44	46
Near East	167	182	18	16	31	20
MSA countries	954	1,027	27	30	255	307
Other countries	738	800	20	18	146	148
Total developing market economies	1,692	1,827	24	25	401	455

Source: FAO, The Fourth World Food Survey, op. cit., p. 53.

1/ The estimates for 1969-71 differ from those presented to the World Food Conference. This is largely due to revisions in the estimates of per caput food supplies and in the population figures.

The table indicates that there were about 400 million undernourished people in the developing market economies in 1969-71. By 1972-74 their numbers had increased to about 455 million, or a quarter of the total population of these countries. The increase of almost 15% between 1969-71 and 1972-74 is, in percentage terms, nearly twice the growth of population, although in absolute terms the increase of 54 million is 40% of the total increase in population. Two thirds of the undernourished people in 1972-74 lived in the MSA countries, and more than half in the densely populated Far East. Virtually all of the increase between 1969-71 and 1972-74 was in the MSA countries in Africa and the Far East. The Near East is the only region where the estimated number of undernourished people decreased between these two periods.

CONSUMER FOOD PRICES

Increases in consumer food prices, which tended to slow down in 1975, generally eased again in 1976 (Table 1-13), and this tendency appears to have continued during 1977. Food prices tended to increase at a slower pace than prices of most other consumer items, in contrast to their leading role in general inflation in recent years. Improved food supplies, and to some extent world recession, largely explain this situation.

Although most of the industrialized countries had slower food price increases in 1976 than in 1975, the rates of increase mostly remained high. Relatively low rates of 6% or less were recorded in 1976 only in Austria, Canada, the Federal Republic of Germany, Switzerland and the United States. In many developed countries there were abnormal rises in prices of fresh fruit, vegetables and tropical beverages. Some official price controls were lifted and some subsidies ended. Retail food prices in the United States are expected to rise by only about 6% during 1977, with generally low farm product prices to some extent offsetting higher marketing costs; for 1978 an increase of 4 to 6% is expected. In Europe, pressure on food prices continued in most of 1977 as a result of supply problems, currency depreciation and increased marketing costs. Nevertheless, rates of increase in food prices tended to slow down in most European countries.

The slower rate of food price increases was clearly marked in the developing countries. Only twelve of the 64 developing countries covered in the table showed higher increases in food prices in 1976 than in 1975. Even the traditionally inflation-plagued Latin American countries, with the exceptions of Argentina, Chile and to a lesser extent Brazil, showed moderate rates in 1976 by usual regional standards. In Africa, however, and in contrast to other developing regions, most countries showed larger price increases for food than for other consumer items. Food prices

Table 1-13. Annual changes in consumer food prices in 89 countries, 1973-74 to 1975-76

% price increase	1973-74	1974-75	1975-76 1/
	..... number of countries		
Developing countries (64)			
Less than 5	1	5	19
5.1-10	4	13	18
10.1-15	7	9	7
15.1-30	35	23	14
30.1 and above	17	14	6
Developed countries (25)			
Less than 5	-	-	3
5.1-10	6	6	7
10.1-15	7	7	5
15.1-30	11	9	9
30.1 and above	1	3	1

Source: Annex Table 12.

1/ Preliminary.

increased by an average of about 15% in the region in 1976, compared to nearly 19% in 1975. The highest rates of increase in food prices in 1976 were in Ghana, where domestic supplies were at their lowest levels since the early 1960s, in Nigeria, where production is lagging far behind domestic demand and marketing difficulties persist despite some recent improvement, and in Uganda.

In the Near East there were marked improvements in 1976 in Cyprus, Iraq, Sudan and Turkey, but food prices rose in Egypt at a faster rate than in 1975 despite heavy government subsidies. The Egyptian Government announced large cuts in these subsidies and price rises of 5 to 50% on a variety of consumer items in January 1977, but these price rises were subsequently suspended. Nearly all countries in the Far East achieved sizeable reductions in food price inflation in 1976. In south Asia, most countries experienced lower food prices, because of the more plentiful cereal supplies.

Information for most developing countries is still insufficient to enable a general assessment to be made of food price trends in 1977. Partial data indicate, however, that the slowdown in rates of increase has continued.

In centrally-planned countries, a number of upward price adjustments have had to be made in the face of increasing consumer demand, prolonged freezing of retail prices for a number of food items, and rising costs of imported raw materials and technology. In Poland the Government announced substantial rises in food prices in June 1976, but these were subsequently postponed until 1977.

INTERNATIONAL TRADE AND PRICES [8/]

Total earnings from agricultural, fishery and forestry exports rose in 1976 by about 9% to some $ 167,665 million (Table 1-14). There were substantial differences in the trading results of the three sectors. The value of world trade in agricultural commodities (crops and livestock) increased by about 6% to $ 128,890 million, as compared with increases as high as 22% (to a total of $ 7,710 million) for fishery products and 20% (to $ 31,065 million) for forest products.

Table 1-14. Value of exports of agricultural, fishery and forest products, 1975 and 1976 [1/]

Sector	Market economies					
	Developed			Developing		
	1975	1976	Change	1975	1976	Change
	million US$		%	million US$		%
Agriculture [2/]	76,360	79,570	4.2	36,000	40,260	11.8
Fisheries	3,810	4,760	24.9	2,000	2,300	15.0
Forestry	20,120	23,830	18.4	2,920	4,170	42.8
Total	100,290	108,160	7.8	40,920	46,730	14.2

	Centrally planned economies			World		
	1975	1976	Change	1975	1976	Change
	million US$		%	million US$		%
Agriculture	9,640	9,065	- 6.0	121,995	128,890	5.6
Fisheries	510	650	27.4	6,320	7,710	22.0
Forestry	2,855	3,065	7.4	25,895	31,065	20.0
Total	13,005	12,780	- 1.7	154,210	167,665	8.7

1/ Preliminary. 2/ Covering about 85% of world agricultural commodity trade, and about 90% of agricultural exports from developing market economies; re-exports are excluded.

The volume of trade in crop and livestock products increased by about 8% in 1976 (Table 1-15), as against increases of about 4% for fishery products and 14% for industrial roundwood. The average unit value of crop and livestock products declined in 1976 by about 2%, in comparison with increases of about 9% for fishery products and 10% for forest products.

8/ For a more detailed review, see FAO Commodity Review and Outlook 1976-77, Rome, 1977, Chapter 1, which is, however, based on preliminary trade figures with a less complete commodity coverage than used here.

Table 1-15. Indices of value, average unit value and volume of world agricultural exports (crops and livestock), 1972 to 1976

	1972	1973	1974	1975	1976 1/	Change 1975 to 1976
	..... 1961-65 average = 100					%
Value	169	251	314	324	342	+ 6
Average unit value	122	167	226	225	222	- 2
Volume	137	148	140	143	154	+ 8

1/ Preliminary.

Changes in the value of world trade in the three sectors in 1976 were not evenly distributed among the different economic groups. In the developing market economies, gross export earnings from crop and livestock products rose by 12%, from $ 36,000 million in 1975 to $ 40,260 million in 1976, despite a large drop in sugar exports (Table 1-16). Coffee accounted for a major share of the higher earnings, together with substantial increases in cotton, meat, oilseeds and rubber exports. In the developed market economies, gross agricultural export earnings rose by only 4%, with higher earnings from such items as meat, dairy products, oilseeds and oilmeal proteins partly offset by smaller earnings from cereals and sugar. The increase of $ 3,210 million in their agricultural export earnings represented only 75% of the increase achieved by the developing market economies in 1976. The 6% reduction in the value of agricultural exports from the centrally planned economies reflected considerable falls in cereals, smaller declines in fats and oils, oilseeds and sugar, and only moderate increases in cotton and meat.

Of the total increase of $ 1,390 million in export earnings from fishery products in 1976, the developed market economies took slightly more than two thirds ($ 950 million, or 68%), with $ 300 million (22%) going to the developing market economies and $ 140 million (10% of the total increase) to the centrally-planned economies.

There was a similar pattern of distribution for the increase in export earnings from forest products. All of the three economic groups shared in the increase of $ 5,170 million. The major share was again obtained by the developed market economies ($ 3,710 million, or 72%), followed by a substantial gain ($ 1,250 million) by the developing market economies. The export earnings from forest products of the centrally-planned economies rose by $ 210 million, or 4% of the total increase.

As a result of these developments, there was a significant change in the distribution of total agricultural, fisheries and forestry export earnings among the three economic groups. In contrast to the longer-term trend, the share of these earnings going to the developed market economies declined slightly to 65%, while those going to the developing market economies increased to 28%. Those of the centrally-planned economies declined to 7% of the total. The overall increase in earnings of about $ 13,455 million in 1976 came from gains of about $ 7,870 million for the developed market economies and $ 5,810 million for the developing market economies, which were only slightly offset by a reduction of about $ 225 million for the centrally-planned economies.

Table 1-16. Value of exports of main crop and livestock products, 1975 and 1976

Commodity or commodity group	Market economies					
	Developed			Developing		
	1975	1976 1/	Change	1975	1976 1/	Change
	million US$		%	million US$		%
Cereals	20,919	19,646	- 6	2,635	2,880	+ 9
Oilseeds, fats and oils, oilcakes and meals	7,563	7,996	+ 6	4,475	5,156	+15
Meat	7,776	8,414	+ 8	899	1,283	+43
Milk and milk products	5,492	5,981	+ 9	101	102	+ 1
Sugar	2,499	2,044	- 18	8,236	4,881	- 41
Cotton	1,107	1,212	+ 10	2,370	2,692	+ 14
Coffee	244	449	+ 84	3,992	7,831	+ 96
Other	30,757	33,825	+ 10	13,289	15,433	+ 16
Total	76,357	79,567	+ 4	35,997	40,258	+ 12

	Centrally-planned economies			World		
	1975	1976 1/	Change	1975	1976 1/	Change
	million US$		%	million US$		%
Cereals	2,175	1,627	- 25	25,729	24,153	- 6
Oilseeds, fats and oils, oilcakes and meals	822	557	- 32	12,860	13,709	+ 7
Meat	1,328	1,444	+ 9	10,003	11,141	+ 11
Milk and milk products	151	152	--	5,744	6,234	+ 9
Sugar	514	366	- 29	11,249	7,292	- 35
Cotton	960	1,056	+ 10	4,436	4,960	+ 12
Coffee	5	6	+ 20	4,241	8,286	+ 95
Other	3,687	3,856	+ 5	47,734	53,115	+ 11
Total	9,642	9,064	- 6	121,996	128,890	+ 6

1/ Preliminary.

MARKET SITUATION AND PRICES

Supply problems, both of shortage and surplus, influenced world markets in 1976 for a number of commodities of special interest to developing countries, including coffee, cocoa, tea, sugar and cotton. There were similar problems for beef, dairy products and wine, of concern mainly to the developed countries. Strong contrasts emerged between market situations and price trends for individual commodities (Table 1-17).

Table 1-17. Recent changes in export prices of selected agricultural commodities

Period	Wheat (US No. 2, Hard winter, ordinary f.o.b. Gulf)	Rice (Thai white rice 5% f.o.b. Bangkok)	Maize Yellow No. 2 f.o.b. Gulf
	US $/metric ton		
1972: January	60	131	51
June	60	136	53
1973: January	108	179	79
June	106	205	102
1974: January	214	538	122
June	154	596	117
1975: January	169	399	132
June	126	346	118
1976: January	143	280	111
June	147	242	122
1977: January	110	259	112
June	94	264	95
July	98	272	85
August	97	275	77
September	102	275	78
October	106	278	83
Average: 1972	70	151	56
1973	139	368 2/	98
1974	181	542	132
1975	150	364	119
1976	122	255	112

	Soybeans (US, c.i.f. Rotterdam)	Sugar (ISA composite price, world market, f.o.b., stowed Caribbean ports)	Coffee (ICO composite price New York ex-warehouse)
	US$/metric ton	US cents/pound	
1972: January	125	7.90	44.80
June	138	6.33	47.76
1973: January	214	9.40	57.03
June	470	9.38	62.78
1974: January	261	15.16	66.22
June	228	23.51	71.49
1975: January	256	38.31	64.96
June	207	13.65	63.00
1976: January	189	14.02	94.97
June	230	12.99	149.24
1977: January	272	8.34	227.89
June	326	7.87	269.81
July	252	7.39	246.15
August	230	7.61	240.17
September	205	7.31 1/	236.97 1/
October	209	7.09 1/	222.00 1/
Average: 1972	140	7.27	50.34
1973	290	9.45	62.16
1974	277	29.66	67.95
1975	220	20.37	71.73
1976	231	11.51	142.45

1/ Provisional. 2/ Thai rice, as well as rice from most other regions, was not quoted regularly on the world market from the second week of March to November 1973; this average is estimated on the basis of the few quotations that are available and is only indicative of the change that took place in prices.

Short supplies and soaring prices have characterized the markets for cocoa and coffee since mid-1975 and for tea since early 1977. Stocks of cocoa remain very low, keeping prices well above the levels established by the International Cocoa Agreement, and inventories are not likely to be replenished until new plantings come into bearing in three or four years. As a result of record coffee prices, world consumption has apparently declined, particularly in the United States, the major consumer. Reflecting easier supplies, the International Coffee Organization's composite price for green coffee (1968 ICA formula) fell from $2.70 per lb. in June to $ 2.22 in October, in comparison with $ 1.49 a year earlier.

The most dramatic developments, however, have been in the world market for sugar, where an acute shortage was replaced by surplus within the space of two years. The combination of large carry-over stocks and an anticipated new record harvest caused world free market prices to fall below 7 cents per lb., f.o.b. They rose slightly following the announcement of the successful nogotiation of a new International Sugar Agreement, but the rise was short-lived.

In world markets for fats and oils a marked improvement in demand, together with some deterioration in production prospects, led to a gradual recovery in prices from June 1976 onward. This accelerated considerably in early 1977 following continuing strong demand. Shortages developed during 1976 in markets for hides and skins, and for cotton, reflecting a revival in demand due to industrial recovery and strong consumer preference for natural raw materials. A tightening of supplies occurred in markets for hard fibres, jute and oilmeal proteins. For hard fibres, this was due chiefly to production cuts which brought supplies into line with shrinking markets. For the other commodities, it chiefly reflected a revival in demand. Revival in demand for commercial feeds, and prospects of poorer soybean crops brought substantial increases in prices of oilmeal proteins.

Markets for rubber, bananas, citrus fruit and tobacco, as well as those for coir and pepper, were in better balance in 1976 and the first half of 1977. Expansion in supplies of rubber, coir and pepper coincided with a revival in import demand (especially for rubber).

International markets for beef were in closer balance in 1976, owing to a moderate increase in production and a partial recovery in export demand following some easing of import restrictions in the EEC and Japan, and the development of alternative export outlets in developing countries.

Wine and dairy products continued to be in surplus on world markets. In the dairy sector, output increased further in 1976 and, with little improvement in the demand for milk products, supplies in developed countries exceeded commercial outlets by increasing amounts. Disposal action by the EEC led to some reduction in stocks of skim milk powder, but stocks of butter continued to rise. Prices for all milk products therefore remained depressed throughout 1976 and the first half of 1977.

In the world markets for cereals, closer balance between demand and supply had been achieved in 1975/76 following two seasons of shortage, and easier supply conditions continued throughout the 1976/77 season. In 1977/78 world imports of wheat are expected to increase by about 10.5 million tons to 69.5 million tons, reflecting growing gaps between production and consumption requirements in many countries, particularly China, north Africa, Mexico and the Sahel. Larger wheat exports are forecast from Australia, Canada, the EEC, Turkey and the United States, and (for the first time in several decades) India will enter the export market. World imports of coarse grains in 1977/78 are likely to be about 74 million tons, or 4% below the 1976/77 record. Lower requirements in the EEC and eastern Europe are expected to be only partially offset by larger requirements in Japan, the Republic of Korea, Mexico, some Near East countries, and the U.S.S.R. The United States are expected to account for over 60% of coarse grain trade in 1977/78. The FAO forecast of world rice trade in 1977, at 8.7 million tons, reflects strong demand. Export prices of rice rose moderately in October and November, after remaining steady for some months, and prices of parboiled rice increased sharply.

With larger supplies and continuing lower prices of wheat in major exporting countries, together with large supplies of weather-damaged wheat in European importing countries, the use of wheat as animal feed is expected to rise still further (by 3 to 6 million tons in the United States). Price relations between coarse grains and livestock remain favourable. Coarse grain fed to livestock may rise from 115 million tons in 1976/77 to 125 million tons in 1978/79. In the EEC wheat and coarse grain feeding is expected to expand by 2 million tons to 70 million tons (of which 11.5 million tons wheat).

TERMS OF TRADE 2/

Following a sharp decline in 1975, the terms of trade of agricultural, fishery and forest products for manufactured goods considerably improved for the developing market economies in 1976 and the first half of 1977 (Table 1-18). They remained virtually unchanged for the developed market economies.

Table 1-18. Terms of trade of all agricultural products 1/ for manufactured goods, 1971 to 1977

Market economies	1971	1972	1973	1974	1975	1976	1977 (first quarter)	1977 (second quarter)
	..... 1970 = 100							
Developing	97	104	130	151	114	122	140	147
Developed	102	111	142	136	116	115	114	114

Source: United Nations Monthly Bulletin of Statistics, September 1977 (adjusted data).

1/ Including fishery and forest products.

The fall in the real prices of agricultural products exported by developing market economies thus appears to have been checked in 1976, and to have improved further during the first half of 1977. Although the United Nations export price index for all agricultural products rose by only 3% in 1976 to 216 (1970 = 100), by the first quarter of 1977 it had increased by 11% to 239 and in the second quarter by another 5% to 250. At the same time the unit value of all goods imported into the developing market economies rose by only 1% in 1976, 8% in the first quarter of 1977, and another 2% in the second quarter. Meanwhile prices of crude fertilizers fell by 28% in 1976, and by another 8% in the first quarter of 1977, and rose by only 1% in the second quarter.

The problem of widespread price instability, which has been a major feature of most commodity markets since 1972, was again prominent in 1976 and 1977. Continuing uncertainties about the general economic outlook, high rates of inflation in some developed and developing countries, and the persistent balance of payments problems of many countries have led world commodity markets to react sharply to short-term changes in supply and demand. Pronounced price fluctuations may thus remain a more permanent feature of commodity markets.

In recent years the degree of instability in the terms of trade for manufactured goods has varied between individual commodities (Table 1-19). The largest fluctuations characterized sisal, sugar, wool, cocoa, and oilmeal proteins. Tobacco was at the opposite extreme with the smallest changes in terms of trade. Tea and jute showed steadily declining terms of trade from 1970 to 1976, but these began to increase in 1977, especially for tea. These changes in the terms of trade affected various countries in different ways depending on the particular importance of individual commodities to them.

2/ Net barter terms of trade, defined as the ratio of the export price index to the import price index usually shown as a percentage.

Table 1-19. World terms of trade of selected agricultural commodities for manufactures, 1971-1977

Commodities	1971	1972	1973	1974	1975	1976	1977 (first quarter)	1977 (second quarter)
Food	101	108	132	143	120	117	121	126
Cereals	97	98	138	162	127	111	93	91
Maize	94	88	117	121	105	100	96	88
Rice	93	97	144	198	127	92	78	88
Wheat	99	103	151	179	142	122	95	90
Sugar	107	143	154	357	225	130	95	97
Meat	106	113	133	99	97	101	99	102
Dairy products	110	117	118	107	115	113	111	112
Cocoa	83	88	125	155	120	160	235	248
Non-food	99	108	147	138	108	119	123	126
Oilseed, oils and fats	98	90	141	162	104	101	114	131
Copra	83	57	119	193	65	69	98	112
Groundnuts	104	100	120	136	105	97	112	123
Palm oil	95	73	110	159	91	85	100	124
Soyabeans	104	107	166	144	103	108	128	147
Textile fibres	97	123	192	151	109	131	136	131
Cotton	104	108	148	149	105	139	145	140
Jute	98	100	80	75	75	63	63	63
Sisal	109	141	250	420	264	221	206	204
Wool	87	145	265	154	112	126	129	123
Coffee	83	87	94	81	81	153	237	256
Tea	96	86	75	80	73	78	119	163
Tobacco	99	96	89	87	93	100	98	99
Rubber	76	72	126	109	75	105	103	99
Hides and skins	95	171	170	111	80	119	124	126

Source: United Nations Monthly Bulletin of Statistics, September 1977.

LONGER-TERM TRENDS

The agricultural export earnings (from crop and livestock products) of the developing countries increased by 3.0% a year in the 1960s and by as much as 17.4% a year in 1970-76 (Table 1-20). The United Nations indexes of world export prices indicate that prices of food products rose by 17.0% a year in 1970-76 and of non-food agricultural products by 16.2%. The most rapid price increases during 1973 and 1974 were for sugar, cocoa, cereals, vegetable oils and oilseeds, and some textile fibres, but most agricultural products shared in the general increase. Most prices have fallen since about the beginning of 1975 with the main exception of some tropical products such as cocoa and coffee.

The large price increases were associated with reductions in the volume (weighted by 1961-65 prices) of the gross agricultural exports of the developing countries in 1971 and again (much more sharply) in 1974. In 1975 the volume was only about 3% more than in 1970, and 6% less than the peak level of 1973. The average annual increase of 1.4% in 1970-76 compares badly with the 3.3% proposed in FAO's Indicative World Plan (IWP).[10/]

10/ Provisional Indicative World Plan for Agricultural Development, FAO, Rome, 1969, Vol. 2, p. 525. The IDS target of 7% annual growth in the total exports of the developing countries is not broken down by sectors. The IWP's 3.3% for agricultural exports would imply an increase of 10 to 12% a year in non-agricultural exports for the overall target to be met.

The value and particularly the volume of the agricultural exports of the developed countries have increased much faster than those of the developing countries during DD2. In contrast to the developing countries, their volume also increased faster in 1970-76 than in the previous decade. The share of the developing countries has declined fairly steadily from 45% of the total value of world agricultural exports in 1961-63 to 41% in 1969-71 and 33% in 1974-76.

Table 1-20. FAO index numbers of value and volume of agricultural exports 1/, world and developing and developed countries

	1971	1972	1973	1974	1975	1976 2/	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	1961-65 average = 100						%		
VALUE	143	169	251	314	324	339	5	3.7	19.9
Developing countries	126	144	200	260	261	286	10	3.0	17.4
Developed countries	157	189	291	356	374	381	2	4.2	21.1
VOLUME	127	137	148	140	143	153	7	2.8	3.1
Developing countries	116	123	127	119	120	131	9	2.8	1.4
Developed countries	138	150	167	159	165	173	5	3.5	4.5

1/ Crop and livestock products. - 2/ Preliminary.

One of the consequences of the lag in agricultural production in the developing countries during DD2 has been a very burdensome increase in their imports of food. The volume of these imports was already rising by 3.0% a year in the 1960s, and the increase accelerated to 5.8% a year in 1970-76 (Table 1-21). Most of the increase in DD2 occurred in 1973 and 1974, and there was little change in 1975 or 1976. More than half of the food imports of the developing countries consists of cereals.

The value of the food imports of the developing countries rose on average by 26.4% a year in 1970-76, as compared with only 3.4% a year in the 1960s. The biggest jumps were in 1973 (58%) and 1974 (a further 64%), but the cost continued to increase in 1975 despite only a slight change in volume, while it declined in 1976. Although they remain much smaller than their agricultural exports, the value and especially the volume of the food imports of the developing countries increased much more rapidly than their exports in 1970-76, after roughly keeping pace with them during the 1960s.

Table 1-21. FAO index numbers of value and volume of food imports 1/, world and developing and developed countries

	1971	1972	1973	1974	1975	1976 2/	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	1961-75 average = 100						%		
VALUE	161	188	272	368	411	394	- 4	4.7	21.8
Developing countries	145	161	255	418	443	404	- 9	3.4	26.4
Developed countries	167	197	278	351	400	391	- 2	5.1	20.4
VOLUME	136	146	158	154	158	169	7	3.3	4.2
Developing countries	134	136	159	168	169	172	2	3.0	5.8
Developed countries	136	149	159	150	155	169	9	3.5	3.7

1/ Crop and livestock products. - 2/ Preliminary.

The volume fo the much larger food imports of the developed countries increased slightly more in 1970-76 than in the 1960s, and much more slowly than in the developing countries. The annual increase in their value was also considerably less in 1970-76 than in the developing countries.

The problems of the developing countries in paying for their increased imports were enhanced by a steep rise in ocean freight rates at the beginning of DD2. Many of these rates more than doubled between 1971/72 and 1972/73 and again in 1973/74, but they have since fallen back to approximately the levels prevailing in 1972/73.

Food aid, which is discussed in more detail later, greatly eased the burden of the food imports of the developing countries during the 1960s and at the beginning of DD2. It provided up to 45% of their cereal imports in peak periods, and the proportion was still about 30% in 1970/71 and 1971/72. With rising imports and declining food aid, it fell to about 20% in 1972/73, and has averaged around 15% or less in the subsequent four years.

AGRICULTURAL EXPORT EARNINGS OF MSA COUNTRIES

The share of the MSA countries in the agricultural export earnings of the developing countries declined during 1971-76, although there was some improvement in this ratio in the latter part of this period (Table 1-22). This disappointing trend not only reflected their generally poor agricultural production, discussed earlier, but also their particular mix of export commodities. The improvement of the agricultural trade balance of the MSAs in 1976 came as a result of the economic recovery in most of the industrialized countries and of higher earnings from some export commodities, notably cocoa and coffee.

The average annual rate of growth in the agricultural export earnings of the MSAs during both the 1960s and 1970-76 has been much lower than for the developing countries as a whole. Their earnings rose by only 2.2% and 14.7% annually in these two periods, compared to 4.2% and 21.1% in all developing countries. The MSAs in Latin America did particularly badly in their agricultural export earnings during the 1960s, showing an average annual decline of 2.2%. They have made a much better showing in DD2 so far, when MSA countries in the Far East and Near East have done relatively badly.

Table 1-22. Agricultural exports of MSA and all developing countries, 1971-76

	1971	1972	1973	1974	1975	1976	Annual rate of change 1961-65 to 1970	Annual rate of change 1970-76
	US$ thousand million						%	
MSA countries in:								
Africa	1.8	2.2	2.7	3.5	3.5	4.6	5.3	16.2
Far East	1.3	1.5	1.7	2.1	2.6	2.6	- 2.2	13.7
Latin America	0.5	0.6	0.7	1.0	1.1	1.4	3.6	18.7
Near East	0.9	0.8	1.1	1.3	1.2	1.3	4.5	9.4
Total MSAs	4.6	5.1	6.2	8.0	8.4	9.8	2.2	14.7
All developing countries	17.1	19.5	27.1	35.3	35.4	38.7	4.2	21.1
	%							
MSA exports as % of all developing countries	26.9	26.1	23.0	22.6	23.8	25.4		

TRADE NEGOTIATIONS

Progress has continued to be slow in the various negotiations aimed at mitigating the long-standing problems of international trade in agricultural and other products.

The first part of a negotiating conference on a common fund, to serve as an instrument for attaining the objectives of UNCTAD's Integrated Programme for Commodities, took place in March-April 1977, pursuant to a resolution of the Fourth Session of UNCTAD in May 1976. Such a fund was seen by the developing countries as a central and integrating element of this programme designed to stabilize and strengthen world markets for all commodities of export interest to developing countries, although the initial coverage includes only 18 commodities, of which 12 are agricultural products and one (phosphate) is used for the manufacture of fertilizer. Three negotiating groups were established: the first to deal with the financing of buffer stocks, the relationship between a common fund and international commodity organizations, and the financing of measures other than stocking; the second with financial requirements, structure and other financial measures; and the third with membership, organization and legal matters. The second part of the conference is to be held in November-December 1977.

The current Tokyo Round of Multilateral Trade Negotiations (MTN), conducted under the auspices of the General Agreement on Tariffs and Trade (GATT), entered the stage of negotiations in February 1975 and has since continued within seven negotiating groups covering agriculture, tropical products, tariffs, non-tariff barriers to trade, safeguards, the sector approach, and improvement in the framework for the conduct of world trade. The first substantial results of the MTN were achieved by the Group on Tropical Products early in 1977, when trade concessions or contributions on tropical products to developing countries by a number of countries took effect. Other countries are expected to implement their offers as soon as necessary domestic procedures are completed. The Group on Improvement in the Framework for the Conduct of World Trade, established in November 1976, is giving particular attention to the rules governing trade relations between developed and developing countries, with the aim of obtaining more favourable treatment for the latter. Both the Agriculture and Non-Tariff Barriers Groups agreed to present their lists of requests by 1 November 1977, and on the deadline of 15 January 1978 for the presentation of offers. It is likely that the negotiations will last well into next year, and even extend into 1979.

A resolution of the Fourth Session of UNCTAD requested the Trade and Development Board to establish a Committee on Economic Cooperation between Developing Countries (ECDC), in order to identify, adopt and implement measures of international support for the programme agreed by the Group of 77 at its Third Ministerial Meeting (Manila, January-February 1976). The committee was established in October 1976 and held its first session in February and May 1977. It generally approved the programme of studies and activities on economic cooperation prepared by the UNCTAD secretariat in response to the request of the Conference on ECDC held in Mexico City in September 1976. Studies approved, of particular relevance to agriculture, relate to a global scheme of trade preferences among developing countries, the establishment of multinational marketing enterprises, and cooperation among state trading corporations. Other steps include the intensification of export credit guarantee schemes, cooperation in the transfer of technology, promotion of international capital flows, and the creation of multinational production enterprises among developing countries.

Negotiations toward international commodity agreements have been completed for cocoa, coffee and sugar, and are currently in progress for wheat. An International Natural Rubber Agreement on Price Stabilization was signed by five producing countries in November 1976. In addition, the feasibility of commodity agreements is being examined for a large number of other agricultural products within the UNCTAD Integrated Programme for Commodities. Consultations on agreements on tea and bananas have continued under FAO auspices.

The renegotiated International Cocoa Agreement came into force on 1 October 1976, and is to run for six years. It provides for a system of export quotas to protect an agreed price range, and also buffer stock operations. It is not operative at present

because current market prices are well above the price range established by the agreement. The new International Coffee Agreement also came into force on 1 October 1976 for a six-year period, providing for a system of export quotas to protect an agreed floor price. It too is not yet operative, because current prices are far above the agreed floor price. A new International Sugar Agreement was approved by the UNCTAD Negotiating Conference on 7 October 1977. The agreement, which is scheduled to last for five years, is an export quota agreement, supported by buffer stocks. Technical discussions continue on a new International Wheat Agreement. Meanwhile the agreement of 1971 has been extended, for the third time, by protocol to 30 June 1978.

FISHERIES

PRODUCTION AND TRADE [11]

Following the depressed conditions of the previous two years, 1976 saw a marked improvement in many aspects of the world fishery economy. The total world catch rose by some 5% to a record level of 73.5 million tons (Table 1-23). The demand for fish, responding to generally rising consumer incomes, strengthened in most major consumer areas, leading to a widespread rise in prices. Increases in costs, however, were more moderate than in recent years, and there was a general improvement in returns to fishery enterprises.

The increase in world fisheries production in 1976 came mainly from developing countries, where landings both for direct human consumption and for reduction to fishmeal and oil were significantly greater than a year earlier. In the latter case this was due almost entirely to improved yields from the southeast Pacific anchoveta fishery, and consequently larger landings by Peru and Chile. Improved supplies of fish for direct human consumption were widespread (with the exception of Africa), with significant increases in catches being reported by many countries in Asia (such as the Republic of Korea, Malaysia and India) and in Latin America (Brazil and Mexico). No information is available concerning recent changes in the level of fishery production in China, where even the approximate size of the catch remains uncertain.

In the developed market economies the main increase in catch came from fish for reduction to meal and oil, and in particular from a substantially increased capelin catch by Norway from the northeast Atlantic. Production by Denmark and Canada also increased, but elsewhere (except in South Africa where there was a sharp fall) catches changed little compared with 1975. Although final data are not available from the U.S.S.R., landings again increased in spite of the further extension of exclusive fishing zones, which might have been expected to affect adversely the long-distance operations on which the U.S.S.R. depends for a substantial proportion of its supplies.

The general improvement in the world fishery economy in 1976 was achieved in spite of the changes now affecting the legal and institutional framework within which the resources of the world's oceans are exploited. It was brought about in the face of sharp competition, at least in the industrialized countries, from many meat and poultry products. The slower increase in costs enabled some developed countries to reduce the level of financial support to the industry, and will also have helped mechanization programmes in the developing world.

The improvement in demand led to a significant revival in international trade (Table 1-24). Imports of fishery products by the two major importing countries, the United States and Japan, rose sharply in 1976. This benefited the foreign exchange earnings of many developing countries, in particular shrimp exporters such as India, and south American countries now exporting considerable quantities of frozen white fish. The imports of many western European countries also increased, and the total value of world trade rose considerably in 1976.

A large proportion of the increase in earnings in 1976 was, however, caused by the substantial rises in prices. The prices for nearly all sizes of shrimp and groundfish, for example, were at near record levels throughout much of 1976 and early 1977. The United States index of ex-vessel prices of all fish rose by over 20% in 1976, registering the first significant increase since 1973. In Denmark a 7% increase in the catch brought a 32% rise in value. Detailed price data from developing countries are less readily available, but sharp rises in the price of important commercial species were reported in Chile, the Republic of Korea, Thailand and other countries. In spite of increased production, the price of fishmeal rose steadily during 1976, reflecting both growing demand and the increasingly tight supply of alternative protein feeds, especially soybean meal.

11/ For a detailed account of the fisheries situation, see FAO, Yearbook of fishery statistics 1976, Vols. 42 and 43 (in press).

Table 1-23. Estimated world catch of fish, crustaceans and molluscs

	1971	1972	1973	1974	1975	1976 1/	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	thousand tons						%		
Developing market economies	26,500	21,050	19,780	22,620	21,970	24,160	+10	7.7	-2.4
Africa	2,840	3,340	3,390	3,280	3,020	3,090	+ 2	7.3	1.7
Far East	8,750	9,040	9,940	10,560	10,920	11,570	+ 6	7.6	6.0
Latin America	13,940	7,640	5,410	7,670	6,910	8,470	+23	7.9	-11.5
Near East	720	760	740	850	820	780	- 5	4.7	2.1
Other	250	270	300	260	300	250	-17	5.9	-0.4
Asian centrally planned economies	9,290	9,430	9,540	9,480	9,560	9,590	-	3.3	1.5
TOTAL DEVELOPING COUNTRIES	35,790	30,480	29,320	32,100	31,530	33,750	+ 7	6.4	-1.4
Developed market economies	26,510	26,750	27,690	27,640	26,900	28,220	+ 5	3.5	1.0
Western Europe	11,080	11,270	11,490	11,420	11,100	12,130	+ 9	4.1	1.1
North America	4,110	3,860	3,880	3,780	3,770	4,140	+10	-	-0.1
Oceania	180	180	200	210	170	180	+ 6	4.8	1.4
Other 2/	11,140	11,440	12,120	12,230	11,860	11,770	- 1	4.5	1.7
Eastern Europe and the U.S.S.R.	8,410	8,880	9,820	10,570	11,460	11,510	-	9.3	6.6
TOTAL DEVELOPED COUNTRIES	34,920	35,630	37,510	38,210	38,360	39,730	+ 4	4.6	2.5
WORLD	70,700	66,100	66,800	70,300	69,900	73,500	+ 5	5.5	0.6

1/ Preliminary. 2/ Israel, Japan, South Africa.

Table 1-24. Indices of volume, unit value and value of world trade in fishery products, 1972 to 1976

	1972	1973	1974	1975	1976 1/	Change 1975 to 1976
	1961-65 average = 100					%
Volume	157	158	153	161	167	+ 4
Average unit value	167	237	262	247	269	+ 9
Value	253	341	367	381	465	+22

1/ Preliminary.

Although partly offset by cost increases, the widespread rise in prices brought an improvement in returns to fishery enterprises, many of which had been in financial difficulties since early 1974. This allowed a number of governments to reduce or remove financial support to the industry, which now appears to have generally adjusted to the higher oil prices and other cost increases which occurred in 1974 and 1975. More recently, however, there are again indications that fishery enterprises are suffering from economic difficulties, particularly in those countries whose activity has been restricted by the extension of exclusive fishing zones.

It seems unlikely that the sharp expansion in fishery production and trade which took place in 1976 will be repeated in 1977. The virtual suspension of fishing for anchoveta by Peruvian vessels, after one of the shortest seasons on record, indicates a fall in catch in 1977 from this important fishery, whose landings continue to have a marked effect upon the overall world catch. The effect of extended economic zones on fish production remains uncertain, but it seems likely that the short-term result, for many north Atlantic countries at least, will be a fall in production as stricter conservation measures are enforced by coastal states.

The outlook for consumption and trade is more difficult to assess. The buoyant state of demand anticipated in the two major markets of the United States and Japan is a favourable factor. On the other hand, prices for most fishery products remain high and in some cases are expected to continue to rise during the rest of 1977 and early 1978. Fishmeal prices, although not at a record level, are nevertheless high, and (with lower production in south America) supplies are expected to be increasingly tight during the remainder of 1977. Towards the end of 1977 some easing in prices may be anticipated as supplies of competing protein meals become more abundant.

LONGER-TERM TRENDS

During the 1960s world fishery production expanded much faster than crop and livestock production, with an average rate of growth as high as 6.6% a year in the developing countries (Table 1-25). In 1970-76, however, there was little further growth in the world catch and a slight decline in developing countries. Only in 1976, after fluctuating for five years, did it exceed the peak level of 71 million tons reached as long ago as 1971.

Table 1-25. Catches of food and non-food fish[1/], world and developing and developed countries

	1971	1972	1973	1974	1975	1976[2/]	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	million metric tons						%		
FOOD	45.4	46.2	48.6	49.2	49.0	50.9	+ 4	3.5	2.4
Developing countries	22.3	23.0	24.2	24.9	25.2	26.1	+ 4	5.5	3.7
Developed countries	23.1	23.2	24.4	24.3	23.8	24.8	+ 4	1.9	1.1
NON-FOOD	25.3	19.9	18.2	21.1	20.9	22.6	+ 8	10.2	-2.8
Developing countries	13.5	7.5	5.1	7.2	6.3	7.7	+22	8.7	-12.1
Developed countries	11.8	12.4	13.1	13.9	14.6	14.9	+ 2	12.2	5.0
TOTAL	70.7	66.1	66.8	70.3	69.9	73.5	+ 5	5.6	0.6
Developing countries	35.8	30.5	29.3	32.1	31.5	33.8	+ 7	6.6	-1.4
Developed countries	34.9	35.6	37.5	38.2	38.4	39.7	+ 3	4.6	2.5

1/ Fish, crustaceans, molluscs, aquatic animals other than whales. - 2/ Preliminary.

Both the rapid increase in the 1960s and the slow growth in 1970-76 were principally influenced by the catches of shoaling pelagic species, such as anchoveta, used mainly for reduction to fish meal and oil, particularly in the fisheries of Angola, Chile and Peru. The catches of fish not used directly for human consumption dropped considerably in the developing countries in 1970-76, and the share of such fish in a virtually unchanged total world catch fell from 38% in 1970 to 30% in 1975 and rose slightly to 31% in 1976. Catches of food fish, in contrast, have maintained a fairly steady expansion in both the 1960s and 1970-76. Although the data in Table 1-25 show lower rates of growth for food fish in the latter period, this is largely due to the influence of China, for which (in the absence of data) a constant catch has been assumed. Production of fish for direct human consumption in the developing market economies shows an increase at about the same rate in 1970-76 as in the 1960s. Including or excluding China, food fish production in the developing countries has also increased more rapidly than in the developed countries. The share of the developing countries in the world catch of food fish stood at 51% in 1976 compared with 45% in 1970, but for fish used for reduction to meal and oil their share dropped from 57% to 34%.

Since most of the major lightly exploited stocks lie off the coasts of developing countries, a continuation of the favourable trend in food fish production in these countries can be expected for perhaps another decade. Present evidence, however, points to a long-term slackening in the rate of increase in output in the world as a whole. The generally high growth rates during the 1960s were based largely on the exploitation of types of fish which are relatively abundant and easily marketable, e.g. shoaling pelagic fish such as anchovies and herring, and demersal fish such as Alaska pollack and hake. Recent assessments confirm the view that there are now rather limited possibilities for expanding the catch of the commercially favoured demersal fish, and that the exploitation of the remaining shoaling pelagic species will present problems of processing and marketing if they are to provide acceptable low-cost products for direct human consumption.

As regards international trade in fishery products, the value of the fishery exports of the developing countries was already increasing by 11.9% a year in the 1960s, and the acceleration in the 1970s has been less marked than in the case of agricultural products (Table 1-26). Their price-weighted volume rose by 4.0% a year in 1970-76, or at about half the rate of the 1960s. The expansion was far from steady, however, owing to the fluctuating supplies of fishmeal for export. Thus the volume of exports of the developing countries as a whole dropped sharply in 1973, and it was only in 1975 that it surpassed the previous record level of 1972. Latin American exports were halved in volume in 1973, and in 1976 were still only 46% of the 1971 level.

Table 1-26. FAO index numbers of value and volume of exports of fishery products, world and developing and developed countries

	1971	1972	1973	1974	1975	1976 1/	Change 1975 to 1976	Annual rate of change 1961-70	Annual rate of change 1970-76
	.....1961-65 average=100.....						.....%		
VALUE	209	253	341	367	381	474	+24	8.4	17.1
Developing countries	274	320	404	441	504	633	+26	11.9	17.3
Developed countries	188	231	320	342	340	421	+24	7.2	16.9
VOLUME	144	157	158	153	161	170	+ 6	4.9	3.0
Developing countries	187	206	192	201	216	227	+ 5	7.7	4.0
Developed countries	128	141	148	139	146	155	+ 6	3.9	3.2

1/ Preliminary.

The annual rate of increase in the volume of exports of the developed countries was much lower in the 1960s than that of the developing countries, but was not much lower in 1970-76. There was also little difference in the rate of increase in the value of exports in these two groups of countries in 1970-76. The share of the developing countries in the value of world exports of fishery products fell from 37% in 1969-71 to 34% in 1974-76, although it still remained higher than in 1961-63.

POLICIES AND ISSUES

Issues connected with extended jurisdiction has continued to occupy those concerned with national and international fisheries policies. Although the United Nations Conference on the Law of the Sea, which met on two further occasions during 1976, has not yet reached agreement on the Informal Composite Negotiating Text drawn up in 1975, it has become clear that the provisions on fisheries, and particularly those concerning jurisdiction over fisheries, are not likely to be changed substantially. In these circumstances, attention has been focused increasingly on the effects of the new regime on the pattern of fishing, on international trade, on the policy options open to those countries (and especially developing countries) acquiring jurisdiction over substantial new resources, and above all on the arrangements for the management of resources.

The main effect of extended jurisdiction on the pattern of fishing is, of course, to discourage long-distance fleets and to encourage the growth or promote the recovery of coastal fisheries. It will, however, be many years before adjustment to the new regime is completed. In the meantime, the impact of the jurisdictional changes has been softened by the negotiation of agreements which permit the continuation of distant water fishing even if at a reduced level.

It is too early to indicate what the secondary effects of the jurisdictional changes will be, for example on the patterns of trade and utilization. It is already clear, however, that these changes will be complex and may lead to long-run changes in the pattern of consumer demand. So far as trade is concerned many of the benefits will accrue to third parties. For instance, the exclusion of the United Kingdom from the Icelandic cod fisheries is leading to increased imports of hake from south America, and similar changes are possible in many other situations. A shortage of supplies from traditional sources will also stimulate the reappraisal of local resources, some of which may have been neglected because of poor consumer demand but which, with product development and modern marketing techniques, could provide adequate substitutes for more familiar species. Similarly, some species now used largely for reduction to meal and oil could be upgraded for human consumption.

The greatest disruption to established patterns of trade and consumption will undoubtedly be in the developed countries, many of which have become dependent for a significant part of their fish supplies on distant (or at least non-local) waters. In the early 1970s, before the extension of limits had an effect, the vessels of developed countries (including eastern Europe and the U.S.S.R.) took some 15 million tons of fish from waters within 200 miles of foreign coasts. Thus about a third of their total fish supply of some 45 million tons during this period is now subject to reallocation. Countries particularly adversely affected are the U.S.S.R., Japan and Spain, whereas important net beneficiaries include Canada, New Zealand and the United States.

Although the total catch of developing countries in distant waters is only a little over 1 million tons, for a few countries extended jurisdiction could have a significant effect on supplies. Among these are the Republic of Korea (with at least a quarter of the total catch vulnerable to limit extensions), Cuba, Thailand and a number of west African countries.

Although attention has been focused on the benefits likely to accrue to developing countries, these will probably be small in the short run. Many tropical waters are not attractive to long-distance fleets from temperate latitudes, on account of the generally lower fish densities and the very wide variety of species, which often poses marketing problems. Catches by foreign fleets off developing countries have therefore generally been small (less than half those off developed countries), and only along the coasts of west Africa do they account for a large share of the catch.

In these areas many of the coastal states are already deriving considerable revenues from the licensing of foreign vessels, but the expansion of local fleets remains dependent on the same factors as have inhibited growth in the past. These include restricted markets in developing countries (because of both poorly developed communications and low purchasing power), and in some cases the need to modernize and expand fleets and improve fishing techniques. There is also a need for more skilled manpower. Although extended jurisdiction is clearly a positive influence on the growth of fisheries in many developing countries, focussing attention on a valuable economic resource, it is unlikely by itself to reduce the period required for the development of this resource.

Further steps have been taken towards bringing management arrangements into line with the realities of a 200 mile extended economic zone. Progress has been greater in some areas than in others, depending on the balance of advantage from the changes involved for the main participants in the fisheries. However, the general trend is for international bodies to be concerned with the management only of those few stocks which lie outside 200 miles. At the same time, they have continued to be concerned with the coordination of scientific research in the whole area, and the establishment of total allowable catches for stocks shared between two or more coastal countries. This process has gone furthest in the north Atlantic, where the three bodies concerned 12/ continue to undertake scientific research but no longer set quotas for stocks within 200 miles. In the northeast Atlantic, however, moves to establish an effective management regime based on extended coastal state jurisdiction have been delayed,partly by the failure of the EEC to arrive at a common fisheries policy.

The management of tuna under a 200 mile extended economic zone presents special management problems which have not yet been resolved by the international bodies concerned. Since a significant proportion of tuna resources can be caught either inside or outside a 200 mile zone, a regime based exclusively on coastal state jurisdiction will clearly be insufficient to ensure effective management. In the circumstances it seems that international bodies may have a greater role to play in the management of tuna than for more truly coastal species. A possible solution may be the negotiation of national quotas, but difficulties would be likely in reaching agreement on the appropriate criteria for their allocation.

In the eastern central Atlantic, where the developing countries of west Africa have acquired jurisdiction over substantial resources, arrangements have been made within the framework of the Fishery Committee for the Eastern Central Atlantic (CECAF) for meetings of groups of coastal countries concerned with particular migratory stocks. In this area, FAO plays a significant role in encouraging and coordinating research and in the analysis of data. It seems clear that assistance from FAO or some other international agency will also be required in many other parts of the world in support of local scientific research, so that developing coastal states can effectively discharge their management responsibilities.

12/ The International Commission for the North Atlantic Fisheries (ICNAF), which undertook its own scientific research, was formerly responsible for management in the northwest Atlantic. The International Council for the Exploration of the Sea (ICES), which is responsible for coordinating scientific research in the northeast Atlantic, had no powers to adopt management measures, which were the responsibility of the Northeast Atlantic Fisheries Commission (NEAFC).

OUTLOOK

The rate of growth of world fishery production has been slowing down throughout this decade, and it seems that the sharp rise in landings in both 1974 and 1976 was due to the exceptional coincidence of a number of factors and does not indicate a change in the trend. Recent assessments, taking into account the nature of the resources which are less fully exploited, and the practical problems of managing multi-species fisheries, suggest that the additional sustainable harvest of the world's oceans for conventional types of fish is no more than 30 to 35 million tons. Much of this unexploited potential is of less readily marketable types of fish than those now forming the bulk of the world catch. It seems therefore unlikely that the average rate of increase in the world catch of fish will exceed 1 to 2% a year for the foreseeable future, in the absence of major developments in the utilization of unconventional species such as krill or meso-pelagic species.

Apart from these longer-term influences, which are discussed in more detail in Chapter 3, shorter-term considerations also suggest a slower growth of world fisheries production. Among these are the measures now being taken by some coastal states to restore depleted stocks. In the northwest Atlantic, for example, the total catch permitted for 1977 by the coastal states is below the actual 1976 catch. In Peru a recent assessment of the state of the anchoveta stock suggests that full recovery is unlikely before the 1980s. As already noted, there was a marked slowing in the rate of growth of fisheries production in the U.S.S.R. in 1976. Against these negative influences, there can be set the possibility of further steady increases in the production of fish for direct human consumption in the developing countries.

The outlook is for a continuing adjustment to the realities of a 200 mile exclusive fishing zone. In some areas this has not yet been implemented or else has so far had little effect on the pattern of fishing. Although further agreements permitting foreign fishing in coastal waters can be expected, these are likely to become increasingly unfavourable to the non-local fleets.

Growing difficulties of supply, on a global basis and particularly in those countries adversely affected by limit extension, can be expected to give further stimulus to work on product development, marketing and distribution for the better use of present catches, as well as on the exploitation of unconventional resources. This would, for example, involve making use of the trash fish caught by trawlers (especially the fish discarded at sea by shrimp vessels), as well as upgrading for direct human consumption fish now used for animal feed. In many tropical countries a substantial increase in supplies could be obtained through greater care in processing and storage.

In general, the utilization of unconventional resources presents more serious problems, although considerable progress has been made toward the utilization of Antarctic krill. One of the major difficulties is the size of the operation required to harvest krill on a commercial scale, and the consequent marketing problems. It is likely that, initially at least, the harvesting of such unconventional species will largely be carried out by developed countries.

FORESTRY

PRODUCTION AND TRADE [13/]

Because of their close association with the general level of economic activity, particularly in building and construction, the production of industrial forest products and the trade in these products were severely affected by the 1974-75 recession. In 1976 the market for forest products recovered to some extent, as the industrialized countries began to emerge from recession.

The impact of the recession was at its maximum in 1975. World production of sawnwood was 10% and that of wood-based panels 15% below the peak of 1973. Pulp and paper production was 15% below the 1974 peak. The reduction in the volume of trade in forest products was of the order of 20%. Although the reduction in production and trade during the two years of recession was very largely in the developed market economies, the much smaller volume of trade of the developing countries was also severely curtailed.

The recovery in 1976 generally appears to have been substantial in both developing and developed countries. However, although the trade levels of 1974 were restored, for most products the recovery did not reach earlier peak levels. The trade recovery in 1976 tended to be less strong in Europe than in North America and Japan, while in the developing countries trade generally recovered strongly, particularly in tropical sawnwoods. Table 1-27 shows the trends in the production of roundwood and of processed forest products, and Table 1-28 those in trade.

Roundwood

World production of industrial roundwood increased by about 5% in 1976, reversing the downward trend since the peak reached in 1973. This expansion was appreciably lower than that in the manufacture of products using roundwood as raw material. This is due in part to the accumulation of stocks of roundwood in producing countries, which have been utilized during 1976.

The rise of 13% in trade in industrial roundwood in 1976 fully compensated for the decline of 1975, so that the volume of trade more than regained the 1974 level. It remained below the peak level of 1973, however, for both coniferous and non-coniferous logs, and for pulpwood. Trade in certain commodities and regions was particularly active. Thus Japan's imports of coniferous logs exceeded the 1974 level, and imports of tropical non-coniferous logs into Japan and Europe increased very sharply, reversing the sharp decline in 1975. Indonesia increased its exports of tropical logs by 35%, and Sabah by 30%. The Far East region appreciably increased its share of European log imports compared with 1975.

First indications suggest that the volume of trade in wood-based products will be greater in 1977 than in 1976. In Japan, for example, the total demand for wood-based products in 1977 may be 5% above the 1976 level.

Current dollar log prices in the Far Eastern market, which had fallen to around 65% of the 1973-74 peak level in 1975, climbed to 120% of that level during the latter half of 1976. African prices, which mostly declined less from peak levels, have in many cases risen to levels equivalent to 130 and even 150% of 1973 peak prices, and these increases have tended to persist during 1977.

Sawnwood and wood-based panels

World production of sawnwood and panels increased by about 8% in 1976. In North America it rose by 17%, but in Japan sawnwood increased only 7%, and panels 8% Total trade in sawnwood increased by about 30%, thereby overtaking the level of 1974 but still not regaining the peak of 1973. Exports of coniferous sawnwood by North American

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13/ For a detailed account of the forest products situation, see FAO, Yearbook of Forest Products 1976, Rome (in press).

Table 1-27. Production of main forest products, world and developing and developed countries, 1971-76

	1971	1972	1973	1974	1975	1976 1/	Change 1975 to 1976	Annual rate of change 2/ 1961-70	1970-76
	million cubic metres						%		
TOTAL ROUNDWOOD	2,425	2,434	2,433	2,510	2,453	2,524	3	1.8	0.8
Developing countries	1,180	1,210	1,238	1,251	1,267	1,287	2	2.7	1.9
Developed countries	1,245	1,224	1,268	1,259	1,185	1,237	4	1.0	-0.3
Fuelwood	1,133	1,145	1,148	1,164	1,180	1,184	-	1.0	1.0
Developing countries	969	988	997	1,014	1,035	1,039	-	2.3	1.6
Developed countries	164	158	151	150	145	145	-	-4.2	2.8
Industrial roundwood	1,293	1,288	1,358	1,347	1,272	1,340	5	2.6	0.6
Developing countries	211	222	240	238	232	248	7	5.0	3.1
Developed countries	1,081	1,066	1,117	1,110	1,040	1,092	5	2.1	0.1
PROCESSED WOOD PRODUCTS									
Sawnwood	427	436	446	424	404	434	7	2.0	-
Developing countries	52	55	56	56	59	62	5	4.2	2.9
Developed countries	375	381	390	368	345	373	8	1.8	-0.4
Wood-based panels	78	87	95	88	82	92	12	9.2	3.5
Developing countries	7	8	9	8	9	10	11	16.2	7.8
Developed countries	71	79	86	89	73	83	14	8.8	3.5
	million tons								
Woodpulp	102	108	115	118	103	112	9	6.0	1.4
Developing countries	4	4	5	5	5	6	20	8.9	9.0
Developed countries	98	104	110	112	97	106	9	5.9	1.0
Paper and paperboard	130	139	148	151	135	151	12	5.9	2.4
Developing countries	11	12	13	14	14	15	7	7.1	7.1
Developed countries	119	128	135	137	120	136	13	5.9	1.8

1/ Preliminary. - 2/ Exponential trend.

Table 1-28. Volume of exports of main forest products, world and developing and developed countries, 1971-76

	1971	1972	1973	1974	1975	1976 1/	Change 1975 to 1976	Annual rate of change 2/ 1961-70	Annual rate of change 2/ 1970-76
	thousand cubic metres						%		
INDUSTRIAL ROUNDWOOD									
Developing countries	39,814	41,935	50,983	43,709	37,706	45,365	20	12.4	1.7
Developed countries	50,257	52,909	63,111	63,953	60,003	65,578	9	9.9	3.8
World	90,070	94,845	114,093	107,662	97,709	110,943	13	10.8	2.9
PROCESSED WOOD PRODUCTS									
Sawnwood									
Developing countries	6,077	7,061	8,521	7,460	6,627	9,043	36	7.6	5.5
Developed countries	53,687	59,212	63,800	54,446	45,794	59,043	29	2.8	-
World	59,763	66,273	72,320	61,905	52,422	68,087	30	3.2	0.6
Wood-based panels									
Developing countries	3,325	4,106	4,596	3,581	3,679	4,452	21	23.0	5.9
Developed countries	7,291	8,288	9,813	9,116	8,484	9,558	13	8.8	5.3
World	10,616	12,394	14,409	12,696	12,164	14,009	15	11.4	5.5
	thousand tons								
Pulp									
Developing countries	371	505	526	565	515	765	49	21.1	12.3
Developed countries	14,558	15,952	17,969	18,491	14,432	16,195	12	6.0	0.2
World	14,928	16,456	18,494	19,056	14,946	16,960	13	6.2	0.6
Paper and board									
Developing countries	317	356	539	500	429	517	21	10.9	8.6
Developed countries	23,216	24,953	27,086	29,411	22,431	26,957	20	7.4	2.0
World	23,532	25,309	27,626	29,911	22,860	27,474	20	7.4	2.1

1/ Preliminary. - 2/ Exponential trend.

and European countries and the exports of non-coniferous sawn timber by developing countries increased by 40% over 1975, so that the total exceeded all years except 1973. Much higher increases in exports of sawnwood were recorded by individual developing countries. The exports of Malaysia increased by nearly 70%, Indonesia by 60% and Ivory Coast by 40%, suggesting that already existing industrial capacity in these countries has been fairly fully utilized. This rapid growth may represent a significant shift toward the extension of local manufacture, replacing the export of unprocessed wood.

The current dollar prices of sawnwood and plywood fell in 1975 by 15 to 25%, but in 1976 regained or exceeded the previous peak levels of 1974. Fluctuations in prices have tended to be greatest in the markets for sawnwood and plywood from the Far East region. As a result of the instability of the prices and trade volume of tropical timber in recent years, this commodity was added to the list included in the UNCTAD Integrated Programme for Commodities.

New investment in the wood-based panels industry continued during 1973-76 despite unfavourable economic conditions. The annual increase in the capacity of the plywood and fibre board industries during this period in the developed countries was about 2%. In the developing countries the capacity of the plywood industry rose by about 3% a year and of particleboard by as much as 10%. The major increases in particleboard capacity in the developing countries were in Latin America and the Near East.

Pulp and paper

Pulp and paper production seems to have recovered most strongly in consumer countries such as Japan and the United States, while in exporting countries the 1976 recovery was much smaller. In 1975 capacity utilization fell to around 70% in a number of major producing countries. Major exporting countries were still operating with ratios in the range 73 to 80% in 1976, with serious consequences for profitability. Relatively low production levels were sustained longer because of the build-up of stocks. This accumulation had been encouraged in Sweden through a wood pulp inventory building subsidy, designed to offset the risk of unemployment during the recession; in the first six months of 1977, however, production fell by 20% as compared with the same period in 1976. The lower increase in world pulp production (6%) than in paper production (13%) indicates that paper production in 1976 depended on accumulated stocks of pulp in many countries. The increase in paper production failed to restore the levels of 1974, so that the capacity of the industry was not fully utilized, and this situation improved little, if at all, in the first part of 1977. The low level of production and capacity utilization in developed countries is reflected by the small investment in additional capacity, amounting to only 2% in 1976, whereas in developing countries the rate of addition to capacity was around 10%.

Pulp and paper prices moved up very substantially during 1975 to levels approximately double those which prevailed in 1973. For some grades there was a tendency for the price to decline in 1976. For others prices reached a peak at the end of 1976 and declined in the early months of 1977. A further sharp decline in pulp prices was reported for September-October 1977.

LONGER-TERM TRENDS

Already in the 1960s total roundwood production was increasing more slowly than crop and livestock production, and this lag became still greater in 1970-76 (see Table 1-28). Almost half of world roundwood production still consists of fuelwood, the output of which is declining in the developed countries and rising in the developing countries, where it represents more than 80% of total roundwood production. The growth of industrial roundwood production, however, also slowed down considerably at the world level from 2.6% a year in the 1960s to 0.6% in 1970-76, and in the developing countries from 5.0% to 3.1%. The production of industrial roundwood in these countries, a large part of which is for export, fell in both 1974 and 1975, as a result of reduced demand caused by the economic recession in the developed market economies, but it recovered in 1976 although still below trend. Even so, the developing countries' share in the world output of

industrial roundwood rose slightly, from 16% in 1970 to 19% in 1976.

Owing to increasing efficiency in the use of wood raw material, output of all the major categories of processed forest product except sawnwood has risen much faster than that of industrial roundwood, both in the world as a whole and in the developing countries. For each of the four main categories production has expanded faster in the developing than in the developed countries, thus increasing their small share of the world total, although only for pulp and paper was the rate of growth in these countries slightly higher in 1970-76 than in the 1960s.

As already emphasized, forestry production and trade have tended to follow fairly closely the level of economic activity, particularly in the sensitive construction industry, in the developed market economies. Already in 1974 sawnwood and wood-based panels had been adversely affected but, largely because of a build up in inventories, pulp and paper production and trade did not decline until 1975. The total volume of the forestry exports of the developing countries rose quite strongly up to 1973, after which it fell considerably until the strong recovery in 1976 (Table 1-29). Thus the average annual increase in their export volume in 1970-76, at 4.0%, was only about one third of that in the 1960s, although still much more than for agricultural exports. The increase in their export volume was, however, about double that of the developed countries both in the 1960s and in 1970-76.

As a result of both higher prices and volume, the value of exports rose sharply in 1972, and even more in 1973 (largely due to higher prices) for both developing and developed countries, and for the developed countries the rise continued strongly into 1974 with their buoyant pulp and paper exports. However, with the marked decline in export volumes in 1975, export values were also reduced but they recovered sharply in 1976 as the recession eased. In spite of these limitations, the average annual increase in the value of exports in developing and developed countries alike in 1970-76 was 18%, although the increase in volume only averaged 2%.

The share of the developing countries in the value of world exports of forest products had risen from 9% in 1961-63 to 13% in 1969-71, but was still the same in 1974-76.

Table 1-29. FAO index numbers of value and volume of exports of forest products, world and developing and developed regions, 1971-76

	1971	1972	1973	1974	1975	1976 1/	Change 1975 to 1976	Annual rate of change 2/ 1961-70	Annual rate of change 2/ 1970-76
	1961-65 average = 100						%		
VALUE	189	223	325	422	375	449	20	8.4	18.4
Developing countries	257	314	562	573	511	603	40	13.3	18.3
Developed countries	181	213	298	405	366	429	17	7.8	18.4
VOLUME	164	180	202	197	161	194	21	7.4	2.1
Developing countries	247	277	334	281	253	320	27	12.9	4.0
Developed countries	153	167	185	185	150	179	19	6.6	1.8

1/ Preliminary. - 2/ Exponential trend.

POLICIES AND ISSUES

Developed countries

In Europe public and private forest owners as well as forest industries are still concerned at the effects of the economic recession. The slack demand for forest products, combined with inflation and rising costs, has resulted in a severe cost-price squeeze all along the production line from forest owners to wood processing industries. A major concern is therefore to improve the financial position of forestry and forest industries, as a prerequisite for attracting the investment needed for sound long-term development.

High levels of unemployment in the economy as a whole have, however, eased the problem of maintaining a work force of adequate size and skills in the forest. The persistence of widespread unemployment is bringing many workers into forestry. This offers a unique opportunity to attract and keep new personnel by improved working conditions and training, and thus reverse the long-term trend towards the ageing of the forest work force.

Rising energy costs could also have some major long-term implications for forest and forest industry policy. These include a reversal of the long-term decline in the use of wood for fuel, increased attention to the use of wood residues for heat and power generation, the establishment of "energy plantations", and the slower mechanization of forest operations, especially in multiple use and urban forests.

Even if the European economy expands more slowly in the next quarter century than in the last, the consumption of wood is likely to expand appreciably, with the persistence of the long-term shift towards a greater share in the form of paper, paperboard and particleboard. 14/ However, the European forest resource will, with some exceptions, still be underutilized in the year 2000. Recognition of this continued potential of a major resource within the region may attract more political and financial support to the sector. With some increase in investment to promote structural changes in forest holdings, improved levels of management and sylviculture, and higher productivity per hectare and per worker, European forests could make a greater contribution to the needs of society.

In the United States the National Forest Management Act of 1976 introduced major new legislation affecting forestry. One effect was to clarify the conflicts over Forest Service authority to work the National Forests for the production of timber, which had arisen in previous years as a result of lawsuits in pursuit of a number of environmental issues. The new Act, together with the Forestry and Range Renewable Resources Planning Act of 1974, requires that a recommended Renewable Resources Programme be transmitted to Congress in 1980.

In Japan issues of environmental conservation are paramount in the country's most recent forestry development plan. Of primary concern are the functions of forest lands in preventing pollution and providing recreation. In order to ensure the prevention of the uncontrolled development of forest land and to ensure its proper utilization, a forest land development permission system has been established. In New Zealand the Government has approved a policy designed to maintain the indigenous forests with a wide range of values, but the most notable feature of forest policy is the long-term objective of greatly increasing export earnings from the output of exotic forests, which will entail an average planting rate of 55,000 ha per year from 1978 to 1980. A build-up of wood and wood fibre supplies from planted forests also continues to be a primary objective in Australia, following a recent review of forestry goals.

14/ European timber trends and prospects, 1950 to 2000, Timber Bulletin for Europe, 29, Supp. 3, Geneva, FAO/ECE, 1976.

Developing countries

Growing attention is being paid in the developing countries to the role of forestry at the level of the rural community, as distinct from large-scale forestry to provide raw materials for industry. Problems include a shortage of wood fuel in many countries, which is causing increasing hardship 15/. The growth of rural populations and the localized nature of the fuel supply has led to the widespread deterioration and destruction of forests. This is compounded by the pressures for more land on which to grow food. Where the destruction of the forest cover is taking place on lands subject to erosion, this inevitably contributes to a deteriorating environmental situation and has adverse effects on agricultural productivity extending far beyond the immediate areas being cleared. Some of these problems are discussed in more detail in Chapter 3.

Programmes are being initiated to reverse these trends, and to generate the contributions that forestry can make to development at the community level, not only through the provision of fuel and other local needs, and the maintenance of the environmental stability necessary for the functioning of the rural economy, but also through the provision of income, employment and infrastructure. In India the Forest Service has been charged with the task of expanding the managed supply of fuelwood and also creating alternative sources of employment and income for the people who earn their living through the illegal collection and sale of fuelwood. In the Republic of Korea, as part of the Saemaeul self-help movement, 11,000 villages are creating village fuelwood lots during 1976-77, with the technical assistance of an extension arm of the forest service set up for this purpose. In Thailand shifting cultivators are being encouraged to settle in forest villages, and are being assisted in adopting new planting methods, including the taungya system of intercropping trees and food crops. In Java in Indonesia joint production systems are being adopted on forest lands for the benefit of communities adjacent to the forests.

In Colombia, both private firms and public agencies are actively implementing several forms of rural organization aimed at obtaining an effective integration of the rural poor in forestry projects designed primarily to satisfy local needs. In Costa Rica research has led to improved systems of farm forestry through technological innovations introduced in the operations of small-scale landholders. Similar schemes are being implemented in other countries in Latin America, such as Honduras, Mexico and Venezuela.

In Africa the taungya system of intercropping food crops with trees on forest land has long been established in some areas, notably Kenya and Nigeria. Widespread attention is now also being paid to establishing local woodlots to provide fuelwood to communities outside the forest areas, notably in the more arid parts of the region. The long-term development programme of the Sahel countries includes a major programme for the supply of forest products for domestic requirements and for combating desertification, sustained by a substantial effort in training, extension and research.

In the area of industrial forestry, action has been taken to strengthen a number of forest development corporations, which have been entrusted with additional responsibilities and resources, for example, in Chile, Colombia, Honduras and Venezuela. In India, public forest development corporations are being set up at the State level to implement a more intensive programme for the production of industrial wood and wood products.

Attention has continued to focus on the development of pulp and paper production, in developing countries. The shifts in the trend of world paper consumption arising from the changed economic situation since 1974 have not yet stabilized, and the future pattern is uncertain. However, an immediate effect of the current reduced rate of growth in the global consumption of paper has been to eliminate the possibility of an early shortage of this commodity. Pulp is now in surplus, paper is readily available on the international

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15/ For an account of the fuelwood situation and problems, see: The State of Food and Agriculture 1976, Rome, FAO, 1977, p. 90-91.

market, and manufacturing capacity is now being fully utilized.

The scarcity and high cost of capital, coupled with the massive escalation of investment costs, the relatively low profitability of the industry and reduced consumption, has not been conducive to attracting investment. With the exception of committed investments likely to come on stream during the next five years, few large-scale enterprises are likely to be initiated in the foreseeable future. The interest shown earlier by overseas investors in the promotion of large-scale pulp mills in developing countries has declined, since the developed market economies are likely to be increasingly self-sufficient in fibre through the more intensive utilization of their own forest resources. With the exception of committed developments in south America and west Africa, it is unlikely that any additional large-scale pulp mills will be constructed within the next decade. However, the rate of growth of paper consumption in the developing market economies is expected to be higher than the global average, and could escalate rapidly in response to the successful implementation of development plans. Domestic market potential is now reaching the level at which a number of developing countries, or groups of countries with the requisite fibre supplies, could justify the establishment of small-scale mills designed to meet internal requirements of the more essential paper grades.

DEVELOPMENT ASSISTANCE AND FOOD AID

The total net capital inflow into non-oil developing countries in 1973, the year before the economic crisis, was (on a balance-of-payments basis) some $27,000 million. It increased to $38,000 million in 1974, $47,000 million in 1975, and almost $59,000 million in 1976. These additional financial resources helped these countries to return to long-term trend rates of economic growth in 1976. At the same time, they have led to a marked increase in the total indebtedness of the developing countries. This has about doubled since 1973, to reach more than $200,000 million in 1976.

The increase in the total net flow of financial resources to non-oil developing countries was from three main sources: greater development assistance and non-concessional resources from member countries of the OECD's Development Assistance Committee (DAC); the emergence of oil-exporting countries as a new source of development assistance and non-concessional resources; and the vastly increased recourse by developing countries to Eurocurrency markets.

Total official and private flows from the DAC countries, which increased sharply in 1975, showed little change in 1976 (Table 1-30). Export credits rose significantly in 1976, but direct investment declined, reflecting lower investment reported by the United States. The new financial resources provided by DAC members represented over four-fifths of the total resource flow to developing countries from all sources, other than Eurolending.

Table 1-30. Net flow of financial resources from DAC countries to developing countries and multilateral institutions, 1972-76 1/

	1972	1973	1974	1975	1976
	..... US $ million				
OFFICIAL DEVELOPMENT ASSISTANCE 2/					
Bilateral grants and grant-like contributions	4,356	4,462	5,336	6,268	6,529
Development lending and capital	2,265	2,621	2,921	3,547	2,966
Contributions to multilateral institutions	1,917	2,268	3,060	3,770	4,161
Total	8,538	9,351	11,317	13,585	13,656
OTHER OFFICIAL FLOWS					
Bilateral	1,160	2,073	2,199	2,945	3,186
Contributions to multilateral institutions, at market terms	386	390	-16	79	119
Total	1,546	2,463	2,183	3,024	3,305
Total official flows	10,034	11,814	13,500	16,609	16,961
PRIVATE FLOWS AT MARKET TERMS					
Investment and lending	7,125	10,254	10,831	18,286	16,762
Export credits	1,448	1,196	2,481	4,142	5,424
Total private flows	8,573	11,450	13,312	22,428	22,186
GRANTS BY VOLUNTARY AGENCIES	1,036	1,365	1,217	1,342	1,358
Total official and private flows	19,693	24,623	28,029	40,378	40,505

Source: OECD.

1/ Disbursements less capital repayments on earlier loans. - 2/ Official transactions which are intended primarily to promote the economic development and welfare of developing countries, and which are provided on concessional financial terms, i.e. with a minimum grant element of 25%, using a 10% discount rate.

The resource flow from OPEC members, which had risen rapidly until 1975, declined in 1976 both in absolute terms and as a share of GNP. Flows were $8,000 million, about $200 million less than in 1975, and were equivalent to 3.3% of GNP.

Eurocurrency loans to developing countries in 1976 amounted to the record sum of $22,500 million (net), as compared with $9,500 million in 1976. Of the 1976 total, $4,800 million represented an increase in the Euromarkets' claims on OPEC members, some of which are no longer in balance of payments surplus.

NET DISBURSEMENTS OF OFFICIAL DEVELOPMENT ASSISTANCE

In 1976 there was stagnation, or even decline, in the official development assistance (ODA) from the major groups of donors (Table 1-31). Net disbursements by DAC member countries rose only slightly to $13,656 million, and were thus lower in real terms than in 1975. ODA from OPEC members appears to have declined from the high level of $5,512 million in 1975 to $5,182 million in 1976. Estimates of concessional aid by the centrally-planned economies also declined for the third year in succession, and the figure of $545 million in 1976 was less than half the 1973 level. Of the total disbursements of ODA in 1976, DAC countries accounted for 70%, OPEC members 17% and centrally-planned economies 3%.

Table 1-31. Net disbursements of official development assistance (ODA) by major donors, 1973-76

	1973	1974	1975	1976
	..... US$ million			
DAC	9,351	11,317	13,585	13,656
OPEC	1,308	3,446	5,512	5,182
Centrally-planned economies	1,120	1,005	750	545
TOTAL	11,779	15,768	19,847	19,383

Source: OECD.

As a share of their GNP, ODA contributions from all three main groups of donors declined in 1976. For the DAC members this share fell from 0.35% to 0.33% in 1976. For OPEC members it remained above 2% of GNP in 1976, while the centrally-planned economies contributed less than 0.1% of their estimated GNP.

Several factors account for the disappointing pause in the expansion of DAC assistance. Some donor countries reduced their allocations from levels planned earlier as the budgetary consequence of tight economic conditions. Others experienced delays in disbursements. Nevertheless, the general outlook is for a return to an upward trend in ODA. Commitments increased by 21% in 1976, and part of the corresponding disbursements will be in 1977. Additional disbursements may be expected as donors implement the Special Action Programme for Poorer Countries agreed at the Conference on International Economic Cooperation held in Paris in May-June 1977.

The decline in ODA from OPEC members in 1976 mainly reflects substantially lower disbursements by Iraq, Kuwait, Libya and Qatar. Those from Nigeria and Saudi Arabia were larger. The decline was confined to bilateral disbursements, and multilateral disbursements increased sharply to almost $800 million. Commitments of OPEC concessional assistance fell by almost $1,700 million to just over $6,000 million in 1976, reflecting reductions by Iran, Iraq, Kuwait, Libya and Qatar. The drop in bilateral commitments was only partly offset by larger multilateral commitments

of about $1,000 million.

The net transfer of ODA from DAC member countries to developing countries and multilateral institutions, taking account not only of amortization, as in Table 1-31, but also of interest payments, was $12,763 million in 1976, or about the same level as in 1975 (Table 1-32). Amortization and interest payments have risen to 16.5% of the gross flow of ODA in 1976.

Outflows from the multilateral institutions changed only slightly in 1976, after three years of rapid growth. Their net disbursements of concessional assistance declined by about 2% to $3,750 million. An expansion of 21% in disbursements by the International Development Association (IDA) was more than offset by declines in the UNDP, WFP and EEC programmes. Concessional outflows from OPEC and Arab multilateral institutions stagnated, but their total outflows almost trebled.

Table 1-32. Gross flows and net transfer[1/] of ODA from DAC countries to developing countries and multilateral institutions, 1972-76

	1972	1973	1974	1975	1976
	..... US$ million				
Gross flow	9,875	10,614	12,467	14,996	15,296
Amortization	1,337	1,263	1,150	1,411	1,640
Interest	602	671	724	815	893
Net transfer	7,963	8,680	10,593	12,770	12,763

Source: Adapted from OECD data.

1/ Gross outflows less receipts of amortization and interest.

EXTERNAL RESOURCES FOR AGRICULTURE

Official commitments of external assistance to agriculture (OCA)[16/] from all sources except the centrally-planned countries for all activities covered under the OECD "broad" definition of agriculture 17/ rose from $2,559 million in 1973 to $4,231 million in 1974 and $5,558 million in 1975 (Table 1-33). According to preliminary data, however, there was a decline to $5,086 million in 1976. The 8% drop in assistance in 1976 represents a reduction of about 9% in real terms (deflated by the United Nations index of the unit value of world exports of manufactured goods), compared with real gains of 36% in 1974 and 17% in 1975.

There was a sharp drop in lending by OPEC members on a bilateral basis in 1976, which may indicate a shift toward lending through multilateral agencies (for example, the OPEC Special Fund). There were also declines in commitments by some of the major multilateral agencies, especially the World Bank, the Asian Development Bank (ADB) and the African Development Bank (AfDB) (Table 1-34). These declines were only partly balanced by increased commitments from the Inter-American Development Bank (IDB) and the EEC. Lending by DAC bilateral sources is provisionally estimated to have shown only a small increase in 1976, for the second year in succession.

16/ Data on the flow of external resources to agriculture on a net disbursement basis are not available.

17/ Including rural infrastructure, agro-industries, fertilizer production, and regional and river projects.

Table 1-33. Official commitments of external assistance to agriculture 1/ (OCA), 1973-76

Source	1973	1974	1975	1976 2/
	..... US$ million			
Value				
Multilateral agencies 3/	1,554	2,311	3,082	2,863 4/
DAC bilateral	969	1,607	1,646	1,723 4/
OPEC bilateral	36	313	830	500 4/
Total	2,559	4,231	5,558	5,086
Total (in constant 1972 prices)	2,169	2,959	3,452	3,140
	..... %			
Distribution				
Multilateral agencies	61	55	55	56
DAC bilateral	38	38	30	34
OPEC bilateral	1	7	15	10
Total	100	100	100	100
Terms (average grant element)				
Multilateral agencies	53	43	31	36
DAC bilateral	83	70	72	...
OPEC bilateral	43	26	36	47
Total	62	47	41	...

Source: FAO and Consultative Group on Food Production and Investment in Developing Countries (CGFPI).

1/ Agriculture conforms to the OECD broad definition. - 2/ Preliminary. - 3/ African Development Bank(AfDB), Arab Bank for Economic Development in Africa (ABEDA), Arab Fund for Economic and Social Development (AFESED), Asian Development Bank (ADB), Consultative Group on International Agricultural Research (CGIAR), European Economic Community (EEC), Inter-American Development Bank (IDB), UNDP/FAO, World Bank. - 4/ Partial estimate.

Table 1-34. Multilateral commitments of external assistance to agriculture by agencies, 1973-76

	1973	1974	1975	1976	Change 1975 to 1976
	..... US$ million				%
World Bank	1,085	1,612	2,224	1,807	- 19
Inter-American Development Bank	183	236	337	428	27
Asian Development Bank	74	134	246	201	- 18
EEC	101	144	63	151	140
UNDP/FAO	74	74	111	109	- 2
Arab Fund for Economic and Social Development 1/	-	41	-	55	...
Consultative Group on International Agricultural Research	26	32	44	59	11
Arab Bank for Economic Development in Africa 2/	-	-	13	29	123
African Development Bank	11	39	45	24	- 47
Total	1,554	2,312	3,083	2,863	- 7

Source: FAO and CGFPI.

1/ Became operational in 1973. - 2/ Became operational in 1975.

This generally discouraging picture partly reflects difficulties in the rapid preparation of agricultural projects. It also underlines the general problem of inadequate concessional resources, particularly for the multilateral lending institutions. Since these agencies contribute the major share of OCA, their smaller commitments in 1976 are especially disturbing. Their share of total OCA is estimated to have increased slightly from 55% in 1974 and 1975 to about 56% in 1976. However, an encouraging development in 1977 has been the large increase in commitments to agriculture by the World Bank. During the first six months of 1977, the World Bank committed more than $2,000 million, which was higher than its commitments to agriculture for the whole of 1976.

The "narrow" OECD definition of agriculture[18/] relates more closely to food production and to the criteria used by FAO in its estimates presented to the World Food Conference of the external resources needed by the developing countries. On this basis the annual external investment requirements in current (1976) prices are between $8,300 and $8,500 million, compared with OCA (in the narrow definition) of about $3,600 million. There is thus a gap of about $5,000 million.

The terms of lending for agriculture hardened throughout the period 1973-75. This was because their borrowing in private capital markets was at steadily rising interest rates, and because the World Bank had available less IDA money on soft terms. In 1976 the World Bank committed a smaller proportion of IDA loans to agriculture. The average grant element for OCA declined in 1975, but in 1976 it recovered to about the 1974 level. There were marked differences in the grant element among different types of donor. The average grant element during 1973-75 for DAC bilateral commitments was about 73%, compared to only 40% for the multilateral agencies and 34% for the OPEC bilateral programmes.

Agricultural commitments to the poorer countries were made on relatively softer terms in 1974 and 1975, largely owing to the distribution of IDA credits, of which more than 70% went to countries with per caput GNP of less than $150 (roughly the MSA countries). The distribution of capital commitments for agriculture by per caput GNP classes of recipient countries shows little change between 1974 and 1975. The poorer countries have been receiving smaller per caput commitments for agriculture than the relatively better-off ones. Thus, during 1974-75, the group of 29 poorest countries with per caput GNP below $150, which account for over 45% of the population of the developing world, received capital commitments for agriculture of only $1.30 per caput per year, compared to $2.50 for the group of countries with per caput GNP between $150 and $300, and $2.75 for countries with per caput GNP above $300.

A number of DAC bilateral donors have shifted their commitments for agriculture in favour of the poorest countries. As a result, the share of bilateral OCA going to countries with per caput GNP of less than $150 increased from 25% in 1974 to more than 45% in 1975. In contrast, the share of the World Bank's OCA going to the poorest countries went down from 39% in 1974 to 27% in 1975 and probably about the same proportion in 1976, largely because of the limited supply of IDA funds. However, the ADB increased the share of the poorest countries in its OCA from some 30% in 1974 to almost 60% in 1975. In marked contrast, however, 95% of agricultural commitments made by the IDB in 1975 went to Latin American countries with per caput GNP of more than $600. During both 1974 and 1975 only about 10% of OPEC bilateral OCA was for the poorest countries, but this figure rose to almost 40% in 1976.

18/ Including crop development, animal husbandry, fisheries, forestry, water development, land development and reclamation, agricultural services, agricultural development banks, agricultural storage, supply of fertilizer and other requisites. In 1975 OCA in the narrow definition amounted to some $3,550 million or about 65% of that in the broad definition. In 1974 OCA in the narrow sense was $3,115 million or about 75% of that in the broad definition.

The Third Window facility of the World Bank, designed to enable it to provide development assistance on terms intermediate between those of the Bank and IDA, became effective on 23 December 1975, and the first loans were approved in January 1976. Although repayment terms for Bank loans have hardened, those for Third Window operations have remained unchanged. By the end of June 1977 the total amount committed under this facility amounted to $700 million, of which $372 million, or 53%, went to agriculture.

Representatives of 26 countries met in Vienna in March 1977 and approved a replenishment level of $7,000 million for IDA. The proposed fifth replenishment would provide the IDA with commitment authority for the three-year period 1 July 1977 to 30 June 1980. Since legislative approval was not in all cases obtained by 30 June 1977, the countries agreed on the need for advance contributions to provide a bridging arrangement from 1 July 1977 until the full agreement becomes effective. By early October, IDA had received formal notification of subscriptions and contributions for the fifth replenishment amounting to about $3,400 million, which included funds provided under the bridging agreement. When these contributions total $6,000 million, the fifth replenishment will become effective.

The World Food Conference called for the establishment of an International Fund for Agricultural Development (IFAD). The Fourth Session of the Preparatory Commissior of IFAD was held in July 1977, and completed its discussions on operational guidelines, loan and financial negotiations, and various administrative matters. The First Session of the Governing Council is scheduled to be held in December 1977.

FOOD AID

Shipments of food aid in cereals in 1976/77 (July/June) were about 8.8 million tons, or 1.8 million tons above those in the previous year. FAO estimates for 1977/78 place total commitments of food aid in cereals at 9.6 million tons, thus still below the minimum target of 10 million tons recommended by the World Food Conference. There is a higher United States allocation of 6.7 million tons compared to 6.1 million tons in 1976/77. Australia has announced plans to progressively increase its cereal food aid to 400,000 tons a year by 1979/80 from the 1977/78 level of 265,000 tons, and to channel at least 20% through the WFP.

The United States Food and Agriculture Act and the International Development and Food Assistance Act, both of 1977, contain several provisions affecting food aid programmes. The legislation extends the life of P.L. 480 by four more years. Among its provisions a minimum of 75% of the food aid commitments allocated under Title I (the concessional sales that are the principal component of P.L. 480) in any fiscal year will go to countries that meet the per caput GNP poverty level set by the IDA ($550 or less) and are also unable to secure sufficient food through their own production or commercial imports. Under Title II (grants) the minimum quantity is raised from 1.3 to 1.6 million tons for the fiscal years 1978-80, of which not less than 1.3 million tons is to be distributed through voluntary agencies and the WFP. The new Title III (food for development) aims to use the foreign currency proceeds from the sale of commodities authorized under Title I for agricultural and rural development (including voluntary family planning, and health and nutrition programmes). The total value of all agreements under Title III will be a minimum of 5% of the value of Title I agreements in 1977/78, 10% in 1978/79, and 15% in subsequent years.

Pledges to the International Emergency Food Reserve of 500,000 tons of cereals recommended by the Seventh Special Session of the United Nations General Assembly stood, in late November, at about 423,000 tons for 1977/78 compared to actual contributions of 115,475 tons in 1976/77. The increase was due to recent additions made by Australia, Canada, Japan, the Netherlands and the United States.

The total availability of food aid in skim milk powder is expected to be well over 200,000 tons in 1977, or a third more than the 1976 shipments. The EEC,

Canada and the United States are the major donors. For butter oil the corresponding figures are about 50,000 tons in 1977 and 40,000 tons in 1976. Australia has announced its intention to provide non-cereal foods regularly as part of its food aid programme.

The United Nations/FAO Committee on Food Aid Policies and Programmes held its third session in May 1977. It noted that progress toward implementing the recommendations of the World Food Conference on improved food aid policy was rather slow. The committee expressed serious concern that the minimum food aid target of 10 million tons of cereals had not yet been fulfilled, and urged traditional and potential aid-giving countries to achieve this target without further delay. It recognized the need for diversifying the food aid basket by providing adequate quantities of commodities other than cereals so as to improve nutritional standards in developing countries. In this connection, many delegates stressed that recourse should be increasingly made to purchase within the developing countries with a view to encouraging local production. The committee also noted that the proportion of food aid given through multilateral agencies continued to be small, and urged donor countries to channel more food aid through such agencies and, in particular, through the WFP.

The committee assessed food aid requirements and food aid targets for cereals and agreed that the mimimum target of 10 million tons recommended by the World Food Conference represents "the collective judgement of the international community". That target will be taken as the point of departure in its assessment of future global food aid needs.

At its Fourth Session in October-November 1977, the committee adopted the figure of $950 million as the pledging target for the WFP for the 1979-80 biennium. It also authorized an increase of $5 million for 1977 and 1978 in the WFP's allocations for emergency relief, thus raising the emergency allocation in each year to $45 million.

2. SOME FACTORS AFFECTING PROGRESS IN FOOD AND AGRICULTURE IN DEVELOPING COUNTRIES

INTRODUCTION

Recent issues of this report have given growing attention to the progress of food and agriculture in the developing countries in the context of longer-term development goals, and especially the basic objective of accelerating the production increase in these countries to an average rate of 4% a year, which forms part of the International Development Strategy (IDS) adopted for the Second United Nations Development Decade (DD2) and was subsequently reaffirmed by the World Food Conference. There has also been increasing emphasis on the deteriorating position of the poorest of the developing countries, as exemplified by the most seriously affected (MSA) countries, in relation to the others.

It is intended in future issues to try to go further in identifying some of the main factors behind these longer-term trends, including the examination of the causes of success or failure in some individual countries, and an attempt to distinguish the effects of the weather and of policies. The latter in particular is a very difficult undertaking, and must depend mainly on studies made by the countries themselves. In the meantime, a start can at least be made by examining some of the main obstacles to food and agricultural development in the developing countries, and the measures that are being taken to overcome them. This chapter represents a first step in this direction.

It is clear from Chapter 1 that the production performance during DD2 has varied greatly as between the different developing regions. The increase in agricultural production in 1970-76 ranged all the way from only 1.1% a year in Africa (where most of the MSA countries are situated) to 3.8% in the Near East. The Far East (2.4%) and Latin America (2.8%) came in between. For food production the increase in each region was slightly faster than for total agricultural production, and in the Near East actually exceeded the 4% target.

A separate section of this chapter is devoted to each of the four developing regions. Different factors are treated under each region, and the selection is intended to be neither exhaustive nor necessarily representing the most important of the many factors concerned. The choice has to a great extent been dictated by the availability of material. Nevertheless the chapter as a whole covers a wide range of different factors. Most of them concern problems and policies in such fields as investment, land utilization, research, technology, prices, trade, economic integration, nutrition and small farmer development. Ecological factors, however, are not neglected. In addition to separate accounts of African animal trypanosomiasis and of desertification in the Near East, such problems are also referred to in a more general way in other parts of the chapter.

The policy measures considered include both past policies and more recent ones. The former provide part of the explanation of the trends that have taken place. Many of the latter represent policy reactions to these generally unsatisfactory trends, and most of them have yet to bear fruit.

As has been repeatedly emphasized, it is in Africa that the recent trends in production and nutrition have been the least satisfactory. This disquieting situation led the African Ministers of Agriculture to request FAO in 1976 to prepare a Regional Food Plan, on which work is now under way. In the meantime, this chapter covers five main factors affecting the recent food and agricultural situation in Africa. Although water is not a limiting factor in large parts of the region, the expansion and more effective use of irrigation is crucial in the Sahel and many other areas where the food problem is most

acute. Research has still hardly affected the traditional systems of food production; the post-colonial reorganization of the region's research institutions is beginning to bear fruit, but it is still necessary to devise farming systems that can easily be adopted by small farmers. Not only in research but in all government services to agriculture, the lack of trained manpower and the inappropriateness of some of the training are acute problems in Africa. A main reason for the deteriorating food and agricultural situation in the region appears to be that in many countries government expenditure on the sector has not kept pace with inflation. Animal trypanosomiasis continues to inhibit not only livestock production but also overall development in very large areas, and FAO has recently begun a long-term programme for the control of this disease.

In the Far East food and agricultural production increased more than twice as fast as in Africa in 1970-76, but it was still only slightly ahead of population growth. It is in this region that the "green revolution" technology has had most effect so far. The rapid advances achieved in wheat and rice production, however, show up all the more sharply the lack of progress in raising the yields of other important crops like millet, sorghum, pulses and root crops. The various objectives of the national agricultural strategies in the region have been accomplished to only a limited extent during DD2 so far. In particular there has been little success in increasing the productivity of the rural poor, and in ensuring their fuller participation in development. There is a growing realization that small farmers are unable to take much advantage of general programmes for agricultural development, and require special measures and funds. Many governments in the region are therefore now turning their attention to reshaping their programmes and policies in support of the small farmers.

The increase in food and agricultural production in the Asian centrally-planned economies in 1970-76 differed little from that in the rest of the Far East. However, on a per caput basis it increased much faster, because of China's much lower rate of population growth. The chapter includes a brief account of recent developments in China, and in particular of the new Five-year Plan for 1976-80.

Although recent trends have been less unsatisfactory in Latin America than in Africa and the Far East, it is estimated that some 15% of the region's population were still below the critical minimum limit of undernourishment in 1972-74. National efforts to formulate and execute food and nutritional plans are still at an early stage in the region, but some progress has been made in recent years. Government price policies have had a major effect on the trends in food and agricultural production. In the past the effect has often been negative, but there has recently been an encouraging shift from policies which control producer prices, often at levels that are uneconomic for the majority of traditional farmers, to the provision of guaranteed minimum prices. The region's agricultural imports have risen much faster than its agricultural exports. The latter face many difficulties, not only trade barriers in export markets but also internal factors affecting production, marketing and distribution. Considerable efforts have been made to overcome some of the trade and other problems through regional and sub-regional schemes of economic integration, but experience has shown that the inclusion of agriculture in such arrangements involves many difficulties. The region's cultivated area has expanded substantially in recent years, and this appears to have contributed about twice as much to the increase in production as have higher yields. Although there is still considerable potential for further extension of the area in many countries, this is likely to take place less rapidly than in the past.

In respect of food and agricultural production, the Near East is the region which provides the main success story in DD2 so far. Food production increased slightly faster than the 4% target in 1970-76, and total agricultural production only slightly below it. Although economic integration among the Arab countries has a long history, it is only recently, with the availability of large investment funds from oil revenues, that it has gained considerable momentum. Agriculture is receiving high priority in the most recent integration activities, and there are many opportunities for developing the region's large agricultural potential through joint ventures. The chapter includes an account of the

Food Investment Strategy of Sudan, as a good example of the problems that are faced and of how they can be approached in the context of regional integration. Since most of these developments are still at an early stage, they can have had little influence on production trends so far, but it seems clear that the region's food and agricultural production is likely to increase even faster in the future. A major problem in much of the region is desertification. Probably because of the availability of oil revenues, it has not caused severe famines as in the Sahelian countries of Africa, but it has nevertheless brought heavy social consequences.

AFRICA

Of all the developing regions, Africa is the only one where food production has grown less than population in the 1970s. The average annual rate of growth in 1970-76 was only 1.2%, or less than half the population growth of 2.7%. This situation compares unfavourably with the 1960s, when food production roughly kept pace with population.

In spite of better performances in 1974 and especially in 1976, the overall picture for the first six years of DD2 is disquieting. The supply of food available per caput, which was already low at the beginning of the decade, has generally been falling. In 1969-71 average dietary energy supplies per caput were only 92% of requirements, already the lowest of all the developing regions. They fell to 91% in 1972-74, with as many as 32 countries out of 40 where per caput supplies were below nutritional requirements.

The relative uniformity in the growth of food production in the different sub-regions of Africa during the 1960s has given place to a bleaker and more varied picture in the 1970s (Table 2-1). The small southern African countries have done even better than in the 1960s. The countries of northwestern Africa, although not quite keeping pace with population in 1970-76, have had growth rates substantially above the African average. Performance in the other sub-regions has been very poor, particularly in western and central Africa.

Table 2-1. Average annual increase in food production in African sub-regions, 1961-65 to 1970 and 1970 to 1976

Sub-region	1961-65 1/ to 1970	1970 to 1976
	..... % per year	
Northwestern	2.9	2.5
Western	2.2	0.3
Central	2.6	0.8
Eastern	2.8	1.7
Southern 2/	3.1	4.2
Total	2.5	1.2

1/ Five-year average centered on 1963. - 2/ Developing countries only.

The decline in per caput food production in Africa has led to a large increase in food imports. Their volume increased by as much as 36% between 1970 and 1976, while the volume of agricultural exports actually declined by 9%. This has put a considerable strain on the balance of payments of many African countries. In value terms, the agricultural trade balance for Africa has dramatically deteriorated. During 1970-76 the value of agricultural imports increased almost twice as fast as that of agricultural exports. In 1970-71 agricultural exports were worth about two and a half times as much as agricultural imports, but by 1975-76 they were worth only one and a half times the value of agricultural imports. If this trend continued, Africa would soon become a net importer of agricultural products, which would be a very serious situation in a region where about three quarters of the active population are still engaged in agriculture, and which badly needs foreign exchange to sustain development.

The food problem is therefore crucial in Africa. Increasing food production and improving its distribution are of paramount importance, not only to ensure adequate nutrition, but also to remove one of the major constraints on economic and social development. This is now widely recognized by African governments, and the objectives of many new national development plans include the achievement of self-sufficiency in food, and (in some cases) food surpluses for export.

The Ninth FAO Regional Conference for Africa, held in Freetown, Sierra Leone, in March 1976, requested "FAO, WFC and any other relevant international organizations in cooperation with Member States of the OAU and the ECA to draw up a Regional Food Plan which would, on its implementation, enable Member States of the OAU to be self-sufficient in food within a period of 10 years, and that the Plan be submitted to the next FAO Regional Conference for Africa". The first phase of work on such a plan is now in preparation in FAO, and will be summarized in next year's issue of the State of Food and Agriculture. The second phase will be undertaken after the next Regional Conference.

A few of the factors responsible for Africa's food problems are examined below. Little attention has so far been given to irrigation. Research priorities have only very recently been shifted towards food crops from a predominant emphasis on export crops. Training programmes for agricultural technicians and scientists have generally failed to meet national requirements. Government expenditure on agriculture, which varies considerably between countries, appears to have been declining in real terms in recent years. African animal trypanosomiasis is a major constraint on agricultural and general development over large parts of the region.

IRRIGATION

Preliminary findings from a study being carried out by FAO on agro-ecological zones suggest that rainfall is normally adequate in approximately two thirds of tropical developing Africa for the growth of short-term annual crops, and in at least one fifth of this area for the growth of perennial crops. Thus water is not necessarily the limiting factor for food production in large parts of Africa. However, the food problem in Africa is to a large extent a problem affecting populations which live in climatically marginal areas, where lack of water is a limiting factor. In these areas, irrigation development is often a precondition for minimizing production and price fluctuations and increasing food output through higher yields and multiple cropping.

Only limited information is available on the extent of irrigated areas in Africa, the type of irrigation facilities, cropping intensities in irrigated areas, or on investment outlays. However, a recent FAO survey has attempted an estimate of irrigated areas in the world which contains some data for Africa. 1/

In Africa (excluding Ethiopia) the irrigated area is estimated to have increased from 1.27 million ha in 1965 to 1.87 million ha in 1975. The average annual growth rate of 4% for the region compares favourably with the world average. However, this is largely explained by the very small area under irrigation in Africa, which in 1975 was little more than 1.5% of the total arable land. The irrigated area in 1975 accounted for 23% of the total arable land in the Far East, 21% in the Near East, and 9% in Latin America.

The effects of the expansion of the irrigated area on food production in Africa have not lived up to earlier expectations. Although the precise measurement of results is difficult, the very small increase in cropping intensity from 106 to 109% achieved in 1965-75 is indicative of the relative failure of new irrigation schemes to have a substantial influence on agricultural production. Many irrigation programmes have tended to be large-scale schemes, directed primarily towards resource availability rather than user

1/ FAO, Water for Agriculture, paper presented to the United Nations Water Conference, Mar del Plata, 14-25 March 1977.

needs. Development programmes have not taken local requirements sufficiently into account. Coupled with a lack of flexibility when faced with different farming structures and social organizations, this has led to waste and to poor financial returns on investment. More recently, however, there has been an encouraging trend towards a broader approach, and irrigation schemes are tending to be designed within a framework of defined types and levels of agricultural production.

The projected increase in irrigated area from 1.9 million ha in 1975 to 2.6 million ha in 1990 represents a rate of growth of only 2.2%, which is slower than in 1965-75. However, a significant rise in cropping intensity is expected, from 109% in 1975 to 125% in 1990. This is based on a slower growth of large projects, and marked improvements in the efficiency of existing irrigation systems, with particular emphasis on providing farmers with the water they need when they need it. Investment requirements for providing irrigation for an additional 720,000 ha between 1975 and 1990 are estimated at $ 2,016 million. The improvement of 561,000 ha of existing irrigated area would cost $ 1,318 million.

The six countries of the Sahel represent a part of Africa where irrigation will play an increasingly important role in the future, mainly as a means of reducing the fluctuations in food production resulting from adverse climatic conditions. FAO's perspective study of the Sahel 2/ proposes a minimum goal of 395,000 ha to be partially or completely equipped for irrigation by 1990, in comparison with an irrigated area of 176,000 ha in 1970.

RESEARCH

If production is to grow rapidly enough to meet the food requirements of the region and to supply increased amounts of agricultural products for export, there is an urgent need for more effort in the field of research and in the dissemination of its findings to small farmers. Traditional systems of cultivation persist in Africa not because farmers are resistant to change. On the contrary, they have proved themselves very willing to adopt new technologies which reduce the drudgery of their work or increase monetary incomes without additional risks. This is confirmed, for example, by the rapid spread of animal draught cultivation in Chad and Mali, and the recent increases in the use of fertilizers by small farmers in many countries. However, research is still heavily commodity oriented, and innovations are mostly applied to cash crops for export, and have not yet substantially affected the traditional systems of food crop production.

It is now too late to discuss whether the farmer will resist changing his farming system or not. Profound economic and social changes, such as the increased pressure of human and animal populations on fragile soils, which have been going on for several decades in large parts of Africa, now force him to change. The only question is whether research will be ready in time to offer him a viable alternative system, or whether change will be forced on him under the worst of conditions.

Research institutions in Africa are undergoing a complete reorganization. In the 1960s the organizations established during colonial times persisted. In French-speaking African countries, research was still undertaken by institutes having their headquarters in France, and specialized according to commodities, either in single export crops, or less often in food crops and livestock products. Coordination of research efforts at the country or regional level was sometimes difficult. In some countries political difficulties brought about a more or less complete abandonment of agricultural research. In English-speaking African countries a number of regional research institutions still depended heavily on expatriate research workers.

Since 1961, first in west Africa and later in other parts of Africa, the FAO Fertilizer Programme has played an important role in encouraging the use of fertilizers and indicating the most suitable types and quantities to apply to various crops, under widely differing soil and climatic conditions. Since the end of the 1960s, new research institutions have been established at the international and regional levels, and better coordination has been sought at various levels.

2/ FAO, Perspective Study of Agricultural Development in the Sahelian Countries 1975-90 - Summary and Conclusions, Rome, 1976, p. 23-25.

The International Institute of Tropical Agriculture (IITA) was established in 1967 at Ibadan, Nigeria, with the objective of improving the quality of the major food crops of the lowland humid tropics. It has been concentrating its efforts on cereals, grain legumes, roots and tubers, and farming systems. The coordinated research in each of these fields is aimed at developing crop combinations, rotations and farm management systems that are applicable by small farmers. The International Laboratory for Research on Animal Diseases (ILRAD) was established in Nairobi, Kenya, in 1973. Its primary objective is to develop immunological procedures for the prevention of trypanosomiasis and East Coast Fever. The International Livestock Centre for Africa (ILCA) was established in Addis Ababa, Ethiopia, in 1974, with the objective of assisting national attempts to change production and marketing systems in tropical Africa, so as to increase the total yield and output of livestock products. The International Centre of Insect Physiology and Ecology (ICIPE) in Nairobi has undertaken research on crop and livestock pests, with the aim of developing biological control systems.

At the national level, many countries have established new or strengthened existing bodies to coordinate research efforts and bring them more in line with the goals of their economic development plans. In other countries where the number of research institutes is still limited, agricultural research is placed directly under the Ministry of Agriculture. However, the fragmentation of responsibilities among various ministries and agencies is a common phenomenon. With the introduction of so many new research bodies, coordination has become even more important than before.

In colonial times, agricultural research in Africa largely placed emphasis on export crops. During the last five or six years research on food crops and livestock of indigenous breeds has gradually gained more importance. All the new international institutes are dealing with food crops or livestock. In the French system, out of 449 research specialists in the Groupement d'études et recherches pour le développement de l'agronomie tropicale (GERDAT) in 1975, 259 worked for the Institut de recherches agronomiques tropicales et des cultures vivrières (IRAT). In the countries themselves, increasing emphasis is being put on food research. In Tanzania, for instance, food crops such as cassava, grain legumes, groundnuts, rice and sorghum, as well as livestock, are given as much importance in research programmes as the traditional cash crops. The same is true for Zambia.

What is even more important than the new emphasis put on food crops is the still limited but significant interest shown by research institutions in a more complete approach to the farmers' needs. It has been realized that the farmer is not only a producer of cotton or cereals, but that he also needs advice on crop rotations, farming systems, land conservation and farm management. IITA's interdisciplinary teams are now concentrating on the technological aspects of farming practices for continuous cropping. IRAT is studying several farming systems in different ecological zones, In Zambia it is recognized that one of the most important research problems yet to be solved is the development of farming systems which are suitable for use under smallholder, semi-traditional management. This multidisciplinary approach is more complex, but is a necessary step if the small farmers are to put research results into use.

Although the reorganization and reorientation of agricultural research in Africa show encouraging trends, the situation remains far from satisfactory. Important obstacles remain, both in the field of research itself and in the broader field of the utilization of research results. Many countries are either too small or too poor to be able to sustain a worthwhile research effort. This is the case in several countries in west and central Africa. Elsewhere, the reorganization of national res arch structures has caused a temporary setback.

The major constraints are, however, the lack of funds and of trained staff. Agricultural research does not escape the generally difficult situation which affects the finances of all agricultural services in Africa. Funds devoted to research are extremely low, and are not always used effectively. Waste may result from inappropriate or low-quality research, and also from the fact that recurrent budgets for research provide mostly for the salaries of personnel, and do not allow sufficient sums for research work and equipment. The few research officers are therefore often employed in administrative positions.

A major factor which prevents agricultural research efforts from being really effective in Africa is the lack of coordination and cooperation between individual countries. The major problems of many countries are identical, and since most of them are too small or too poor to undertake research on the complete range of agricultural problems, there is an obvious advantage in sharing programmes, costs, and results.

In addition to these constraints in the field of research itself, there are major problems in the dissemination of research findings. The margin between crop yields, particularly of food crops, at research stations and those on farms is often very wide. Work at the International Centre of Tropical Agriculture (CIAT) in Colombia has shown that improved cultivation of cassava, kept free of disease and well managed, can produce yields of up to 70 tons per ha. At IITA research has produced sweet potato clones which can give 30 to 40 tons per ha within four months. However, average yields in the Guinean zone of Africa are of the order of only 7 tons per ha. There is therefore apparently no urgent need to go on selecting still higher yielding varieties of food crops, but rather to concentrate on resistance to disease and climatic variation. Above all, it is necessary to devise suitable cultivation techniques and farming systems that can easily be adopted, especially by small farmers.

TRAINED MANPOWER

Agricultural production is stagnant in most African countries mainly because the traditional sector is stagnant. Central to this situation is the undue attention of most governments to the so-called "modern" sector, which is almost everywhere limited in size, especially in the production of food crops. Programmes aimed at the largest number of producers, the small and subsistence farmers, have been seen as a slow and often politically unattractive process. Government help has therefore tended to go to large commercial and state farms.

This emphasis is apparent in government policy towards trained manpower. The training of agricultural technicians is often not oriented to the economic and social conditions of the rural poor and to technologies which they could apply. Newly trained agricultural technicians therefore see themselves mostly as technical innovators introducing new, improved techniques and naturally tend to concentrate their efforts on the minority of producers who have the financial resources and basic knowledge to implement the proposed innovations. A simple cost-benefit analysis would probably justify this concentration of effort. In fact, however, the relatively small increases in total production from the modern sector are accompanied by the increasing proletarization of subsistence farmers, who tend to emigrate to urban areas and thus become consumers of the increased food production.

The adoption of western models of training, which may be appropriate for a developed, technically well-equipped agriculture, where the technician has been trained to work with literate farmers who already have a fair amount of technical knowledge, is obviously not appropriate at the small farm level. There is controversy in several African countries about the most suitable training levels for field or extension agents. The general tendency, however, is for governments to upgrade standards, thus imitating the situation in developed countries.

The lack of appropriate agricultural training is a particularly serious handicap in most of Africa, where so much of the agricultural technology has recently been imported. In such a situation, the importance of those skills acquired by experience, or in lower technical schools, or non-formal training, is paramount. A university graduate without the support of technicians and other field staff with sound basic and mechanical skills may in fact have very little impact on production.

Trained Africans active in agriculture are often imbued with a technological culture that leads them to foster "progress" in all its forms. This includes an in-built preference for "progressive" farmers, and often a bias against rural development programmes aiming at the improvement of life of rural people and less immediate economic returns. Lack of confidence and understanding by trained staff is reported as

one of the main causes adversely affecting the Ujamaa schemes of Tanzania, where the difficulties inherent in the inclusion of the poorest farmers, operating marginal lands, were compounded by lukewarm support of some of the technical staff.

The harmful effect of foreign models is also shown by the general lack of recognition of the role of women in African societies. The role of women as rural producers in Africa, which has always been very large, tends to become even greater with rural-urban migration. Trained manpower , especially in extension and similar services, is primarily male . Even more significant, it is male oriented, and assistance to women tends to be confined to home economics. This situation may at least partly explain lower food production in areas where women, poorly trained and without any help from the technical services, are left in charge. The lack of technical assistance to rural women is even more dramatic in agricultural marketing, where they tend to lose their leading role in favour of urban-based male organizers as soon as technical innovation is introduced, for example, the use of trucks.

In some African countries a few prestige projects, giving immediate economic returns, absorb high proportions of the available trained manpower, to the detriment of areas where no such projects exist. Ambitious area projects, for example in irrigation, have tended to absorb large numbers of trained manpower, depleting the regular extension services. Agricultural cooperatives have been particularly hampered by the lack of adequate trained staff. This may be caused by official neglect arising from a failure to recognize that effective farm cooperatives can make a useful contribution towards increasing production, and by the difficult working and living conditions in the villages where rural cooperatives are located.

An important part of the problem of improving technical services is that expatriates still provide the bulk of the technicians in some African countries. For instance, as late as 1971 expatriates in Zambia accounted for about 87% of the professional levels of the technical services. In countries where there was formerly a white settlement policy, as in southern Africa, the problem is mainly one of nationalizing cadres. In addition, the general organization of work and training has to be changed so support a policy of self reliance. For exemple, in Mozambique in the early 1970s there were only two schools of agriculture at the technical level which only trained white settlers' sons. African students started to attend them in limited numbers only on the eve of independence. The problem is therefore one of changing the basis of student selection in addition to drastic increases in their numbers. In such countries, the departure of large numbers of commercial farmers, and the accompanying disruption of marketing services, are some of the causes of lower production, together with the lack of trained staff, recruited locally, to help small farmers and others to adjust to the new situation.

Apart from problems of replacement of expatriate staff, most countries have, in their first decade or so of independence, experienced difficulties in establishing a stable technical advisory service. The situation in Nigeria, where at least 10% of the junior staff leave the advisory services every year, is not uncommon.

GOVERNMENT EXPENDITURE ON AGRICULTURE

Comparable data on government expenditure on agriculture in Africa, for both recurrent and capital expenditure, are relatively scarce. There is no uniform definition of what constitutes investment in agriculture. For example, it may include or exclude expenditure on irrigation. There are often wide differences between budgeted and actual expenditures.

The available evidence is not very reassuring, for it seems that in many African countries agriculture does not receive the official support it clearly should have. Direct government investment in agriculture has not been at all in proportion to the number of people who depend upon the sector for their livelihood, even though public capital formation in the sector does appear to have received increased emphasis in certain countries. Table 2-2 indicates the wide differences in the proportion of annual government expenditure allocated to agriculture in various countries. Recurrent

expenditure on agriculture in the 1977 budget for the Ivory Coast, for example, represented only 3 % of total government expenditure, compared with 7 % in Kenya in 1976/77, and an average of 16 % in the state budgets in Nigeria. Capital expenditure on agriculture amounted to only 2% of the government budget in Gabon for 1977, compared with 34% in Togo, and 37% in both Kenya and Mali. The limited data appear to indicate that total annual government expenditure on agriculture has not kept pace with inflation, and that its share of the total budget has declined, or merely maintained its average share. In Gabon, for example, the budget for recurrent expenditure in 1977 rose by 44%, while the budget for rural development increased by only 26%, lowering its share in the total from 1.8 to 1.6%. For the region as a whole, it is doubtful whether the total amount of expenditure on agriculture has increased very much in real terms in recent years.

Table 2-2. Recent budget allocations for recurrent and capital expenditure for agriculture in selected African countries, 1976 and 1977

Country	Year	Proportion of budget allocated for agriculture	
		Recurrent expenditure	Capital expenditure
		..... %	
Central African Empire	1977	6	...
Chad	1977	4	...
Congo	1977	5	30
Gabon	1976	2	...
	1977	2	2
Ghana	1975/76	...	15
Ivory Coast	1976	3	...
	1977	3	...
Kenya	1976/77	7	37
Libya	1976	...	26
Madagascar	1976/77	...	29
Mali	1976	3	28
	1977	2	37
Niger	1977	3	8
Nigeria	1975/76, Federal	...	4
	1975/76, States (average)	13	...
	1976/77, Federal	...	6
	1976/77, States (average)	16	...
Togo	1976		34
Upper Volta	1976	7	26

Source: Government plans and related documents.

ANIMAL TRYPANOSOMIASIS

A major factor holding up the settlement and economic development of a major part of Africa is trypanosomiasis, the parasitic disease transmitted by tsetse flies (Glossina spp.), and affecting both humans and animals. Trypanosomiasis is prevalent in Africa between latitudes 15°N and 21°S, representing an area of about 10 million km^2. The incidence and severity of the disease are dependent upon local conditions. They can result in areas where no livestock development can be attempted, or where some livestock breeds, tolerant to the disease, can be maintained, or where breeds susceptible to the disease can be reared only by using curative and prophylactic trypanocides.

In addition to the direct losses caused by the disease and the cost of control operations, animal trypanosomiasis also reduces the supply of meat and milk products and impedes the improvement of nutritional levels. It also prevents the introduction of improved breeds and can cause the deterioration of range lands if sound management is not established in tsetse-free areas. It affects crop production, through the lack of draught animals and manure. It affects the rural economy by preventing integrated crop and livestock production, and by contributing to transhumance, since some pastures are seasonally made unsafe through fly advances. Inevitably it affects the national economy, since the deficit in livestock production compels affected countries to import meat and dairy products and removes the possibility of developing an export trade in these valuable commodities.

Some species of tsetse flies are vectors of human trypanosomiasis (sleeping sickness), a disease which poses a major problem for public health in Africa. It is estimated that about 45 million people live in endemic trypanosomiasis areas. In most countries the disease has been brought under control through strict medical surveillance and treatment, but where surveillance has been relaxed it continues to be a serious problem, with the threat of development into epidemic proportions ever present.

The urgent need to control animal trypanosomiasis in Africa was brought to the attention of the World Food Conference by FAO, together with the broad outlines of a programme for control of the disease. That Conference endorsed the proposal, and FAO has subsequently elaborated a long-term programme for the control of trypanosomiasis. In the 35 African countries affected by tsetse flies, the total area of the tsetse-infested zone which could be used for livestock amounts to about 7 million km^2, with an average potential carrying capacity of 20 cattle per km^2, and a total potential capacity of 140 million cattle. Currently the tsetse-infested zone carries about 20 million head, each producing some 12.5 kg of meat per year. Thus the theoretical potential increase in meat production in this zone, assuming no rise in animal productivity, is 1.5 million tons per year, which at 50 cents per kg amounts to US$ 750 million. This very crude estimate indicates only one of the benefits which the control of trypanosomiasis could bring. Other benefits include the provision of employment, the development of new rural communities and the opportunity provided to introduce new systems of land tenure and farming.

FAR EAST

In the Far East region as a whole, the growth of food and agricultural production barely kept pace with population growth in 1970-76. The situation was aggravated by substantial year-to-year fluctuations in production, mainly due to the weather. The average per caput dietary energy intake remained below minimum requirements. Although the introduction of improved technology has contributed to increased output, the great mass of the rural population has received little share in the benefits. The persistence of poverty is closely related to unemployment, underemployment and unequal income distribution, which in the rural areas of many countries stems mainly from restricted access to productive resources.

The review which follows deals first with agricultural productivity and technological change. It then examines the main goals of national agricultural strategies in the region. This is followed by a discussion of the role of the small farmers in the Far East, and of the kinds of action that governments are now taking to improve their position. Finally, there is a brief account of recent developments in China.

AGRICULTURAL PRODUCTIVITY AND TECHNOLOGICAL CHANGE

One of the most significant developments affecting agriculture in the Far East region in the past 10 years has been the introduction and widespread adoption of new technologies. Their main impact has been on rice and wheat, which are the basic staples in the diet. Rice is the cereal that is most widely grown in the region; wheat is grown principally in northern India and Pakistan. Relatively little advance in technology has been achieved thus far for most of the other food and non-food crops.

Table 2-3 shows the area planted to high-yielding varieties (HYVs) of rice, and the proportion of the total rice area under HYVs in 1970/71 and 1974/75 in selected countries. There has clearly been a considerable variation in the rate of adoption among countries (and also within countries), which is apparently related more to physical conditions than to institutional factors. The latest analysis shows that the HYVs have continued to increase fairly steadily as a proportion of the total rice area, and by 1974/75 accounted for 26% of the rice area in the developing market economies of the Far East. The highest proportions in 1974 75 were in the Philippines (62%), Sri Lanka (44%), Indonesia (40%), Pakistan (39%), West Malaysia (38%) and India (29%).

The impact of the HYVs on average rice yields has been partly dependent on the level of technology and of rice yields when they were introduced (Table 2-4). For example, average rice yields in the Republic of Korea, at 4.1 tons/ha in 1961-65 were more than double those in all the other countries in the region except West Malaysia (2.5 tons/ha). Subsequently Pakistan, Indonesia and the Philippines have registered faster yield increases than the Republic of Korea, thus narrowing the gap. It is significant, however, that yield increases in the Republic of Korea have been maintained at 2.2% annually despite their already high levels, partly as a result of the successful adoption of the new generation of HYVs in 1971. Bangladesh and Burma have achieved little growth in yields, and Sri Lanka and Thailand have done only slightly better. A major difficulty encountered in these four countries has been inadequate water control. Because of their shorter stature and shorter growing period, the HYVs of rice are frequently more sensitive to flooding and drought than local varieties. The risk associated with applying fertilizers and other purchased inputs is greater under uncontrolled water conditions.

Table 2-3. Area planted to high-yielding varieties (HYVs) of rice in selected countries in the Far East, 1970/71 and 1974/75

	Area planted to HYVs		Annual rate of growth	Proportion of rice area under HYVs	
	1970/71	1974/75		1970/71	1974/75
	.....thousand ha.....		..... %		
Bangladesh	460	1,444	33	4.6	14.7
Burma	191	332	15	4.0	6.8
India	5,454	11,045	19	14.5	29.2
Indonesia	903	3,440	40	11.1	40.3
Korea, Republic of	188 1/	307	28	15.6 1/	25.5
Malaysia, West	165	217 2/	10	31.4	37.5
Nepal	68	223	35	5.7	18.0
Pakistan	550	631	4	36.6	39.3
Philippines	1,565	2,175	9	50.3	61.5
Sri Lanka	31	352	85	5.0	44.2
Thailand	30	450	95	0.4	6.1
Vietnam	502	900	16	20.0	17.6

Source: Dana G. Dalrymple, Development and spread of high-yielding varieties of wheat and rice in the less developed nations, United States Department of Agriculture, Foreign Agricultural Economic Report No. 95, Washington D.C., August 1976.

1/ 1972/73. - 2/ 1973/74.

Table 2-4. Area and yields of rice in selected countries in the Far East, 1961-65 and 1972-76

	Yield		Annual rate of growth 1961-65 to 1972-76	
	1961-65	1972-76	Area	Yield
	.....tons/ha.....		.....%	
Bangladesh	1.7	1.8	0.9	0.4
Burma	1.6	1.8	10.5	0.6
India	1.5	1.7	9.0	1.4
Indonesia	1.8	2.5	1.7	3.3
Korea, Republic of	4.1	5.2	0.3	2.2
Malaysia, West	2.5	2.9	3.8	1.5
Nepal	2.0	2.0	0.9	-
Pakistan	1.4	2.3	2.0	4.6
Philippines	1.3	1.7	0.9	2.5
Sri Lanka	1.9	2.1	2.0	0.9
Thailand	1.6	1.8	0.9	1.2
Vietnam	2.0	2.8	0.6	3.0

On a countrywide basis the increase in rice yields in India has been slightly less than in the region as a whole, but the national average conceals marked contrasts between different parts of the country. North India compares favourably with Pakistan in the rate both of the adoption of the HYVs of rice and of the increase in yields. In parts of eastern India, many farmers adopt HYVs and modern inputs during the dry season, but change back to traditional varieties in the wet season.

So far there appear to have been no major pest and disease outbreaks directly due to the HYVs. Although this danger undoubtedly still exists, it appears to have diminished with the increased crossing of HYVs with local varieties, and the better resistance of the new generation of HYVs.

As wheat is the dominant cereal only in Pakistan and northern India in the developing market economies of the Far East region, the area under HYVs in 1974/75 (some 16 million ha) was considerably lower than the corresponding area for rice (about 22.5 million ha). However, these varieties accounted for almost 60% of the wheat area in the developing market economies of the region in 1974/75, or more than double the proportion of the rice area under HYVs. Table 2-5 indicates that for wheat the highest proportions were in Nepal (85%), followed by India (63%) and Pakistan (60%). Only 27% of the relatively small wheat area in Bangladesh was under HYVs in 1974/75, but this was a considerable advance on the 11% of a much smaller wheat area in 1970/71. Except in Nepal, there was a substantial expansion of both the area and yield of wheat (Table 2-6). In some cases, wheat replaced inferior grains such as maize, sorghum and millet, or (to a smaller extent) pulses. In other areas, it was possible to grow two crops, wheat followed by rice, on land previously single-cropped.

Table 2-5. Area planted to high-yielding varieties (HYVs) of wheat in selected countries in the Far East, 1970/71 and 1974/75

	Area planted to HYVs		Annual rate of growth	Proportion of wheat area under HYVs	
	1970/71	1974/75		1970/71	1974/75
	....thousand ha....		..... %		
Bangladesh	14	33	25	11	27
India	6,543	11,778	16	39	63
Nepal	98	247	26	50	85
Pakistan	3,128	3,683	4	50	60

Source: Dana G. Dalrymple, op. cit.

In sharp contrast to the rapid technological advances made in rice and wheat production in the Far East, there has been no major advance in maize, sorghum and millet production. Much of the recent increase in the output of maize, particularly in the Philippines and Thailand, has come from an expansion in area, although there has also been a steady gain in yields. The area planted to sorghum, which declined in the early 1970s, increased in 1975 and 1976 but is still less than in 1961-65. No clear trend in yield or output is discernable for either sorghum or millet, because of the large year-to-year fluctuations that characterize these crops, which are grown in areas of low and uncertain rainfall.

No significant improvements have occurred recently in yields of roots and tubers, mainly sweet potatoes and cassava, which are of considerable importance in certain areas of the region. The same is true of sugarcane. Among other major crops, yields of jute, copra and tea have stagnated in recent years. There have been striking improvements in yields of rubber in the major producing countries (7.5% a year), and to a smaller extent those of oil palm (2.9%) and cotton (2.2%).

Table 2-6. Area and yields of wheat in selected countries in the Far East, 1961-65 and 1972-76

	Yield		Annual rate of growth 1961-65 to 1972-76	
	1961-65	1972-76	Area	Yield
	..... tons/ha		..... %	
Bangladesh	0.6	1.0	7.2	4.7
India	0.8	1.3	3.3	4.2
Nepal	1.2	1.1	9.0	-0.9
Pakistan	0.8	1.3	1.7	4.0

HYVs require other modern inputs if their full potential is to be realized, including fertilizers, crop protection and new implements and sources of power for carrying out field and post-harvest operations. They also require controlled and assured water supplies. Although fertilizer has contributed substantially to the growth of rice production in the Far East in DD2, the combined effect of the area and yield increase due to expanded irrigation facilities exceeds the contribution of fertilizer. In Burma, the annual production growth has been exceedingly low, while in Thailand the major component of growth has been the expansion of the rainfed paddy area.

Nevertheless, non-irrigated areas constitute more than 50% of the rice land in the Far East (Table 2-7). Traditional varieties perform as well as, or even better than, the HYVs on these areas. The limit to a more rapid expansion of the current generation of HYVs is that most of the irrigated rice land has already been planted to some type of HYVs. Recent changes in irrigated area, and in the proportion of net cropped area which is irrigated, have varied considerably (Table 2-8). However, not all the increases in irrigated areas have been net gains, as they have often been partly offset by land that has declined in productivity or even gone completely out of production as a result of waterlogging and salinity, which are only partly due to poor irrigation practices. Comparable data on the effectiveness of national irrigation systems in the Far East are not available, but major improvements have recently taken place in several countries. Some of the most significant investments in irrigation in Indonesia during the past decade, for example, have been in renovating and improving the maintenance of existing systems.

The increased use of diesel engines and electric motors to power tubewells and low-lift pumps accounts for much of the expanded use of mechanical power in the agricultural sector, particularly in south Asia. The principal effect of the greatly expanded use of power-driven pumps has been an enormous increase in the use of ground water for irrigation, especially in India and Pakistan, and a rapid expansion of irrigation during the dry (boro) season in Bangladesh, mainly using low-lift pumps. The technical superiority of mechanical power in lifting water is so great that the use of power-driven pumps essentially represents a new activity rather than merely a substitute for traditional devices such as the Persian wheel. Moreover, the irrigation made possible by mechanical power is highly complementary to the HYVs and increased fertilizer use, and the net effect has been a significant increase in productive employment opportunities in agriculture.

Table 2-7. Estimates of the proportion of rice area in five major categories, in selected countries in the Far East, 1975

Country	Total rice area 1/	Proportion of area				
		Irrigated	Rainfed	Upland	Deep-water	Second crop
	thousand ha	..... %				
Bangladesh	9,766	16	39	19	26	10
Burma	4,985	17	81	1	1	1
India	37,755	40	50	5	5	5
Indonesia	8,482	47	31	17	5	19
Malaysia, West	771	77	20	3	0	50
Nepal	1,200	16	76	9	0	0
Pakistan	1,518	100	0	0	0	0
Philippines	3,488	41	48	11	0	14
Sri Lanka	604	61	37	2	0	25
Thailand	7,037	11	80	2	7	2
Vietnam	2,713	15	60	5	20	5
TOTAL	78,319	19	47	10	10	14

Source: R. Barker, H.E. Kauffman and R.W. Herdt, Production Constraints and Priorities for Research, International Rice Research Institute, Los Baños, April 1975 (mimeo).

1/ 1970-74 average (FAO data).

Table 2-8. Irrigated area and proportion of net cropped area irrigated in selected countries of the Far East, 1970 and 1975

Country	Irrigated area			Proportion of net cropped area irrigated		
	1970	1975	Annual rate of growth	1970	1975	Annual rate of growth
	thousand ha			..... %		
Bangladesh	1,058	1,500	7.2	11.9	16.1	6.2
Burma	839	976	3.1	8.4	9.8	3.1
India	30,440	32,300	1.2	19.0	19.9	0.9
Indonesia	4,280	4,380	0.5	32.9	32.8	-0.1
Korea, Rep of	848	915	1.6	38.5	40.9	1.2
Malaysia, West	231	300	5.4	37.9	48.0	4.8
Nepal	117	180	9.0	5.9	9.1	9.1
Pakistan	12,950	14,300	2.0	67.6	74.2	1.9
Philippines	1,150	1,391	3.9	24.8	27.1	1.8
Sri Lanka	465	440	-1.1	52.0	49.2	-1.1
Thailand	1,960	3,149	9.9	15.9	21.3	6.0

Although the use of chemical fertilizers began to increase in the Far East during the 1950s, the consumption level was still very low in most countries in the early 1960s, when the FAO Fertilizer Programme began its work in the region. Almost all countries have experienced a rapid increase in fertilizer use since then, but the level of consumption continues to vary widely (Table 2-9). This is due not only to differences in environmental and institutional conditions, but also to significant differences in national price policies. Between 1970 and 1974 fertilizer consumption went down in a number of countries owing to the sharp rise in fertilizer prices. The total consumption of nitrogenous fertilizers (nitrogen is by far the major plant nutrient in Asian countries) was only marginally higher in India in 1974 and 1975 than in 1972. In Pakistan there appears to have been a small reduction during the three years following a peak in 1972.

A striking feature of the new agricultural technology in the Far East is the rapid increase in the number of tractors and power tillers. The available evidence suggests that tractor mechanization by itself has little, if any, effect on crop yields. However, tractor owners commonly use relatively large amounts of fertilizers and other yield-increasing inputs, with the result that they often have higher yields than farmers using animal power. Tractor mechanization also makes it possible to save time, and thus to further intensify the cropping pattern. In some areas, where time is a critical factor, mechanization can facilitate the growing of an additional crop which further expands the demand for labour. Generally speaking, however, this has been possible only in the limited areas with very good water control.

Table 2-9. Total fertilizer consumption (NPK) and consumption per hectare in selected countries of the Far East, 1970 and 1975

	Total consumption			Consumption per hectare 1/		
	1970	1975	Annual growth	1970	1975	Annual growth
	thousand tons		%	kg/ha		%
Bangladesh	143.2	215.0	8	15.7	22.6	8
Burma	21.9	42.5	14	2.1	4.1	14
Dem. Kampuchea	3.5	1.7	-13	1.1	0.6	-11
India	2,177.3	2,754.0	5	13.2	16.5	5
Indonesia	237.2	483.4	15	13.1	26.0	15
Korea, Rep. of	562.9	865.5	9	241.6	357.9	8
Lao	0.2	0.4	15	0.2	0.4	15
Malaysia, West	154.1	174.3	2	53.9	59.4	2
Nepal	5.4	12.3	18	2.7	6.1	18
Pakistan	283.2	545.0	14	14.6	28.0	14
Philippines	201.1	221.7	2	28.8	28.1	- 1
Sri Lanka	93.7	64.3	- 7	47.3	32.5	- 7
Thailand	81.0	180.2	17	5.9	10.9	13
Vietnam	311.3	340.0	2	61.7	61.0	-

Source : FAO Annual Fertilizer Review 1976

1/ Arable land and permanent crops.

AGRICULTURAL STRATEGIES

During DD2 the countries of the Far East have adopted a wide variety of measures to achieve their agricultural development objectives. Despite their various climates and economic, social, political and cultural conditions, there were marked similarities in these objectives. Typical policy goals were 3/: increasing food production to meet the continually growing demands of an expanding population with higher incomes, to reduce reliance on imports, and to provide some form of national food security against the risk of poor harvest; increasing non-food agricultural production to meet the raw material requirements of expanding industries and to provide foreign exchange through exports; improving the opportunities for productive employment in agriculture and raising the income of the rural population; diversifying agricultural production in order to provide both farmers and the economy with greater protection from large disturbances in international markets, and to take full advantage of changing patterns of domestic and foreign demand; giving farmers improved access to basic resources such as land and water, and eliminating unfair relationships in agricultural factor and product markets; and adopting a more comprehensive approach to the development of the rural economy, with emphasis on improving the quality of life in rural areas.

These various objectives were accomplished only to a very limited extent in most countries of the region during the first half of DD2, partly because the policies undertaken could not by their very nature become really effective in a short period. The rate of growth of production in many countries, particularly in south Asia, was not sufficient or reliable enough to provide adequate levels of consumption for growing populations. As a result, reliance on cereal imports in the food deficit countries did not diminish, while in food surplus countries exportable supplies were reduced. Labour absorption in agriculture could not keep pace with increases in the rural work force. The non-agricultural sector failed to establish adequate direct and indirect linkages to provide sufficient stimulus for agricultural growth or opportunities for nonagricultural employment. This was partly because the low incomes of the bulk of the farming and rural households precluded the emergence of the necessary linkage between the agricultural and nonagricultural sectors, and partly because the predominant pattern of industrialization was capital intensive and urban-oriented. All these features led to a situation in which development bypassed the lower one third of the rural population.

Based on this experience, a number of priorities are already clear and are accepted by some countries. The rate of increase in agricultural production has to be accelerated considerably. This expansion of production has to be done in such a way that small and marginal farmers will both contribute to and benefit from it. For the large numbers of rural workers (landless labourers and sub-marginal farmers) who do not have an adequate production base of their own, wage employment or income-supplementing occupations in the agricultural and nonagricultural sectors have to be provided. Linkages have to be strengthened between the agricultural and nonagricultural sectors, so that gains in productivity and growth in one sector are efficiently transmitted to the other. At the same time, world production and trade patterns for agricultural commodities have to be reorganized, so that the developing countries can share in the expansion of world income, without having to expose their economies to excessively destabilizing influences from abroad.

A requirement common to all countries in the region is the need either to realign existing institutions in rural areas, or to create new institutions where necessary, in order to facilitate rapid increases in productive employment opportunities and to reduce poverty. The misalignment of institutions has led in the past to several difficult problems, including imperfections in factor markets, and constraints on the mobilization of resources, on the generation of effective demand, and on the provision of more employment.

3/ Largely based on Asian Agricultural Survey 1976. Rural Asia: Challenge and Opportunity, Asian Development Bank, Manila, Part III, Chapter 1 (in press).

Failure in rural development programmes has often followed from lack of success in achieving two essential objectives: to increase the productivity of the rural poor, particularly the small and marginal farmers, and to ensure their full participation in planning and executing the programme.

SMALL FARMERS

DD2 has seen a growing concern with various social problems associated with the new technology in agriculture. These problems centre around income distribution and employment. Although the new technology has been regarded as scale neutral, the pace of its adoption by the small farmers who constitute the bulk of the farming community in the Far East has been slow. This has resulted in a widening of the disparity in incomes between the large and medium farmers on the one hand and the small farmers on the other. Moreover, the advantage that the small farms have enjoyed from greater intensity of land use, in the form of higher output per hectare than the large farms, has been narrowed by the high yields with the new technology. Many small farmers have been reduced from tenants to landless labourers, as the gains from the new technology have induced large and medium farmers to resume land for self-cultivation.

The plight of the small farmers as a consequence of these developments has begun to exercise the minds of governments. Equally there has been a realization that further increases in agricultural production are largely dependent on increasing the productivity of the small farmer. Hence many governments are now turning their attention to reshaping programmes and policies in support of the small farmer.

The predominance of small farms in the Far East can be seen from Table 2-10. Holdings of less than 1 ha represent more than half the total in Bangladesh, India, Indonesia, Republic of Korea and Sri Lanka. The average holdings are somewhat larger in the Philippines, where just under two thirds of the holdings are less than 3 ha. In Bangladesh, Indonesia and the Republic of Korea only a very small proportion of holdings are larger than 3 ha.

Table 2-10. Small holdings as proportion of total holdings in selected countries of the Far East, 1971

Country	Size of holding		
	Less than 1 ha	Less than 3 ha	Less than 5 ha
	..... %		
Bangladesh 1/	66	95	97
India	51	79	90
Indonesia 2/	70	94	98
Republic of Korea 1/	67	92	100
Philippines	15	61	85
Sri Lanka	65	-	96

1/ 1974 - 2/ 1963.

In general, the size of holding has been the criterion used to identify small farmers in special programmes to assist them. In Nepal, farmers with 2.5 ha of land in the Terrai and 1 ha in the Hills are considered small farmers. In Bangladesh, small farmers include those who have land up to 2 acres, with further subdivision into subsistence farmers-cum-sharecroppers with holdings of 1 acre and below, and viable and potentially viable owners with holdings of 2 and 1 acres respectively. In India, the programme for small and marginal farmers classifies them on the basis of both farm size and income.

Small farmers are those with operational holdings of 5 to 10 acres in terms of dry land, or whose annual incomes from agricultural and nonagricultural sources do not exceed Rs. 2,400. Marginal farmers are those with 2 to 5 acres in terms of dry land, or with annual incomes not exceeding Rs. 1,800. Agricultural labourers are those earning an average of less than Rs. 1,200 gross per year. In the Philippines, small farmers have been defined by decree as those who are the actual tillers (whether full owners or lessees) of not more than 7 ha of rice or maize land, or their equivalent in other crops.

The poverty of the small farmers in the region stems precisely from the smallness of their holdings, since they control few resources, their incomes are low. Since the farms they operate are too small to utilize their labour fully, they suffer from under-employment. In addition, they are generally handicapped by the limited availability of irrigation, credit, chemicals and other inputs for production, unfavourable market conditions and prices, limited opportunities for steady off-farm employment at adequate wages, and the incapacity or disinclination of existing institutions to take action on their behalf. Small farmers also tend to have little control over the operation of the institutions affecting the agricultural sector. However, the most important limiting factor is undoubtedly the small area of land available to each farmer, as this determines the access to inputs and other facilities for production.

General programmes for agricultural and rural development are not sufficient to alleviate the lot of small farmers. There is a need for specific programmes to help them, aimed at increasing the physical base for farm production through changes in agrarian structure, raising productivity, improving the government services available to them, and developing better facilities for marketing. Ill-designed projects aimed at small farmers, without removing their basic physical resource constraints, are not likely to succeed.

Access to productive resources in agriculture is dependent to a large extent on the distribution of land holdings and the rights under which they are held. An equitable agrarian structure is therefore a basic element in any comprehensive programme to improve the income potential of the small farmer. The experience of Japan and the Republic of Korea demonstrates that agricultural development can be accelerated with a relatively equitable distribution of holdings, even if they are of very small size. In other countries, although a ceiling on land holdings has been imposed and surplus land redistributed, the problem of limited access to productive assets by small farmers has not been solved, because the maximum size of holdings has been set too high, or the redistribution hampered by the political influence of the landowners, or by exemptions. Thus the upper limit has been as high as 150 acres of irrigated land per individual in Pakistan and 160 in Thailand. The result has been that the amount of surplus land eventually redistributed to the landless or marginal farmer has been very small. There has also often been a lack of serious political commitment, and failure to provide the necessary supporting services to the beneficiaries. Nor have those who benefited under the land redistribution been organized to protect their interests under land reform laws. As a consequence, there has been a continued concentration of land holdings in a few very large units. In 1970, 4% of the farms in India cultivated 31% of the total land area, and in Pakistan, 11% of the farms cultivated 43% of the land area.

Where a regulatory and gradual approach has been taken to land reform, in order to mitigate some of the worst features of landlord exploitation, as in Nepal, Sri Lanka and to some extent Indonesia, it has been found in actual practice that the regulations could not be enforced effectively. The reasons have included gaps in the laws, the absence or deficiency of land records indicating tenants' possession, bias towards the landlord in rural administration, the landlord's social and economic power, and the lack of group action by tenants. The updating of land records and the effective regulation of tenancies have therefore to be organized on a nationwide scale as a matter of priority if matters are to be improved.

Increased productivity is dependent on access to yield-increasing inputs such as irrigation facilities, improved seeds and fertilizers. In India marginal and small farms account for the largest share of the area irrigated by tanks and "other" sources (Table 2-11). They are thus exposed to a greater risk of crop failure than the medium and large farmers, who are generally provided with better irrigation facilities.

Table 2-11. Distribution of land irrigated by different systems, by size of holdings, India, 1970/71

Size of holding	System of Irrigation				
	Canals	Tanks	Wells	Tubewells	Other
	..... % of irrigated area				
Marginal	14.5	21.0	12.6	14.0	19.4
Small	16.4	19.0	14.6	15.4	19.0
Semi-medium	22.3	22.8	21.9	23.9	24.3
Medium	28.6	23.6	30.6	31.7	23.8
Large	18.2	13.6	20.3	15.0	13.5
All	100.0	100.0	100.0	100.0	100.0

Source : All-India Agricultural Census 1970/71.

With the emphasis given to groundwater development in Bangladesh, India and Pakistan, low-cost shallow tubewells have now come within the reach of the small farmer. Bamboo tubewells introduced in Bihar State in India in 1968 have brought the tapping of groundwater well within the reach of the small farmer. Even cultivators with half an acre of land have installed bamboo tubewells which have enabled them to bring the entire holding under irrigation.

Major irrigation programmes now tend to give increased emphasis to improvements in existing systems. Here again, it is possible to use techniques within the reach of the small farmer. For instance, the use of country tiles to carry canal water to small farmers' fields, with less evaporation or seepage, has much potential.

Absolute farm size does not seem to be a disadvantage in the adoption of yield-increasing innovations such as improved varieties, fertilizers and insecticides. However, related requirements of the new technology may limit its adoption by small farmers. Thus the small farmer is often faced with difficult transport problems, particularly between his scattered fields, and with the unavailability of credit.

Some governments are attempting to improve credit facilities for the small farmer by simplifying the procedures for the provision of institutional credit. One of the major steps taken to increase their access to credit has been the setting up of small rural banks as separate institutions. In the Philippines 790 rural banks have been established under the supervision of the Central Bank. They have proved themselves viable institutions for mobilizing rural capital and directing it into agriculture, but the extent to which the small farmer has benefited is open to doubt. In India, the Central Government has decided to set up 100 rural banks in the public sector, each of which is expected to have a network of branches.

With the nationalization of commercial banks in India, the number of branches has increased, although it is still far short of carrying banking facilities to the door of the rural community. In Sri Lanka, where the Government has established 500 Agricultural Productivity Committees, each covering from 2,000 to 4,000 ha, the Bank of Ceylon has ensured that branches are provided in all the areas covered by these committees. In Pakistan field loan officers have been appointed to keep in contact with small farmers and assist them to obtain loans. Still another method to provide better credit facilities, which is being used in the Philippines, is the mobile bank or "bank on the wheel", which moves about the rural areas in the seasons when loans have to be extended and recovered.

With regard to the simplification of loan policies and procedures, there have been some departures from the requirement of collateral, which clearly discriminated against small farmers and the landless. Government lending through village cooperatives or farmers' organizations is now an accepted principle for reaching a large number of small farmers. Under the Masagana 99 Programme in the Philippines, farmers are required to form informal groups of five to 15 members, through whom crop loans are advanced on their joint and several responsibility. On the recommendations of the National Commission on Agriculture, the public sector banks in India are being associated with the Organization of Farmers' Service Society, with the intention of providing credit to the small and marginal farmers and agricultural labourers.

To ensure that farm credit is used for productive purposes and that it can be repaid, it may have to be provided in kind. Where a credit institution is also responsible for distributing such items as seeds and fertilizers, for example the Agricultural Cooperative Federation in the Republic of Korea, credit in kind requires only simple procedures. In the rice-growing areas of Malaysia, farmers receive production credit in coupons which are presented to a village shopkeeper (a local credit centre) in exchange for fertilizers and other agricultural inputs. The village agent is given a commission for the service, but is responsible for collecting the loans to pay back to the bank.

The provision of institutional credit to small farmers has to be part of an integrated programme covering marketing, price policy and advisory services. The poor condition of rural roads and lack of transport facilities hamper the marketing of small quantities by individual farmers, and discourage the small farmer from producing for the market. The construction of all-weather roads and the provision of marketing facilities in the mountain provinces in the Philippines have been decisive factors in persuading farmers to start producing for the market.

Cooperative marketing has been a success in Japan, where over 90% of rural produce is now marketed through the cooperative societies. In India, the Small Farmers' Development Agency makes grants towards the capital costs of setting up infrastructure facilities, and is encouraging the linking of credit with marketing through the cooperative system. However, relatively large farmers have infiltrated the system.

Lack of storage facilities is one reason for the low price often received by farmers, forcing them to sell immediately after harvest. Although in recent years a number of governments have provided increased grain storage capacity, this has seldom affected the small farmer. However, efforts are being made in some countries to design small storage bins which would enable small farmers to store their grain without loss. In India, over 35,000 bins of this type have been distributed.

Most governments in the Far East have now developed a system for stabilizing foodgrain prices, which involves guaranteeing a minimum price to the producer and frequently the setting up of government-authorized buying agencies in the rural areas. Farmers' associations are also used as the local official buying agency. Where private traders are used to buy the grain, governments rarely find it practical to supervise the prices paid to small farmers in the villages.

The small farmer would benefit greatly if he were to get regular cash payments for his marketable commodities, particularly for dairy products. One of the main features of the cooperative milk producers' union in Anand in India, which has also been adopted elsewhere, is the daily cash payment to farmers for their milk. This has benefited the small producers not only through the security of a market outlet but also through the ease by which they can obtain credit for feed and other production expenses, since these can be deducted from the regular payments.

Efficient and appropriate extension services are the key to the transfer of technology necessary to raise the productivity and income of the small farmers. However the small farmers who most need the extension services are usually the last to benefit from them. The lowest level extension workers usually concentrate their efforts on the big farmers, where returns to their efforts are proportionately larger. It is, however, essential to put more emphasis on activities with small farmers than with large ones, who are better placed to look after their own needs. In Bangladesh, an approach is being tried out by which capable small farmers are being trained for employment as extension agents.

While a fairly effective system to provide small farmers with inputs and services has been developed in most of the countries of the region, the marketing of their produce is still poorly organized. Cooperatives have therefore generally failed to provide small farmers with the marketing facilities they need.

Where there is a relatively homogeneous rural society, as in the Republic of Korea, it has been possible to develop efficient marketing cooperatives at the village level. Thus under the Saemaeul Movement, each village has a Saemaeul Committee of 15 members elected by the villagers. Each village elects a Saemaeul leader, and the village committee and the elected leader can serve as a very effective agency for handling government aid and services. The aim of the movement is to develop self-reliance, and the capacity of the villagers to programme, finance and execute a wider range of development activities with the minimum of outside assistance. This aim seems to a great extent to have been achieved, because of the strong commitment of the national leadership, the high level of literacy among the farmers, and the uniform size of farms.

There is a growing realization that small farmers are unable to take much advantage of general programmes for agricultural development, and require special measures and funds. In India, two schemes, the Small Farmers Development Agency (SFDA) and the Marginal Farmers and Agricultural Labourers Development Agency (MFAL) have been started with this specific intention. Each SFDA agency is expected to cover 50,000 small farmers, and each MFAL agency 15,000 marginal farmers and 5,000 agricultural labourers. In Nepal, the Sajha (Cooperative) Development Programme has the specific aim of increasing the production and income of small farmers by providing loan facilities and farm inputs in the villages.

CHINA

The first half of DD2 coincided with China's Fourth Five-Year Plan (1971-75), which brought considerable progress in food supplies. Grain production, which had reached 240 million tons in 1974, the last year for which the Government has published an official figure, is estimated to have reached a new record of about 285 million tons in 1975. This represents an average annual increase of 3.5% in the plan period, which is considerably above the population growth rate of about 1.3 to 1.5%, according to various Chinese unofficial sources. The Government also announced that the target for reserve stocks above the commune level had been increased from 40 to 60 million tons, with the intention of eventually increasing stocks to 80 million tons.

In spite of these considerable reserves, China continued to buy foodgrains (mostly wheat) from some of the major exporting countries such as Australia, Canada and Argentina. The main reason seems to have been that, at its present stage of development,

China does not attempt to create a unified national market for major food commodities, but prefers to let regions and provinces build stocks at varying rates. Patterns of nutrition have rapidly changed towards greater consumption of wheat products, such as bread and noodles, particularly in the densely-populated coastal urban areas which for more than 100 years used to draw on grain shipments from overseas. Taking advantage of the much higher rice prices in the international markets, China exported to southeast Asia some of the rice surplus from the central and southern high-yield areas, such as the Yangtze delta and Guangdong, thus financing the larger part of her wheat imports.

The new Fifth Five-year Plan (1976-80) will attempt to bring considerable qualitative changes in the economic management of agriculture, with emphasis on farm mechanization. Steps leading to this goal were prepared by two All-China Conferences : the First National Conference on Agriculture in Tachai in September-October 1975, and the Second National Conference in December 1976 in Peking. The first of these conferences was followed by several major sectoral meetings, e.g. on forestry, aquatic production and agricultural meteorology, before the Second Conference reviewed and then revised, where necessary, the general guidelines of the plan prepared 15 months earlier.

The Fifth Plan reaffirms the priority of general socio-political objectives over purely economic ones in the Chinese development strategy. The Second National Conference added the warning that the plan targets would have to be achieved through enhanced diligence, economy and a hightened sense of responsibility towards the common task, as recent experience had shown that China's agriculture still had a considerable way to go in making the country more secure in its food supplies. This experience in 1977 included severe earthquakes in the coastal northeast, central regions and the southwest, and drought elsewhere.

Although China has nearly reached a 300 million ton grain harvest, which 20 years ago was considered to be close to nutritional abundance, the Government has apparently now set its sights still higher, partly because food security margins have been raised in the light of experience, and because the country's agricultural potential has not yet been fully utilized. In this respect, the central authorities draw inspiration from the achievements of what was one of the poorest agricultural districts in an already notoriously poor province, Hsiyang Hsien (County) in Shanxi, the seat of Tachai village, the renowned model brigade and pacesetter in rural development. Hsiyang County itself also won acclaim as an outstanding case of rural reconstruction and diversification on the basis of self-reliance, i.e. independently from government initiative and assistance. The Government, on the basis of the experience gained in Tachai in intra-communal development, and in Hsiyang County, in inter-communal cooperation and area development, now wants to extend these lessons to the country as a whole. Accordingly it has made the emulation of these two examples a major goal of the plan. According to reports from the first Tachai Conference, about 330 counties had already reached the Hsiyang level by the end of the Fourth Plan period, and about 100 more attained this level in 1976. The target for 1980 is to have at least a third of China's 2,200 rural counties on the level of Hsiyang County.

This level, as far as production and service standards are concerned, is one where per caput production of foodgrains has exceeded the minimum set by the government, where the state procurement of grain has reached approximately 30% of total production, and where production has been diversified to the extent that a significant part of total output consists of cash crops, animal products and miscellaneous produce. The level of accumulation (i.e. internal capital generation) should have reached or surpassed 20 to 25% of the collective's gross revenue. A "high level of collectivity" should have been attained, i.e. the share of the higher levels of the production collectives (the brigades and communes), both in productive assets and in collective income, should exceed that of the production teams. The production and service infrastructure of the county should be "well developed and diversified", and the network of research and extension facilities should be comprehensive and effective. The productivity and income of the poorer production teams should be approaching the present level of county averages. Finally, 70% of the main aspects of production should be mechanized.

The two National Conferences characteristically prescribe the way to manage these advances primarily in political terms. In order to turn a county into a Hsiyang-type Hsien, it is first necessary to intensify "ideological rectification and mobilization", and to have sufficiently politically motivated activists on the revolutionary (management) committees, not only at the county level itself but also in the corresponding communes and brigades.

It is expected to achieve two goals: slow but tangible increases in rural personal incomes through improvements in global output, and in individual productivity, and to increase the degree of equality between individual producers. Here the rough guideline is that the top personal income decile should maintain the level of affluence already attained, while the lower nine tenths should increase theirs, the poorest to the level of present county averages. At the same time, further diversification of production should make possible large increases in the revenue available for capital formation.

Recent expansion in irrigated area, in the use of high-yielding varieties, in intercropping (particularly of cash crops) and in livestock production has greatly increased the labour requirements of China's agriculture. During the last plan period many communes from all parts of the country reported that labour shortages, previously only seasonal, had become a pressing problem. Their experience is supported by projections of manpower requirements for agriculture prepared for the Fifth Plan period (1976-80), which indicate that they will double unless large-scale mechanization is carried out. A key element in the Fifth Plan is thus a programme of farm mechanization. The technical implementation and financing will be left to the counties and communes, so that the whole programme will proceed at different rates and forms in various parts of the country. The central government will not impose standard production models and processes, and will in general encourage a decentralized approach. Machines and equipment will, as far as possible, be produced in the 800,000 industrial enterprises already operating in the commune sector.

LATIN AMERICA

In comparison with Africa and the Far East, Latin America did relatively well in food and agricultural production during 1970-76. Per caput dietary energy supplies exceeded minimum nutritional requirements, although as many as 10 to 12 smaller countries continued to have a deficit of dietary energy at the national level. There remained, of course, a substantial maldistribution of food supplies in relation to nutritional requirements within each country, as a result of the pattern of income distribution.

National efforts to formulate and execute food and nutritional plans are still at an early stage in Latin America, but progress has been made in DD2. This is the first item reviewed below. Then follows an examination of recent changes in government policies affecting agricultural prices. Recent trends in agricultural imports and exports are then discussed. This is followed by an account of the efforts made to overcome some of the trade and other problems through various kinds of regional and sub-regional economic integration. A final section discusses land utilization in the region, including the future potential and the sources of production increases.

FOOD AND NUTRITION POLICIES

Governments have given increasing attention to problems connected with food and nutrition. Nevertheless the levels of nutrition of broad sections of the region's population remain below minimum requirements. A national approach has been adopted towards food and nutrition problems in some countries, following the limited success of earlier, more narrowly conceived programmes, which were often restricted to particular areas. Although national food policies tend to be wider in scope and are often set in the framework of economic and social development planning, a common difficulty is the coordination of different ministries and agencies in the attempt to develop comprehensive and efficient nutritional programmes. There is still a large number of countries where national food policies are not set in any comprehensive strategy, mainly in those where nutrition levels tend to be lower.

As far back as 1970, Latin American Ministers of Agriculture and Health agreed independently to recommend to their governments that national health and nutrition policies should be an integral part of national planning. They also requested FAO, WHO and UNICEF to develop a plan to promote the formulation and development of food and nutrition policies in all countries of the region.

During the next few years, some countries (notably Brazil, Colombia, the Dominican Republic, Jamaica and Peru) made significant attempts to include food and nutrition policies in their national planning efforts. With the assistance of FAO, Brazil and Peru carried out national food consumption and household budget surveys, which provided a basis for studying the relationship between socio-economic variables, levels of food intake and nutritional requirements, so as to formulate food and nutrition policies and programmes. Other important developments at this time were the establishment of national food institutes in Brazil and Chile, of a Ministry of Food in Peru, and of national food councils in Bolivia, Colombia, Ecuador, Paraguay, Venezuela and various countries of central America and the Caribbean. National action along these lines was encouraged by the Andean Group and the Central American Common Market. In 1971, the Institute of Nutrition for Central America and Panama reorganized its Department of Applied Nutrition to give its member countries special support in the development of food and nutrition policies. The Caribbean Food and Nutrition Institute undertook similar work in the English-speaking countries of the Caribbean.

By 1976, detailed food surveys had been carried out in Bolivia, Honduras and Paraguay. National food policies had been adopted in Bolivia, Cuba, the Dominican Republic, Paraguay and Venezuela, and nutrition programmes had received further

impetus in Brazil, Colombia, Chile and Mexico. National and international food and nutrition institutes in the region had generally been strengthened, with larger funds and increased staffing. Training, research and methodology were receiving more attention.

Thus there has been an attempt in many Latin American countries to achieve some degree of integration and coordination in developing their food and nutrition programmes. National programmes vary considerably, however, in their strategy, objectives and specific policies, partly reflecting different political philosophies. There is still much that is unknown about the actual state of nutrition among large segments of the national populations, which makes it difficult for governments to formulate realistic nutrition policies. Moreover, the main prerequisite of any solid and lasting improvement in levels of nutrition is the removal of extreme poverty among large groups of people, particularly in rural areas and in the rapidly growing urban slums.

Problems have included the shortage of well-planned programmes and projects. The methodology of nutritional surveillance is still at an early stage. There is a shortage of funds and trained staff. The nutrition institutes are sometimes isolated from each other, and from the ministries concerned with food and nutrition programmes. These institutes have not always provided the results expected from them, particularly if they are organized on traditional lines. Practical difficulties in achieving multisectoral programmes through institutes of this type have often been severe, as change is resisted. If specialized national organizations are formed to overcome this problem, they may find their effectiveness limited by conflict with the older, better established institutes.

Governments need considerable time to overcome these initial problems in their attempts to develop comprehensive, valid and efficient nutritional programmes. Such programmes cannot be effective in the long run unless both political and financial support is forthcoming on a regular basis. Frequent changes in administration and in policy directives create uncertainty and delay, and often bring programmes to a complete halt. Expressions of political support for food and nutrition planning have not been lacking in Latin America in recent years, but they have not always been accompanied by appropriate decisions, and the allocation of adequate financial and technical resources to accomplish the stated objectives. Furthermore, sharply rising food prices and high rates of inflation have made it very difficult to achieve more than limited progress in improving the diets of the poorest groups.

AGRICULTURAL PRICE POLICIES

Nearly all national development plans and policy guidelines in Latin America refer to the need to provide farmers with remunerative prices, while safeguarding the interests of the consumer. These twin objectives may not necessarily be contradictory. In practice they often mean double expenditure from the government: price supports to producers and consumers subsidies. Latin American governments have shown a decisive preference for intervention in the markets for essential foods, in order to exercise some form of control through market regulations. This intervention affects both internal and external trade. Thus, given both structural imperfections and price controls, producers and consumers in Latin America seldom benefit from the specialization in production and exchange which unrestricted markets can bring about. Whether justified or not, the generally accepted position is that, given the imperfections of existing market systems, public intervention is necessary to protect both producers and consumers from monopolies, foreign dumping and other forms of "unfair competition", and especially from unnecessary and wasteful middlemen.

Policy choices relating to farm prices involve a wide variety of vital and often conflicting problems which raise both economic and social issues. Price policies are generally defined at the highest political level. The actual formulation and implementation of price policies in most countries is the shared responsibility of many government agencies. Coordination is generally entrusted to the Ministry of Agriculture, but its work is complicated by the growing tendency to establish price policies by product, or group of product, which may result in a large number of different agencies operating with various degrees of coordination or even autonomously. In such circumstances, the

Ministry of Agriculture may be reduced to taking only administrative action, and policy is decided elsewhere. Policy decisions are often the result of bargaining exercises involving representatives of the parties, e.g. producers and middlemen, directly concerned, whilst consumers' interests are left to be defended by their own organizations and by the government. Under these conditions "political prices", relating to short-term social, rather than economic, factors are common in the region. Regulatory measures are commonly taken at all levels of the marketing chain, and may include farm price support, consumer price control, anti-speculation measures, and direct government buying and selling in domestic and foreign trade.

Producer prices

At the producer level, government action has tended to produce results which give farmers lower prices than they would receive under "free" market conditions for staple commodities, in an attempt to hold down consumer food prices which are a very large component of the overall cost of living. Experience in Latin America has shown that official reluctance to raise government controlled food prices has contributed to food shortages by providing farmers with insufficient incentive to increase production. The resulting shortages have brought increases in food prices that are perhaps greater than those that would have been necessary to bring forth a sufficient increase in domestic production. However, in recent years there have been encouraging signs that some Latin American governments are more aware of the harmful effects of domestic price controls which discriminate against their agricultural sectors, especially when they coexist with more liberal policies for agricultural exports. Revised domestic farm prices are now in effect in such countries as Argentina, Brazil, Chile, Colombia, Ecuador and Venezuela, with the objective of self-sufficiency in some staple food commodities.

Nevertheless, nearly all countries in the region exercise some form of downward pressure on producer prices. The controls have varied widely between individual countries, and at different times. In 1976, for example, there was limited control of producer prices in Nicaragua and Venezuela. Colombia controlled the prices of only a few products, including coffee and unprocessed milk, Brazil beef and milk, Mexico sugar, and Ecuador wheat and unprocessed milk. On the other hand, price controls at the producer level in Costa Rica, Paraguay, Peru and Uruguay covered the whole range of major agricultural commodities. Price control may sometimes be very rigid. For instance, milk prices remained completely frozen in Ecuador between 1964 and 1969, and were adjusted only a few times until 1974. In Peru, producer prices of potatoes remained restricted for long periods, while pesticide and fertilizer costs doubled in a single year. The inevitable consequence was a sharp fall in potato plantings and short market supplies. It is not difficult to present other examples of this type, but no systematic attempt has apparently yet been made to assess the net effect on supply response of government controls over producer prices in Latin American countries. Certainly there is clear evidence in most of these countries of a widening gap between producer and consumer food prices, which only partly reflects the improved marketing services provided.

Although price controls may act as a disincentive to farm production, price support programmes can act as a positive element, especially in national programmes aiming at self-sufficiency. In Latin America, price support is generally operated through government purchasing agencies, which offer to buy (under specified conditions) approved commodities at guaranteed prices. In some countries, as in Colombia and Mexico, a flexible system of "floor prices" is adopted, by which the government sets minimum prices but permits free sales on any better conditions the market can offer. In other cases, for example oilseeds and vegetable oils in Venezuela, processing firms are required to pay minimum prices when purchasing direct from producers. In Paraguay, farmers may receive "deficiency payments" for wheat to make up any difference between the market price and the (lower) guaranteed minimum price.

The effectiveness of price supports depends not only on good administration but also on adequate funds, and both have often been lacking. On the other hand, an efficient operation can lead quite rapidly to encouraging results, as with the successful expansion of soybean production in Brazil during the 1970s, and the large increase in wheat production which accompanied it (wheat in Brazil is increasingly being double-cropped with soybeans). In Colombia, support prices for selected commodities, based on average production costs on medium and small farms, are generally lower than commercial prices, but nevertheless seem to influence production and marketing. Purchases by the Colombian Marketing Agency (IDEMA), which, for example, purchased all the wheat offered from the 1976 main harvest, can be substantial when farmers encounter marketing difficulties. Such actions give valuable security to farmers by preventing "distress selling". This particular agency also plays an important role by its influence on planting programmes; a temporary freeze on raw cotton prices in April 1977 was designed to lead to larger plantings of beans, maize, rice and sorghum, for example. In Mexico, the system of farm support prices is similarly regarded as an effective means of influencing farmers' planting intentions. The large-scale abandonment of cotton in Mexico in 1975 in favour of price-supported crops is a successful example of this kind of operation. Support measures are sometimes coupled with regulations designed to limit their application to designated groups of farmers. In Mexico, maize prices were recently guaranteed at relatively high levels, but permission to plant maize was restricted to certain areas where traditional methods of cultivation were practised.

Argentina presents an example of a country where substantial agricultural policy changes have recently been carried out, mainly through changes in price supports and trading regulations. In place of low farm prices paid by state monopoly agencies prior to March 1976, price levels are now more in line with world market prices; domestic price controls on food items are being progressively eliminated; export taxes are being abolished, and the monopoly element of the meat and grain boards eliminated. The response of producers to the new measures has been positive and immediate.

In the central American countries, the influence of government price support and purchasing measures has been limited. With the exception of Costa Rica, and to some extent Guatemala, government agencies in this field are greatly limited by inadequate funds and storage facilities.

Government subsidies on such items as fertilizers, pesticides, improved seeds, and occasionally farm implements are not uncommon in Latin America. They have not, however, succeeded in holding down the rapid rise in the costs of these items during most of the 1970s.

The most encouraging developments relate to the gradual shift in Latin America from government policies which control producer prices, often at uneconomic levels for the majority of small and medium farmers operating within traditional systems, to systems of minimum guaranteed prices. There is also evidence of the liberalization of procurement policies, export controls and taxes in some important Latin American countries. Recent high international coffee prices, however, have moved producing countries to renew temporary export taxes and controls. The actual benefit of these programmes is extremely difficult to assess, especially the distribution of the benefits between large and small farmers, consumers and taxpayers. As the aggregative supply response for many farm products is highly inelastic, large incentives (including subsidies) may be needed to bring forth relatively small additions to output. Although information is available in most Latin American countries on the direct cash costs of government farm price support and other similar measures, this is only part of the picture. Some attempt has to be made to measure their social cost in terms of misused investment (as judged by other alternatives available), distortions in trade, prices and factor utilization, and regressive patterns of distribution among different social and economic groups. It is not yet clear which are the main beneficiaries, although it is often held to be the large modern farm enterprises. A common thesis is that programmes which establish price supports on the basis of costs of production on small and medium farms give major benefits to the larger farmers, who are able to lower costs through extensive mechanization of a kind which the smaller farmers are unable to adopt.

Consumer food prices

The problem of rising consumer food prices in Latin America during the 1970s, particularly during 1974 and 1975, is obviously closely linked to the general inflationary process which has affected most countries. It is a familiar problem in the region, with no easy or short-term solution. There were, however, some unusual features in the recent inflationary upsurge, in that it occurred simultaneously in all countries of the region, its scale was particularly severe (the annual average increase in consumer food prices in the region was about 30% in 1974 and 20% in 1975, compared to about 10% in the early 1970s 4/), and it occurred in a period of unusual market and monetary instability. In this context, the food sector played a major role, as until 1975 food prices tended to rise faster than other prices in most countries of the region. Also, with incomes lagging behind prices, expenditure on food tended to take an increasing share of incomes, particularly during 1973-75.

While the influence of outside forces, especially higher import costs for energy and other inputs, was common to most Latin American countries, the upsurge in food prices presented its own set of characteristics in each country. A wide diversity of anti-inflationary policies and measures were used to cope with the problem. Apart from the classically accepted measures to check internal demand (fiscal, credit and monetary), the efforts of many countries were concentrated on external sources of inflation, as is discussed later. A number of measures were also introduced, or reinforced, to mitigate the effects, rather than eliminate the causes of rising prices. In particular, nearly all countries in Latin America intervened directly through statutory price control and, in some cases, consumer subsidies. The methods of control ranged from price freezing over variable periods of time (fluid milk prices were dealt with in this way in a number of countries), to informal agreement with wholesale distributors and supermarkets to hold down prices (as in Brazil). In nearly all countries, retail price ceilings were successively fixed for cereals, pulses and meat. Measures to protect consumers were also undertaken in some cases through direct subsidies, as for wheat in Brazil (still in operation) and in Colombia (in 1973 and 1974). The Federación Colombiana de Cafetaleros also provided subsidies to coffee roasters, this being a direct benefit to consumers. Beans in Costa Rica, soya in Ecuador and powdered milk in Venezuela are other examples of foods benefiting from government subsidies.

Foreign trade policies

Foreign trade policies have been an important influence on the prices of food and agricultural commodities in Latin America. In the complexity of changing and often conflicting trade regulations, it is often difficult to decide exactly what policy line a particular government is following. It appears, however, that the countries of the region can conveniently be placed in two groups.

The first group, typified by Bolivia, Costa Rica and Ecuador, have adopted a protectionist attitude towards foreign inflationary pressures. Exchange rates were kept stable in an attempt to mitigate the effects of rising import costs, resulting in a gradual over evaluation of the national currency, and in effect a subsidy on imports and a penalty on exports. At the same time, import restrictions were reduced or even completely lifted, control over internal prices, especially food prices, was strengthened, and wage increases controlled. The effect of these measures was generally insufficient to reduce external pressures on prices to any significant extent.

The second group of countries, including Brazil, Colombia and Uruguay, chose to live with "imported inflation" and adjusted their policies along more liberal lines. National currencies were successively devalued, in close relation to the movements in internal prices which were aligned to international quotations. Argentina and Chile have lately moved progressively towards free trading systems. In 1976-77 "imported inflation" has tended to slow down, as grain prices and other commodity quotations on the world market have fallen somewhat.

Policy measures relating to agricultural trade have varied widely according to the country and time period, but countries following broadly liberal or protectionist

4/ Excluding the extreme cases of Argentina and Chile; the figures are rounded.

policies have used similar measures at one time or another. In the export trade, objectives have included the stabilization of export earnings, the restriction of exports in order to ensure larger domestic supplies, and tax incentives for export commodities. In some countries exchange rates were manipulated to promote exports. In Brazil, for example, the coffee industry benefited from a system of multiple exchange rates, and in Argentina in 1976 meat producers gained in a similar manner. However, while multiple exchange rates helped in some cases to increase or stabilize export earnings, they also introduced an element of market distortion or uncertainty. Under the new move to trade liberalization in Argentina, the official aim is to have "realistic exchange rates". Export taxes, which represented about 70% of all taxes paid by the agricultural sector in Argentina, are being progressively eliminated. Tax refunds on exports, in particular of dairy products, were abolished in 1975.

Export bans and controls operated both as a means to provide government revenue, and in order to release supplies for domestic consumption. Recent examples of export restrictions designed with the explicit purpose of protecting supplies for domestic consumers are those in Argentina temporarily banning all exports of milk products, in Brazil controlling exports of beef and sugar and penalizing exports of groundnuts and soybean oil, in Colombia suspending potato shipments to Europe and applying severe controls over the sale of cattle to Venezuela, and in Guatemala forbidding all exports of staple grain.

Government policy towards control over food imports ranges from virtually monopoly control over essential food items to no intervention in the import trade, and even import subsidies. In numerous cases where purchases are handled by government trading bodies, taxes and duties are not applied, but prices tend to be aligned to domestic levels. Imports are frequently allowed as a last defence against consumer pressures arising from food shortages and high prices. In Colombia and Ecuador, for example, a common practice has been to allow imports of substantial volumes of skim milk powder in preference to allowing price increases. More generally, import requirements are forecast and budgeted on an annual basis. Peru, for example, fixes annual import targets for all staple commodities, although the system has proved somewhat rigid, contributing only marginally towards reducing price fluctuations on the domestic market. Chile's imports of basic foods are now subject only to sanitary controls. An example of import subsidies is found in Venezuela, where the price of bread wheat imports was subsidized until 1976.

In the context of foreign trade policies, mention should be made of the numerous efforts to stabilize agricultural prices and coordinate price policies within the framework of the existing regional integration schemes. Unfortunately, little progress has been made so far, beyond agreement upon general principles. Partial success has been achieved in negotiations on individual commodities, such as the agreement by the Union of Banana Exporting Countries to work towards the establishment of a common price policy. In this general field the creation of the Latin American Economic System (SELA) has brought some new expectations.

AGRICULTURAL TRADE

Most Latin American countries depend on agricultural exports to earn a large part of the necessary foreign exchange to cover their import needs, including those required for development. Yet in recent years (except in 1976 when the trend was sharply upwards) the region's agricultural exports have increased at the very low rate of about 1% annually, compared to almost 4% worldwide. It follows that in the long term Latin America's share in world agricultural exports has been steadily falling. The main agricultural exports of the region are still coffee, sugar, beef, cotton, soybeans, maize, bananas, cocoa and fishmeal. Trade in these commodities tends to have certain basic characteristics which place a limit on the more rapid expansion of exports. There is, for instance, a marked tendency to depend on a small number of markets outside the region, and for individual exporting countries to rely heavily on a very limited range of commodities, which are often vulnerable to large fluctuations in prices. The large volume of exports offered in several major commodities by Latin American exporters faces an external demand

which is not stable, but moves closely in line with the economic prosperity or otherwise of the main importing countries. Such is the position for coffee, bananas and sugar, for which supplies from Latin America represent nearly 60% of the world total. Despite improved export earnings in 1976, due to the economic recovery in the industrialized countries and to world shortages of coffee, cocoa, fishmeal, soybeans and cotton, the instability of these earnings remains a major obstacle to development in the region.

Agricultural exports from Latin America are also influenced by a number of international agreements. New agreements for coffee, cocoa and sugar, for example, have recently been negotiated between producers and consumers. In March 1974 Colombia, Costa Rica, Guatemala, Honduras and Panama established the Union of Banana Exporting Countries, and agreed on cooperation in pricing and marketing. By the end of 1975 an export quota system was proposed, and in 1977 a Multinational Banana Trading Company was created.

Under the Lomé Convention of February 1975, special market concessions were established for bananas, cocoa, coffee and sugar, benefiting the EEC's former colonies in Africa, the Pacific and the Caribbean. As the EEC represents more than one third of world imports of coffee and cocoa, two thirds of the banana imports and one tenth of sugar imports, this agreement has had considerable impact on international markets. Before this convention the EEC received nearly two thirds of Latin America's banana exports, one third of its coffee exports and one fifth of its cocoa exports. Since this preferential market came into effect, the exports of Latin American countries (except Barbados, Jamaica and Trinidad and Tobago) have been adversely affected.

Although the volume of Latin American exports of several major commodities actually declined in the first half of the 1970s, the total value of agricultural exports in current prices increased sharply between 1971 and 1975, at an annual rate of 24%. This enabled Latin America to maintain its share of about 13% of the value of world agricultural trade. During this period about 65% of Latin America's agricultural export earnings came from only five products: coffee, sugar, bananas, beef and cotton. Many countries in the region received more than 75% of their export earnings from three or four products. For instance, bananas, meat and sugar accounted for 98% of Panama's agricultural exports, while sugar, coffee and cotton provided 94% of those of Peru. Although soybeans and other fats and oils increased their share of total regional exports from 2% in 1950 to 12% in 1975, the diversification of agricultural exports remains slow. Trade flows are mainly to developed regions, particularly to North America and western Europe (75%), although trade with eastern Europe and the U.S.S.R. (15%) and intraregional trade (10%) have increased considerably in recent years.

The expansion of agricultural exports to both developed and developing countries has been hindered by several factors operating simultaneously, including changes in consumer preferences, the imposition of quota controls and more restrictive sanitary and quality controls in importing countries, and the provision of export incentives by governments in competing countries outside the region. As already noted, the closer trade ties between member countries of the EEC and their former colonies, and the preferential treatment accorded them, has also had a limiting effect on market access. Growing competition from synthetics has also been a discouraging factor for such important items as cotton.

The general move towards greater protectionism, which has been particularly apparent in the recent years of world recession, has made it increasingly difficult for Latin American exporters to organize supplies, and to take decisions relating to investment and production plans. Even within the same region, there are barriers to agricultural trade despite some progress in economic integration.

However, not all the problems affecting the region's export trade can be blamed on external factors. There are some internal factors that affect production, marketing and distribution. Exports are lost through poor marketing techniques and lack of up-to-date market information, slow progress in adopting new technology, inadequate transport, storage and processing facilities, shipment of goods below international standards, and insufficient official encouragement to export new agricultural items.

The slow rate of expansion of agricultural exports is in marked contrast to rapid increases in agricultural imports. The volume of agricultural imports increased by 6% a year during the 1960s and 12% a year in 1971-75. The major increases in food imports have been in Brazil, Mexico and the Andean group of countries. The steadily increasing dependence on imports is particularly marked for certain basic items such as edible oils, wheat and dairy products. An exception is beef, which represented 21% of the regional total of food imports in 1955-60, but only 6% in 1960-65 and slightly below 2% in 1971-75. On the other hand, imports of cereals amounted to 60% of the total in 1971-75, compared to 46% in 1965-70. One result of the increasing use of cereals for livestock feeding in Latin America (particularly for poultry production) and of the larger cereal imports it has involved, is a decline in the self-sufficiency ratio for this item in many countries. Self-sufficiency ratios have increased for other products such as cotton and sugar. However, it must be stressed that for some commodities (such as cereals, vegetable oils and meat) the regional producers prefer to sell to their traditional European and North American markets, while importers show a marked preference for extraregional suppliers. Several factors, such as favourable terms of payment, regular contracts and financial assistance, as well as consumer preferences, explain this situation.

REGIONAL ECONOMIC INTEGRATION

Experience has shown that the inclusion of agriculture in regional integration arrangements involves many difficulties. A basic difficulty in Latin America is that national agricultural industries tend to be competitive rather than complementary. A related problem is that the most progressive and responsive part of these industries is generally directed towards export markets outside the region. There is obviously less scope or urgency for regional integration of export agriculture of this kind. If a number of countries in Latin America producing a common export commodity wish to cooperate, they can do so without requiring a regional integration programme. Similarly, there are a number of desirable regional actions in agriculture which can be taken without integration, for example the development of a shared natural resource such as a river basin. The fact that integration schemes are not needed for these and other forms of cooperation in agriculture makes governments less concerned to support integration for this sector. On the other hand, regional integration forms a natural framework for such cooperative efforts and its existence should encourage these forms of cooperation. It must be stressed that existing integration schemes have generated a set of actions and treaties that have led to the progressive identification and less reluctant acceptance of areas for cooperation in the social, economic and even the political field.

Governments in Latin America, as in other regions, are often unwilling in practice to encourage changes which might increase their dependence on other countries for food supplies, even those within the same regional integration scheme. The maximum feasible extent of national food self-sufficiency is a deeply ingrained policy goal, whether it is explicit or not. It takes time for governments to be persuaded that an appropriate degree of regional self-sufficiency is a better and more feasible economic goal than the target of higher degrees of self-sufficiency primarily at the national level.

Unlike the initial situation in the regional integration of developed countries, among developing countries the distribution of benefits from the integration of industry can be achieved largely in the course of assigning new manufacturing plants among members. Thus (contrary to the situation in the EEC, for instance), there is usually no need to bring agriculture into an integration scheme among developing countries in order to achieve a politically acceptable initial distribution of benefits from freeing trade in manufactures. This reduces the political necessity of including agriculture or of giving it a high priority in integration policies. These policies in Latin America, as in most other developing regions, have continued to reflect the primary purpose of integration schemes in these regions, which is to establish and foster industry.

A further difficulty concerning agriculture in regional integration in Latin America has been the general backwardness of the sector and of its infrastructure. Transport and communications tend to be poor. Market information is scanty and often unreliable, and a large part of farming is outside the money economy and thus outside any immediate integration influence. Price levels for different products vary widely among countries, and as they often tend to be "political" prices there would be difficulty in exposing them to the impact of freer trade within the region. This underlines one of the basic problems of integrating agriculture in Latin America. Countries do not generally have the administrative or financial resources required for a system of marketing which frees trade to a significant extent, but also protects farmers from price fluctuations and from the full impact on the incomes of high cost producers stemming from competition from cheaper regional supplies.

Faced with the difficulties outlined above, it is not surprising that only slow progress has been made towards regional agricultural integration in Latin America during the 1970s. Efforts so far have mainly involved establishing the framework for eventual integration, including the maintenance of a regional information system on markets and prices for member countries' agricultural products (for example, in the Andean Group and the Central American Common Market), and establishing a system of sanitary measures to facilitate the flow of trade in products meeting the minimum standards. There is also a cereal agreement in the Central American Common Market, with the purpose of achieving self-sufficiency in basic grains before the end of the decade.

The integration movements in Latin America have recently entered a new transitional period of adjustment to changing national and external situations. This has entailed some changes in the ideas and mechanisms to achieve integration. To achieve regional unity in the face of external trade restrictions, and to adopt joint measures leading to a New International Economic Order have been strong political motivations in Latin America during the past few years.

The Andean Pact faced a major crisis after Chile's withdrawal in October 1976, for that country was considered to have a greater variety of temperate products to offer the other members in exchange for tropical products. The five remaining members have made efforts to develop new forms of cooperation, adopting a "specific projects" approach that may not necessarily involve all members. They have created as permanent arrangements an Agricultural Council and an annual meeting of Agriculture Ministers, which address requests for action in particular fields to the secretariat.

An encouraging recent development has been the success of the Caribbean Common Market in establishing the Caribbean Food Corporation as part of a major effort to change the production structure in the area, in order to reduce its large annual food import bill and help to eradicate malnutrition among the 4.5 million people of the Caribbean Community. The Latin American Economic System (SELA), whose main purpose is to institute a permanent system of intraregional cooperation, consultation and coordination of the position of Latin America in both international economic agencies and fora and in relation to other countries and groups of countries, has already carried out some important measures affecting the agricultural sector. These include the adoption of common policy lines in trade negotiations, and the organization of a programme of food and agricultural cooperation under which Action Committees are to be created for grains, fruit, oilseeds, meat, dairy products and fisheries, as well as for some agricultural inputs. A feature of SELA is that its measures need not be followed by all member countries but may concern only some of them. Its aim is to strengthen existing integration programmes rather than to absorb them.

LAND UTILIZATION

Long-term trends

The agricultural sector in Latin America has greatly benefited from the extension of the cultivated area. This has been achieved mainly through the extension of agricultural frontiers, especially in some regions located by the great river basins, and through the better utilization of land already incorporated in production areas. The expansion of the harvested area in the past 25 years has come mainly from the cultivation of permanent pastures, which are themselves displacing woodlands and forests.

The total harvested area [5/] increased from 53 million ha in 1950 to 97 million ha in 1976, or at an average annual rate of 2.3%. However, the annual rate fell from 2.7% in the 1950s to 2.5% in 1960-65, 1.6% in 1966-70, and only 0.8% in 1970-73. From 1973 onwards there was a renewed interest in agriculture, reflecting the general improvement in world markets and prices, and in only three years (1973-76) over 10 million ha of additional land were brought into production.

Increases in the cultivated area were very moderate in some countries, such as Argentina, Chile, Cuba, Honduras, Trinidad and Tobago, and Uruguay. Countries where there were considerable increases include Bolivia, Brazil, Costa Rica, Ecuador, Mexico, Panama and Paraguay. Brazil is perhaps the most outstanding case, as the cultivated area has passed from 17.5 million ha in 1950 to 44 million ha (45% of the regional total) in 1976.

The composition of the cultivated area by type of crop has undergone some interesting changes. The relative importance of cereals has decreased, although they still account for 53% of the total area. The same is true for coffee, tea, tobacco, cotton and other natural fibres, roots and tubers, and fruits. In contrast, the share of oilseeds in the total cultivated area rose from 6% in 1950 to 12% in 1976, reflecting the extraordinary expansion of soybeans in recent years.

The irrigated area was 12.2 million ha in 1975, or twice as much as in 1950. Although only 8.6% of the total crop land [6/] is irrigated, the proportion is considerably higher in some countries, for example 35% in Peru, 22% in Chile, 17% in Cuba, and 16% in Mexico. The largest irrigated area (4.5 million ha) is in Mexico.

Available information on the land used for livestock production is insufficient to indicate accurately the changes that have occurred. But the availability of fodder has increased steadily, there have been moderate improvements in productivity (achieved largely through better feeding), and there has been a steady expansion in livestock numbers from 150 million head in 1950 to 265 million in 1976, or an annual increase of 2%. In central America the annual increase in livestock numbers was 3.2%, in Mexico 3.0%, and in south America 1.8%. There has been an increase in pasture land through the taking over of forest lands, some deterioration of natural pastures due to overgrazing, and a significant increase in cultivated pasture lands, including those improved through fertilization and the introduction of improved grasses and legumes. At present about 530 million ha of varying carrying capacity are estimated to be available for pasture, of which about 65 to 75 million ha are cultivated and improved pastures.

5/ Areas with double or multiple cropping are computed twice or more.

6/ Including arable land and permanent crops, temporary pastures, and fallow.

Recent trends

Between 1970 and 1973 there was only a very slow increase in the cultivated area. The crop area even declined in 1972, as a result of droughts and other unfavourable weather. But from 1973 there have been major increases, especially in the land devoted to annual crops (notably soybeans), as interesting possibilities have developed in export markets. In 1974 about 2 million additional hectares were harvested, in 1975 another 4 million, and in 1976 slightly more than 4 million, giving an average annual increase of 4%.

During this period of rapid expansion in land area, the world food crisis created some favourable opportunities for food exporting countries. Countries in the region with possibilities for fast agricultural growth tried to take advantage of these circumstances, in order to offset to some extent the adverse effects of the high costs of imported fuel. For this purpose, they provided additional economic stimuli to their farmers, such as attractive prices, favourable marketing conditions, better services, technical assistance and irrigation.

The most significant increases in cultivated area took place in central and south America, although the situation varied widely from one country to another. In the Caribbean, in contrast, there were no significant changes, although some countries, such as Jamaica, made special efforts to expand the harvested area. In Mexico there was only a slow expansion. The countries that seem to have reacted most quickly to these favourable conditions are Costa Rica and Nicaragua in central America, and Bolivia, Paraguay and particularly Brazil in south America. Argentina showed considerable expansion, but only very recently. Brazil had the largest absolute expansion in land area. After having added an annual average of nearly 800,000 ha during the past two decades, Brazil has added another 2 million annually during the 1970s, and contributed about three quarters of the regional increase in 1970-76.

The expansion in the cropped area has mainly affected two groups of products, cereals and oilseeds, for which international prices increased considerably in the mid-1970s. Between 1973 and 1976, 7 million additional hectares were planted to cereals (especially maize, sorghum and wheat), and nearly 3 million to soybeans. In contrast, there was no major increase for such basic domestic food crops as beans, cassava and potatoes.

Total pasture land appears to have increased in 1973-76, despite a reduction in some countries which partly reflected the deterioration in international markets for beef and dairy products, and the better returns to be gained from some export crops, like soybeans.

Potential land area

The recent decline in international prices of cereals and sugar, and more recently still of oils and oilseeds, will undoubtedly lead, in the short run at least, to a slower expansion in the cultivated area. However, very large expansions are still possible in the future. About 1,400 million ha of the geographic area of Latin America (2,050 million ha) are estimated to have some potential for agriculture or forestry. The most recent estimate is that about 575 million ha can be cultivated, the rest being land with some potential for natural or improved pastures and for forest exploitation.

At present about 140 million ha are cultivated, or about one quarter of the total potential area. Pastures could also be expanded far beyond the 530 million ha existing today. Although this would mean some reduction in forest lands from the present 1,000 million ha, improved forest exploitation and management could undoubtedly give large increases in forest products.

It must be recognized, however, that the assessment of land and water resources is still very inadequate in large zones, particularly in the Amazon basin. Experience also shows that most detailed studies tend to be less optimistic than previous less detailed evaluations, as has occurred, for example, in Chile and Uruguay. Furthermore, as is discussed in Chapter 3, there are serious limitations on some of the soils of the region. A preliminary evaluation of the Amazon region, the largest and least populated of south America, concludes that 90% of the soils in this area have low natural fertility, and that their utilization also requires protection against floods and drainage and conservation measures. 7/

Although the maximum cultivable area in Brazil might reach 300 million ha (out of the total of 575 million ha for the region), it appears that about 100 million ha would only be suitable for permanent crops. Moreover much of the new land would be usable only after important constraints were removed. 8/

The main unutilized areas in the region are located in areas of difficult access, with poor weather conditions which hinder agricultural activities, and where available technology is still rudimentary. In these areas the investment needed for basic infrastructure is very substantial. Experience of colonization undertaken in the marginal zones of Latin America in recent years has been generally disappointing, not only because of the high cost involved but also because of the need, rarely fulfilled, for an integrated approach to this kind of development.

With a few important exceptions, probably most of the land which is relatively easy to occupy is already exploited. Although the extension of the agricultural frontier still offers good prospects for increasing production, these prospects are not quite as good as to justify statements such as "Latin America cultivates less than one fifth of its available land". On the contrary, intensifying land use appears to be, at least in the medium term, a major priority for expanding production in the region. In fact, the underutilization of already exploited land is a general feature in Latin America, even in its more densely-populated countries.

In central America the possibilities for expanding cropping areas, particularly those under long cropping cycles, are still quite good. Only about 40% of the total area of some 14 million ha estimated as suitable for cultivation is at present utilized for crop production. The remaining 60% is being exploited much more extensively, although most of it is already incorporated into farms. Its more intensive use, however, is subject to a number of constraints. Insufficient purchasing power prevents unsatisfied food needs from materializing into effective demand. Other constraints of an institutional character are associated with the existing agrarian structures and their negative effects on employment, income, and in some cases production and land utilization.

Nor are there any other important areas left for colonization in Mexico. Crops already cover more than half of the potential farm land of the country, and a large part of the remainder is along the Mexico Gulf coast and in Yucatan, where there are major technical and economic constraints. Insufficient and badly distributed rainfall affects about 80% of the cultivable land of the country.

In the Andean region, the occupation of new land presents similar problems, particularly with regard to annual crops like wheat. Chile has already completed its occupation of agricultural land. In other countries the best possibilities are in tropical areas with high humidity, such as the Orinoco and Amazon basins, where productive conditions are far from optimal. Bolivia can still expand its agricultural land, mainly in the Chaco area.

7/ FAO, Evaluación y Manejo de Suelos en la Región Amázonica, Proyecto PNUD/FAO RLA/70/457, Santiago, Chile, September 1972.

8/ SUPLAN, Oferta e Demanda de Terras no Brazil, Brasilia, 1975.

Argentina and Uruguay have long since finished their colonizing process, but may still double their cropland as limitations for annual crops (particularly wheat) are smaller. In Argentina this expansion can be achieved not only in the Pampas region and the Parana basin (provided flood control can be improved in the latter), but also in the Pampa borders and in the Chaco, where irrigation and drainage operations are more frequently required.

In both Brazil and Paraguay there is still considerable scope for expanding permanent pastures and croplands. As mentioned earlier, a high proportion of the potentially exploitable land in Brazil suffers from severe limitations, particularly in the Amazonian region. However, possibilities do exist and are still being made use of, mainly in the south and middle west. Even so, it will be difficult for Brazil to base its agricultural expansion upon land extension on the same scale as in the past. For this reason, research and technical assistance are now being given high priority in the development programmes of the country.

The potential for land expansion for livestock use has received even less study than that for other types of agriculture. However, considering that only a maximum of about 575 million ha could be used for cultivation in the region (20% of the total area), there should be no difficulty in expanding pasture. This could be done mainly in tropical areas, following the tendency observed during the last decades to grow pastures in the Amazon, along the central American Atlantic coast, in southeastern Mexico, and in the Orinoco basin in Colombia and Venezuela.

Sources of production increases

Crop production in Latin America has risen by about 3.5% annually during the last 25 years. The total harvested area has increased by an annual average of 2.3%, which implies that yields have risen about 1.1% annually 9/. Thus about two thirds of the increase in crop production has come from changes in harvested area, and only one third from higher yields. Although these proportions remained unchanged in 1970-76, it is reasonable to assume that yield increases are growing in importance. In the last few years, however, exceptionally good market conditions for certain commodities, such as soybeans, have led some producers with the opportunity to do so to take the quickest way to raising output by exploiting new lands, without much attention to efficiency.

The sources of production increases vary widely from one country to another. In Brazil, for example, the abundance of available land has favoured a strategy based mainly upon land expansion, which generated about 80% of the production increase during the last 25 years. If Brazil is excluded from the region, however, changes in yields appear much more important, with about 40% of the increase in output in 1950-76 derived from that source. This proportion rose from 50% in 1960-70 to 75% in 1970-76.

Improvements in yields are one indication of modernization in Latin American agriculture, but this process has gone together with mechanization, which does not necessarily lead to noticeably higher yields. Mechanization has mainly been based on the substitution of labour by machines in countries enjoying abundant land and with the possibility of incorporating new areas with good natural fertility. Some idea of the extent of farm modernization in Latin America is given by the rapid increase in fertilizer use, which (admittedly from very low initial levels) has increased twelve times since 1950.

9/ This figure implicitly includes the effects of changes in the pattern of production. While it has not been possible to identify these changes, they appear to have exerted a slightly negative effect, as the proportion of crops with the highest value per hectare (coffee, tea, tobacco, fruit, root crops and fibres) has declined.

During this period the number of farm tractors trebled, while both the agricultural labour force and the cropped area rose by only half.

In nearly all countries of the region, modernization has largely taken place among a relatively small number of medium to large farms. These enterprises generally occupy the best lands, and have benefited from a major share of the government support in the form of infrastructure investment, technical assistance, credit, remunerative prices and other incentives. While this group only contains a small proportion of all farms and farm families, it controls a very high proportion of all the newly exploited land. It has accounted for a high proportion of all farm production and of income increases during the past 20 to 30 years. At the same time, it seldom favours additional farm employment.

The negative side of this modernization process has been a worsening of the production problems in the traditional sector. Increasing pressure on land, and limited access to modern inputs, government assistance and improved marketing channels, has led to stagnation or even deterioration in the incomes of the majority of the agricultural population. This problem is all the more difficult to solve because of the structural characteristics of the agricultural sector in Latin America, with its high concentration of land ownership and the institutional control of labour.

NEAR EAST

The Near East is the only developing region which has achieved higher rates of growth in food and agricultural production in the 1970s than in the previous decade. Its performance in this area during DD2 has been outstanding, with annual growth rates for both food and agricultural production averaging about 4%. Dietary energy supplies for the region have remained close to minimum nutritional needs, although (as in the other developing regions) large groups of people continue to live on inadequate diets. The Near East also differs from the other developing regions in the opportunity provided by the recent large increases in oil revenues to increase investment in agriculture, so as to make it more self-supporting in its food supplies.

A key factor in this situation is the move towards closer economic integration. Recent developments in this direction are examined first, followed by an analysis of some recent and likely future agricultural investment strategies. Since a large part of the region is characterized by arid or semi-arid climatic conditions, their review is concluded by a discussion of desertification, and the steps that could be taken to halt it.

ECONOMIC INTEGRATION

Joint action in economic matters began to develop in the early 1940s. The League of Arab States 10/ was constituted in 1945, and was entrusted with the development of multilateral cooperation in economic and social development. An Economic Council was established, as well as various committees to deal with specific areas. The need for specialized agencies to undertake the necessary studies and provide expertise in specific fields led to the creation of organizations such as the Arab Organization for Administrative Sciences (1961), the Arab League Education, Cultural and Scientific Organization (1964), and the Arab Labour Organization and the Arab Organization for Standardization and Metrology (1965). Similar agencies dealing with agriculture were among the latest to be established, indicating that agriculture did not receive priority attention in the early efforts towards technical, economic and social cooperation. The Arab Organization for Agricultural Development was established in 1970, and the Arab Centre for the Study of Dry Regions and Arid Territories in 1971.

Various agreements, relating mainly to the development of trade relations, were concluded during the first decade of the Arab League's existence, but their effects on the expansion of trade were limited. The lack of a well-defined conceptual framework and of well-conceived programmes for joint action, as well as the strongly nationally oriented approach to economic development, were major obstacles at this time. It was only in the late 1950s that Arab countries became more aware of the need to develop cooperation within an agreed framework and through a phased programme of action. This led to the signature in 1962 of the Agreement of Economic Unity among Arab States, which came into force two years later after its ratification by five member countries. This agreement aims at the freedom of movement of persons and capital; freedom of exchange of domestic and foreign goods; freedom of residence, work and employment and exercise of economic activities; and freedom of transport and transit and the rights of ownership. To achieve these goals it stipulates the establishment of a common customs zone subject to a single administration; the unification of customs tariffs and regulations; the unification of import-export policies and regulations; standardization of transport and transit systems; and the coordination of monetary policies, as well as policies relating to agriculture, industry and internal trade matters.

10/ The member states of the Arab League are: Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, the PLO, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, Yemen Arab Republic, and Yemen People's Democratic Republic.

The Council of Arab Economic Unity (CAEU) was established in 1964 to plan and monitor the implementation of the agreement. One of its functions is to coordinate national development plans, including those concerning the agricultural sector.

In the same year the Maghreb countries (Algeria, Libya, Morocco and Tunisia) decided to set up the Maghreb Permanent Consultative Committee 11/. This was entrusted with the task of studying all matters concerning economic cooperation, and making proposals for joint action.

The establishment of the institutional infrastructure for the economic integration of the Arab world has continued rapidly since the conclusion of the Agreement of Economic Unity. In particular, the rapid increase in financial resources that has resulted from higher oil prices has brought the establishment of new financial and development institutions to channel capital from capital surplus countries for the ecomonic and social development of other Arab countries.

The new institutions include the Arab Fund for Economic and Social Development (AFESD), the Arab Monetary Fund, and the Arab Authority for Agricultural Development and Investment. The AFESD is to help in channelling public as well as private capital to economic and social development projects in general and joint ventures in particular. The Arab Monetary Fund is expected to play a crucial role in developing cooperation in monetary and financial matters. Its major objectives are to help finance balance of payment deficits of member states, stabilize exchange rates, and facilitate current payments between the Arab states. It will therefore have a key role in the future development of intraregional trade. The latest integration institution to be established is the Arab Authority for Agricultural Development and Investment, which will be assisting in the implementation of the 10-year Basic Programme of Agricultural Development of the Sudan, prepared by the AFESD, and engaging in similar activities in other Arab countries at their request.

The objectives pursued by the Arab Authority for Agricultural Development and Investment include the expansion of the capital flow to agriculture and other related sectors, the development of food and agricultural production to reduce the Arab world's dependence in food imports, and the introduction of modern agricultural technology.

Besides the creation of regional financial institutions, members of the Organization of Arab Petroleum Exporting Countries (CAPEC) have also established their own development funds for lending programmes to Arab and other countries. Examples are the Kuwait Fund for Economic and Social Development, the Abu Dhabi Fund for Economic Development, the External Iraq Fund for Development, and the Saudi Fund for Arab Development. A number of banks and joint investment companies have also been set up recently, notably the Islamic Development Bank and the Arab Bank for Economic Development in Africa.

The strengthening of Arab economic cooperation and integration was first approached through trade liberalization. The Arab Common Market 12/ was established by the CAEU in 1965. Its objectives are to benefit from the large size of the market, specialization in production, technological progress, and the full utilization of available resources. The CAEU has agreed to gradually liberalize trade, through the elimination of custom duties and quantitative and adminstrative restrictions, in order to achieve a free trade area among the four countries. Other measures have been agreed in order to prepare the ground for the gradual development of the free trade area into a customs union, and subsequently a common market.

11/ Libya withdrew in 1970, and Mauritania joined in 1975.

12/ The member countries are: Egypt, Iraq, Jordan and Syria.

Although the trade liberalization measures that have been implemented have contributed to an increase of 156% in the volume of trade among the four countries between 1965 and 1973, the results achieved are far below expectations. The intra-regional Arab trade of the countries is still very small compared to their total trade. In 1971-73, the trade flows between Arab countries represented only 3.1% of their total imports and 6.1% of their exports. For agriculture the figures were 12.8% of their imports and 13.1% of their exports. However, agriculture accounted for only 13.0% of their total imports and 16.2% of their exports.

There is thus no evidence that the efforts made for trade liberalization had any significant impact on the evolution of intraregional trade in the last decade. This is partly because of the existing structure of agricultural production and trade in many countries, reflecting the well-established trade and economic links between them and other countries outside the Arab world due to various historical, geographical and political reasons. Other factors include the low levels of productivity in the agricultural sector, and the considerable differences in costs of production for different commodities; the lack of adequate transport facilities between the Arab countries; the relative lack of knowledge of the import needs and export potential of the countries of the region; and the limitation put on trade through government control in some countries.

The poor results in trade expansion among Arab countries through trade liberalization measures alone induced the CAEU to look for ways to remove the obstacles mentioned above. It adopted for this purpose the approach of creating and encouraging joint ventures between Arab states, with the aim of broadening their production base. So far however , only one such joint venture has been established in the agricultural sector. This is the oint Arab Company for Livestock Development, with a capital of 66 million Kuwaiti Dinars. Another joint venture, the Arab Company for Agriculture and Food Production, is in the process of being established. Various federations, such as the Arab Federation of Food Industries, the Arab Federation of Fish Producers and the Arab Federation for Fertilizers, have also been set up to develop technical cooperation.

More recently the coordination of planning has been adopted as the main method to develop the economic integration of Arab states. The preparatory work which has been started by the CAEU is expected to include country economic reviews, sectoral analyses, and the elaboration of a global economic model for the Arab world.

The need to include the agricultural sector in the economic integration of the Arab world is now well recognized. Economic integration in agriculture implies specialization according to the comparative advantage of each country or agro-ecological zone, thus raising the efficiency of the agricultural sector of the region. It should also enable this sector to take advantage of the benefits of large-scale production and large markets.

The Arab world is a food deficit region, despite its vast financial, natural and human resources. Food deficits are likely to increase rapidly if past production trends are not reversed. Table 2-10 indicates some of the import needs of the region. However, even a rough assessment 13/ of the agricultural resources available shows a great potential for both horizontal and vertical expansion of agricultural production, which would enable the region largely to meet its future food requirements and even have available considerable food exports.

13/ Based on papers presented (in Arabic) at the FAO/CAEU Seminar on Agricultural Aspects of Economic Integration, Alexandria, Egypt, 2 to 7 April 1977.

Table 2-10. Imports of some major food products in the Arab countries, 1971-73, and projected requirements in 1985

	1971-73	1985 1/
	..... million tons ..	
Wheat	5.1	8.6
Sugar	1.6	1.3
Vegetable oils and oilseeds	-	0.5
Meat and by-products	0.05	0.7
Dairy products	0.3	2.2
Eggs	0.05	0.2

Source: Papers presented (in Arabic) at the FAO/CAEU Seminar on Agricultural Aspects of Economic Integration, Alexandria, Egypt, 2 to 7 April 1977.

1/ Difference between projected domestic production and demand.

Given the general climatic conditions, water is the major limiting factor for agricultural development. At present only about two thirds of the available water (surface and underground water) are mobilized, and the average efficiency of water use hardly exceeds 50%.

Agricultural land is the second major limiting factor, but it has been estimated that it could be expanded from its present level of 50 million ha to at least 80 million ha without major problems. Rainfed agriculture would benefit from about 75% of this possible expansion. The present irrigated area could be nearly doubled in the long run. More than half of the expansion of the agricultural land would be in Sudan, with most of the rest in north Africa. However, since most of the good agricultural land is already in use, part of the land expansion would be in areas of relatively low rainfall and marginal land. According to recent studies and available long-term national plans, it would be possible by 1985 to expand total cultivated land by nearly 6.8 million ha (of which about one third would be irrigated).

The potential for the vertical expansion of agricultural production is also considerable. For irrigated areas in particular, more than 30% of the water used at present for irrigation could eventually be recuperated for agricultural production through increased efficiency in water use. This would require the gradual improvement of traditional irrigation practices, drainage facilities, and the introduction of modern technology. Another indicator of possible improved use of the irrigated area is the relatively low cropping intensity: 1.00 on average and 0.65 if Egypt is excluded (the figure for Egypt alone is around 1.90). These possibilities of intensification of agriculture are even greater in the rainfed areas, where the average cropping intensity is only about 0.30, mainly because of fallowing. Although more research is still needed, the fallow land could be reduced substantially in areas receiving adequate rainfall through suitable crop rotations and the use of improved seeds and modern inputs.

Average yields are rather low at present. Various factors contribute to this situation, such as the inadequacy of basic infrastructure, land tenure systems, the lack of necessary services and the insufficient use of improved seeds and modern inputs. It is generally thought that present yields of major food products could be more than doubled in the next 25 years if these obstacles were substantially reduced.

Great possibilities also exist for the development of animal production. There is indeed considerable potential for both horizontal and vertical expansion of livestock production in the irrigated zones, as well as in the rainfed areas. Regional as well as national programmes for the improvement of breeds and the use of modern methods of animal husbandry would greatly increase the productivity of the sector. Animal feed production and animal health offer excellent opportunities for regional cooperation.

The total potential fish catch in the Arab marine region is estimated at about 3.3 million tons, compared to the present production of less than 1 million tons. There are considerable possibilities to expand fish production, provided the marketing system, which needs to be reorganized, is also able to promote fish consumption. This sector, which at present lacks the necessary investments to improve the fishing fleets and marketing systems, provides good opportunities for setting up joint ventures in the form of large-scale production and marketing projects.

Production specialization based on comparative advantages will help increase the productivity of the whole agricultural sector, through the optimal use of factors of production. The Arab world could easily meet its food requirements in the future. However, individual country efforts alone are unlikely to be sufficient. Joint efforts are therefore vital to secure the food needs of the Arab world, and for this purpose agricultural development must be viewed within a regional context. Necessary resources have to be combined. Surplus financial resources available to Arab oil-producing countries could profitably be invested in agriculture.

Investment in vertical expansion programmes could yield rapid results, but most of the other investments in agriculture are of a long-term nature and their impact would be felt only after a fairly long period. In view of this long-term nature of agricultural development, joint actions would have to be viewed within a general framework of Arab economic integration, in which the role and objectives of agriculture are considered in the regional context. A long-term strategy, taking into account the resources available and their possible development, would have to be defined to achieve these objectives. Priority programmes and projects could then be identified, and specific arrangements for joint action worked out.

The preparation of such a strategy, as well as the elaboration of programmes of action, requires close coordination between the various regional specialized institutions and agencies dealing with agriculture and development financing. A system of coordination would also have to be established between the regional bodies and the national authorities concerned. This would be in line with the present efforts made by the CAEU for the coordination of national plans. Special attention should be devoted to increasing the absorptive capacity for investment. This would imply considerable investment to develop basic infrastructure, and to improve the countries' and region's capabilities to plan and implement agricultural development programmes and projects.

Joint ventures would be encouraged within the framework of economic cooperation, and selected according to their contribution to the achievement of long-term regional objectives of agricultural development. Joint efforts to produce the necessary agricultural machinery and other inputs should receive high priority.

The investment programming approach applied in Sudan by the AFESD, which has led to the preparation of the 10-year Basic Programme of Agricultural Development, should be adopted as far as possible, and especially in the least developed countries of the Arab world. This programming approach has the advantage of integrating all components of agricultural development, and ensuring a harmonized development of the sector.

Production specialization, based on comparative advantage, is essential to increase the efficiency of Arab agriculture and ensure its integration. Programmes for such specialization should be based on detailed studies, including not only the technical factors but also the social and economic implications both at the country and regional levels. Finally, it should be emphasized that without strong and continuous political support for agricultural integration, it would be almost impossible to carry out the programmes of production specialization and expansion needed to reduce the region's dependence on food imports.

AGRICULTURAL INVESTMENT STRATEGIES

The cultivated area in the Arab countries (about 50 million ha) is not adequately exploited either in terms of intensity or efficiency, as indicated already. Opportunities for raising productivity per hectare (i.e. vertical expansion) are therefore considerable in all the Arab countries with the possible exception of Egypt, where crop yields are relatively high. Scope for the further extension of agricultural areas (i.e. horizontal expansion) is greater in the African countries, especially in Sudan, Somalia and to some extent in the Maghreb countries. In contrast, the possibilities for vertical expansion are greater in the Asian countries, especially in Iraq and Syria.

Thus there are two interrelated strategies for increased agricultural production. The first is through the more rational and efficient utilization of the water and land resources now in use. The second is through the development and conservation of unexploited natural resources. In this connection, there is particularly a need for the scientific management of rangelands, in order to maintain fodder production and to control the desertification which, as is discussed later, is becoming increasingly serious in a number of countries.

At present the countries in the Near East utilize around 60% of their surface and underground water resources to irrigate approximately 10 million ha or about 20% of the cultivated area. But the area actually irrigated in any one year is closer to 9 million ha, because of the land left fallow within irrigation projects in a few countries. The main reasons for keeping this land fallow are not only inadequate water management and lack of main and field drainage channels, but also insufficient water supplies for irrigation.

In addition, a proportion of the irrigated areas in several countries is not irrigated perennially, but merely draws upon flood waters and torrential rainfall. Hence the area perennially irrigated is really around 8.5 million ha. A large part of this is irrigated by traditional methods, often with outdated systems which significantly reduce the output capacity.

In short, the production on irrigated land is not in proportion to the importance of the irrigated areas or the quantities of water used. There is a crucial need for improving irrigation systems and methods. This is not easy to accomplish, because of inadequate infrastructure and supporting services, and the weak cooperative spirit in some rural areas.

The area of land effectively irrigated is expected to increase to 11-12 million ha over the coming decade, and to at least 15 million ha by the year 2000. The major part of the expansion would be in Iraq, Sudan, Egypt, Syria and the Maghreb countries. In Iraq the entire increase would be through raising the cropping intensity in the irrigated areas by eliminating the fallow system on a large part of them. This also applies in part to Sudan and Syria, although there would also be a very large proportion of new irrigated lands in these countries. In the other countries, most if not all of the extension of the irrigated area would be on new lands.

The total rainfed cultivated area is around 40 million ha, including several million ha which are left fallow every year. During the next decade the area of fallow is likely to be reduced by 1.5 million ha, and about 3 million ha of cultivated land to be added in new areas. This would constitute only a small part of the potential that is available particularly in Sudan, Somalia and in those areas of the Maghreb where the average rainfall is sufficient for the production of one crop per year. An indicative plan prepared by the AFESD has set a target for the cultivation of 8.5 million ha of new lands in Sudan by the year 2000 (of which 2.1 million ha by 1985) for the mechanized production of cereals (sorghum and maize), oilseeds (groundnuts, sesame and sunflower) and various fodder crops.

The capital costs of land reclamation and development in the region vary widely according to factors such as the sources of water, the type and size of construction works and machinery, and the required infrastructure and services. The most plausible figures arrived at in recent surveys (1976) seem to be around $1,500 per ha for rainfed land, and $5,000 per ha for irrigated land, inclusive of infrastructure and supporting services. At these rates, the investment costs for developing by the year 2000 6 million ha under irrigation and 15 to 20 million ha of new rainfed lands would amount to around $55,000 million, a figure which is within the financial capability of the Arab world.

The implementation of a programme of agricultural development of this magnitude would not only meet the demand for most food commodities and thus ensure food security for the Arab countries, but would also contribute significantly to world market supplies of feedgrains, livestock products, and some horticultural products.

In addition to the aridity of so much of the region, obstacles to the rapid development of agriculture are the following : the chronic underdevelopment of the production base, resulting from such factors as the limited managerial capacity of farmers, soil deterioration, inefficient utilization of irrigation water, and limited use of modern production factors; the lack of adequate infrastructure, which is readily apparent in the irrigation and drainage networks and in the transport, communication and storage facilities in several countries; the insufficient number of technicians and skilled workers, which in many cases has been the cause of the slow implementation of development programmes and projects; the fragmentation of agricultural holdings, which in a number of countries has acted as a disincentive to the modernization of agriculture; and the general inadequacy of supporting institutions, especially in the fields of agricultural education, extension, research, marketing and credit.

The elaboration of agricultural investment strategies in the region is strictly linked to the diversity of agrarian structures, natural resources, population densities, availability of financial resources and the general level of development in the different countries. In each country it requires the analysis and solution of complex policy issues, which government planning agencies have not always been able to tackle with the necessary strength and imagination.

The strategy recently proposed by the Government of Sudan, although not generally applicable to the rest of the Near East, illustrates the magnitude of the problems and offers a good example of how to approach them. Sudan's Food Investment Strategy for 1977-85 was presented at the fourth meeting of the Consultative Group on Food Production and Investment (CGFPI) in September 1977. It has the following main objectives : national self-sufficiency in all basic food commodities; nationwide availability of adequate food supplies at reasonable cost; surplus production of certain crop and livestock products for export; availability of food supplies for possible use in national or regional food reserve programmes; large-scale production of food commodities suitable for industrial processing; and the improvement of the employment, incomes and living levels of the rural population.

Agricultural production in Sudan is at present carried out under the following five main systems : mechanized rainfed farming (1.6 million ha); irrigated farming (1.6 million ha); traditional farming, including nomadic and semi-nomadic livestock rearing (3.8 million ha); capital-intensive livestock production; and sugar production on irrigated plantations (25,000 ha).

Mechanized rainfed farming offers great scope for the rapid achievement of self-sufficiency in some basic food commodities and a significant exportable suplus. Sesame, sorghum and short-staple cotton are the main crops, and efforts are being made to integrate livestock into the system. Two major aspects of mechanized farming are the extension of public sector investment into relatively remote rural areas, and the mobilization of private capital for large-scale, capital-intensive agricultural development. The Government is promoting mechanized farming by offering various fiscal incentives to entrepreneurs with the required capital. The Mechanized Farming Corporation, a semi-autonomous public agency, provides the institutional framework for the system. Investment in the mechanized farming system is expected to have a beneficial effect on the peripheral traditional farming areas as well, mainly through the improvement of the physical infrastructure and the provision of seasonal employment.

The area under irrigated farming (excluding sugarcane) covers about a quarter of the total crop area. The main crops are cotton, groundnuts, sorghum, wheat, pulses and vegetables. Under the National Development Plan, public sector commitments to the country's two major irrigation schemes, the Gezira and Rahad, amount to about $170 million; an additional $560 million of direct public funding is projected for other irrigation schemes. About half of these commitments represent expenditure in foreign currency. The irrigated farming schemes are capital-intensive production units, with a high degree of mechanization. However, they provide seasonal employment for about 500,000 people annually, and this adds to the income of the traditional farming sector. With the experience gained from the successful operation of these irrigated schemes and the potential for doubling the existing irrigated area of 1.6 million ha, it is expected in the near future to be able to attract private sector funds, both national and foreign, for irrigated farming.

The traditional farming system encompasses virtually all small-scale rainfed crop production and rudimentary irrigated farming, both mainly at the subsistence level, as well as livestock production under nomadic and semi-nomadic conditions. About 80% of the rural population is engaged in the traditional farming sector. The inadequate transport system, the near absence of supporting services, and the limited number of clearly identified or formulated production-oriented investment opportunities set severe limits to the quick improvement of production and incomes in this sector. In the short run assistance to the traditional sector will therefore be concentrated on the establishment of the basic physical infrastructure and the institutional framework required for the execution of an effective long-term development programme.

As regards livestock production, there is already an exportable surplus of meat. However, intensive livestock production still provides ample scope for investment by the private sector. The Food Investment Strategy also includes a number of projects directed to the improvement of production in traditional livestock farming, which initially will be the main source of animals for the feedlots. They cover animal health services, better water supply, improved pastures, and institutional support services.

The production of sugar is given high priority, in order to provide both for national self-sufficiency and for export earnings. Ecological conditions are ideally suited for sugarcane cultivation, with the limitation of rainfall being offset by the availability of ample irrigation water. Although largely mechanized, sugar production will nevertheless contribute significantly to rural income, through the generation of seasonal employment for the traditional sector.

The Planning Administration of the Ministry of Agriculture, Food and Natural Resources has been designated as the central authority with responsibility for the implementation of the strategy. A system for the effective monitoring of its execution is being devised, which will report to the Ministry of National Planning.

A major part of the external finance for those projects identified by the AFESD is expected to come from the member countries of this body. It is anticipated that most of these resources will be mobilized under the aegis of the Arab Authority for Agricultural Development and Investment, which is expected to monitor the operation of all projects which it is involved in funding.

Many Near East countries have recently shown great interest in the further development of agro-industries, including sugar manufacturing and refining, the processing of fruit and vegetables, cotton ginning and yarn making, vegetable oil industries, and the processing of livestock products. Although there is still a vast potential for the development of these industries, studies and surveys carried out in several countries of the region paradoxically revealed that there is a substantial idle capacity in most of the existing plant. The reasons for this include the lack of coordination between the production of raw materials and processing operations, poor location of factories, high transport costs, insufficient economic incentives, inadequate market information, and the methods of payment for raw materials.

On the basis of the available information it would appear that future investment in agro-industrial development should first attempt, wherever economically feasible, to improve the utilization of the existing capacities, and second to modernize the existing factories which operate at a low level of efficiency. Agro-industrial investment should be directed to those projects of land expansion which offer good possibilities for integrating agriculture and agro-industry, and which are free of the usual constraints of land tenure, small and fragmented holdings, and traditional technology.

DESERTIFICATION

The United Nations Conference on Desertification, held in Nairobi, Kenya, in August-September 1977, attracted the attention of the international community to the serious consequences of desertification. Some of the social and economic consequences of desertification in the Near East are briefly examined here. 14/

Desertification is both a natural and a manmade process. It is a natural phenomenon, involving long-term, chronic and pervasive physical processes associated with the deterioration of the environment, and also a human phenomenon arising most commonly from the aggravation or intensification of such conditions. It covers such phenomena as dune and sand encroachment, degradation of vegetation, soil erosion, waterlogging and salinization, combined with the poor management of irrigation projects, inadequate land tenure systems, ineffective conservation and land tenure policies, bad communications, lack of awareness of acute problems, and a high level of illiteracy.

A case study of the Greater Mussayeb Project in Iraq may be taken as an example. This shows that solutions exist for the physical and technical problems of reclaiming saline lands, and that in this sense the processes of desertification are reversible. However, it also confirms that the more intractable problems are the human, social and economic ones.

14/ This review is mainly based on the papers prepared for the United Nations Conference on Desertification.

The exact numbers of people living in the Near East region in dryland conditions or in areas undergoing severe desertification are not known. However, in the Mediterranean basin alone, about 107 million people live on drylands, and about 10 million are in areas of severe desertification.

For the purpose of this review the countries of the Near East may be divided into three groups : the relatively poor countries (Afghanistan, Jordan, Pakistan, Somalia, Sudan, Yemen Arab Republic and People's Democratic Republic of the Yemen), the middle income countries (Cyprus, Egypt, Lebanon and Syria), and the relatively rich countries (Bahrain, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia and United Arab Emirates). This classification gives some indication of the capacity of each group of countries to contain or live with desertification. In general, the adverse impact of desertification has not been as serious in the Near East in recent years as in other arid or semi-arid regions of the world. There have not been severe famine situations as a consequence of drought, as there have been recently in the Sahel countries of Africa or as there were in the past history of the region. This may to a large extent be explained by the wealth which oil has brought to the region.

Migration has been, and to some extent still is, the way to escape from the consequences of desertification. Such migration has been easily absorbed by the rich countries of the region. At present, approximately half a million Lebanese and another half million Yemenites (without counting many Palestinians, Egyptians and Pakistanis) are absorbed by the prosperous economies of Saudi Arabia and the Gulf States.

However, it is inevitably the poorest countries which are the more vulnerable. Migration generally involves the following consequences, which are mainly felt by the rural community: the loss of farmers' income and assets, rising indebtedness, less viable holdings, and a shortage of labour in the abandoned rural areas. If the drought lasts long enough, it leads to continued crop failure, the complete collapse of traditional systems, hunger, disease and premature deaths. Cities become overcrowded with nomads and other rural people living in very different conditions to which they find it difficult to adjust, usually in slums, and with high rates of illiteracy, juvenile delinquency and crime.

These are the heavy social consequences of desertification, which can in turn lead to even more waste and destruction of established rural communities, and ultimately to the complete physical deterioration of an environment. Often the process of economic, social and physical deterioration is so gradual and all-pervasive that it is hardly noticed until it is too late.

There are many such situations in the arid and semi-arid areas of the Near East, particularly in Iran, Libya, Saudi Arabia, Somalia and Sudan. The problems of desertification and soil deterioration are often made more difficult by the lack of awareness and interest and even outright indifference shown by governments, particularly as regards the need for long-term conservation policies. This has led to the gradual abandonment of marginal lands and the deterioration of fragile areas, which could have been avoided if specific policies and programmes had been devised in time.

In Iran and Iraq, waterlogging and soil salinity (for example in the Greater Mussayeb Project) have been exacerbated by human and social problems, such as the lack of communications, and inadequate education and extension services, combined with the inability of government officials to enforce the law on land grants and the lack of economic incentives for farmers.

In many countries land tenure and agrarian reform legislation has not helped soil conservation. Tenancy leases to encourage tenants to stay for long periods and land consolidation schemes designed to prevent the fragmentation of holdings are almost non-existent, and in some countries the abandonment of land is actually encouraged. In Iraq, for example, by subdividing holdings into small, uneconomic and unviable units, agrarian reform laws have created even more problems of soil salinity, waterlogging and

deterioration than existed before. Programmes to reduce the fallow area by encroaching on more rangeland have often had the effect of reducing soil fertility and increasing soil erosion. In this sense the use of the tractor has often been more harmful than beneficial (for example in Turkey).

In many countries of the Near East there is an official neglect and indifference concerning the welfare of the nomads. They are considered as a by-product of nature, and nobody feels any particular responsibility for them. The consequence is that the nomads, with their increasing numbers of people and livestock, encroach more and more into the desert, leading to problems of overstocking and overgrazing. Alternatives to solve these problems and measures for the conservation of the environment are needed if there is to be any real and lasting improvement in the living levels of the nomads.

In cooperation with the United Nations Environment Programme (UNEP), FAO has launched a programme on the Ecological Management of Arid and Semi-arid Rangelands in Africa and the Near and Middle East. A permanent secretariat is to promote and assist national programmes and regional activities related to range management, and facilitate concerted action at sub-regional, regional and global levels. The programme will involve surveying and monitoring, education and training, advisory services and development programmes.

3. THE STATE OF NATURAL RESOURCES AND THE HUMAN ENVIRONMENT FOR FOOD AND AGRICULTURE

INTRODUCTION

Man's demands on the natural resources that sustain his existence have increased enormously with the unprecedented rise in his numbers that has occurred in modern times. Two centuries ago the world population was probably still less than 1,000 million, and by the beginning of the present century it was only a little more than 1,500 million. But it rose to 2,500 million in 1950 and 4,000 million in 1975. Although the population is generally expected to stabilize some time towards the end of the next century, further large increases are inevitable in the meantime. Looking only as far ahead as the end of this century, the latest United Nations projections indicate a world population somewhere between 5,800 and 6,600 million, with the most probable figure around 6,300 million.1/

The past population growth has already placed considerable pressure on natural resources, and has in many cases led to their degradation and depletion. In the future this pressure will become even greater. Merely to sustain the likely population of 6,300 million in the year 2000 at current levels of consumption would entail a further increase of almost 60% in agricultural, fisheries and forestry production in the quarter of a century from 1975. Allowing for the expected rise in incomes and effective demand might raise this figure to at least 80%.2/

But the demands on natural resources are likely to rise even more rapidly than is indicated by such figures. More than 90% of the population increase that is expected by the year 2000 would be in the developing countries, so that they would by then account for almost 80% of the world total.3/ A very large number of people in these countries still live in abject poverty and are unable to obtain their nutritional and other basic needs. If their basic needs are to be met by means of income redistribution and other measures, and if the income gap between the developed and developing countries is to be reduced in the spirit of the Declaration and Programme of Action on the Establishment of a New International Economic Order, agricultural production in the developing countries will have to be increased at an unprecedented rate.

Even the effective demand for food in the market in these countries is rising by as much as 3.6% a year4/. Meeting the basic needs of their poorest people by the end of the century would entail a still faster increase in their production. The International Development Strategy adopted for the Second United Nations Development Decade, covering the

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1/ United Nations, World Population Prospects as Assessed in 1973, Population Studies, No. 60, New York, 1977, p. 14.

2/ FAO's projections of the future demand for food and agricultural products are at present being revised and updated to cover the 1990s in the longer-term perspective of the whole period up to the end of the century. A global perspective study, entitled Agriculture: Towards 2000, is now in preparation. In the meantime, the latest FAO projections of the world demand for food from 1969-71 to 1985 indicate an average annual increase of 2.4% (United Nations World Food Conference, Assessment of the World Food Situation, Present and Future, E/CONF.65/3, Rome, 1974, p. 79).

3/ United Nations, op. cit., p. 15.

4/ United Nations World Food Conference, op. cit., p. 15.

1970s, set the target of a 4% average annual increase in the agricultural production of the developing countries. This target was reaffirmed, in respect of food production, by the World Food Conference in November 1974. Even this rate of growth would probably not suffice to meet the basic needs of the poor by the end of the century, but it would already imply that the food production of the developing countries should be doubled in the next 18 years, in comparison with the period of slightly less than 25 years taken for the last doubling.

The past damage to natural resources and the greatly increased pressure on them that is to be expected in the future, especially in the developing countries, make it urgent to carry out an assessment of these resources. The productive capacities of most of the natural resources that are used for agricultural production depend on delicate physical and biological balances that man does not yet fully understand and cannot fully control. The ecological equilibrium appears to be less stable in the tropics, where most of the developing countries are to be found, than in the temperate zone. Man's capability of disturbing this equilibrium has vastly increased and, whenever a resource is used beyond its productive capacity, this results in degradation and depletion, often beyond the possibility of recovery for many generations to come. At the same time, modern agriculture is developing approaches and methods that make production possible on a sustained basis, through a better understanding of the productive capacity of natural resources under various ecosystems. It is therefore necessary to identify these approaches and methods more clearly, and to adapt them to the different socio-economic conditions of local environments.

The Seventeenth Session of the FAO Conference discussed these problems, and concluded that "the major environmental problems facing agriculture, forestry and fisheries were not only the avoidance of environmental pollution but the ensuring, in the development process, of the maintenance of the productive capacity of the basic natural resources for food and agriculture through rational management and conservation measures". It recognized that "agricultural development and world food security depended on the careful husbandry of living resources, on their biological laws and ecological balances as well as on the adjustments of production, supply and reserves to demands". It therefore endorsed the Director-General's proposal "to make periodic assessment of 'the State of Natural Resources and Environment' as an essential complement to the existing yearly report on the State of Food and Agriculture in the field of production and economics."[5/]

This chapter has been prepared as the first such assessment. It is a preliminary benchmark survey of the state of the natural resources of principal importance for agricultural production and development, and of some of the more critical problems that have arisen from man's use of these resources. Since it is aimed at a wide audience, it attempts to highlight the crucial issues, without going into too much detail on technical and management aspects. Its preparation has been made difficult by the lack of adequate basic data. For many countries data on the natural resources for food and agriculture are either completely lacking or, at best, incomplete and heterogeneous. This first global assessment therefore cannot pretend to be exhaustive, and will have to be revised and updated as improved data become available.

The main objectives of the chapter are threefold: first, to provide a broad overview of the complexity, vastness and importance of the problems of natural resource management and conservation in relation to food and agricultural production; second, to draw attention to the possibilities and limitations of the productive capacity of certain key natural resources, in relation to other resources and to the environment, for the satisfaction of man's present and future requirements on a sustained basis; and, third, to

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5/ FAO, Report of the Conference of FAO, Seventeenth Session, Rome, 10-29 November 1973, C 73/REP, Rome, 1973, p. 57.

identify critical environmental issues deriving from the pressure put on natural resources, particularly in developing countries, in order to satisfy the rapidly increasing demand for food and agricultural products.

The first and main part of the chapter consists of a global overview of the state of the principal natural resources for food and agricultural production, and of related environmental issues. The remainder of the chapter is necessarily much more selective. Four specific problems of the environmental impact of the intensification of agricultural production are briefly discussed: those arising from fertilizer use, pest control, pollution by forest industries, and the contamination of food and feed. Some environmental problems are to a great extent specific to certain ecological zones, and of these three are selected for discussion: shifting cultivation in the sub-humid and humid tropical zones, desertification, and land utilization problems in highland areas. After a brief review of some of the legislative aspects of environmental problems, the chapter attempts to draw some general conclusions on the state of natural resources, the different environmental problems of developed and developing countries, and some of the requirements for the better assessment and management of natural resources.

THE STATE OF NATURAL RESOURCES

The following global overview of the state of natural resources covers soil, water, grazing land and forage, forests, wildlife, fisheries, and genetic resources. Although atmospheric resources such as air and climate are also of major importance for agriculture, they are not dealt with separately here in view of the lack of knowledge of man's influence on them. Energy resources and their use in agriculture were examined in the 1976 issue of The State of Food and Agriculture.6/

Each of the main natural resources is of necessity treated separately, although the interrelations between the different resources are brought out as far as possible. In each case an account is given of the principal problems arising from man's activities in using the resource.

SOIL RESOURCES

The appraisal of soil resources on a global basis has been attempted from the beginning of the century, and various estimates have been made of the extent and distribution of the world's potentially arable soils. A recent study noted that the world's arable land area could be increased from 1,400 to 3,200 million hectares, and that over 50% of the unused potential was in tropical areas.7/

Estimates of this kind have been handicapped by inadequate data for some regions and by the lack of a uniform approach, which has made it difficult to compare data from different parts of the world. Furthermore, overall estimates of "arable land" which do not specify the type of land use envisaged provide only a very rough indication of the potential of land resources. A unified approach for obtaining a more accurate inventory and appraisal of the world's soil resources has recently been developed in the framework of the FAO/UNESCO Soil Map of the World8/. By interpreting this information in terms of major limitations for agricultural use, a general indication can be given of the distribution of soil resources and their potential for food and agricultural production.9/

6/ FAO, The State of Food and Agriculture 1976, Rome, 1977, p. 79-111.

7/ C.E. Kellogg and A.C. Orvedal, Potentially Arable Soils of the World and Critical Measures for their Use, United States Department of Agriculture, 1977.

8/ FAO/UNESCO, Soil Map of the World, Vol. 1, Paris, 1964.

9/ R. Dudal, Inventory of major soils of the world with special reference to mineral stress, Proceedings of Workshop on Adaptations of Plants to Mineral Stress in Problem Soils, ARS, Cornell University, AID? Washington, D.C., 1976.

FAO is now compiling data on the extent of the land variously suited to the rain-fed production of twelve major crops at two levels of inputs (approximating to subsistence and commercial farming). The study takes into account both climatic and soil conditions, and the results are to be presented by agro-ecological zones. In this way the food production potential of different regions will be determined. In the assessment, the principles of the FAO Framework for Land Evaluation are being applied, including the concept that suitability refers to use on a sustained basis and without risk of environmental degradation. Any comprehensive land use planning through land suitability assessment must take full account of the interrelations between the desired technical and socio-economic goals and the physical and biological components of the environment.

On a global basis, the main limitations to the use of the world's soil resources for agricultural production are drought, mineral stress, shallow depth, water excess, and permafrost (Table 3-1). Only about 11% of the world's soils offer no serious limitations to agriculture. Europe, Central America and North America have the highest proportion of soils with no serious limitations. North and Central Asia, South America and Australasia have the lowest proportions. Drought is the dominant limitation not only on a world basis but also in Central America, Africa, South Asia, and Australasia.

The uneven geographic distribution of soil resources does not correspond to the equally uneven distribution of population. There is thus an imbalance between land potential and food and agricultural requirements in various regions of the world. The uneven distribution of soil resources may be illustrated by comparing the endowments of South America and Africa.

The dominant feature in South America is the high proportion of soils with low fertility status. Almost 50% of the continent, centred on the Amazon basin and the central uplands, is occupied by such soils. Soils under semi-arid climates occupy approximately 17% of the continent, covering large parts of the western and southern uplands, the lowlands and mountain deserts along the west coast, and the Andean Altiplano. Steep lands, with limited agricultural potential, make up about 11% of the continent.

In Africa, 44% of the area is occupied by deserts or soils under arid and semi-arid climates. Soils with low fertility status occupy a further 18% of the area. The soils of the savanna zones suffer from unfavourable physical properties and can be subject to severe erosion. Large areas with iron-stone crusts occurring at various depths in the soil are particularly threatened by erosion, since the removal of surface layers irreversibly lessens rooting depth.

Table 3-1. World soil resources and their major limitations for agriculture

	Drought	Mineral stress 1/	Shallow depth	Water excess	Permafrost	No serious limitations
	..... % of total land area					
North America	20	22	10	10	16	22
Central America	32	16	17	10	-	25
South America	17	47	11	10	-	15
Europe	8	33	12	8	3	36
Africa	44	18	13	9	-	16
South Asia	43	5	23	11	-	18
North and Central Asia	17	9	38	13	13	10
Southeast Asia	2	59	6	19	-	14
Australasia	55	6	8	16	-	15
WORLD	28	23	22	10	6	11

Source: Data compiled from FAO/UNESCO Soil Map of the World, Paris, 1964-74.

1/ Nutritional deficiencies or toxicities related to chemical composition or mode of origin.

The available evidence indicates that globally soil resources are sufficient to meet a large expansion in the current world demand for food and agricultural products. The major constraint resides in the uneven geographic distribution of these resources with respect to population density and the level of technology applied in their use. This creates imbalances between the land available for agriculture and the food requirements of a country or region, with the result that in certain areas the expansion of arable land into marginal areas may cause severe degradation and even loss of soil resources.

Soil degradation problems

Soil degradation refers to the deterioration or total loss of the productive capacity of the soil for present and future use. It has many causes, but those of most immediate concern are erosion, salinization and waterlogging, and chemical degradation.

Erosion is the washing or blowing away of surface soil. This phenomenon may take place without man's influence, but it is often accelerated when his activities cause the disappearance of the protective cover of natural vegetation. Soil may be washed or blown away faster than it can regenerate, resulting in a net soil loss. The degree to which erosion takes place is influenced by a combination of factors, the most important being climate, the slope of the land, vegetation cover, the nature of the soil, and cultivation practices. Erosion hazards severely limit the range of uses to which the land may be put.

A rough idea of the degree and distribution of soil erosion in the world may be obtained from estimates of the suspended sediment loads of major rivers.10/ It appears that the most susceptible areas are the lands receiving medium to high rainfall with latitudes approximately between 42° north and 42° south. In tropical areas the danger of soil erosion from run-off and rain is negligible wherever dense evergreen forest is present but, as soon as it is removed, especially on slopes, serious erosion may take place. The hazard of soil erosion decreases in the temperate regions at higher latitudes where rainfall is gentler and more evenly spread throughout the year.

Table 3-2 lists the world's major rivers in terms of their mean annual yield of suspended sediment. Erosion intensity can be assessed by comparing the area of the basin with the total sediment load. The International Commission on Erosion and Sedimentation is compiling a world map on the basis of such data.

Whilst heavier sediment loads are associated with humid tropical zones, there is also a positive correlation with the relative proximity of mountains to the sea. This is especially so in Southeast Asia, Europe, South America, and generally at latitudes around 20° north.

A major problem associated with erosion and sedimentation is that of siltation, which can result in the silting up of reservoirs and streams and in the frequent clogging of irrigation channels. It is estimated that more than 1,000 million m^3 of sediment are deposited each year in the major reservoirs of the United States alone.11/ The cost of sediment removal, the dredging of streams, the purification of water supplies and the reconstitution of irrigation systems is enormous.

Wind erosion can be a problem in all dry and semi-arid areas, as well as in areas of sloping or flat lands with seasonal rainfall. The conditions which favour wind erosion are dry loose soil with little or no vegetative cover, a relatively smooth surface, and a

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10/ F. Fournier, Climat et érosion: la relation entre l'érosion du sol par l'eau et les précipitations atmosphériques, Paris, 1960.

11/ N. Holeman, The sediment yield of major rivers of the world, Water Resources Research, 4, 1968, p. 737-747.

Table 3-2. Major rivers of the world ranked by sediment yield

River	Drainage basin	Average annual suspended load	
	thousand km^2	million metric tons	metric tons/km^2
Yellow	673	1,887	2,804
Ganges	956	1,451	1,518
Brahmaputra	666	726	1,090
Yangtze	1,942	499	257
Indus	969	435	449
Ching	57	408	7,158
Amazon	5,776	363	63
Mississippi	3,222	312	97
Irrawaddy	430	299	695
Missouri	1,370	218	159
Lo	26	190	7,308
Kosi	62	172	2,774
Mekong	795	170	214
Colorado	637	135	212
Red	119	130	1,092
Nile	2,978	111	37

Source: N. Holeman, The sediment yield of major rivers of the world, Water Resources Research, 4, 1968, p. 737-747.

wind of sufficient velocity. In the semi-arid and sub-humid regions the expansion of livestock numbers and overgrazing lead to the breakdown of the traditional pastoral systems, with the result that soils are stripped of their vegetative cover and become subject to severe blowing.

Salinization is the accumulation of salts to the extent that they have a deleterious effect on soil productivity and crop yields. Alkalinization refers to a high saturation of the soil with sodium. The main factors affecting salinization are the aridity of the climate, geomorphology, topography, hydrology, the physical properties of the soil, and agricultural management practices.

Salt affected soils are found in every continent (Table 3-3), and it is estimated that they total close to 7% of the land area of the world. In Europe only about 51 million hectares of saline soils are reported, but the potentially salt affected areas are considerably larger. The problem is very extensive in Australasia, with 357 million hectares affected, and also in the U.S.S.R., with close to 200 million hectares. Salinization is also a major problem in the Near East, although its extent in quantitative terms is not known in all the countries of the region.

Chemical degradation may occur if the nutrients in the soil are not replenished to maintain soil fertility. Particularly in the humid tropics, the climate is very conducive to the leaching and depletion of soil nutrients. As was shown in Table 3-1, while 23% of the world's soils suffer from mineral stress, the proportion is as high as 59% in Southeast Asia and 47% in South America.

The traditional practice of shifting cultivation, aiming at the replenishment of soil fertility through long fallows (10 to 25 years, depending on the nature of the soil), has for a long time been the land use best adapted to the conditions prevailing in the humid tropics. When population growth necessitates more intensive land use, ho ever, a reduction in the length of the fallows may result in rapid chemical degradation, and a drop in yields. Shifting cultivation is discussed in more detail in a later part of this chapter.

Table 3-3. World distribution of salt affected soils

Region	Area	
	thousand ha	% of total land area
North America	15,755	0.9
Central America	1,965	0.7
South America	129,163	7.6
Europe	50,804	4.6
Africa	98,521	3.5
South Asia	85,108	7.9
North and Central Asia	211,686	7.2
Southeast Asia	19,983	5.9
Australasia	357,330	42.3

Source: Data compiled from FAO/UNESCO, Soil Map of the World, op. cit.

While the problem of soil degradation is of great magnitude, no comprehensive appraisal has yet been made. A global assessment of both actual and potential soil degradation is now being undertaken by FAO, with the support of the United Nations Environment Programme (UNEP).

WATER RESOURCES

The water available to man is only a small fraction of the total estimated water resources of the world ($1.4 \times 10^9 km^3$), since 95% is saline, 4% is frozen and only the remaining 1% is in a fresh liquid state. Of this small percentage, almost 98% is groundwater and 2% is surface water.12/

As water is a renewable resource and is needed in continuous supply by man, the concept of its annual flow through the hydrological cycle is important. Estimates of the annual volumes of water moving through the different parts of the hydrological cycle are shown in Table 3-4. Although the circulation of groundwater comprises only 0.4% of the world's total water, it is still a vast quantity.

Table 3-4. Annual global flows of water (hydrological cycle)

	km^3	% of total precipitation
Total precipitation	577,000	100
Precipitation over land	118,900	20.6
Evaporation from land	72,000	12.5
Run-off from land to oceans	46,900	8.1
Surface water	44,700	7.7
Groundwater	2,200	0.4

Source: M. Holy, op. cit.

12/ M. Holy, Water and the Environment, Irrigation and Drainage Paper No. 8, FAO, Rome, 1971.

The paradox of the abundance of annual supplies of fresh water on the one hand and water shortages on the other lies in the variability of their distribution in space and time. The amount of fresh water available is meaningless unless it is related to where and when it is needed by man and by nature itself. Some regions of the world have perennial surpluses and others shortages. Africa has, on the average, an excess of precipitation over evaporation, but there is a marked difference between the Sahelian zone and the more tropical regions. This spatial variation also occurs at the country level and within river basins. An idea of its magnitude at the country level may be obtained from Table 3-5. The percentage of potential evapotranspiration covered by rainfall varies from 274% at Sao Gabriel, Brazil, to as little as 1% at Antofagasta, Chile. The amount of water available for rainfed crops is indicated by the figures exceeding 100%.

Table 3-5. Annual rainfall and potential evapotranspiration for selected stations in Africa and South America

	Annual rainfall	Annual potential evapotranspiration	Amount of potential evapotranspiration covered by rainfall
	.....mm.....		%
AFRICA			
Yangambi, Zaire	1,710	1,130	151
Brazzaville, Congo	1,450	1,360	107
Kaduna, Nigeria	1,250	2,050	60
Port Amelia, Mozambique	800	1,430	55
Ouagadougou, Upper Volta	930	2,550	36
El Fasher, Sudan	300	3,210	9
Villa Cisneros, Spanish Sahara	70	920	8
Tamanrasset, Algeria	30	2,310	2
SOUTH AMERICA			
Sao Gabriel, Brazil	2,956	1,078	274
Calabozo, Venezuela	1,280	960	133
Cuenca, Ecuador	705	820	86
Uyani, Bolivia	190	1,160	16
Antofagasta, Chile	10	590	1

Source: United Nations, The Demand for Water, op. cit.

Added to variability in space is variability in time, which can be either seasonal within the year, or a year-to-year variation. In monsoon regions the average annual precipitation is about 1,800 mm, but 80% of it is concentrated in a five-month period, with widespread flooding often alternating with crop failures owing to water shortages during the dry season. The year-to-year variation also has a major impact, especially in the semi-arid tropics, where the mean annual rainfall is 600-900 mm but is characterized by a high degree of annual unreliability. Under these conditions, farming becomes a risky operation and the area may gradually deteriorate. An instability index based on crop yield data shows that in humid temperate regions annual crop yields vary by an average of 8%, but in certain semi-arid areas this variability can be as high as 40%.[13/]

13/ United Nations, The Demand for Water, Natural Resources, Water Series No. 3, New York, 1976.

Where it is available, surface water (lakes, rivers, etc.) is extensively used for agriculture and other needs. It is supplemented, to varying degrees, by groundwater. The ratio of groundwater use to total water use depends, above all, on the availability of other water resources. For this reason groundwater resources assume greater importance in the more arid regions. Table 3-6 compares water use between some of the more arid and more humid areas of the United States. In the more arid areas, where the proportion of groundwater use is higher than elsewhere, irrigation is often a major factor in this regard.

Table 3-6. Comparison of groundwater use in the United States between more arid and more humid states

State	Public supplies	Rural	Irrigation	Industrial	Total ground water use	Ratio of groundwater use to total water use
	..... million gallons per day					... % ...
MORE ARID STATES						
Arizona	110	10	4,700	140	4,960	69
New Mexico	85	16	1,700	46	1,547	58
Texas	550	140	6,500	1,030	8,220	48
California	540	89	10,000	460	11,089	36
MORE HUMID STATES						
Minnesota	50	72	2.2	190	314	17
Georgia	85	23	12	210	330	15
Indiana	140	79	5.1	390	614	9
Illinois	160	95	3.2	393	651	7

Source: D.K. Todd, Ground Water Hydrology, New York and London, Wiley, 1959.

There is very little information on the spatial distribution and depth of occurrence of groundwater resources in the developing countries. Moreover, although abundant information is available in many developed countries, data on global or regional groundwater resources are very limited. Better documentation should be actively pursued, particularly in those developing countries where groundwater needs are greatest.

Although irrigated land comprises only 13% of the world's total arable area, irrigation accounts for by far the largest proportion of the total water used by man (Table 3-7). Other non-agricultural water uses (for industry, mining and domestic purposes) are now increasing much faster than the use for irrigation. However, a considerable amount of this water is non-consumptive and is recycled, while irrigation continues to be a consumptive use. Irrigated agriculture will therefore continue to be the greatest water consumer in the future.

Within a region, country or river basin, the spectrum of uses and withdrawals of water will vary according to climatic and socio-economic conditions, and it is thus necessary to distinguish between consumptive and non-consumptive use. For example, Table 3-8 indicates that, among the countries covered, the highest annual withdrawals per caput occur in the United States and the U.S.S.R., where both irrigated agriculture and industry are highly developed. However, very high withdrawals also take place in non-industrialized countries such as Mexico and India, where there is a large use of water for irrigated agriculture. The figures for Czechoslovakia and the United Kingdom show that per caput demand may be quite low in industrial countries with very low demands for irrigation.

Table 3-7. Estimates of world water use, 1967, and projections to 2000

	Total use			Proportion of total use	
	1967	2000	Projected rate of growth 1967 - 2000	1967	2000
	....million m^3 ...		...% per year ...	.....%	
Agriculture					
Irrigation	1,400,000	2,800,000	2.1	70	51
Livestock	58,800	102,200	1.7	3	2
Rural domestic	19,800	38,300	2.0	1	1
Other					
Urban domestic	73,000	278,900	4.1	4	5
Industry and mining	437,700	2,231,000	5.0	22	41
TOTAL	1,989,300	5,450,400	3.1	100	100

Source: M. Holy, op. cit.

Water quality

The need for water resources, however, goes beyond quantity and must also consider quality. The harmful effects of waste disposal on quality are well known, but a major unseen problem is the increasing salinity of water resources with use. This is an inevitable process in nature, but man has greatly accelerated it and, with continued increases in the intensity of use, the problem will become greater.

Guidelines have been drawn up for interpreting the quality of water for irrigation[14/]. Table 3-9 illustrates the application of some of these guidelines to the quality of water in three irrigated areas. The Mona project in Pakistan and the Pecos River in the United States would be classified as having severe or increasing water quality problems for irrigation. The Tigris River would be classified as having no problem, although sodium concentrations would be regarded as borderline.

Increased salinity in water supplies results from the two basic processes of salt loading and salt concentrating. Salt loading is due both to natural causes such as surface run-off and to man-made sources such as industrial waste and return flows from irrigated land. The relative effects of salt loading and salt concentrating on salinity concentrations for the Colorado River in the United States are shown in Table 3-10. While 59% of the average salinity concentration over the 20 year monitoring period was attributable to natural causes (including evaporation), 41% was due to man's activities (mainly irrigation, which accounted for 37%).

14/ R.S. Ayers and D.W. Westcott, Water Quality for Agriculture, Irrigation and Drainage Paper No. 29, Rome, FAO, 1976.

Table 3-8. Water use in selected countries, 1965

Country	Total	Municipal and rural water supply	Agriculture	Industry
	m^3 per caput	..... % of total		
United Kingdom	200	31	3	66
Czechoslovakia	285	13	6	81
India	600	3	96	1
Japan	710	10	72	18
Mexico	930	4	91	5
U.S.S.R.	1,000	8	53	39
United States	2,300	10	42	48

Source: United Nations, The Demand for Water, op. cit.

Another major concern in the developing countries is the provision of safe drinking water and the hygienic disposal of wastes. A recent WHO survey, covering 1,600 million people (including those of 88 developing countries), found that 77% of the populations surveyed were not satisfactorily served by community water supplies.[15]

Irrigation problems

Irrigation, or the controlled use of water for agriculture, is playing an increasingly important role in increasing production and in reducing its instability. In the Near East, for example, 70% of the total agricultural production is derived from the 35% of the cultivated area that is irrigated.[16] The benefits of irrigation go far beyond the mere provision of water, since it creates conditions suitable for the optimum use of other inputs, such as fertilizers and high-yielding varieties.

Table 3-9. Water quality in three selected irrigation areas

	Salinity ECw[1]	Sodium SAR[2]
Guideline		
No problem	Below 0.75	Below 3
Increasing problem	0.75 - 3.0	3-9
Severe problem	Above 3.0	Above 9
Irrigation area		
Mona project, Pakistan, 1968	3.60	38.0
Pecos River, United States, 1946	3.21	8.6
Tigris River, Iraq, 1966-69	0.51	2.5

Source: R.S. Ayers and D.W. Westcott, Water Quality for Agriculture, op.cit.

1/ Electrical conductivity, expressed in mmhos/cm. -

2/ Sodium absorption rate, adjusted for calcium and magnesium content.

15/ United Nations, The Demand for Water, op. cit.

16/ M. El Gabaly, Seminar of Committee on Water Research, Cairo, 1976.

Table 3-10. Effect of various factors on salt concentration of Colorado River, United States, 1942-61 [1/]

Factor	Cumulative concentration	Share of total
	mg/l	%
Natural sources	334	47
Evaporation	80	12
Irrigation (salt contribution)	178	26
Irrigation (consumptive use)	75	11
Municipal and industrial sources	10	1
Exports out of the basin	20	3

Source: United States Environmental Protection Agency, Summary Report, 1971.

1/ At Hoover Dam.

The total irrigated area of the world was 223 million hectares in 1975, and is expected to rise to 273 million hectares by 1990. Table 3-11 shows estimates of the area equipped for irrigation in the developing market economies in 1975, and targets for new irrigation and the improvement of the existing irrigation in these countries by 1990. Irrigation accounted for 66% of the cropped area in Asia in 1975, 19% in the Near East, 13% in Latin America, and only 3% in Africa. The demand for water for irrigation in the developing market economies would increase between 1975 and 1990 by 438 km^3, or more than 30% of the total world use of water for irrigation as estimated in Table 3-7 above.

The major irrigation problems arise from water losses due to ineffective or badly managed systems, and from salinity and waterlogging associated with inadequate drainage. As regards the former, the targets shown in Table 3-11 indicate the need for the improvement of almost half of the existing main and on-farm irrigation systems in the developing market economies. About 40% of these improvements are classified as "major". Even under optimum conditions of efficiency, some 25 to 30% of the water used in irrigation schemes is not utilized by the crop, but is lost in run-off, evaporation and percolation. More often the figure is 50% or even more. More efficient irrigation systems, however, require large investments, which must be returned in higher yields and income. The cost of the improvements included in Table 3-11 has been estimated as U.S. $23,000 million at 1975 prices.

As regards salinity and waterlogging problems, salinization is very often associated with irrigation. The causes include unsuitable soils, irrigation with poor quality water (as discussed above), inadequate soil drainage to remove soluble salts, a high water table, and a high evapotranspiration rate. It is estimated that about half of all the irrigated lands of the world have been damaged by salinization, alkanization and waterlogging.[17/]

Past neglect of drainage, in conjunction with irrigation, has reduced the productivity of millions of hectares, which must now be reclaimed if at all possible. In some cases, large areas of irrigated land have had to be abandoned as a result of soil salinization. The serious extent of this problem is illustrated in Table 3-11. Improved drainage should be extended to 52 million hectares of irrigated land in the developing market economies, much of it within the 45 million hectares requiring improvements in the irrigation system. The cost of the drainage improvements shown in Table 3-11 has been estimated as U.S. $13,700 million at 1975 prices.

17/ FAO/UNESCO, Soil Map of the World, op cit.

Table 3-11. Irrigation and drainage in the developing market economies, 1975, and targets, 1990

	Africa	Latin America	Near East	Asia	Total
			thousand ha.		
IRRIGATION					
Equipped irrigation area, 1975	2,610	11,749	17,105	60,522	91,986
Targets, 1990					
New irrigation	960	3,101	4,295	13,848	22,204
Improvements to existing irrigation	783	4,698	9,789	29,718	44,988
of which minor	522	2,349	6,368	17,614	26,853
major	261	2,349	3,421	12,104	18,135
			km^3		
Increased water demand	20	33	44	341	438
			thousand ha		
DRAINAGE					
Equipped drainage area, 1975	7,044	46,585	18,212	62,501	134,342
Improvement targets, 1990	5,900	19,245	9,643	43,396	78,184
of which on irrigated land	1,177	2,018	7,076	42,152	52,423
on non-irrigated land	4,723	17,227	2,567	1,244	25,761

Source: United Nations Water Conference, Water for Agriculture, 1977, Annex I.

In Pakistan, out of a total of 15 million hectares of irrigated land, about 11 million suffer from salinity, waterlogging or both, resulting in pronounced reductions in crop yields. In Iraq, more than 50% of the Lower Rafadain Plain suffers from salinity and waterlogging. In Syria, about 50% of the irrigated land in the Euphrates Valley is seriously affected, with crop losses worth about U.S.$ 30 million annually. In Egypt, some 0.8 million hectares, or 30% of the total, are affected, and in Iran over 15% of the irrigated lands.[18]

Among other factors to be considered, the most important is disease transmission as a result of irrigation. Schistosomiasis is the most serious of the diseases concerned. Irrigation schemes provide a natural environment for its spread, and in one case 60% of the adults and 80% of the children are affected.[19] Malaria can also thrive on irrigation projects, when havens for vector breeding become established as a result of defective planning and water management.

The problems of irrigation are immense, but the crop production potential due to irrigation is equally great. The solution lies mainly in the rehabilitation and improvement of existing irrigation schemes and the proper installation and subsequent management of new ones. The installation of new schemes will be particularly important in Africa, where irrigated areas are now expanding rapidly.

18/ M. El Gabaly, op. cit.

19/ M.A. Amin, Problems and Effects of Schistosomiasis in Irrigation Schemes in the Sudan, Khartoum Bilharzia Project

GRAZING LAND AND FORAGE RESOURCES

Grazing land and forage provide the major part of the nutrition of the world's ruminant and equine livestock population, which totalled a little less than 3,000 million head in 1976 (Table 3-12). In many countries they provide no less than 80% of the total feed consumed, and on a world basis they are by far the most important resource on which to base the future expansion of milk and meat production.

Grazing and forage production is the most extended form of land use on a world scale. The statistical information indicates about 30 million km^2 of permanent pasture (Table 3-13), which is some 23% of the world's land area. About half of the total is located in the developing market economies. Permanent pasture is defined as land used for five years or more for herbaceous forage crops, either cultivated or growing wild. But, depending on the reporting of various countries, large stretches of land with scattered tree and shrub growth or more prominent wood components are classified under forests and woodland, in spite of their sometimes substantial grazing use. Similarly, large areas statistically classified as "other land" are used for rough grazing or nomadic grazing in the arid zones and the tundras. If these resources and also the areas used for shorter-term forage production are taken into account, it can be assumed that almost half of the land area of the world is used for grazing and forage.

The vast majority of grazing land and forage resources is determined by natural vegetation which has developed to favour forage use through the interaction of climate and soils, and also to a considerable extent through the effect of grazing animals, wild as well as domesticated, and man's activities such as forest and bush clearing, burning, mowing and cropping. In large areas these influences date back to prehistoric times. In others there are historical records showing how pastures have developed as secondary vegetation as a result of forest clearing, or other major man-made vegetational changes, including the planting of improved pastures. From a strictly scientific point of view, there are presumably not many vegetation types used as grazing land today which could be classified as unchanged climax vegetation. This is even true for the large areas of primary vegetation supporting grazing use, such as grasslands, prairies, steppes and savannas.

A basic understanding of the major factors determining the present vegetational composition, growth characteristics and forage value of grazing and forage resources is very often a prerequisite for estimating the present and potential productivity of these resources, and developing viable concepts for their rational use, management and improvement. In spite of considerable work done in some areas, the widespread insufficiency or even complete lack of reliable basic data is a major obstacle to the more accurate determination of the productivity and quality of these resources for animal production, and of the stages of deterioration which call for specific programmes for reclamation and improvement.

Table 3-12. Numbers of ruminant and equine livestock, 1976

	World total	Developing market economies	
	.... million head		% of world total
Sheep and goats	1,451	754	52
Cattle	1,214	696	57
Buffaloes	132	98	74
Horses, mules and asses	123	74	60
Camels	14	12	86

Source: FAO Production Yearbook 1976, Rome, 1977, p. 193-201.

Table 3-13. Extent and distribution of permanent pastures, 1975

	Permanent pastures
	million km^2
Developing market economies[1/]	14.4
Africa	6.9
Far East	0.3
Latin America	5.3
Near East	1.9
Asian centrally planned economies	3.6
TOTAL DEVELOPING COUNTRIES	18.0
Developed market economies[1/]	8.6
North America	2.4
Western Europe	0.7
Oceania	4.7
Eastern Europe and the U.S.S.R.	3.9
TOTAL DEVELOPED COUNTRIES	12.5
WORLD	30.5

Source: FAO Production Yearbook 1976, op. cit., p. 45-56.

1/ Including countries in other regions not specified.

With a few exceptions, grazing lands prevail in those areas which have severe restrictions for crop cultivation. The most important of these restrictions on a global scale is insufficient rainfall, but soil characteristics such as low fertility, steep slopes, shallowness, waterlogging or flooding, or other reasons such as low temperatures, short grazing seasons and inaccessibility through lack of adequate infrastructures, may likewise be important. Depending on the climate and on the growth characteristics of the forage vegetation, most forage resources provide feed for animals of sufficient quantity and quality only in part of the year. This results in a seasonal pattern of production, if no compensatory feed resources are available or are established through such practices as the alternate use of different vegetation types (including cultivated forages), forage conservation as standing hay, hay or silage conservation, or the use of byproducts. The annual productivity of grazing lands and forage resources varies from 1 ha supporting 3 or even 5 animal units on well-managed and fertile pastures in central Europe or Japan, to 50 to 60 ha being required to maintain 1 animal unit on arid grazing lands in Saudi Arabia or New Mexico (United States).

The vastness of the world's grazing land resources may be misleading in relation to their potential for animal production. Low productivity per unit of land is widespread in all areas of limited rainfall, or where other factors such as low fertility limit plant production. Misuse and neglect are more common than sound traditional pastoral systems or effective ranging systems that keep forage production and its use by livestock in a proper balance and introduce measures to maintain or improve productivity.

Degradation of grazing land and forage resources

The future of grazing land and forage resources is closely related to the development of sound land use concepts, based on improved ecological and agronomic data. The growth of the human population will further increase the pressure on these resources, either for conversion to cropland or for feeding increasing numbers of livestock.

Between 1955 and 1976 cattle numbers rose by 38% in the world as a whole, and 35% in the developing market economies (Table 3-14). They almost doubled in Oceania, and rose by 77% in eastern Europe and the U.S.S.R., 62% in the Near East, and 51% in Latin America. For sheep and goats the increase was only 21% at the world level but 28% in the developing market economies. The most rapid increases were in the Asian centrally planned economies (52%) and Africa (44%).

These increases reflect the rapidly expanding demand for livestock products, and are also partly due to improvements in animal health. In some areas they have put a heavy pressure on grazing and forage resources. This has led to the serious deterioration of grazing land, particularly in the Sahelian and Sudanian zones of Africa, and in parts of the Near East, the Mediterranean and North Africa. The grazing resources in these areas are to a large extent under arid and semi-arid conditions, and some of them have already been threatened for hundreds and sometimes thousands of years by overuse, leading to complete changes in the vegetation, which have left only shrubs of low palatability. Further increases in grazing pressure and aggravated misuse result in the complete devastation of all vegetation, which finally ends in desertification. The problem has been magnified by the encroachment of cropping on to the grazing area, as a result of faster population growth outside the range area. Similar problems exist in other arid and semi-arid areas, for example in continental Eurasia, in India and Pakistan, and in Northeast Brazil.

Table 3-14. Numbers of cattle, and of sheep and goats, 1955 and 1976

	Cattle		Sheep and goats	
	1955	1976	1955	1976
	..... million head			
Developing market economies[1/]	514.3	696.3	587.8	754.3
Africa	95.0	129.9	150.3	216.8
Far East	214.8	254.0	130.5	176.6
Latin America	175.7	265.6	155.9	161.4
Near East	28.6	46.2	150.8	199.3
Asian centrally planned economies	57.5	71.6	101.6	154.8
TOTAL DEVELOPING COUNTRIES	571.8	767.9	689.4	909.1
Developing market economies[1/]	225.0	302.0	364.8	359.6
North America	106.4	141.7	35.3	15.0
Western Europe	82.0	100.6	115.7	103.0
Oceania	21.7	43.2	170.1	205.0
Eastern Europe and the U.S.S.R.	81.2	143.9	146.7	182.0
TOTAL DEVELOPED COUNTRIES	306.2	445.9	511.5	541.6
WORLD	878.1	1,213.9	1,200.8	1,450.6

Source: FAO data and FAO Production Yearbook 1976, op. cit., p. 196-201.

1/ Including countries in other regions not specified.

Such grazing land can be reclaimed by reseeding with suitable forage species, including legumes and shrubs, and by the introduction of improved systems of grazing management. Such measures are costly, however, and it is also difficult to introduce the necessary changes in the prevailing socio-economic systems of nomadism and pastoralism, in pastoral legislation, and in administrative control. A major feature of these changes is the integration of the animal production of rangelands with improved forage production in neighbouring cropping systems, including those under irrigation. These or other forms of stratification may be the most promising ways to develop viable livestock industries in semi-arid areas, and to improve and maintain their always fragile but important grazing resources. FAO and UNEP are cooperating in a programme on Ecological Management of Semi-Arid Rangelands, to support government efforts of this kind.

Deterioration is less of a problem in the humid and sub-humid areas of the tropics and sub-tropics, where various types of savanna and woodland provide the major grazing and forage resource. These areas sustain about 40% of the world's livestock population (Table 3-15). Major deficiencies in such areas are the rapid decline in the feeding value of forage grasses during rapid growth in the rainy season, and the length of the dry season, during which good quality forage is scarce. In some areas, particularly in Africa, major animal diseases such as trypanosomiasis have so far prevented heavy grazing pressure. In others, as in parts of Latin America, major nutrient deficiencies of soils and plants are severe limiting factors for livestock production. Locally, however, overgrazing may be a serious problem, and considerably reduce the productivity of the sward. The incorporation of tropical legumes in existing swards or their complementary planting in improved areas, the control of the regrowth of undesirable and noxious species, and improved systems of animal husbandry, including grazing management, are among the most promising measures to develop the productivity of these grazing resources and to counteract deterioration. As in the arid and semi-arid areas, however, solutions must be found to the socio-economic constraints.

In certain areas, for example in West Africa, the improvement of humid and sub-humid grasslands can reduce grazing pressure in the arid and semi-arid parts of the same country. Thus there is a complementary effect, which benefits both types of grazing resource.

Table 3-15. Permanent pasture, forest and woodland and livestock numbers in the humid and semi-humid tropics, 1972-75

	Permanent pasture	Forest and woodland	Livestock numbers			
			Cattle	Sheep	Goats	Buffaloes
	million ha		million head			
Africa	345	521	86	34	53	-
Central America	57	51	35	3	6	-
South America	198	814	134	44	21	-
Asia	29	341	194	30	62	75
Oceania	26	160	6	-	-	-
Total of above	655	1,887	456	111	142	75
WORLD	2,992	4,035	1,132	1,057	887	126

Source: W.J.A. Payne, Problems and advances under humid tropic conditions, Proceedings, Second World Conference on Animal Production, Urbana, American Dairy Science Association, 1968, p. 52-60.

Grazing and forage resources in the area of the tropical rain forests vary in size and importance. Those being developed as a sub-climax on alluvial river banks which are periodically flooded, as in the Varzea of the Amazon Basin, may be very productive (1 animal unit/ha). Those that are being increasingly developed in forest clearings in the lowlands and in lower mountain elevations compete with forestry and with other agricultural uses. Plantings with suitable forage grasses and legumes can develop productive swards, but soil deterioration because of less protection against insolation and increased leaching of nutrients must be carefully monitored in order to avoid irreversible effects. Increased research is necessary to develop land use systems in which grazing and forage resources might find their proper place in the derived ecosystem.

The development of grazing resources in various forest types at higher elevations in tropical and sub-tropical mountain areas is very extensive, for example in the Himalayas and the Andes. The process, which is still going on, has led to a considerable reduction in forest cover during the last few centuries. The grassland cover developed as secondary vegetation by the spread of indigenous or introduced species is often poor, not only from a production point of view, but also as a soil cover. Soil erosion is very common, and is aggravated by indiscriminate and uncontrolled grazing and overstocking. Lack of attention to common grazing land in small farm areas, lack of knowledge of methods of improvement, socio-economic constraints, and increasing pressure on the use of agricultural land place this important resource in danger of further deterioration. Increased productivity of suitable cropland, including forage cultivation using new production systems with the necessary inputs, is one major tool to reduce grazing pressure on these mountain lands. It must be followed by better adapted grazing systems, which may include the partial improvement of existing swards by reseeding, fertilization and irrigation. The stratification of animal production between highlands and lowlands might be another important improvement. Reduction in grazing pressure would at the same time allow reforestation to improve vegetation cover and erosion control.

High mountain grassland above the tree line, often referred to as alpine grassland, has been under considerable grazing pressure, primarily by sheep and goats and by wildlife, in many parts of the world. The short grazing season and low productivity of these areas have allowed their use only in systems of transhumance, a form of stratification with other grazing resources of lower elevation. Problems of deterioration do not seem to be serious, but there is a widespread lack of information. The improvement of more productive forage resources at lower elevations is the major means to reduce grazing pressure in these areas, as has been demonstrated in the European Alps.

This review of grazing and forage resources is incomplete, and does not cover all important areas of the world. But the grasslands of the humid and cool temperate climate should be mentioned, because of the high productivity they have reached in some areas of western and central Europe and in New Zealand. Developed as a secondary vegetation replacing deciduous forests, they have found their place between the croplands (including forage crops) and the forested land, and have varied in extent over the centuries. Although their productivity differs with soil, water and atmospheric conditions, the deterioration of these grasslands was very common in Europe in the past, as a result of uncontrolled selective grazing and exploitation of soil nutrients, sometimes since neolithic times. The heath areas of Scotland and Germany remain visible signs of this degradation. Modern grassland science has developed the basis for improvements to develop, introduce and maintain productive forage grasses, legumes and herbs in the sward, using fertilization and well-adapted management systems, often combining grazing and mowing to secure part of the forage for conservation for the winter feeding period. With the increase in forage production on the land best suited to it, and with the necessary socio-economic changes, the less productive grassland is increasingly reforested or used for recreational purposes.

Grazing and forage resources cannot be considered in isolation from other types of land use. For various areas there is considerable knowledge of how deteriorated grazing lands can be reclaimed, and how improvements in productivity for animal production could be introduced in existing grazing land ecosystems. But substantial further research is needed in many areas, particularly in the developing countries, to establish the necessary

data base and to develop methods and management systems applicable to existing socio-economic conditions. This should include research on ecologically and economically sound decisions on where existing grazing land should be converted into cropland or forest, and where cropland of low productivity might be more suitable for grazing land.

FOREST RESOURCES

A forest is a community or an ecosystem of biotic and non-biotic components, consisting predominantly of trees or other woody vegetation growing more or less closely together. In addition to the trees, biotic components are shrubs, grass and other plants, and big and small animals. The non-biotic components are soil and the local climate prevailing within and in the vicinity of the forest. Each individual component has an influence on the others, resulting in a sometimes fragile ecological balance.

These communities or ecosystems can be very complex, as in the case of the tropical evergreen rain forests, or much more simple, as in the coniferous boreal forests. As a consequence of various factors of degradation or transformation, such as fire, shifting cultivation, grazing or commercial cutting, the complex primary forests, both tropical and temperate, are succeeded by more simple, but sometimes more economically useful types of secondary forest. Some of these transformations may be the outcome of deliberate management plans.

A forest is therefore more than the juxtaposition of individual trees. It creates its own environment: the forest environment. The classical concept of forests, based in particular on the closeness of the trees, has sometimes been expanded to include any land carrying scattered trees or even woody vegetation. Since there is no widely accepted clear definition of what should be classified as forest, and since no comprehensive global survey has ever been made, it is impossible to give a reliable estimate of the world area under forests.

It is helpful to distinguish between the closed forests, where tree crowns cover more than 20% of the ground, and which (more or less) enjoy a forest environment, and the open forests, which represent all the remainder of the area carrying a woody vegetation, but which lack the true forest environment. The closed forests have the statistical advantage of being easy to identify either from the ground or by remote sensing, so that their area is relatively easy to evaluate.

It has been estimated that about 4,300 million hectares, or about a third of the world's land area, may be covered by some woody vegetation,[20/] but this figure has to be taken as a mere indication. The area of closed forest can be more accurately estimated at 2,970 million hectares (Table 3-16), or about a quarter of the land area. A little more than half of the closed forest is in the developed countries. The forest areas of the world are also shown in Figure 3-1, where they are divided into coniferous and broadleaved.

The roles of forests

Forests provide both goods and services. The goods are not only the woody products obtained from the trunks of the trees, but also products derived from the other parts of the trees and from other components of the forest community. The woody products are numerous and extremely varied: timber and sawnwood for furniture, dwelling construction and public works; wood panels of all kinds for furniture, walls, doors and shuttering; pulpwood for pulp and paper (newsprint, cultural and wrapping papers) and carton and dissolving pulp for rayon; poles, posts, mining timbers, railway sleepers and fuelwood. The non-woody products are even more varied, ranging from fruits, fodder and game meat to pharmaceutical products and honey.

20/ R.G. Fontaine, Forestry and environment, Geoforum, 10, 1972.

Table 3-16. Area of closed forest, 1975

	Developed countries	Developing countries	Total
	..... million ha		
North America			665
Canada	325		
United States	305		
Mexico		35	
Europe	135		135
U.S.S.R.	770		770
Africa			190
North Africa		1	
West Africa		20	
Central Africa		150	
East Africa and islands		19	
Southern Africa	-	-	
Central and south America			665
Central America and Caribbean 1/		70	
Andean region		220	
Brazil		345	
Southeast Latin America		30	
Asia and Far East			545
West Asia		10	
South Asia		70	
Continental southeast Asia		100	
Insular southeast Asia		125	
East Asia		125	
Oceania	50	40	
Japan	25		
WORLD	1,610	1,360	2,970

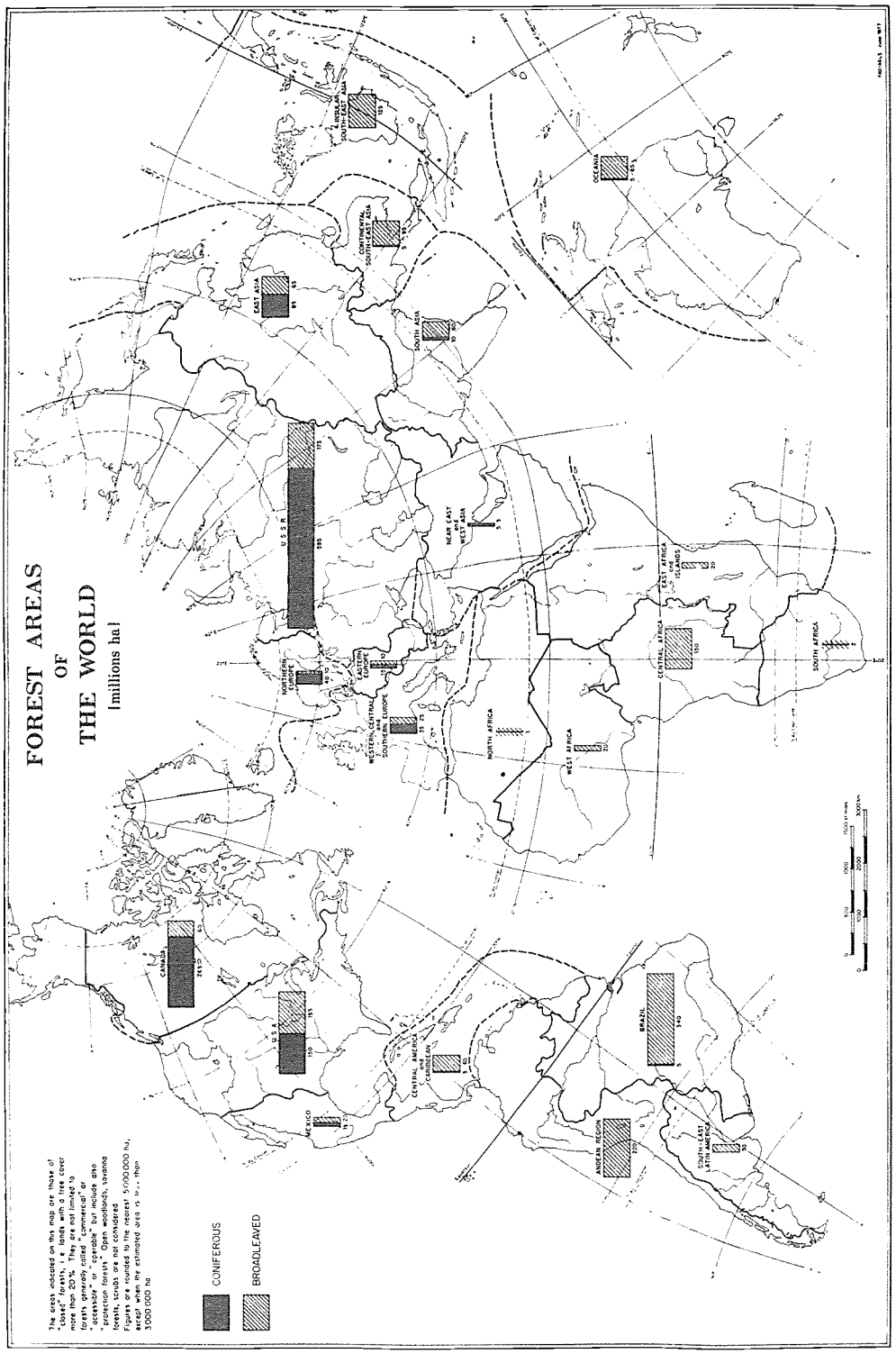
Source: Canadian Forest Service, Canada's Forests, 1976; FAO, Forest Resources in the European Region, Rome, 1976, p.3; R. Persoon, Forest Resources of Africa, Stockholm, 1975; FAO/IBDF, Una Análise Estatística da Actual Situação Florestal Brasileira, Brasilia, 1976; FAO, Forest Resources in the Asia and Far East Region, Rome, 1976, p. 3.

1/ Excluding Mexico and including Guyanas.

As a transition from goods to services, there is the role of the forest as a traditional means to rebuild soil fertility. This is reviewed in a later part of the chapter which discusses shifting cultivation.

The services rendered by forests (and particularly by the closed forests) are as numerous and sometimes as essential for mankind as the goods they produce. Forests play an important role in protecting soils against erosion or degradation, in producing a continuous flow of clean water, in reducing the danger of flooding, and in protecting crops and settlements against dessicating winds or excessive temperatures. It is no coincidence that desertification and deforestation are parallel phenomena. The role of forests in the

Figure 3-1. - Forest areas of the world



regularization of the local micro-climate is now widely accepted. On the other hand, little is known about the possible consequences of the massive destruction of forests for the climate of a whole country, region or continent.

Forests, and more generally trees or green vegetation also provide beauty, amenity and recreation, and in some industrial and urban civilizations they are as much a factor of man's psychological balance as of ecological balance. The use man makes of the forest is characteristic of the type of society he lives in (Table 3-17). Traditional aboriginal communities are heavily dependent on the forest for their living and even for their survival. The forest provides them with food, fodder, game meat, medicines, honey, and fuelwood. The disappearance of the forest or even the disturbance of the forest environment may cause the destruction of these societies. At the other extreme, urban and highly sophisticated civilizations tend to consider the forest more as a source of beauty or recreation, and possibly also of clean water, than as a supplier of goods, without realizing that these goods are necessary for the survival of their very type of civilization. For example, the average United States citizen consumes for paper alone the equivalent of 1 m^3 of roundwood per year, which is approximately the annual sustained yield of a third of a hectare of average temperate forest. On the other hand, in most developing countries the corresponding figure is about 0.05 m^3. The relative consumption of fuelwood, however, is reversed as between the two groups of countries.

Table 3-17. Use of the forest according to type of society

	Developed	Developing
Goods	More industrial wood (in particular pulpwood) than fuelwood. Little use of minor products such as fodder or game meat.	Wood products used in primary form (poles, posts, and mostly fuelwood). Importance of minor non-woody products.
Services	Soil and particularly water protection. Amenity and recreation roles are prominent and increasing.	Soil and water protection, but the essential role is the regeneration of fertility in shifting cultivation.

Almost all the services provided by forests are related to their role in the ecological balance, and are thus concerned with the environment. However, the two roles of the forest in providing goods and services are closely interdependent. If man destroys or overexploits a forest for the production of goods, he may also destroy its capacity to provide services, and thus its environmental value. In the remainder of this discussion both roles of the forest will therefore be reviewed jointly.

Evolution of the world's forests[21/]

In the developed countries, with few exceptions, forest cover is generally stable or even increasing slightly. In France, for instance, the area covered by forest has increased by probably more than a third since the start of the century. A balance between agricultural and non-agricultural land has already been achieved, to the extent that in many cases a natural forest of poor commercial value has invaded the abandoned marginal agricultural lands.

The situation is completely different in the developing countries, where no balance has yet been obtained between agricultural and non-agricultural land. Moreover, the very

21/ The following refers only to closed forests, unless open forests are explicitly mentioned.

widespread (and up to now unavoidable) method of shifting cultivation does not permit a distinction between forest and non-forest land, because a plot now under forest cover is an agricultural plot in perspective.

The closed and open forests of the developing world are mostly located within the inter-tropical belt. Within this belt, forests are not homogeneous. Their structure, physiognomy and composition vary, mainly but not exclusively (e.g. mangrove forests and mountain forests) according to the temperature and rainfall and their distribution over the year. Tropical forests are usually classified according to their climax type, whether the climax vegetation still exists or has already been destroyed. Three belts, approximately parallel to the equator, are generally identified in Africa, Asia and Latin America.

On both sides of the equator there is the tropical moist evergreen forest belt, which is also called the rain or humid or moist tropical forest belt. Tropical moist deciduous forest belts are located north and south of this belt. They are transition belts between the almost permanently humid and green forest and the dry one. Dry tropical forest belts are located north and south of them, ending to the north in the Mexican, the Sahara and the Asian deserts, and to the south in the Chilean, South African and Australian deserts, where forests cease to exist. All these types of forest have been extensively cleared and sometimes completely destroyed in the past, and the clearing and destruction continue.

In the humid tropical belt, as well as part of the transition belts (moist deciduous forest), the main factor causing destruction is clearing for agriculture, mostly by shifting cultivation. As discussed later in this chapter, shifting cultivation is not an absolute evil, but becomes dangerous for the maintenance of the forest environment and consequently for the environment as a whole if the duration of the forest fallow is too short, i.e. if the population is too dense. Most of the modern export or market-oriented logging operations are located in the humid tropical belt, but they do not seriously affect the environmental value of the forest, since they generally take out of it at most a quarter of the standing volume. However, they open up formerly inaccessible areas to land-hungry farmers and shifting cultivators.

Alarming estimates have been made about the destruction of the humid tropical forest. The present world area of closed humid tropical forest has been estimated as 935 million ha (506 million in Latin America, 254 million in Asia, and 175 million in Africa).[22/] Some authors estimate a rate of destruction as high as 1.5% or even 2% per year, which would mean the disappearance of all tropical humid forest in less than 50 years. No global assessment can be made of these figures, but accurate estimates have been made in some specific cases of the clearing of tropical forest for agricultural purposes.

In the Azuero peninsula in Panama, it was found that, out of a total mountainous forest area of 215,000 ha, 92,000 ha, or 42%, had been cleared for agriculture between 1954 and 1972.[23/] Northern Thailand presents a classic example of clearing followed by increased floods in the watershed area of the Mae Nam River. At the beginning of the century over 39,500 km^2 of the area were covered with forests, but an inventory carried out in 1956 showed that 58% had been felled and were either devoted to shifting cultivation or existed in the form of old clearings of secondary growth.[24/] In the Ivory Coast,

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22/ A. Sommer, Attempt at an assessment of the world's tropical forests, Unasylva, 112-113, p. 3-24.

23/ UNDP/FAO, Reconocimiento de los bosques y inventario detallado de Azuero, Inventariación y Demostraciones Forestales - Panama, 1972, Vol. 3, p. 169.

24/ FAO, Report to the Government of Thailand on Forest Industry of the Northern Teak Bearing Province, FAO Report No. 895, Rome, 1958.

aerial photographs taken in 1956 and 1966 showed how shifting cultivation had reduced the forest cover by 30% during this period; this rate of clearing has continued, so that now only 5 million ha are left out of the 15 million ha of forest believed to exist at the beginning of the century.25/ In the Philippines, about 350,000 ha are being cleared annually by shifting cultivation, and one million ha were cleared in Mindanao alone between 1960 and 1971.26/

The above examples show that apparently pessimistic estimates of the disappearance of the humid tropical forests cannot be taken lightly. However, it must be emphasized that the clearing of the original humid tropical forests does not always and automatically mean the destruction of the forest area or represent a danger for the environment. It may be more usefully or adequately replaced by, for instance, a good pasture, a good artificial forest, industrial or fruit tree plantations, or by shifting cultivation with an adequate period of fallow. There are numerous examples of the beneficial effects of forest clearing, even in the forestry field proper, such as the regeneration of Dipterocarps in eastern Asia, Aucomea in Gabon, and Cedrela and Swietenia in Latin America.

It is obviously difficult to draw a clear line of demarcation between the three main forest belts in the developing countries. The wetter parts of the transition forest belts (the moist deciduous tropical forest) possess to varying degrees the features already described for the moist evergreen forest. Their drier parts have many similarities with the dry forest belts, which will now be briefly discussed.

Except in their more arid parts, the dry belts are more densely populated than the humid belt. Many moist forests remain under forest precisely because of the low density of the population. Consequently, the area of closed forest is proportionately much smaller in the dry belts than in the moist, evergreen belt. The dry belts are largely made up of savannas, carrying shrubs and scattered trees. Shifting cultivation affects the dry belts too. Although its effects are less spectacular than the drastic changes in landscape that occur with the clearing of the impressive high evergreen forest, it may be much more dangerous since the ecosystem is more fragile.

The dry belts are generally little affected by commercial, market-oriented and industrial logging operations, but their trees are of paramount importance for domestic uses such as poles, posts and, above all, fuelwood. The use of fuelwood in the dry or transition tropical belts is economically so important and has such serious implications for the environment that it is discussed separately below.

Uncontrolled grazing, browsing by animals, and the cutting of branches by herdsmen are other important factors causing the degradation and often the destruction of dry and transitional forests, whether closed or open. In addition, during the dry season fires plague immense areas of the open forests throughout the world. In the developing countries they are generally started by herdsmen trying to renew the grass, or in the shifting cultivation plots. Some of the related problems are reviewed later in discussing shifting cultivation and also desertification.

25/ J.P. Lanly, Regression de la forêt dense en Côte d'Ivoire, Bois et Forêts des Tropiques, 127, p. 45-59.

26/ FAO, Environmental Aspects of Natural Resources Management: Forestry, Rome, 1971.

Fuelwood[27/]

Of all the wood consumed annually in the developing countries, 82% (1,000 million m^3) is used for fuel. The contribution of wood fuel to total energy use is as high as 58% in Africa (Table 3-18). Fuelwood consumption is mainly for domestic use, with charcoal accounting for part of the total.

Table 3-18. Estimates of contribution of wood fuel to total energy use in developing regions

Region	Contribution to total energy use
	%
Africa	58
Far East	42
Latin America	20
Near East	14

Source: FAO, The State of Food and Agriculture 1976, op cit., p. 90.

This massive dependence on fuelwood, together with the localized character of wood supply, puts increasingly heavy pressure on the tree cover and other woody vegetation, and can lead not only to destruction of the forest but to the complete removal of all tree and scrub cover. In the densely populated Gangetic plain, for example, the forest cover has been reduced to 0.35% of the land area in West Bengal and about 2% in Uttar Pradesh.[28/]

The impact of the demand for wood fuel is felt most heavily around centres where population and processing industries are concentrated. The annual use of 3 million m^3 of wood for fuel in Bangkok is felt over a large part of Thailand.[29/] Even in the sparsely populated region of the Sahel, areas surrounding small and medium-sized centres of population are largely deforested. Around one fishing centre in this region, where the drying of 40,000 tons of fish annually requires 130,000 tons of wood, deforestation extends as far away as 100 km. What is worse, the area affected is growing at a frightening speed. In one large town in the Sahel, where until recently nobody hauled fuelwood more than 50 km, it is now common to have to go as far as 100 km to get it.[30/]

Where fuelwood becomes scarce or costly, it is substituted by animal dung and crop residues. The shortage of fuelwood weighs disproportionately heavily on the poorest. At prevailing prices it would, for example, absorb 15% of household income in the highlands of the Republic of Korea and up to 25% in the poorer parts of the Andean Sierra and the Sahelian zone, if it were available for purchase on the spot. The option of substituting commercial fuels as organic fuels disappear is beyond the means of the poorest people, and investment in stoves is also too costly for them. Thus for millions of people the progressive disappearance of fuelwood means the progressive disappearance of the means to cook and keep warm.

27/ For a fuller discussion, see: FAO, The State of Food and Agriculture 1976, op. cit., p. 88-92.

28/ R.S. Mathur, Certain trends in the consumption of wood in India, Indian Forester, Jan. 1975.

29/ M.F.E. de Backer and K. Openshaw, Present and Future Forest Policy Goals, a Timber Trends Study 1970-2000: A Report Prepared for the Government of Thailand, FAO TA Report No. 3156, 1972.

30/ J.C. Delwaulle and Y. Roeberer, Le bois de feu à Niamey, Bois et Forêts des Tropiques, 152, Nov.-Dec. 1973.

It must therefore be expected that for the foreseeable future locally available wood and other organic materials will have to continue to meet most of the energy requirements in developing countries. The negative effects on forest resources and on the environment will unfortunately continue, and in many areas will become worse unless suitable action is taken in the immediate future. Many countries carry out programmes to provide fuelwood at the village level. In China and the Republic of Korea, trees have been planted for this purpose through community efforts in village woodlots, around farms and as larger plantations.

Wood resources in relation to demand

Wood cutting for market purposes is often accused of being the main cause of forest degradation or destruction, with concomitant effects on the environment. The above review already suggests that this opinion may have to be modified.

The productive capacity of a forest may be calculated on a sustained basis not only for the goods but also for the services it normally provides. The quantification of services is, however, often difficult.

A very dry forest may produce less than 1 m^3 of roundwood per ha per year, whereas the best artificial plantations may, in good conditions, produce more than 25 m^3 per ha per year. Each type of forest produces different types of wood suitable for different uses: dry open forest in the Sahel cannot produce better than fuelwood and poles, while a well managed temperate oak forest may produce very valuable veneer logs 200 years after its establishment.

When referring to the productive capacity of a forest or of forest land, one must not only speak in quantitative terms but also qualitatively. This is particularly relevant to tropical forests, because they (in particular the moist ones) are heterogeneous, with up to 300 species in the same forest, and only a limited number of species are at present accepted by the trade.

All the available information suggests that sometimes at the national level, but certainly at regional or sub-regional levels, the developed world is, or could easily be self-sufficient for most of the wood it consumes, both quantitatively and qualitatively. Removals do not seem to exceed productive capacity, so that, with proper management, it should be possible to safeguard the environmental role of the forests of the developed countries. Each inhabitant of the developed world has on the average more than one hectare of forest at his disposal to provide the wood products he requires. As the population of the developed world is growing only slowly and the area covered by forest is increasing slightly, there should not be any crisis, at least in this century. The present productive capacity of average temperate closed forest is around 2 m^3 per ha per year on a sustained basis, which is much more than is likely to be needed. Moreover, in many developed countries forests are not managed intensively enough to produce to their maximum capacity.

It may therefore be concluded that during this century wood demand, and consequently wood cutting, should not normally create an environmental crisis in the developed world. Urbanization is a more serious cause of forest destruction than wood removals in these countries. A possible exception is Japan, which possesses only 25 million ha of forest land for a population of 112 million, but this highly industrialized country makes up its wood deficit by importing logs, which it pays for by exporting sophisticated industrial goods. However, Japan's domestic forests are quite adequately managed. Japan imports 50 million m^3 of logs a year, but the other developed countries import only marginal amounts of tropical woods (about 3% of their consumption). Except for very special qualities of wood, they could probably do without these imports, provided they apply more intensive management to their own forests.

The present consumption of the developing countries is about 1,500 million m^3 of roundwood, or 0.5 m^3 per caput per year, of which 82% is fuelwood. Assuming that, according to the United Nations medium variant, the population of the developing world

reaches about 4,900 million in the year 2000, and that per caput GNP increases by 3.4% per year, the total consumption of wood products would reach the level of 4,000 million m^3 (0.8 m^3 per caput), nearly half of which might still be fuelwood. At the global level, such needs could be satisfied if the productivity of the closed forests of the developing countries could be raised to 2.9 m^3 per ha per year. This seems technically possible, at least in quantitative terms. Thus, if the developing world were a single market community, and if the wood products could be transported over long distances, there should not be any serious problem.

This optimistic view is reinforced by the fact that fuelwood, which is likely to represent half of the developing world's requirements in the year 2000, can be obtained not only from closed forests but also from the large area of open forests, from linear plantations, from shrubs and even from agricultural residues. The supply base of fuelwood is so wide that its consumption is a cause of the degradation and destruction of the forest and environment only in dry areas, or exceptionally in those more humid areas where the local population is extremely dense. Excluding fuelwood, the requirements of the developing world in the year 2000 would be in the region of 2,000 million m^3 of roundwood, and at the global level it does not seem impossible to obtain this quantity on a sustained basis from the 1,400 million ha of closed forest that now remain. This represents an annual cut of only 1.4 m^3 per ha, which is less than 0.7% of the average standing volume of 200 m^3 per ha. Moreover, Figure 3-1 suggests that at the regional, and possibly also at the subregional and sometimes at the national level, the developing countries at present have enough forest area to be self-sufficient in wood products, provided of course they form some regional or subregional economic or trade communities to allow the countries richly endowed with forests to supply the poorer ones.

Table 3-19. Area of closed forest per caput, developing countries, by continent, 1975

Region	Closed forest	Population	Closed forest per caput
	million ha	million	ha
Latin America	700	324	2.16
Africa	190	376	0.51
Asia	430	2,142	0.20
Oceania	40	4	10.00
Total	1,360	2,847	0.48

Source: Table 3-16 and United Nations population estimates.

Table 3-19 shows the present area of forest available for each inhabitant of the developing countries. It would seem that Asia already has few forests to supply its huge population but this is largely compensated by the predominance of Dyptocarpacean forests, most species of which are now accepted by markets. Moreover, China, which has about 40% of the continent's population, has embarked on a massive reforestation programme. The fact that the market now accepts just a few species from the moist tropical forest should not cause excessive preoccupation. Constant technological breakthroughs make an increasing number of species acceptable to the market, as the increased demand tends to be accompanied by an increased use of new species, so that the number of newly used tropical species is increasing all over the world.

On the other hand, it is true that a great part of the supply base, namely the area of closed tropical forest, is shrinking. As was noted earlier, according to some authors it is shrinking at an alarming rate within the moist tropical forest belt. It has also been seen that the main cause of the disappearance of the tropical forest is clearing for agriculture. Shifting cultivation does not always destroy the forest and may just replace it by secondary forest, which is also productive, and sometimes more productive than the

original one. It is often forgotten that untouched, virgin forest does not produce any wood, as growth is balanced by natural mortality with no benefit to mankind. Moreover, original or virgin forest can be replaced by more productive land use, which (particularly in the framework of agri-silvicultural methods) may, if properly devised and managed, play an environmental role almost as satisfactory as that formerly played by the original forest. Nigeria, for example, is now replacing its natural rain forest (except in some reserves) to meet the needs of its large population. Since there are no accurate figures of the rate of clearing and destruction of the tropical forest, no estimate can be made of the area of intensively managed new forests necessary to make up for it. In general, however, in spite of some gaps, enough is known about tropical silviculture and forest management to make up for the shrinking of the area of the closed natural forest through an increase in the productive capacity of the land.

No longer taking a global but a more local view, there are two main circumstances in which specific measures may have to be taken locally to prevent or make up for the degradation or destruction of the forest, together with the degradation of its environmental role. First, some fragile or critical areas, for instance on steep slopes of erodible soils or important water catchments, should never be cleared. This applies also to certain natural forest reserves which might be needed for the conservation of some ecosystems, genes and species, including wild animals, and for the survival of aboriginal communities. Second, wood products (except paper and some sophisticated secondary products) are bulky, and cannot economically be shipped over long distances. This is particularly the case with fuelwood and wood for domestic use, which are employed in a round or unprocessed form. For this reason, even in countries like Cameroon or Nigeria, which range from the humid tropics with particularly good forest potential to the dry tropics, it may be necessary to create new forests close to the markets.

On the basis of the best available information, it may be concluded that the risk of degradation and destruction of the environmental role of forests will be serious only in areas of heavy population pressure and difficult conditions for tree growth. In such areas, action is urgently required in several fields if further harmful degradation is to be avoided.

First, the quantitative and qualitative monitoring of the evolution of tropical forest cover, already initiated on a pilot basis by UNEP and FAO, should be continued and extended. In addition, each country should periodically carry out a national forest inventory, geared not only to environmental but also commercial purposes. This is the only way to compare possible supply with demand, and estimate the pressure which may be exerted by cutting operations on the forest area, its composition and its role in the environment.

Second, critical or fragile areas, including natural reserves for ecosystem conservation purposes, may have to be preserved from clearing or commercial exploitation. In some cases it may be sufficient to impose some restrictions on cutting. Third, in some parts of the world, in order to meet local needs for wood products which cannot be economically imported from more richly endowed areas, or to make up for the shrinkage of the original tropical forest, intensification of forest management, including high-yielding artificial plantations, may be necessary. This applies particularly to fuelwood and wood for domestic use in the drier areas. Fourth, when the length of the forest fallow becomes too short as a result of the density of the population, shifting cultivation has to be replaced by more intensive land use, including agri-silviculture, which has the dual merit of creating a forest fallow of high commercial value while maintaining a forest cover favourable to the environment. The last three measures mentioned above should be taken in the framework of a proper land use plan.

It therefore seems that up to the year 2000, if only the simple technical solutions that are already well known were to be effectively applied, most of the possible harmful effects could be avoided. During this period, the problem is less technical than social and political, and its solution depends mainly on the determination of the world community and of individual countries.

Beyond the year 2000, however, at least in some parts of the world, more sophisticated and intensive land use methods will have to be employed. Experience shows that a tropical forestry revolution is possible which would allow the developing world to obtain on a sustained basis from more intensively managed forests, whether natural or artificial, the goods and services (including the preservation of the environment) it will need.

In order to take the measures suggested above and to obtain the optimum benefit from their forest potential, both developed and developing countries should accentuate their efforts, in particular at the local community level, in the fields of forest management and planning, forestry research (particularly on the long-term environmental effects of successive rotation of fast-growing tropical plantations), education, extension, and institution building. Forestry education, it should be noted, traditionally includes environmental education as a routine matter.

Problems will be more difficult in the drier areas, where forests are difficult to keep, to establish or to regenerate, and are anyhow of low productivity. This aspect is reviewed later in the discussion of desertification.

WILDLIFE RESOURCES

Many resource surveys fail to recognize wildlife[31/] as a significant renewable natural resource, and as a source of food, particularly for rural communities. The distribution of wildlife resources varies considerably both between and within continents. Africa and North America are the richest in quantity and quality, but extensive regions of South America, Asia and Oceania also have wide ranges of fauna. The African fauna is essentially concentrated in savannas and rain forests. In North America and Asia, the tundras contain large stocks of animals, which have a very high potential if managed for food production. South America's tropical rain forests also support a rich fauna, but the quantity is less than in simpler ecosystems such as savannas or tundra.

Table 3-20. Estimates of potential average annual standing crop (biomass) of wild ungulates in principal ecosystems

	..... kg/km^2		
Savannas (Africa)	1,000	to	20,000[1/]
Prairies (North America)	2,450	to	3,500
Tundras (North America, North Asia)	170	to	250
Tropical rain forest (South America, Central Africa, Southeast Asia)	1,000	to	3,000
Mountains (Asia, America, Europe)	4,000	to	10,000
Deserts (North America, Asia, Africa)	0.3	to	200
Temperate forests (North America, Europe, Asia)	250	to	1,000

1/ Wide range due to geographic variations within savanna region.

Unproductive ecosystems such as deserts and circumpolar regions have little or no wildlife from the food production point of view. But in other regions with severe limitations for agriculture, wildlife offers a very important alternative use of marginal land. Table 3-20 gives estimates of the biomass potential (meat for human consumption) of the principal undisturbed ecosystems of the world.

31/ This term is used here to cover all wild animals except fish.

Table 3-21. Mean annual rural consumption of local and imported animal foods, southern Nigeria, 1965-66

Commodity	Quantity	Share of total consumption of animal products	Value
	thousand tons	%	N£ millions
Game meat 1/	61.7	18.5	10.2
Fish 2/	198.8	59.7	38.2
Poultry and eggs	0.3	0.1	1.0
Dairy products	0.9	0.3	-
Beef, mutton, etc. 3/	71.4	21.4	13.9
TOTAL	333.1	100.0	63.2

Source: Federal Office of Statistics, Rural Economic Survey of Nigeria, 1965-66 - Rural Consumption Enquiry, Food items, West, Mid-West, and Eastern Nigeria, Lagos.

1/ Including rodents and shelled forms; excluding wildfowl, which are not recorded.
2/ Including crabs and crawfish. 3/ Including meat from all domesticated animals except poultry.

Several studies have shown the potential of wildlife for meat production. In the Amazonian forest, for example, the daily per caput game meat consumption of the rural population is 52 to 76 grammes. In southern Nigeria, wildlife accounted for some 19% of animal food consumption, compared with 60% for fish and 21% for domestic livestock (Table 3-21).

In addition to the benefits that wildlife contributes to human welfare in terms of nutrition, there are other valuable products that generate significant cash incomes. These include musk (from the musk deer in Asia), deer antlers (Asia), ivory (elephant and hippopotamus in Africa), luxury leather (e.g. crocodile leather in Africa, Asia and South America), and special wools (e.g. vicuña in Latin America).

Wildlife is also the resource base for recreation and tourism in many parts of the world. This utilization of the resource may be consumptive in the context of recreational hunting, which in many situations can be the most lucrative form of utilization in terms of cash return. In many developed countries, recreational hunting forms an integral part of forest or estate management that contributes to the economic viability of these operations. Utilization may also be non-consumptive, and in many developing countries forms the basis for tourism industries. There are well-known examples of this in Africa, where national park networks have been created that cater for visitors wishing to view, rather than hunt, wildlife.

Depletion of wildlife resources

Statistics on wildlife resources are hard to obtain, but it is known that they are becoming extinct in many regions. For example, there is an almost total absence of wildlife in some parts of the Near East, because of overgrazing and the destruction of the rangelands, following the expansion of human population and domesticated animal production. But it is also due to excessive hunting.

The two main causes of the depletion of wildlife resources are over-exploitation and the destruction of habitat. Over-exploitation results from the uncontrolled commercialization of the products of wildlife, and also from unlawful hunting for personal profit

(meat, tusks, skins or antlers). There is also the destruction wrought by irresponsible hunters "for sport" in areas where game laws are either weakly enforced or non-existent.

The depletion or destruction of the habitat becomes acceptable only when organized agriculture can supply more food, more economically, than wildlife would be able to do. Often, however, the destruction of forests and other natural habitats is irrational, and the consequence of migratory agricultural systems or ill-conceived development schemes. As a result wildlife is unable to survive, while the new agricultural system often fails to supply as much food as the wildlife did in its undisturbed state.

The approaches to the conservation and utilization of wildlife resources that appear to hold most promise for the future are adapting traditional systems of use, utilizing the physiological advantages of wild species in harsh environments, and captive breeding to restore wild populations. The adaptation of traditional systems of use is particularly appropriate to the tropical forest areas. The rural populations of these areas are highly dependent on wildlife to meet a significant proportion of their protein requirements. Current work in Ghana and Nigeria on large rodents is an example of this approach. Arid zone and high altitude species have received particular attention in the second approach. Pilot studies on oryx in eastern Africa and on vicuña in Latin America are encouraging. The third approach allows the intensive management of the restored populations, including the farming of the species. Examples include musk deer (for musk), deer (for antlers) and crocodiles (for hides).

FISHERY RESOURCES

With the rapid growth of population and income since the second world war, fishery production has expanded very rapidly. Total landings, including those from inland waters, rose from only 20 million tons in 1948 to over 70 million tons by 1970[32/]. The main trends in production are summarized in Table 3-22, and the recent situation in Figure 3-2, which is appended at the end of the chapter. The recent annual average harvest of about 70 million tons contributes 6% of the total world supply of protein, and 18% of animal protein.

Table 3-22. Annual world fish landings

	Annual average									
	1948-52	1953-57	1958-62	1963-67	1968-72	1973-76	1973	1974	1975	1976[1/]
	million metric tons									
Marine waters	19.4	25.2	34.0	46.6	57.5	59.5	56.7	60.4	59.3	61.5
of which										
anchoveta	(-)	(0.1)	(3.7)	(9.0)	(10.0)	(3.5)	(2.0)	(4.0)	(3.5)	(4.5)
other	(19.4)	(25.1)	(30.3)	(37.6)	(47.5)	(56.0)	(54.7)	(56.4)	(55.8)	(57.0)
Inland waters	2.5	3.8	5.8	7.3	8.9	10.3	10.1	10.1	10.4	10.6
TOTAL	21.9	29.0	39.8	53.9	66.5	69.8	66.8	70.5	69.7	72.1

Source: FAO data

1/ Preliminary

Several major influences on the rapid growth of fishery production may be identified. These include the expansion of production by Japan by means of both local and long-distance fishing, increased long-distance operations by the U.S.S.R. and other centrally planned economies, and the explosive growth of the anchoveta fishery in the southeast

32/ FAO, Review of the State of Exploitation of the World Fish Resources, COFI/77/5, Rome, 1976.

Pacific. In particular, fluctuations in the catch of anchoveta and other shoaling pelagic fish used largely for reduction to meal and oil have had a marked effect on the level of world fishery production. They sharply boosted the rate of increase during the 1960s and caused it to level off in the 1970s as catches declined because of heavy fishing and environmental changes. The present prospects for the recovery of several of these stocks, including the anchoveta, are poor until at least the 1980s. Some increase in the catch of fish used for direct human consumption can, however, be expected, particularly in the developing countries.

Table 3-23 indicates the relative magnitude and degree of exploitation of the fish, crustacean and cephalopod resources of the major marine areas. Molluscs other than cephalopods (oysters, mussels, clams, etc.) have been excluded, since their potential (which is ultimately very large) depends more on cultivation than on natural factors affecting self-renewal. The data in the table must, however, be interpreted with some caution. For example, the apparently large unexploited potential in the southeast Pacific and northwest Atlantic is to some extent illusory and results from overexploitation. Catches in these areas have in the past been significantly higher than in 1975.

The table indicates heavy exploitation of areas close to developed countries (e.g., northwest Pacific, northeast Atlantic and the Mediterranean). The best possibilities for greater catches are in tropical or sub-tropical waters (e.g., the Indian Ocean) off the coasts of developing countries. In the world's oceans as a whole, roughly half of the potential remains theoretically unexploited. However, given the practical impossibility of harvesting the full potential of all stocks, the possibilities of catch increase are considerably less than this. Probably no more than an additional 30 to 35 million tons of

Table 3-23. Catches and potential production of marine fish, crustaceans and cephalopods by major marine area

	Catch					Estimated potential	Utilization 1975
	1965	1970	1972	1974	1975		
	thousand metric tons						...%
N.W. Atlantic	3,242	3,697	3,833	3,461	3,230	7,000	46
N.E. Atlantic	9,090	10,140	10,045	11,222	11,499	14,600	79
W.C. Atlantic	1,192	1,208	1,298	1,334	1,350	6,400	21
E.C. Atlantic	1,216	2,981	3,350	3,758	3,493	5,600	62
Mediterranean and Black Sea	940	1,040	1,077	1,305	1,236	1,800	69
S.W. Atlantic	489	1,032	774	886	824	8,500	10
S.E. Atlantic	2,213	2,453	2,954	2,876	2,535	5,000	51
W. Indian Ocean	1,238	1,583	1,737	2,141	2,029	9,600	21
E. Indian Ocean	628	779	799	1,010	1,042	5,300	20
N.W. Pacific	9,540	11,634	13,061	14,825	15,201	17,400	87
N.E. Pacific	1,420	2,609	2,725	2,293	2,206	4,600	48
W.C. Pacific	2,560	3,923	4,505	4,867	4,637	10,400	45
E.C. Pacific	575	861	923	1,023	1,233	6,000	21
S.W. Pacific	101	144	249	396	258	1,300	20
S.E. Pacific	8,054	13,621	5,445	5,232	4,516	13,300 1/	34
TOTAL	42,498	57,705	52,775	56,289	55,289	116,800	47

Source: FAO, Review of the State of Exploitation of the World Fish Resources, op. cit.

1/ Assuming full recovery of anchoveta stock.

Table 3-24. State of exploitation of fish stocks in the northeast Atlantic

Stocks	Estimated potential	1974 catch	State of exploitation[1/]
	..... thousand metric tons		
Cod[2/]	1,175	1,235	3
Haddock[2/]	300	360	3
Hake	150	98	3-4
Saithe	700	678	3
Blue whiting	1,000	31	1
Sandeels	500	532	2
Capelin	1,500	1,610	2-3
Herring[2/]	2,200	259	4
Sprat[2/]	600	555	2
Pilchard	400	136	2
Mackerel[2/]	400	326	3
Squid	1,000	9	1

Source: FAO, Review of the State of Exploitation of the World Fish Resources, op. cit.

1/ The figure 1 indicates that the stock is virtually unexploited, 2 that it is moderately exploited, 3 fully exploited, and 4 depleted. - 2/ Selected stocks only.

conventional species can be harvested on a sustainable basis. Since the unexploited potential consists largely of species of poorer commercial prospects than those already harvested, in the absence of any major new developments the average growth of production is unlikely to exceed 1 or 2% a year.

As a more detailed example, the size of catches in relation to the estimated potential is shown in Table 3-24 for major species in the northeast Atlantic. This confirms that all the larger bottom-dwelling fish are fully exploited, and that all herring stocks have been seriously depleted. This applies especially to the Atlanto-Scandian stock, where the fishery for adult fish has ceased to be viable. Some of the stocks are protected by national regulations, while control over the fishing of others is the subject of negotiations both within the European Economic Community (EEC) and between the EEC and third countries. For the depleted North Sea herring stock, a complete ban on fishing was introduced in August 1977.

For the northwest Pacific, estimates of potential are less detailed. Sardine is regarded as moderately exploited and salmon somewhat depleted, but all the other major stocks are classified as fully exploited.[33/]

The years 1975-76 marked a milestone in world fisheries as the final era of relatively unrestrained high seas fishing (with the exception of tuna). Though the discussions at the United Nations Conference on the Law of the Sea have not reached final conclusions, de facto extensions of jurisdiction by most countries with large fisheries off their coasts had taken place by 1977. The likely impact of this extension of waters under national jurisdiction can be seen from Table 3-25, which gives for each fishery region rough estimates of the total catch, excluding whales, taken by non-coastal countries, as well as the division of this total between vessels from developing and developed countries.

33/ Ibid.

Table 3-25. World fish catches by non-local fleets, 1972[1/]

Region	Catch		Origin of vessel		Location	
	All species	Tuna	Developed countries	Developing countries	Off developed countries	Off developing countries
	thousand metric tons					
N.W. Atlantic	2,292	10	2,288	4	2,194	98
N.E. Atlantic	3,667	1	3,667	-	3,619	48
W.C. Atlantic	143	5	128	15	37	106
E.C. Atlantic	1,930	180	1,870	60	-	1,930
Mediterranean and Black Sea	40	-	40	-	-	40
S.W. Atlantic	24	12	14	10	-	24
S.E. Atlantic	1,771	29	1,662	109	271	1,500
W. Indian Ocean	221	67	158	43	-	201
E. Indian Ocean	88	36	23	65	9	79
N.W. Pacific	2,936	-	2,600	336	2,550	386
N.E. Pacific	2,254	-	2,254	-	2,254	-
W.C. Pacific	479	114	129	350	-	479
E.C. Pacific	287	274	284	3	13	274
S.W. Pacific	199	100	123	76	199	-
S.E. Pacific	43	13	48	-	-	48
TOTAL	16,359	841	15,288	1,071	11,146	5,213

Source: FAO, Review of the State of Exploitation of World Fish Resources, op. cit.

1/ Excluding catches by countries in areas off their own coasts.

The extent to which fishing by non-coastal countries has been concentrated in the North Pacific, the North Atlantic and the Eastern Atlantic is evident. The effects of the extension of fishing limits in these areas are likely to be substantial.

The expansion of world catches of fish from inland waters has slowed down markedly during the past five years (Table 3-26). They have accounted for about 15% of all reported catches in most recent years. Many inland waters are now fully exploited, and in some parts of the world it is doubtful whether there can be much further growth in catches from natural stocks.

Inland catches may be of great importance at the local level. They are particularly significant in Asia, and to a smaller extent in Africa. The greatest potential for increasing catches from natural inland waters probably lies in Latin America. Aquaculture, which is discussed separately below, is reported to contribute a large proportion of total inland catches in Asia, especially in China, but the lack of precise data makes the interpretation of reported catches difficult.

Problems of living aquatic resources

In the context of natural resources and the human environment, the main problems of living aquatic resources that have to be considered are overfishing (including the special problem of marine mammals), and the effects of potentially polluting materials.

The effects of the relatively high degree of exploitation and, in some cases, depletion of certain fish stocks have already been mentioned. It is essential that there should be a balance between the size of catches and the size of stocks. Although the concept of maximum sustainable yield is useful, it has to be carefully interpreted because of various

Table 3-26. World fish catches in inland waters

Region	1965	1970	1971	1972	1973	1974	1975
	thousand metric tons						
Africa	820	1,140	1,366	1,410	1,424	1,442	1,498
North America	140	140	128	131	146	153	153
South America	230	250	135	189	194	169	171
Asia	5,400	6,250	7,068	7,128	7,203	7,267	7,393
Europe	210	230	240	251	260	266	285
Oceania	-	-	3	3	2	6	11
U.S.S.R.	830	850	935	870	850	773	944
TOTAL	7,630	8,860	9,875	9,982	10,078	10,076	10,444

Source: FAO data.

complicating factors. Nevertheless, for any stock of fish, there is a level of fishing beyond which the stock does not produce any sustainable yield increase. At this point, further fishing can result in a decrease in yield, so that it is essential to limit the size of catches before this point is reached.

Until the recent general de facto extension of limits referred to above, fisheries management was largely the responsibility of international bodies, such as the Northeast Atlantic Fisheries Commission. Such bodies generally achieved only limited success in this task. Although the trend to extended jurisdiction will allow greater participation by coastal states in the fisheries, it will also impose the management duty of adjusting fishing effort to the stocks available. Where migratory stocks are concerned, this will still often involve some form of international negotiation, but the reduction in the number of participants in many of the international commissions may make agreement easier to obtain.

Various species of marine mammals (whales, seals, dolphins and dugongs) are being exploited or otherwise affected by human activities. Some species have been brought close to extermination and some (Steller's seacow, the Western Pacific gray whale, and perhaps the Caribbean monk seal) are actually extinct. Other species have been seriously reduced, such as the blue humpback and fin whales. Most of the seriously depleted species are now under protection. Various species or sub-groups, such as the Californian gray whale, the sea otter and the southern sea elephant, have made good recoveries under protection.

The effects of potentially polluting materials on aquatic production were reviewed in detail in the 1971 issue of The State of Food and Agriculture.[34/] The conclusions reached at that time are still valid, and only some of the main aspects will therefore be referred to here.

The principal aquatic pollutants are domestic sewage and agricultural wastes, detergents, pesticides, oil and oil dispersants, other organic wastes, inorganic wastes, radioactive materials, and solid wastes. All these substances have deleterious biological and ecological effects on aquatic resources, as well as direct effects on fishing and fishery products, especially in inland and coastal waters.

34/ FAO, The State of Food and Agriculture 1971, Rome, 1971, p. 121-170.

Developed countries are obviously the largest producers of pollutants affecting fisheries. In many developing countries, however, especially in southern continental Asia, fishing in lakes and streams is of considerable importance. The problems of water supply and the management of its quality for fisheries are immense in these countries, and in many instances the use of water for fisheries must be coordinated with domestic, industrial, and irrigation and other agricultural uses.

There are many ways of reducing the pollution of fisheries and of introducing preventive and curative measures. The integrated planning of fisheries, agricultural and industrial development schemes is necessary in order to recycle their waste products into useful functions. Emergency remedial measures are often necessary, as well as administrative and legal controls, and the establishment and strengthening of research institutions.

Aquaculture

Although the world fishery catch is still increasing, the trend of growth seems, as noted above, to be levelling off. Greater attention is therefore being given to aquaculture as a further means to increase food production from aquatic living resources. Although good statistics do not exist, the aquaculture production of the world is estimated to be over 6 million tons, or somewhat less than 10% of the world total fishery output.35/ About two thirds of the aquaculture production is fin fish, and the rest mainly molluscs and seaweeds. About 80% of the total comes from the developing countries in Asia, where (except in China) production is dominated by small-scale individual farmers. Achievements elsewhere, as in Europe and America, have tended towards systems needing larger investments, and have concentrated on high-priced species.

Technological advances in aquaculture production in the last decade have shown that it could still be greatly increased. It is no longer limited to specially constructed ponds but can be carried out in natural waters, both inland and coastal. Cage and pen culture are outstanding examples of recent technologies that have evolved in some countries. "Raceways" and "silos" have been developed as a new system. Aquaculture combined with agricultural activities has been found to be a very effective means of converting organic wastes into useful products for human food.

The potential for the expansion and development of aquaculture is great, particularly in the developing countries. It could produce a large amount of additional animal protein. Among the main problems are the limited supply of water in some areas, the deteriorating quality of water, particularly in highly industrialized areas, difficulties in securing sufficient amounts of seeds, and the high price of feeds, fertilizers and other inputs.

GENETIC RESOURCES

The plant or animal breeder, in effecting genetic improvement, is strongly guided by concepts of biometrical genetics, whereby the complexities of continuously varying quantitative characters are studied in order to select those that can be easily exploited. The selection of the best parents and methods often starts from a survey of the genotypically and environmentally determined variation in the genetic stocks available.

New strains of animals, plants, fish and even micro-organisms are constantly being developed in response to the needs of modern intensive production systems. Because of intense selection for high performance, many recent varieties and breeds possess a narrow genetic base. In the past, wide genetic diversity was maintained and often evolution continued by dynamic interaction with wild relatives. Innumerable strains and races developed to suit different local environments, especially in some areas which represent centres of diversity. Many of these primitive forms are now at risk because of modern intensive agricultural practices, and even forest, wildlife and other species are threatened by environmental management and modification. The loss of genetic

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35/ FAO, Report of the Technical Conference on Aquaculture, Kyoto, Japan, 26 May - 2 June 1976, FAO Fisheries Report No. 188, Rome, 1976.

diversity threatens future breeding and hence future development. Although short-term development will rely on the selection and exploitation of modern high-yielding and high-quality stocks, longer-term development may well need to revert to the genetic diversity that still exists. If this is not collected, documented, conserved and used, it will be eroded and become irreplaceable.

Crop genetic resources

For the past decade, FAO has played a central role in taking and stimulating action to collect, conserve, evaluate and document crop genetic resources. Plant breeders have become increasingly aware that unexploited genetic diversity should not be abandoned, and that progress in plant breeding requires a continuous supply of genes or gene-complexes to meet present and unforeseen needs.

Rapid changes in agriculture, and especially the trend to greater uniformity in crops, has in several cases led to genetic vulnerability and crop losses in newly released varieties. It is in the interest of every country to maintain genetic diversity to provide maximum protection against such crop production losses, so that technological advances in crop yields or quality can continue and the diversity provide protection against any perceptible genetic change in the prevalent pests and diseases. Surveys of most existing national collections show that, although many have sufficient coverage of elite cultivars, mutants and commercial varieties, they are mostly deficient in primitive cultivars, weed races and closely related wild species, all of which are usually rich in gene combinations for adaptability. This material can be manipulated to maximize potential gains, and wide crosses can be used on a larger scale, including the theoretical possibility of very wide DNA hybridizations.

In 1972 the United Nations Conference on the Human Environment made several recommendations on genetic resources, including the need to organize a coordinating body. The International Board for Plant Genetic Resources (IBPGR) was thus established in 1974, with the sponsorship of the Consultative Group on International Agricultural Research (CGIAR), and a secretariat provided by FAO. There have also been a number of regional initiatives.

International and national awareness have increased, and many countries have established national genetic resources committees. Through its Crop Germplasm Advisory Committees for a number of major crops, the IBPGR provides advice on establishing world networks dealing with the collection, conservation, documentation and use of the crop germplasm. National programmes are increasingly participating in regional cooperative efforts. FAO and the IBPGR have recommended standards for long-term seed conservation, and for the engineering and design aspects of seed storage facilities. The IBPGR has started to designate institutions to be responsible for maintaining the world's major base collections of seeds of the principal food crops for long-term conservation. Expanded training programmes are being supported to provide personnel in the developing world for genetic resources work. FAO and the IBPGR have jointly sponsored the development of an international computerized system for recording data about genetic resources. Priorities have been established for the collection of crops and also for work in the areas showing significant genetic diversity.

In spite of these important achievements, it is still necessary to stimulate many countries to develop national crop genetic resources programmes. While initially the stress should continue to be on the collection and conservation of the material, the programmes must be integrated with all aspects of genetic resources work, in order to derive full benefit from the use of the material.

The collecting of crop genetic resources must be rapidly intensified, in order to keep pace with the eroding away of endemic variability which is occurring in the developing countries. Whereas international bodies will be more and more concerned with rescuing variability which is threatened, the national programmes will need to implement plans promptly to collect and conserve the major food, feed and fibre crops, and participate internationally in a global network.

The material collected and conserved has to be evaluated for a number of characteristics. Following evaluation, a broad array of plant breeding programmes should successfully exploit the genetic resources. This will also make it possible to pursue greater crop diversity and the development of varieties for crop production in marginal areas.

Forest genetic resources

In contrast to crop production, forestry is still largely concerned with "wild" species. It is estimated that only about 80 million ha of man-made forests had been planted up to 1965.36/ Over half the planted forests at that time were less than ten years old. Forestry is now where agriculture was about ten thousand years ago. Wild populations predominate, but there are some primitive cultivars of considerable promise in most countries. There are therefore good opportunities to conserve genetic diversity as part of the conservation of natural forest ecosystems.

Operations undertaken in the last few decades in exploration, collection and evaluation have conferred incidental benefits in conservation. The current FAO/UNEP project for the Conservation of Forest Genetic Resources is directed specifically towards conservation for its own sake, and includes action for the conservation of genetic resources in situ as a part of natural ecosystems, as seed, and in artificial stands ex situ.

A major problem is the lack of knowledge of the reproductive biology of many tree species. Even now, only a few of those planted as commercial species have been studied in any detail. The breeding systems and seed physiology of tropical moist forest species present a special problem, since the seed viability of many of them is short, so that the techniques of drying to a low moisture content and storing at low temperatures, which are standard for "orthodox" seeds, are unsuccessful.

Especially in the tropics, there is a risk that, before a rational breeding programme can start, certain populations will have been lost as a result of pressure to divert the land carrying natural stands to some other purpose. Though the risk of entire commercial species becoming extinct is small, certain populations are known to be under threat. In the case of the climax forests of the humid tropical zone, the conservation of a large number of valuable species depends heavily on the continued integrity of the ecosystem to which they belong.

Tree breeding provides the possibility of increasing genetic diversity through the controlled production of new gene combinations. It also carries the risk of reducing genetic diversity, through the mass propagation of a narrow range of "improved" genotypes, but this can be mitigated by a well-planned breeding strategy.

During the last decade the biggest progress has been in the exploration and collection of seed from a number of sources covering certain important commercial species. This has made it possible to carry out international provenance trials over a wide range of climates and sites in many countries, and thus to investigate which provenances are of most general value over a wider range, and to estimate the extent of genotype and environment interaction, the importance of which varies greatly from species to species and provenance to provenance. Another line of research which may give valuable results in the future is concerned with the separation and identification of seed resources by biochemical methods, e.g. using phenols and iscenzymes. In many older species and provenance trials the exact source of the seed is unknown, and such biochemical methods may make possible the identification of provenances which have done particularly well in these older trials.

There is now greater realization of the need for the dynamic management of natural ecosystems and the genetic resources they contain for the purpose of conservation, rather

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36/ FAO, Report on World Symposium on Man-Made Forests, Unasylva, 21, 1967, p. 3-4.

than a static "museum type" of preservation. The concept of a central core, surrounded by one or more buffer zones, allows the flexibility which is necessary if conservation is to be integrated with development.37/

The implementation of the FAO/UNEP project for the Conservation of Forest Genetic Resources has made it possible to initiate the establishment of ex situ conservation stands (each of approximately 10 ha) of important commercial species which are suitable for plantation monoculture. Ideal species for this purpose are pioneers such as some of the pines and the eucalypts. Ex situ conservation enables genetic resources to be conserved in reasonably accessible locations, where it is possible to exercise close management and protection which is impossible within the natural range.

Other developments are concerned with the possibilities of long-term storage of seed. For "orthodox" seeds, the methods recommended by agricultural seed specialists seem to be equally applicable to forest seeds. In some cases of species difficult to store, careful attention must be paid to the handling and drying of the seed between collection and storage. For "recalcitrant" seeds, the situation is much more difficult, but again the problems are similar for both forest seeds and agricultural seeds. Much more research needs to be done on some of these seeds, particularly those of tropical species. Tissue and organ culture is a new possibility and more research may well indicate that it is a practical means of long-term conservation. In tree breeding, the ability of the geneticist to bring together genotypes which would not normally interbreed in nature has made it possible to achieve substantial genetic gains, combined with a reduction in the costs of harvesting the seed. In some cases, high specific combining ability of two individual genotypes has shown itself to be much more significant for breeding than the general combining activities of each one. The artificial creation of new combinations of gene should be considered just as important as the conservation of the natural genetic resources.

Animal genetic resources

Whereas the number of plant species of actual or potential use in agriculture is comparatively large, 90% of domestic livestock belong to only a dozen species. However, within each species there are very many breeds or strains which by natural and man-directed selection have become adapted to a variety of environments, climates and production systems. The genetic variation existing between as well as within breeds or strains forms the basis for adaptation to new situations as well as for future increases in animal productivity.

For the utilization and conservation of animal genetic resources, simultaneous consideration must be given to the immediate need for genetic improvement and to conservation for future unforeseen needs (as well as for historical and scientific purposes). Although there is an understandable tendency to stress the immediate needs, it is becoming increasingly recognized that concerted action is needed to evaluate locally adapted breeds and strains and to conserve useful animal genetic stocks for present and future needs so as to avoid further irrevocable losses.

The introduction of artificial insemination has revolutionized the scope of animal breeding, particularly with cattle, where frozen semen is widely used. Efficient methods have been developed for genetic evaluation (progeny and performance testing) and intensive selection, and are now widely used in conjunction with artificial insemination. In the industrialized countries, the increase in the genetic potential and productivity of practically all livestock species has been very marked during the last 25 years, but the same methods are also becoming well established in developing countries. Because of these new breeding methods, more change in the livestock populations can now take place in a few decades than occurred over hundreds of years in the past.

37/ UNESCO, Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves, Man and the Biosphere Report No. 22, Paris, 1974.

Breeds or strains that are considered less competitive disappear rapidly in the industrialized countries. Of the total number of cattle breeds which existed in 1970 in Europe and the Mediterranean basin, 115 indigenous breeds are threatened by extinction and only 30 are holding their own.38/ Most of the changes have been based on logical efforts to change the cattle population towards more efficient animals which would respond to the general improvements in agriculture and to changes in market requirements. However, as the changes are so rapid, and since the loss of a breed is irrevocable, it is necessary to decide in time what breeds should and could be preserved for future economic needs or for cultural or scientific reasons.

With regard to dairy production in the developing countries, numerous studies have shown that crossbreeding and upgrading to specialized dairy breeds from the temperate zone lead to a rapid increase in milk production. In areas with moderate climate (e.g., the high plateaus of Iran and Kenya) and reasonably good management, the native breeds may very well be entirely replaced by temperate dairy breeds or high grades thereof. However, where the climatic stress is severe, as in the humid tropics, and management practices are lagging, crossbreds between native and temperate breeds are superior. Because of the excellent results obtained in the developing countries with the first cross and generally also with the first backcross to temperate breeds, there has been a tendency to ignore native cattle for milk production. However, as heterosis (hybrid vigour) is large, and genetic tolerance to climatic stress can be provided by genes from tropical cattle, the use of some kind of criss-cross system between temperate and improved tropical breeds seems to be called for in the hot humid tropics. The main problem is the low genetic potential for milk production of most breeds originating in the tropics, although there are a few notable exceptions, such as the Sahiwal, Tharparker and Red Sindhi breeds of India and Pakistan, the Kenana and Butana of the Sudan, and some Criollo strains in Latin America. Unfortunately, these strains are low in numbers, and programmes for their genetic improvement are often weak. It is important that they should be preserved and further developed, as with the successful initiatives in Kenya to improve the Sahiwal population through a modern breeding programme.

Considerable improvement of the natural environment (shade, improved pastures, supplementary feeding, etc.) is usually undertaken for dairy production, but beef cattle have to a much larger extent to cope with the existing environment, and are kept on land which cannot be used for more intensive types of agricultural production. The most important production characteristic for beef cattle is the ability to survive, grow and reproduce, and the inherent hardiness of the local strains is therefore a great asset. Under unimproved and moderately improved conditions, the local strains do better than imported breeds, although where the pastures are improved and reasonably good veterinary services available, crosses between European cattle and Boran, or other African zebus, are superior to the pure zebu strains. Beef production in the developing countries will therefore have to rely to a large extent on the local well-adapted strains, and it is important that these should be systematically evaluated and the better ones included in programmes for further genetic improvement.

In Africa the single most important constraint to cattle production is the prevalence of trypanosomiasis in large areas. In cooperation with the International Livestock Centre for Africa (ILCA) and UNEP, FAO is undertaking a survey of trypano-tolerant cattle breeds in West Africa, followed by breeding programmes to ensure their conservation (e.g. Lagune cattle) or better economic exploitation (e.g., Baulé and Borgu). The N'Dama and West African Shorthorn, after generations of natural selection, have acquired varying degrees of tolerance to trypanosomiasis, but the genetic nature of the tolerance and the general characteristics of trypano-tolerant strains are very poorly known. Such animals should be studied, evaluated and protected against indiscriminate crossing, in order to avoid the loss of a genetic resource that might be of considerable importance in the future.

38/ J.J. Lamargne, Disappearing cattle breeds in Europe and the Mediterranean basin, FAO/UNEP Pilot Study on Conservation of Animal Genetic Resources, Rome, 1975, p. 21-41.

The problems of sheep breeding in the developing countries are in many ways similar to those for beef cattle, although sheep are usually kept under even more extreme environmental conditions. Local sheep breeds show a high degree of adaptation to existing environmental conditions. The low lambing rate of most sheep breeds is a general handicap, but in several tropical areas, and particularly in the Caribbean, Indonesia and West Africa, there are highly fertile hair sheep breeds. The best known is the Barbados Blackbelly, but its numbers are few and, in spite of its reputation, there are few published figures on its fertility and other performance traits. It is high time that this and other prolific tropical sheep should be systematically evaluated.

In the industrialized countries highly productive strains of pigs have been developed, with low feed requirements per unit of output. The pigs native to the tropical countries are usually slow growing and produce a high portion of fat. Most pig breeds and strains thrive well in warm climates, provided they are kept under hygienic conditions. Thus the adoption of intensive production systems in the developing countries has been accompanied by the introduction of the high-yielding breeds of the developed countries. In these circumstances, no great efforts seem to be required to adapt the pigs through selection to new and very different environments. However, several of the local pig strains in the tropical countries are likely to disappear, because of their low competitiveness under more intensive production systems, and efforts should be made to maintain some of these in animal parks and institutions.

Poultry production in the industrialized countries has undergone even more dramatic changes than pig production. Most breeding stock is now produced by large companies, utilizing scientific breeding techniques. The old breed concept has been abolished, and the commercial strains usually contain genes from several sources, although in laying birds the Leghorn component is usually large. The production birds are as a rule derived by crossing at least four lines, so as to ensure hybrid vigour. In the developing countries the commercial sector of large-scale intensive production is based on continuous and costly imports of breeding material (grandparent stock) from large enterprises in Europe or North America. As the standards of feeding, housing and management are likely to continue to lag for some time, and as there appears to be a considerable genotype-environmental interaction for overall productivity, it is time to reconsider such import policies. India, for example, has announced that it will soon discontinue imports of breeding stock. In an industry that is changing as rapidly as poultry production, it is very difficult to pinpoint which genetic strains require conservation for possible use under a future, new set of conditions. That there is a conservation problem under the modern poultry production systems is, however, recognized by many scientists and also by commercial breeding companies, some of which keep reserve stock for future use. More needs to be done, particularly in the developing countries.

There are a number of livestock species, mainly confined to the developing countries, which have been grossly neglected as far as genetic evaluation and improvement is concerned. For example, in spite of the considerable importance of the goat as a source of milk, meat, hair and hides, and its adaptability to a wide variety of natural conditions from semi-arid highlands to lowland tropical forests, very little is known about the relative economic merit of different strains and breeds, and even less has been done to introduce modern improvement methods. At present there seems to be no pressing need for conservation programmes, but some attention to the evaluation and better utilization of the goat is obviously required.

Most of the draught power used in rice cultivation in the Far East is provided by water buffaloes of the swamp type, and in India about three quarters of the milk produced for human consumption comes from water buffaloes of the so-called river type. In India and Pakistan buffaloes are increasing more rapidly than cattle, which indicates their competitiveness. Their meat is also becoming more appreciated. A more thorough evaluation may indicate whether specific steps should be taken to conserve special breeds for future use in breeding programmes. At present, however, there is no serious problem of genetic deterioration.

Camel meat is much appreciated in several north African and Near East countries, and the camel is therefore increasingly being used as a meat animal on poor rangelands. There is very little information on its potential as a milk and wool producer, or on the specific needs for conservation.

The camelidae of Latin America are confined to the Andean highlands. There are two domestic species, the alpaca and the llama, which are used for the production of meat and wool and as beasts of burden, and are of great importance to the economies of some of the Andean countries, notably Peru and Bolivia.

As it will be difficult to conserve all the breeds and strains of domesticated animals now in existence, careful decisions are necessary, nationally and internationally, which should take into account the often limited knowledge available on future needs. The most appropriate method for the conservation of breeds seems at present to be through animal parks. Relatively small samples of animals are required, but the initial animal population must be very carefully selected. Thereafter, the maintenance of the herd requires a thoroughly planned breeding programme to minimize random genetic drift. Increased international cooperation is called for between scientists and organizations responsible for such animal parks.

With scientific progress, other methods might be developed to complement or partly replace the rather expensive method of conservation in animal parks. The preservation of genetic material in the form of deep frozen semen is one possibility that is already used to a certain extent in cattle. Semen from a group of 10 to 20 well-chosen bulls will make a fairly good sample of a breed. It has also proved possible to conserve living mammalian embryos in the frozen state, and for brood cows that have received embryos conserved in this way to give birth to normal calves.

For some time to come, however, genetic conservation will have to be through more traditional breeding methods. It will be necessary to keep a sufficiently broad genetic base in the farm animal populations to make it possible to achieve gradual changes through selection to adapt the breeds and strains to different environmental or economic situations as they arise. There is obviously a conflict between the demand for rapid genetic progress in productivity under a set economic situation, and the demand to keep genetic flexibility for future unknown needs. How to obtain the best balance between these two demands requires further study.

Wildlife genetic resources

Although the world has already lost many species of wildlife, many more are at present endangered: over 1,000 species or subspecies of vertebrate animals are threatened with extinction. Their conservation *in situ* causes problems because of their mobility. Many of these wild species are adapted to harsh environments, and they thus constitute a genetic resource of great value.

The conservation of wild animals *ex situ* is practised in zoological gardens, wildlife parks, game farms and the like. Some species can survive this way even if *in situ* conservation is unsuccessful. However, genetic adaptation to an unnatural environment, and a break in the continuous process of evolution through natural selection in the wild population, may destroy the value of the genetic resource itself.

The main problem in the conservation of wild animals *in situ* lies in the conservation of sufficient areas of their habitat. Migratory animals are a particularly difficult case in this respect. In contrast to domestic animals, their management by man has received little attention. Their seasonal and daily movements for water, food, shade and breeding often require large areas with diversified habitats. If their conservation is to be successful all these aspects need to be considered.

Fish genetic resources

Aquaculture has been going on for centuries, and yet very little is known of the genetic qualities of the culture species used. Fish transplantation and hybridization is being carried out with more and more intensity, but without any control or organization. As a result, the original strains used in aquaculture have been lost. Introductions or exotic species upset the genetic advantage of local populations for natural selection. With the exception of carps and some salmonids, the genetic quality of species with potential for aquaculture is not known. Exploitation of natural stocks could lead to reduction in species and in genetic variation.

The major gap is therefore the lack of information. A catalogue of genetic materials, which would serve as a nucleus for conservation efforts on a worldwide basis, does not exist.

ENVIRONMENTAL IMPACT OF INTENSIFICATION OF AGRICULTURE

The above survey of the state of natural resources for food and agricultural production has drawn attention to the many ways in which the intensification of production has led to the degradation and depletion of these resources. In addition, some aspects of the intensification of agriculture and of related forest and agro-industries may create specific pollution problems in the environment. The problems arising from the use of fertilizers and pesticides and from forest industries are briefly reviewed below. There is also a brief discussion of the contamination of food and feed from various sources.

Another problem arises from the use of agricultural and agro-industrial wastes and residues. A recent UNEP/FAO seminar which reviewed the global availability of such materials for recycling concluded that it was difficult to identify the extent of pollution or environmental problems deriving from them.[39/] A review of this subject must therefore await the analysis of the data that are at present being collected, although some mention is made below of the problems involved in the use of these and other organic materials as fertilizer.

FERTILIZER USE

Especially in view of the very rapid increase in the use of mineral fertilizers, concern has been expressed about the possible side-effects of intensive fertilizer use on the environment. Because of the crucial importance of effective fertilizer use for the expansion of food production,[40/] it is essential to examine the grounds for these fears.

The world consumption of mineral fertilizers has quadrupled during the last two decades, increasing from about 22 million tons of plant nutrients (N, P_2O_5 and K_2O) in the early 1950s to 89 million tons in 1975/76. However, although there is intensive use in developed countries, consumption remains low in the developing world. The total consumption in all of the developing countries taken together (including China and the other Asian centrally planned economies) is approximately equal to that in North America alone.

In a recent study of the effects of intensive fertilizer use on the environment in countries where consumption is steadily rising,[41/] it was concluded that, when

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39/ UNEP/FAO Seminar on Utilization and Management of Agricultural and Agro-Industrial Wastes, Rome, 18 - 21 January 1977.

40/ It will be recalled that Table 3-1 indicated that about 23% of world soil resources suffer from mineral stress, with proportions as high as 59% in southeast Asia, 47% in South America, and 33% in Africa.

41/ FAO/SIDA, Effects of Intensive Fertilizer Use on the Human Environment, FAO Soils Bulletin No. 16, Rome, 1972.

fertilizers are properly applied, their contribution to the loading of surface and groundwater in nitrogen, phosphorus and potassium is smaller than that coming from other sources. Where detrimental effects were observed, they were related to excessive use, and could be corrected by the careful adjustment of applications to the requirements of soils and plants. On the other hand, the efficient use of fertilizers can also benefit the environment indirectly in that, by increasing the yield per hectare of good land, it allows the withdrawal from cultivation of land of low inherent quality that otherwise would be prone to such hazards as erosion.

Since not all the nutrients applied are taken up by the crop, the fate of fertilizer residues must be given due consideration. They can remain in the soil, be removed in drainage water, or be lost to the atmosphere by volatilization. The three major crop nutrients behave quite differently under intensive use in soils.

Only a negligible proportion of fertilizer phosphorus is leached from soils into drainage water, since it is very immobile in most soils. It can, however, be carried into rivers, mainly through soil erosion, having first been absorbed on soil particles. Similarly, only a small proportion of fertilizer potassium can be lost by leaching, because most soils hold most of the added potassium sufficiently strongly for only very little to enter the soil drainage water.

Nitrogen is the most likely fertilizer element to be leached out of the soil, but there is very limited evidence that this has had an appreciable effect on the composition of groundwater or streams. Researchers recognize, however, that it is technically difficult to interpret specific changes in water composition, since the whole process is complicated by related biological activities and the release of various other industrial, urban and rural effluents in the drainage system. Run-off and soil erosion can be a main factor in the enrichment of surface waters in plant nutrients, especially where steeply sloping lands are cultivated. The intensive use of fertilizers should therefore be combined with proper soil conservation practices.

Recent research results indicate that nitrogen oxide (N_2O) released into the atmosphere through a number of man's activities can be carried by air motions into the stratosphere, and contribute to the depletion of the ozone layer. The denitrification of nitrogenous fertilizers used for intensive cultivation is often mentioned as one of the causes. A recent UNEP expert meeting, however, came to the conclusion that more research is needed to identify those human activities contributing most to the release of N_2O in the atmosphere.[42/]

Possibly undesirable effects on the environment will be minimized if fertilizers are used with maximum efficiency. The correct choice of fertilizers and their application at the correct time and in optimum quantity for crop yields are all important considerations. In most developing countries, the threshold at which fertilizer applications would be in excess of actual requirements is far from being reached. At present only 15% of the total world consumption of mineral fertilizers is used in developing countries, although they have 70% of the world population. There is still plenty of room for the further intensification of fertilizer use in these countries.

The constraints on the increased use of fertilizers in the developing countries are well known. They include the lack of fertilizer supplies at national or village level, lack of knowledge among small farmers, low prices for farm products, high fertilizer prices, and the shortage of credit facilities. Under these circumstances, any fear of a negative impact of fertilizers in these countries is premature.

Organic fertilizers

Organic materials represent a rich and underexploited source of fertilizer, especially in the developing countries. It is estimated in Table 3-27 that about 113 million

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42/ UNEP, Meeting of Experts Designated by Governments, Inter-Governmental and Non-Governmental Organizations on the Ozone Layer, Washington, D.C., 1 - 9 March 1977.

Table 3-27. Availability of plant nutrients in organic residues in developing countries[1/], 1971

Source	N	P_2O_5	K_2O	Total
	million metric tons			
Human	12.3	2.9	2.6	17.8
Cattle	11.4	3.1	9.0	23.5
Farm compost	9.5	3.3	9.5	22.3
Urban compost	0.5	0.4	0.6	1.5
Urban sewage	1.4	0.3	0.9	2.6
Other[2/]	6.6	4.5	11.4	22.5
TOTAL	41.7	14.5	34.0	90.2

1/ Excluding central America and developing countries in Oceania, but including Asian centrally planned economies. - 2/ Bone meal, poultry, sheep and goat litter, bagasse, oil cake, press mud.

tons of plant nutrients were potentially available in these countries in 1971 in the form of organic residues. This is about eight times the 13.5 million tons of mineral fertilizer used in the same countries in 1970/71. This enormous potential supply of organic plant nutrients in the developing countries also considerably exceeds the present total world supply from mineral fertilizers. In combination with the limited amount of mineral fertilizer available to the developing countries, it could contribute substantially to increasing their agricultural production. Its greater use would be especially beneficial in tropical areas, where organic matter is an essential component of soil fertility and stability.

The storage and disposal of organic waste products are not without problems, and hygienic and pollution hazards need to be taken into account. Drainage or run-off water leaving the farm may pollute sources of drinking water, and may carry with it considerable amounts of phosphate and nitrogen from manure heaps. Special care therefore needs to be taken to prevent soluble organic compounds from getting into drainage ditches and surface water. The amounts of manure or slurry spread on the land must be determined on the basis of the absorptive capacity of the soils and the nutrient requirements of the crops to be grown. With the use of sewage sludge, attention must also be paid to the content of heavy metals, which may in the long run accumulate in the soil at toxic levels.

The use of manures, compost and night soil as a plant nutrient can be combined with the production of biogas (methane).[43/] The process reduces the loss of organic matter through decomposition and stops nitrogen losses. At the same time, it provides gas for cooking and reduces the requirements for fuelwood, the collection of which is, as already noted, a serious threat to forest resources in some parts of the developing world.

Symbiotic nitrogen fixation

In the context of the possible pollution of the environment as a result of excessive applications of fertilizers, it is necessary to consider the possibilities of economizing in their use. One way of doing this is by making fuller use of the fixation of atmospheric nitrogen by nodulated legumes through their symbiosis with the Rhizobium bacteria. This is an important source of soil nitrogen, which in some cases may increase the nitrogen available for subsequent crops. It should in fact be considered as a significant component of the natural resources for food and agricultural production. Its more effective use gains even greater relevance in the light of the high price of mineral fertilizers in relation to the purchasing power of small farmers in developing countries, and the present dependence of the manufacture of nitrogen fertilizers on feedstocks deriving from fossil fuels.

43/ For a fuller discussion, see: FAO, The State of Food and Agriculture 1976, op. cit., p. 88, 92.

Results obtained in certain countries have shown that the potential of tropical legumes for fixing nitrogen is as high, or almost as high as that of temperate ones.[44] In the temperate zones, pastures of white clover and ryegrass can fix the equivalent of 250 to 400 kg/ha of nitrogen per year. In the tropics, several legume and grass mixtures are known to fix 200 to 250 kg/ha per year, and some much higher figures have also been obtained. An indication of the potential is the wide variety of pulse crops grown in the developing countries, especially in Asia, as a major source of protein. The total harvested area of such crops in the developing countries (including the Asian centrally planned economies) is estimated as about 60 million ha in 1976.[45]

The greater and more effective use of symbiotic nitrogen fixation in developing countries is now being given increased attention. In cooperation with UNEP, FAO has made an assessment of the potential in several countries of Africa and Latin America.[46]

Inoculation with Rhizobium bacteria can be used to improve the nodulation of traditionally grown crops, or when a new crop is introduced into an area where the specific Rhizobium is not present. Lotononis, Desmodium and Centrosema are examples of forage legumes which require a specific strain, in the absence of which they will obtain their nitrogen from the soil. Soybeans are a similar example among crops of major economic significance. They are indigenous to the Far East, and when they are grown in other parts of the world it is essential to inoculate them with their specific Rhizobium strain. It is estimated that the fixation of atmospheric nitrogen by well-nodulated soybeans can reach from 25% to more than 50% of the total needs of the crop.[47] The persistence of the specific Rhizobium in old fields is limited, so that it is necessary to inoculate soybeans at sowing. This can be carried out at low cost, and is now a common practice.

Field studies have also shown that, within certain Rhizobium strains, there are some which are more efficient than others. By the use of plant breeding, it is therefore possible to obtain a more efficient symbiosis. In general, however, there is still insufficient knowledge and practical experience of how to make better use of symbiotic nitrogen fixation. For example, in some countries 150 kg/ha of nitrogen fertilizer is used to grow lucerne, while in others with similar ecological conditions none is required. Nevertheless, it is essential to consider the inoculation of legumes with their appropriate Rhizobium strain as one of the inputs required for higher production.

The possibility of extending nitrogen fixation to non-legume crops is also promising.[48] Some cowpea strains of Rhizobium can form abundant nitrogen-fixing nodules on the small non-legume bush Trema cannabina. Casuarina trees, which are very useful in semi-arid areas as shelter belts to prevent soil erosion, have been found to have nitrogen fixing non-legume nodules formed by actinomycetes. In Senegal, casuarina trees can fix up to 60 kg/ha of nitrogen per year.

The role of blue-green algae in biological nitrogen fixation is also hopeful. It is estimated that algae associated with a water fern (Azolla) in rice paddies contribute more

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44/ Shaw and Bryan (eds.), Tropical Pasture Research, Commonwealth Agricultural Bureau Bulletin, 1976.

45/ FAO Production Yearbook 1976, op. cit., p. 116

46/ FAO/UNEP, Development of a Programme Promoting the Use of Organic Materials as Fertilizers, Rome, 1976.

47/ J.R. Jardini - Freize, in FAO/UNEP Report on Biological Nitrogen Fixation (in the press).

48/ P.J. Dart, Recent Developments in the Field of Biological Nitrogen Fixation, CGIAR, TAC, 14th Meeting, Hyderabad, 14 - 18 October 1976.

fixed nitrogen than the root system of the plant, which fixes around 0.05 kg/ha per day.[49] Nitrogen balance studies at the International Rice Research Institute (IRRI) and elsewhere indicate that an average of 60 kg/ha of nitrogen can be taken up by a rice crop, other than that from fertilizers.

PESTICIDE USE

Pests[50] represent one of the major constraints on agricultural production. Until effective means of control, in the form of synthetic organic pesticides, became generally available, cultural controls such as crop rotation and field clearing were almost the only means of reducing their impact. Some of the changes associated with the intensification of production, such as greater reliance on monoculture, increased fertilizer use, improved water management, multiple cropping, the use of a smaller number of crop varieties, and reduced tillage, in fact create conditions which can increase the danger of pest attack. For example, in the United States, notwithstanding the considerable increase in the use of plant protection measures, the total losses from pests appear to have increased in the last 30 years both in absolute terms and as a proportion of the value of the crop.

Various attempts have been made to estimate the magnitude of the losses caused by pests, but the results are still far from satisfactory. FAO has recently established a programme to collect further information. In general, the losses due to pest attack are put at between 20 and 40% on a worldwide basis. In developing countries, where pesticides are only lightly used and other methods of control as yet poorly developed, the losses are probably still higher.

Chemical pest control

Over the past three decades, pesticides have made very substantial contributions to the great expansion in agricultural production and productivity. Particularly in developing countries, where their use is so far quite small, requirements are likely to continue to increase for many years to come. Replies from 38 developing countries to a questionnaire sent out by FAO indicated a total 1973 consumption of 162,000 metric tons.[51] This represented an increase of 23% a year since 1971, while the future increases in these countries were estimated at about 10% a year, this lower figure resulting mainly from increased costs. In many developing countries herbicides are barely used at present, and their use is expected to increase more rapidly than for any other class of pesticide. Moreover, only a very small part of the estimated 20% of total world consumption of pesticides that is accounted for by the developing countries is used for food crops.

Notwithstanding the considerable efforts being made to optimize pesticide use through integration with biological and cultural controls, the continued need for an expanding use of pesticides must be recognized. This was the conclusion of the FAO Ad Hoc Government Consultation on Pesticides in Agriculture and Public Health, held in 1975. It specifically recommended that further attention should be paid to raising efficiency in methods of distribution and use, to providing training and generally raising competence in monitoring the presence of residues, and to monitoring and evaluating the importance of environmental impacts of uses in developing countries.[52]

49/ Idem, Biological Nitrogen Fixation, CGIAR, TAC, 8th Meeting, Washington, D.C. 24 July - 2 August 1974.

50/ Including weeds, insects, mites, rodents, birds, nematodes, bacteria, fungi, viruses, and other plant pathogens.

51/ Pesticide Requirements in Developing Countries, Summary of Replies to 1975 FAO Questionnaire, Ad Hoc Government Consultation on Pesticides in Agriculture and Public Health, Doc. AGP:PEST/PH/75/B44, 1975.

52/ FAO, Report of the Ad Hoc Government Consultation on Pesticides in Agriculture and Public Health, 7 - 11 April 1975, Doc. AGP:1975/M/3, Rome, 1975.

Efforts are being made to implement these recommendations through various components of the FAO Pesticides Programme. A number of countries are being assisted in the establishment and administration of schemes for the registration and official control of the introduction and use of pesticides. Training courses in safe and efficient use are organized. Official laboratories are being assisted to raise their competence in the detection and measurement of residues in food and other substrates. The statutory groups of experts that provide advice on official control of pesticides, on the occurrence of residues in foods, on impacts on the environment, and on the development of resistance of pests to pesticides have recently been reconstituted.

It must be recognized that over-dependence on pesticides, particularly in some developed countries with intensive agricultural systems, has led to considerable problems, including the development of pest strains resistant to the chemicals used for their control, the destruction of natural enemies of past species, the expansion of populations of species not previously regarded as pests, the occurrence of unwanted residues, and other undesirable environmental effects. But the knowledge that has become available from studies of these effects now provides a much sounder basis for planning for the future.

The experience of the last 30 years has led to the re-shaping of concepts of pest control. Greater emphasis is now being placed on the study of the complex made up by the crop, the pest, and the natural enemies of the pest, and on crop management strategies that minimize dependence on chemicals, using them to supplement cultural and biological methods rather than to supplant them. There is also greater emphasis on the introduction of pest resistant crop strains, and on possible new departures such as the use of attractants, repellents and hormones as pest control agents. This broad multidisciplinary approach to practical pest control has come to be referred to as integrated pest management.

Integrated pest management

It has become evident that nature can play a much more important role in the control of pests than was previously thought. Even with pests causing regular damage to crops, parasites and predators can cause considerable mortality. Such a situation should be fully exploited, and should not be disturbed, for example by the indiscriminate use of pesticides.

In the developing world, where food crops are almost entirely produced on a small farm basis, there are good opportunities to promote the principles of integrated pest management from the beginning. These principles include the application of pesticides only when needed and in a way which avoids killing natural enemies (ecological selectivity); the development and introduction of pest-resistant crop varieties; the adoption of suitable agricultural practices; biological control, such as the use in China and various Latin American countries of artificially multiplied parasites to control certain caterpillars; and the correct forecasting of pest development.

Integrated pest management has been successfully introduced, for example, in certain cotton-growing areas, including Nicaragua, Peru and the United States. This experience has demonstrated that the amount of pesticides needed to control cotton pests effectively may be reduced by more than 50%.[53/] In Central America the sole reliance on pesticides, with up to 40 applications per season, created serious environmental contamination, including the development of pesticide-resistant plant pests and vectors of malaria, and the elimination of natural predators.

A Panel of Experts on Integrated Pest Control was established by FAO in 1966, and the FAO/UNEP Cooperative Global Programme for the Development and Application of

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53/ L.A. Carruth and L. Moore, Cotton scouting and pesticide use in eastern Arizona, Journal of Economic Entomology, 66, 1973, p. 187 - 190.

Integrated Pest Control in Agriculture was initiated in 1975. This programme provides for the setting up of inter-country programmes on major crops, including demonstration and training, applied research, and assistance in the implementation of knowledge at the farm level.

New regulations adopted in many countries will already reduce, to a large extent, the shortcomings of pesticides use as they were revealed in the past. Moreover, the gradual adoption of integrated pest management practices will further optimize the use of pesticides. It must, however, be recognized that it will still need considerable efforts to permit the full and effective use of these new approaches.

Because of their effectiveness and easy use, pesticides will remain essential elements in crop protection programmes for the foreseeable future. Continued efforts must be made to ensure that they supplement rather than supplant good crop and pest management practices, and that they are distributed and used with maximum efficiency and safety to man and the environment.

POLLUTION PROBLEMS OF FOREST INDUSTRIES

The pulp and paper industry has had a bad reputation in public opinion as a gross polluter, especially of rivers and lakes into which untreated effluent was discharged. In recent years, the environmental issue has become widely recognized and the industry has been under heavy pressure by environmentalists and legislators to reduce the harmful effects of both liquid effluent and atmospheric discharges. In some countries very strict laws have been passed and are rigidly enforced. In developing countries, the tendency is to undertake some form of environmental impact assessment and to plan control measures case by case.

The processes used to reduce liquid effluent pollutants include the settling of solid matters as a first step, followed by biological treatment and, as a last step in some cases, colour removal. Internal measures, such as the reduction of water consumption through its efficient recirculation and the recovery of pulp and liquor spills, are very effective means of reducing effluent pollution, and this method is employed by most new mills. New bleaching processes also reduce the worst source of pollution. Atmospheric pollutants, particulate matters and obnoxious gases are treated by scrubbing devices, chemical treatment, and burning.

As a result of all these measures, pollution from the pulp and paper industry has been drastically reduced. After the completion of the abatement programmes now being carried out in at least the main producing countries, the point will soon be reached where the pulp and paper industry is no longer a major hazard to the environment. However, this will not be achieved without considerable cost. The installation of pollution abatement systems is a heavy financial burden for the industry, and cannot be accomplished without affecting product prices. In some cases it has not been financially possible to eliminate effluent discharge from old mills, and this has caused the closure of the operation and consequently unemployment. It must therefore be understood that there is a price to pay for a clean environment.

Among the mechanical forest industries, fibreboard manufacturing is technologically the closest to the pulp and paper industry. If adequate purification facilities are not installed, wet process fibreboard mills are often a source of considerable water pollution. Good progress is reported from various parts of the world in the implementation of the most efficient and economical ways of water pollution abatement in fibreboard industries. In addition, during the last few years several mills have achieved the complete closure of the "white water" system. This requires additional expenditure on investment and operation, and also affects certain characteristics of the final products. It has, however, paid off handsomely in densely populated areas with scarce water resources, where fibreboard mills were faced with the possibility of closing down if they continued to pollute.

Another means adopted by fibreboard industries for coping with water pollution has been the application of the dry method of manufacture, which does not require water for the forming of the fibre mat and therefore causes no water pollution problems. There are, however, disadvantages in using this system. Synthetic adhesives are needed as an additive in the manufacturing process, and there is considerable air pollution.

Other mechanical wood product industries (sawmilling, and plywood and particle board manufacture) do not produce substantial amounts of toxic wastes, but their disposal of organic waste (bark and wood particles) can create pollution problems in waterways, due to oxygen depletion. However, these problems can be alleviated by the use of the organic wastes. Residues from sawmilling can be used for pulp and board manufacture, or as fuel.

FOOD AND FEED CONTAMINATION

In recent years the intensification of production, the increased use of storage, and the centralized processing, distribution and handling of food and feed have created greater potential hazards of chemical or biological contamination. Chemical contamination is more characteristic of the present industrial era. Biological contamination is mainly due to underdevelopment and poverty, and can often become endemic.

Chemical contamination of food and feed may originate from industrial activity, industrial wastes, chemicals and pesticides used in agriculture which find their way into the food chain, and toxic metals such as lead, cadmium or mercury arising also from pressing, packaging, seed dressings or accumulations. Biological contamination is caused by pathogenic micro-organisms such as salmonella, enterotoxin producing bacteria, and various parasites and fungi.

Greater awareness of the problems of food and feed contamination and its contribution to health hazards and economic losses has emerged during recent years. Spectacular and tragic accidents, like Minamata and Niigate in Japan, resulting in aquatic pollution with mercury and its resultant uptake and accumulation by edible fish, have helped to highlight these problems. Other examples have included the findings that "itai-itai" disease in Japan was the result of environmental contamination provoking high levels of cadmium in food over long periods of time; the accidental use of mercury treated seed wheat as human and animal feed in Iraq; and the accidental admixture of polybrominated biphenols with cattlefeed and the consequent loss of thousands of cows and over 1½ million chickens, pigs and sheep in the United States. It is estimated that 71% of the outbreaks of food-borne diseases in the United States in 1969 resulted from contamination of food by pathogenic micro-organisms.[54/] Food is a good indicator of the quality of the environment in which it is produced, and has often been the trigger which has set natural resources protection measures in motion.

As a result of a series of such mishaps, added to a more general awareness of the problems of the environment and of the need for the protection of food, systematic food contamination monitoring now exists in many industrialized countries. The results of such monitoring have already proved useful, for example in the United Kingdom with lead in infant foods, in Sweden with mercury in fish, and in Canada, the United States and a number of European countries with pesticide control.

In the developing countries the main problems of food contamination are found in the sub-humid and humid tropical zones, where they arise mainly from contaminants of biological origin, such as parasitic infections in livestock, enterotoxin producing staphylococci, coliform bacteria, and the group of enterobacteriaceae. The lack of scientific knowledge and of an appropriate infrastructure for food control has also been

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54/ W.H. Booker Jr. et al., Food-borne disease surveillance, Washington State, American Journal of Public Health, 64(7), 1974, p. 854-859.

responsible for several large-scale accidents of food poisoning in these zones. A major problem that has been increasingly recognized during the past two decades is that temperature and atmospheric humidity favour the development of fungi and the production of toxic metabolites (mycotoxins).

The classic example of the effects of a mycotoxin is the ergot poisoning that, during the Middle Ages and sporadically since that time, has resulted from the consumption of cereal grains infected with the parasitic fungus Claviceps purpurea. In 1942-47 there were numerous deaths in certain communities in the U.S.S.R. associated with the fungi present in overwintered mouldy grain. Nevertheless, the hazards from these and other moulds continued to be largely ignored. Then, in the early 1960s, over 100,000 turkeys died after eating groundnut cake contaminated with the mould Aspergillus flavus. Epidemiological data support the hypothesis of a causal role for aflatoxin, the toxic metabolite of this mould, in the aetiology of primary liver cancer in Africa and southeast Asia, where the disease is common. Toxicity data are scarce for man, but a recent report from India indicated that in 1976 over 100 people died after consuming mouldy maize for a period of about two months, with an average daily consumption of aflatoxin of about 6 mg.[55/] Although the mycotoxin problem is more acute in the tropical and subtropical countries, it is not confined to those areas. Other mycotoxins such as ochratoxin, zearalenone and the trichothecene toxins have been demonstrated to be responsible for adverse effects in animals and man on a worldwide basis. Outbreaks of mycotoxicoses in farm animals have been reported in many countries of the temperate zone.

In the developing countries the economic losses caused by the contamination of food and feed can often be of great significance. The introduction of tolerance limits for aflatoxin by many importing countries has led to reduced export earnings for crops such as groundnuts, and sometimes the total loss of the import market. Millions of tons of food and feed are lost every year because they are not sufficiently protected against insects, rodents, and microbiological and man-made chemical pollutants. These losses are especially important in developing countries, because they add to the extent of malnutrition.

Problems relating to fish and fishery products cover a large number of natural and artificial contaminants. Chemical contamination has affected some fisheries, where accumulation through the food chain has caused levels in certain products to exceed the standards adopted by some countries. Trace metals may also be a problem.

Measures for the control of food contamination through environmental pollution consist of monitoring and surveillance, and the strengthening of food control activities. Several developing countries are seeking to start such programmes. The FAO/WHO Codex Alimentarius Commission has been developing international food standards both to protect the consumer and to facilitate trade, and these standards contain provisions for maximum levels or residues of certain important contaminants. FAO, WHO and UNEP are also developing a Joint International Food and Animal Feed Contamination Monitoring Programme. The major objectives of this programme are to determine global trends of food contamination; population groups that may be at high risk; the geographical spread of certain specific highly toxic contaminants; the total intake of such substances via food; the total exposure to a contaminant through air, water and food; the extent and trends in the contamination of food by biological agents; and to provide information to those responsible for the development of international food standards containing a contaminant component.

55/ K.A.V.R. Krishnamachari, R.V. Blat, V. Nagarejan and T.S.B. Trilak, Investigations into an outbreak of hepatitis in parts of western India, Indian Journal of Medical Research, 63, 1975, p. 1036 - 1049.

SELECTED ENVIRONMENTAL PROBLEMS OF SPECIFIC ECOLOGICAL ZONES

In the developed countries the gradual transition from traditional systems of agriculture to modern intensive methods of production took more than a century. In the developing countries the pace of change has had to be far more rapid, largely because of the very backward situation from which it started, and the unprecedented population growth of the last 30 years or so.

The difficulties of the developing countries have been aggravated by the inaccessibility to small farmers of modern inputs such as fertilizers and pesticides,by outmoded rural institutional structures, and by the lack of trained manpower to provide essential government services to the millions of scattered small farmers. The insufficiency of the data base for the assessment of the state of natural resources and of present and potential damage to the environment, together with the general lack of adequate land use planning with due attention to environmental considerations have proved much more serious in view of the very rapid changes that are inevitably taking place. Moreover, the ecological balance appears generally to be more fragile in the tropical and sub-tropical zones, where most of the developing countries are situated.

Thus, as will be apparent from the earlier review of the state of natural resources, tremendous strains have been placed on some of these resources, and the formerly well-adapted traditional patterns of agricultural production in the developing countries have been dislocated. A number of the environmental problems that have arisen from population pressure and the consequent utilization of natural resources beyond their carrying capacity are characteristic of specific ecological zones. A discussion of some of these problems by ecological zone has the advantage of making it possible to get away from the somewhat piecemeal approach that had to be adopted in reviewing the state of the main natural resources, and to look simultaneously at the whole complex of natural resources and the impact of man's activities upon them. Out of the many such problems only three can be briefly reviewed here: shifting cultivation, desertification, and problems of land utilization in the highlands.

SHIFTING CULTIVATION IN THE HUMID AND SUB-HUMID TROPICS

The term shifting cultivation is used to describe a traditional system of tropical agriculture which relies on natural fallows for the maintenance of soil fertility. In its simplest form, farmers clear the land, burn the cleared vegetation, and cultivate plots in forest, bush or grassland until crop yields fall below the subsistence level. When the original area is considered to have recovered its fertility, they return to repeat the process, until once again the land is apparently exhausted. The period of fallow, which varies according to the climate and the inherent fertility of the land, is from 8 to 12 years in tropical rain forest, up to as much as 20 or 30 years in drier areas.

Problems arise with shifting cultivation when, because of population growth beyond the level which the system can support, cropping is intensified by reducing the length of the fallow. This usually happens when the population density reaches about 30 to 50 persons per km^2, although the figure varies considerably according to local conditions. At higher population densities, the natural cycle of regeneration is broken, and rapid soil degradation sets in. Yields become lower, and the community often suffers from severe food shortage or even starvation.

Some years ago it was estimated that over 200 million people, thinly scattered over 36 million km^2 of the tropics, obtained the bulk of their food from shifting cultivation.[56/] Besides causing soil degradation, shifting cultivation also results in the destruction of

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56/ P.H. Nye and D.J. Greenland, The Soil Under Shifting Cultivation, Commonwealth Bureau of Soils, Technical Communication No. 51, Farnham Royal, Commonwealth Agricultural Bureau, 1960.

large areas of forest. It has been estimated that in Latin America between 5 and 10 million hectares are felled annually, while in the Far East there are about 24.5 million shifting cultivators, who annually fell about 8.5 million hectares of forest. In Africa, it is estimated that the original area of closed tropical forest south of the Sahara has shrunk by at least 100 million hectares because of shifting cultivation. Almost two thirds of the land under shifting cultivation is in upland forest, where very serious soil erosion follows whenever the fallow period is considerably shortened.

The problems of changing from shifting cultivation to more permanent cropping are complex and difficult to solve. The cultivators involved are trapped within a system where the rising population demands more intensive production than the soil is capable of without major improvements. Inputs such as fertilizers and better seed, and improvements such as crop rotations, mixed farming and soil conservation measures are required, but they are generally beyond the economic means of the poor farmers. Their major difficulties concern the maintenance of soil fertility, the provision of an adequate supply of plant nutrients, and the prevention of soil degradation when the natural fallow cycle is reduced or eliminated.

There are many proposals on how to approach the problem of shifting cultivation, ranging from the opinion that, from the environmental point of view, nothing should be done, to the other extreme of the complete replacement of shifting cultivation by continuous forms of land use in order to meet the increasing demand for food. In between these two extremes, various proposals and practices aim at a more or less gradual improvement of the productivity of the present system.

Experiments have been carried out, using mainly mineral fertilizers but also different types of organic material, to shorten the fallow period gradually. They indicate that appropriate farming systems, including good soil management practices, mixed cropping, the use of mineral fertilizers and the conservation of organic materials, can not only maintain the yield levels obtained with the usual fallowing practices but can considerably surpass them. This points to extending the cropping periods and eventually the possibility of replacing the fallow period completely. If, for economic and other reasons, this is not envisaged immediately, the efficiency of the fallow period could be increased by substituting the natural fallow by cover crops, part of which can be used economically. Another possibility is the introduction of semi-permanent cultivation, which consists essentially of short fallows, with some use of short-term grass fallows for cattle grazing when feasible. The rapid growth of population in many areas of West Africa and South America will enforce changes of this kind from shifting cultivation to continuous cultivation. Especially under high rainfall conditions, such changes have to include advanced soil management practices, including the use of organic and mineral fertilizers and appropriate cropping systems.

The problems of replacing shifting cultivation by more permanent cultivation are being studied in many parts of the world. More research is required to find suitable solutions for the various ecological conditions which are also socially and economically acceptable.

DESERTIFICATION

The Sahelian drought of the early 1970s, and its tragic effect on the people of the region drew,world attention to the chronic problems of human survival and development on the desert margins. Desertification is a problem on the margins of all the hot deserts of the world, and occurs on all continents. It may be triggered by various combinations of causes. It leads to lower biological productivity, with consequent reductions in the plant biomass, in livestock carrying capacity, in crop yields, and in human activity.

Desertification does not apply to the fringes of the sandy deserts only. It refers to all surfaces which, for various reasons such as overgrazing, the onset of salinity or alkalinity, or the cultivation of unsuitable areas, lose their protective vegetative cover and show the characteristics of a desert. It includes many extensive regions where

Table 3-28. Area already affected and likely to be affected by desertification, by continent

	Existing extreme desert	Degree of desertification hazards			Total	Share of total land area
		Very high	High	Moderate		
	thousand km^2					%
Africa	6,178	1,725	4,911	3,741	16,555	55
North and central America	33	163	1,313	2,854	4,363	19
South America	200	414	1,261	1,602	3,478	20
Asia	1,581	790	7,253	5,608	15,232	34
Australia	-	308	1,722	3,712	5,742	75
Europe	-	49	-	190	238	2
TOTAL	7,992	3,449	16,460	17,707	45,608	35

Source: FAO, UNESCO, WMO, op. cit.

good soil cover existed a short time ago and where now only extremely shallow soil or perhaps no soil at all remains over the bedrock.

The inherent vulnerability of the ecosystem to desertification is determined by its present climate, terrain, soil and vegetation conditions. This inherent vulnerability is inseparable from human influence. Population and livestock density are important factors, as well as the intense pressure of cultivation associated with mechanization and the submarginal expansion of cropland agriculture. The risk of degradation by desertification is therefore a function of both the inherent vulnerability of the region and the human or animal pressures on its resources. It is greatest in arid and semi-arid zones, but is also occuring in sub-humid regions.

Although the phenomenon of desertification has been recognized for many years as a threat of great magnitude to the environment, and in particular to the welfare of people living on the desert margins, no quantitative assessment of its extent was made until the United Nations Conference on Desertification was held in Nairobi from 29 August to 9 September 1977. Within the framework of the conference, a study of desertification on a global basis, including a Desertification Map of the World,has now been published.57/ This map is reproduced in Figure 3-3. A more detailed desertification map (1 : 5 million) of Africa north of the Equator has also been prepared.

The Desertification Map of the World includes areas subject to sand movement, stony and rocky surfaces subject to stripping by blowing or washing (e.g., the reg or seria of the Sahara, and the Gibber Plain of Australia), areas subject to soil stripping and accelerated gully erosion, and areas subject to salinization and alkalinization. For human and animal population pressure, limits of 7 inhabitants per km^2 and one animal unit per 5 ha were chosen as critical for the arid zone, and 20 inhabitants per km^2 and one animal unit per ha for the semi-arid zone.

The desertification hazards are classified as very high, high, or moderate, according to the rapidity with which desertification is likely to take place if existing conditions do not change. The areas in each of these categories, together with the existing area of extreme desert, are quantified by continent in Table 3-28. The total area already

57/ FAO, UNESCO, WMO, Explanatory Note and Desertification Map of the World, United Nations Conference on Desertification, Nairobi, 29 August - 9 September 1977, A/CONF.74/2.

Figure 3-3. Desertification map of the world

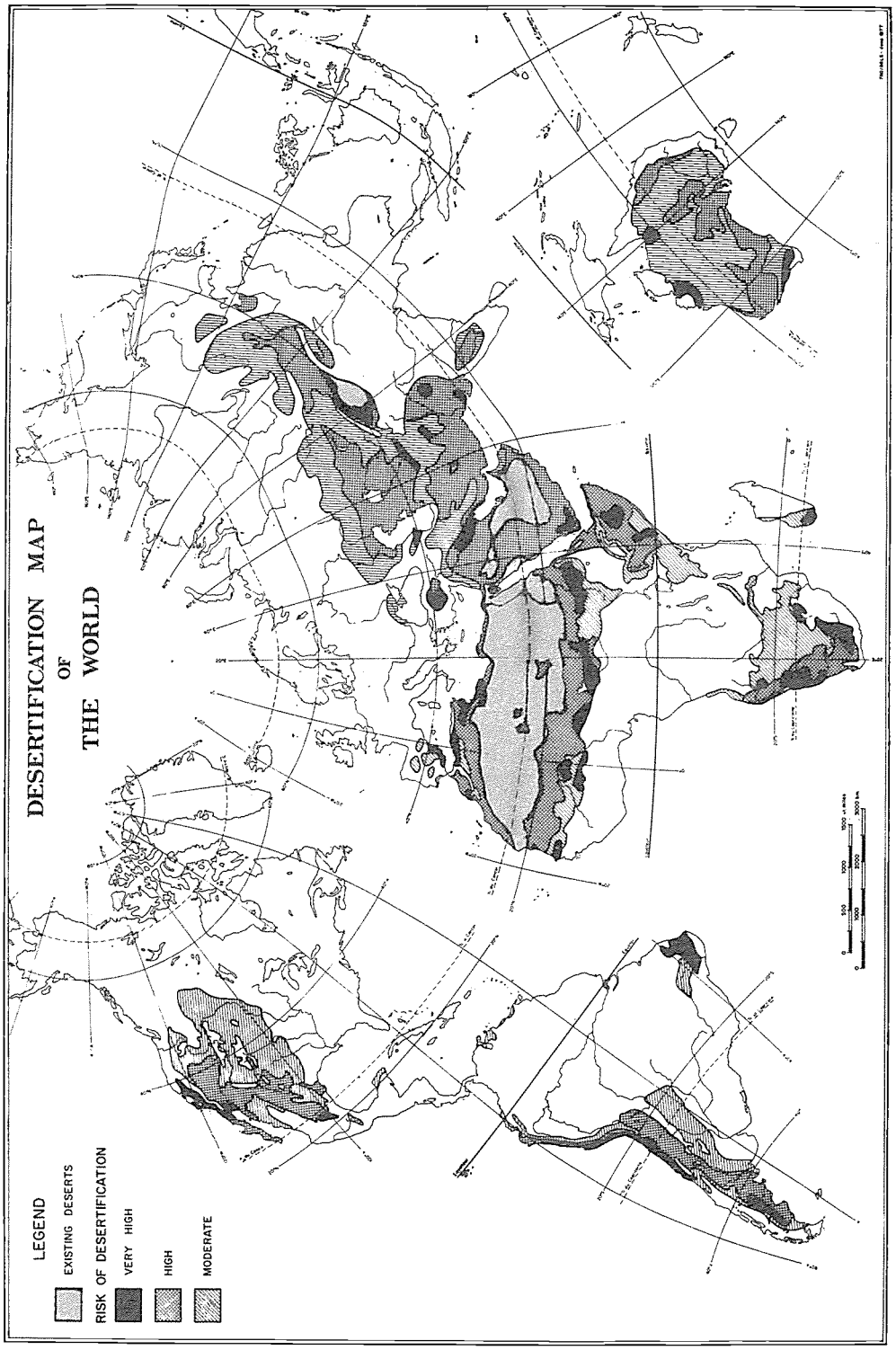

Table 3-29. Area already affected and likely to be affected by desertification, by bioclimatic zone

	Bioclimatic zone[1/]							
	Hyper-arid	Arid	Semi-arid	Sub-humid	Hyper-arid	Arid	Semi-arid	Sub-humid
	thousand km^2				% of total land area			
Existing extreme desert	7,992	-	-	-	100	-	-	-
Degree of desertification hazards								
Very high	-	1,110	2,181	159	-	6	12	1
High	-	13,440	2,440	580	-	77	14	4
Moderate	-	2,105	12,452	3,173	-	12	69	23
TOTAL	7,992	16,655	17,073	3,912	100	95	95	28

Source: FAO, UNESCO, WMO. op. cit.

1/ Defined according to climatic aridity, based on the ratio of precipitation to evapotranspiration: hyper-arid less than 0.03, arid 0.03 to 0.20, semi-arid 0.20 to 0.50 and sub-humid 0.50 to 0.75.

affected or likely to be affected by desertification is more than a third of the world's total land area. The area classified as likely to be affected is about ten times as large as the existing area of extreme desert, although in only a very small proportion are the hazards categorized as "very high".

The same data are shown by bioclimatic zone in Table 3-29. As might be expected, the degree of desertification hazards in the more arid zones is particularly alarming. As much as 95% of the total land area in the arid and semi-arid zones is subject to the risk of desertification, with most of it classified as at high risk in the arid zone. However, it is significant that desertification is not confined to the driest areas, and that the hazards reach large proportions even in the sub-humid zones.

Desertification is one aspect of the widespread deterioration of ecosystems under the combined pressures of adverse climate and agricultural exploitation. It is basically a problem of the misuse of land, in that the activities pursued in certain areas are inappropriate, either in degree or in kind, for the resources of these areas. Particularly in pastoral areas, much of the problem results from the customs, value systems and attitudes of the people concerning grazing lands and livestock, together with the lack of government mechanisms for effective control. Such attitudes and activities are either based on ignorant or calculated attempts to maximize short-term gain at the expense of long-term productivity, or perhaps more often are motivated by population pressure and lack of socio-economic development which leaves no other choice. The problem is of such magnitude and consequence that its dangers cannot be ignored.

LAND UTILIZATION PROBLEMS IN HIGHLAND ZONES

Some of the environmental problems of temperate and tropical highlands are similar. Tropical highlands in general constitute a fragile ecosystem, and are often overpopulated. However, in temperate highlands depopulation has sometimes caused their neglect.

The drastic results of forest clearing even on gentle slopes in vast parts of the tropics have already been referred to, but the effects of clear felling in steep mountain areas can be far more severe. The environment often deteriorates more quickly, and the erosion damage may be irreversible if bedrock is exposed. This problem often arises when population pressure causes extensive clear felling in the attempt to enlarge the agricultural area.

The three major mountain ranges of the developing world which are of greatest concern are the Himalayas, the Andes and the East African Highlands. A recent UNESCO expert panel expressed grave concern because of the widespread degradation in these areas.[58/] There has been a very large increase in the last decade in the destruction of forest cover, soil erosion, flood damage and silting.

As a result of population pressure, the Himalayan forests have been very quickly cleared, in places up to 2,000 m, even on steep slopes. In the rainy season, huge landslides occur. Sheets of scree debris (consisting of soil and stones) over two kilometres wide have been observed, giving unmistakable evidence of the widespread destruction taking place.

The problems of the highlands of the Andes and East Africa are similar, and in places just as serious as those of the Himalayas. They vary according to population density. Most of the Andean countries have a very high population growth, resulting in an almost unbearable pressure on the highlands. However, in some parts of the Andes it is because of migration from the hills, and the consequent inability to maintain old soil erosion control terraces and dams, that the environment is deteriorating. In some of the more heavily populated highland areas of East Africa soil erosion is very serious.

Any solution to the problem of highland deterioration must first cope with the basic cause of overpopulation, through planned emigration and the provision of alternative employment, for example by promoting international tourism. Other possibilities which need further attention are the development of erosion control measures at high altitudes in tropical areas, the provision of better roads, increased output from the better land, and the revegetation of marginal lands.

Cultural and political factors are of primary concern. Another important aspect is the adverse effects on the lowlands which result from highland deterioration. Flood damage and silting are greatly increased, and migration from the hills can result in the reckless settlement of lowland areas, leading to excessive demands on their productive capacity.

LEGISLATIVE ASPECTS

Environmental problems are not only caused by natural or technological factors. They are often generated and usually aggravated by socio-economic factors as well. Outmoded patterns of land and water use are often closely tied to the underlying legal structure of ownership and rights of use. In this sense, there may be many legal constraints on the more rational use of natural resources. At the same time legislative measures themselves constitute a powerful tool in arriving at the better use of natural resources and the avoidance of environmental problems.

Such problems as land degradation and desertification stem partly from the legal structure. The excessive intensification of production, for instance, may in part result from the excessive fragmentation of holdings, owing to existing laws regarding land

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58/ UNESCO, Impact of Human Activities on Mountain and Tundra Ecosystems

tenure and succession. Overgrazing may be partly caused by traditional rights of land use, which are insufficiently adapted to changing economic and demographic circumstances. The mutual legal claims of upstream and downstream water users, whether based on contiguity or acquired rights of use, may prevent the optimal development of shared water resources. Similarly, the historical legal regime of the oceans raised the danger of the overexploitation of common marine resources.

Outdated legal structures may thus act as constraints on the rational management of resources. This is, however, not necessarily so. Many countries have begun to rediscover the advantages of adapting long-existing legal instruments for the new requirements of resource conservation and environmental protection. Examples are the discharge permits required pursuant to the 1899 United States Refuse Act, or the remedies for neighbourhood nuisances (troubles de voisinage) available under 19th century European civil codes, both of which have been turned into useful instruments of pollution control today.

The very multitude and diversity of laws applicable to natural resources and environmental matters, and the ensuing risk of overlapping or contradictory regulations and competences, have been recognized as a problem in most countries. While the need for coordination and administrative reorganization is urgent, new integrated legislation should not be considered as a panacea. The effectiveness of modern environmental law depends to a large extent on sound sectoral legislation and administration for specific resources in such traditional fields as land and water law, forestry, fisheries and wildlife legislation, and health and food regulations.

One of the shortcomings of past legislation for the conservation and protection of natural resources has been its predominantly negative and punitive approach. While legal restrictions are necessary to avoid over-exploitation and interference by incompatible activities, legislation should do more than just prohibit pollution, hunting, or timber-felling. The need to combine sanctions with positive incentives to implement policy objectives, and the need to provide a legal basis for the planning and management of resource use arises both at the national and the international level. For example, the 200 miles extension of national jurisdiction over living marine resources, which is emerging from the Third United Nations Conference on the Law of the Sea, not only involves (as noted earlier) increased management responsibilities for coastal states, but also creates a need for the review and harmonization of legal regimes and institutions.

There is also a close interrelation between national and international aspects as regards the effects of legal rules on international trade. Strict environmental controls unilaterally applied to certain commodities and products in one country may seriously affect imports from other countries. In order to reconcile conflicting national laws and standards in this field, international efforts at harmonization are required, along the lines of the work already undertaken by the Joint FAO/WHO Codex Alimentarius Commission.

Since different countries share common problems of resource management and environment protection, they should also share the experience acquired in coping with these problems, and endeavour to develop mutually acceptable solutions. The international exchange of information for this purpose includes the exchange of legal data. Several United Nations Specialized Agencies have for many years disseminated information on the current legislation of their Member States in such environment-related fields as health law[59/] and renewable natural resources law.[60/] The principal aim of these information services is to bring innovative developments in national legislation to the attention of other interested countries. In 1976 FAO and UNEP initiated a joint experimental project for the cataloguing of such environmentally relevant legislative data in computerized form.

59/ WHO, International Digest of Health Legislation.

60/ FAO, Food and Agricultural Legislation.

A significant trend in both national and international law-making in this field has been the broadening scope of legal rules, from a use-oriented to a resource-oriented perspective. Some countries have attempted the comprehensive codification of all rules relating to renewable natural resources and environment protection, in a single natural resources or environment code. Others, while retaining separate legal instruments for different categories of resources, have introduced substantive reforms, with a change in emphasis from the police functions to the management functions of the law, and to new incentives for compliance; from classical nature protection to natural resources conservation; from water and air pollution controls to general anti-pollution acts; from provisions for specific dangerous chemicals, such as pesticides, to the regulation of all potentially harmful substances; and from laws protecting particular species of animals and plants, to trade controls over the primary and secondary products derived from them.

At the same time, besides re-allocating administrative competence between existing and new institutions, a growing number of countries have enacted framework legislation laying down general policies and procedures for environmental management, including citizen participation in decision-making. The regulatory systems developed for this purpose usually require either special licences or environmental impact statements for all activities involving potential environmental risks. At the international level, a combination of legal restrictions with compulsory licencing and joint technical measures has been developed, for example for the control of waste dumping in ocean and inland waters. There is also a tendency to establish (by law, and in some cases by international agreements) functional administrative units for ecological areas which are either particularly suitable for resource management (e.g., self-governing water basin authorities) or particularly endangered (e.g., nature reserves and parks).

There now are more than 40 multilateral conventions dealing with natural resource management and conservation. These have especially concerned the marine environment. While a number of these treaties are global in scope (possibly culminating in a future convention on the law of the sea), the main advances in recent years have been made at the regional level. In particular, a number of new legal instruments have been created (and existing agreements revised) for the joint management of inland water resources and ocean fisheries, and for environmental protection in special marine regions such as the Baltic, the Mediterranean and the Red Sea. Together with bilateral agreements on shared resources and trans-frontier pollution, and with the related declarations, recommendations and standard-setting activities of several international and regional organizations, these instruments may be considered as part of the growing body of international environmental law. Besides serving as secretariat for several of the institutions concerned, FAO has contributed to the development of new methodological approaches in this field by way of information exchange, legal drafting assistance, and the organization of expert meetings and intergovernmental conferences.

CONCLUSIONS

This preliminary survey of the state of natural resources and the human environment for food and agriculture brings out the wide variations that exist in the use and conservation of these resources. At the global level, the world's natural resources appear to be adequate for mankind's likely needs. However, they are unevenly distributed in relation to the population and its demands on them, and their utilization thus creates environmental problems in particular areas. These problems frequently differ in both nature and degree as between the developed and developing countries.

In the developed countries the unprecedented rise in levels of living has brought very heavy demands on natural resources from both the industrial and agricultural sectors. It has stimulated the development of highly industrialized, energy-intensive agricultural systems, in order to maximize the productivity of natural resources. This has created problems such as waste disposal, which have necessitated technical and legal measures and comprehensive planning to reduce the adverse environmental impact. Moreover,

agricultural processing and service industries, like other industrial activities, have caused the pollution of land, water and air, and the contamination of food and feed.

In the developing countries, on the other hand, the major environmental concern is not so much the pollution of natural resources as their degradation or depletion. The rapid increase in the population of these countries has placed great pressure on natural resources. The consequent drive to intensify production has caused the dislocation of traditional agricultural systems, and has led to sometimes over-hasty attempts to replace them by modern agricultural systems and technologies that are not compatible with the prevailing ecological and socio-economic conditions. Many of these changes are taking place in tropical ecosystems that are more fragile than those of the temperate zone. Full scientific knowledge of the productive capacity of the natural resources in these ecosystems is still lacking.

Although the environmental problems of the developed and developing countries are thus different, their experience in overcoming them could be mutually beneficial, especially in the light of the energy crisis. There are a number of main types of action that are required at the national and regional levels, particularly in the developing countries, for the assessment of natural resources and for their rational management so that the demands on them can be met on a sustained basis.

It is necessary to reduce the knowledge gaps in the assessment of natural resources, by means of adaptive research on the introduction of new technologies in traditional agricultural systems. Multidisciplinary research is particularly required on the effects of environmental factors and technological inputs on the physical and biological productivity of tropical agricultural systems. More emphasis should be placed on the application of research findings at the field level under specific local socio-economic conditions.

A further requirement for the improved assessment of natural resources is the development of coherent networks of data on these resources. Sectoral surveys and inventories are essential, but they should increasingly be part of and compatible with a broader scheme for the full assessment of the relationships between man's activities and the state of natural resources. Local ad hoc monitoring should be undertaken whenever there is a major change in the use of a resource, and the data collected should be used to assess the environmental impact.

As regards the more rational management of natural resources, a major need is for integrated land use planning. Such planning should be comprehensive enough to link both physical and socio-economic requirements, and should aim to guide rural development programmes towards the rational management of natural resources for increased productivity. It should be dynamic and flexible, so that plans can be continuously adapted to development requirements, keeping in view not only the immediate goals but also the productive capacity of natural resources on a sustained basis. Plans should also be adapted to new technologies, and revised according to the findings of new research and surveys. A large part of the planning should be carried out at the local level, involving local communities and taking into account the diversity of the rural environment.

In view of the heavy pressure that is indiscriminately put on land resources, especially in developing countries, to meet the increasing demand for food and agricultural products, it is important to concentrate the intensification of agricultural production as far as possible in the most suitable areas. This will reduce the pressure on marginal lands which are ecologically fragile and subject to rapid degradation if they are exploited beyond their productive capacity. The more suitable areas should be developed through sound soil and water conservation and land use practices, taking account of the ecological limitations and the demands of the local population for socio-economic development.

A further requirement for more rational management is the promotion of well-adapted systems of production that integrate modern technology with the traditional systems of resource management. In many areas there is a move away from traditional uses of natural resources in agriculture. During the transition stage, many valuable components

of the old systems (which usually take account of the need for the balanced use of resources) are discarded. More attention has been paid in recent years to the integration of the modern technologies required for the intensification of production with traditional production systems. It is necessary, however, to promote the exchange of information on promising new approaches based on traditional systems, and to guide and assist small farmers to a better understanding and utilization both of natural resources and human skills. Farming systems that closely associate crop and animal husbandry, and agri-silviculture and aquaculture are particularly appropriate. The aim should be to help small farmers adopt self-reliant systems which make full use of local traditional knowledge, experience and custom.

In conjunction with the application of improved technologies, it will be necessary to develop adequate rural institutions and infrastructures, including extension, credit and marketing services that are adapted to the needs of small farmers. It must be recognized that it is particularly difficult for extension and other services to train small farmers in developing countries in appropriate agricultural practices and in the safe use of new technologies. This is mainly because of the large number of people and production units involved, and the scarcity of production means and of trained personnel, but another less frequently recognized factor is the rapidity with which changes are occurring in the rural areas of the developing countries. This has a strong bearing on the degradation of natural resources. In order to prevent millions of farmers from damaging the productive capacity of the resources at their disposal, it is urgently necessary to disseminate and apply the information and experience already available, and to provide them with the means for achieving increased productivity on a sustained basis.

At the same time, it is necessary to develop a legal system to define the rights and duties of individuals or groups in relation to the utilization of natural resources in the light of their ecological limitations. The legal framework for this purpose has to be flexible enough to take account of the traditional system of regulatory power, as well as changes in the pattern of resource use. A mechanism is also required for the rational planning, implementation and monitoring of the use of natural resources from national to village level.

Education on the better management and conservation of the natural resources used in agriculture is another requirement. It should aim to make the general public aware of the ecological limitations on the potential of natural resources, of the need to utilize these resources in a rational manner, and of the rapid degradation which may occur through reckless management.

At the more technical level, education for improved resource use should provide administrators, decision-makers, extension officers and small farmers with a sound knowledge of all the operational aspects of good resource management. This should include not only the technical aspects, but also their relationship to the socio-economic environment in which they must be applied.

In addition to these general requirements for action in such fields as research, data collection and monitoring, planning, institutions and services, legal systems, and education and training, it is possible to identify a number of specific major problems on which a concerted attack is urgently required. The priority areas mentioned below are divided into measures for the more rational management of natural resources, and measures to combat the existing degradation and loss of these resources. In all cases, appropriate solutions are already available, but they have to be further developed and promoted.

In the former category concerning more rational management, mention has already been made of the need to concentrate the intensification of production on the most suitable land. More generally, the improvement of soil fertility should be pursued through the judicious combination of the efficient use of mineral fertilizers with the recycling of organic materials and the wider use of nitrogen fixing organisms. Improved genetic materials should be developed by making full use of the existing genetic variability and gene combinations in locally adapted strains. Techniques of integrated pest management should be promoted. Wherever feasible, crop and animal husbandry should be integrated,

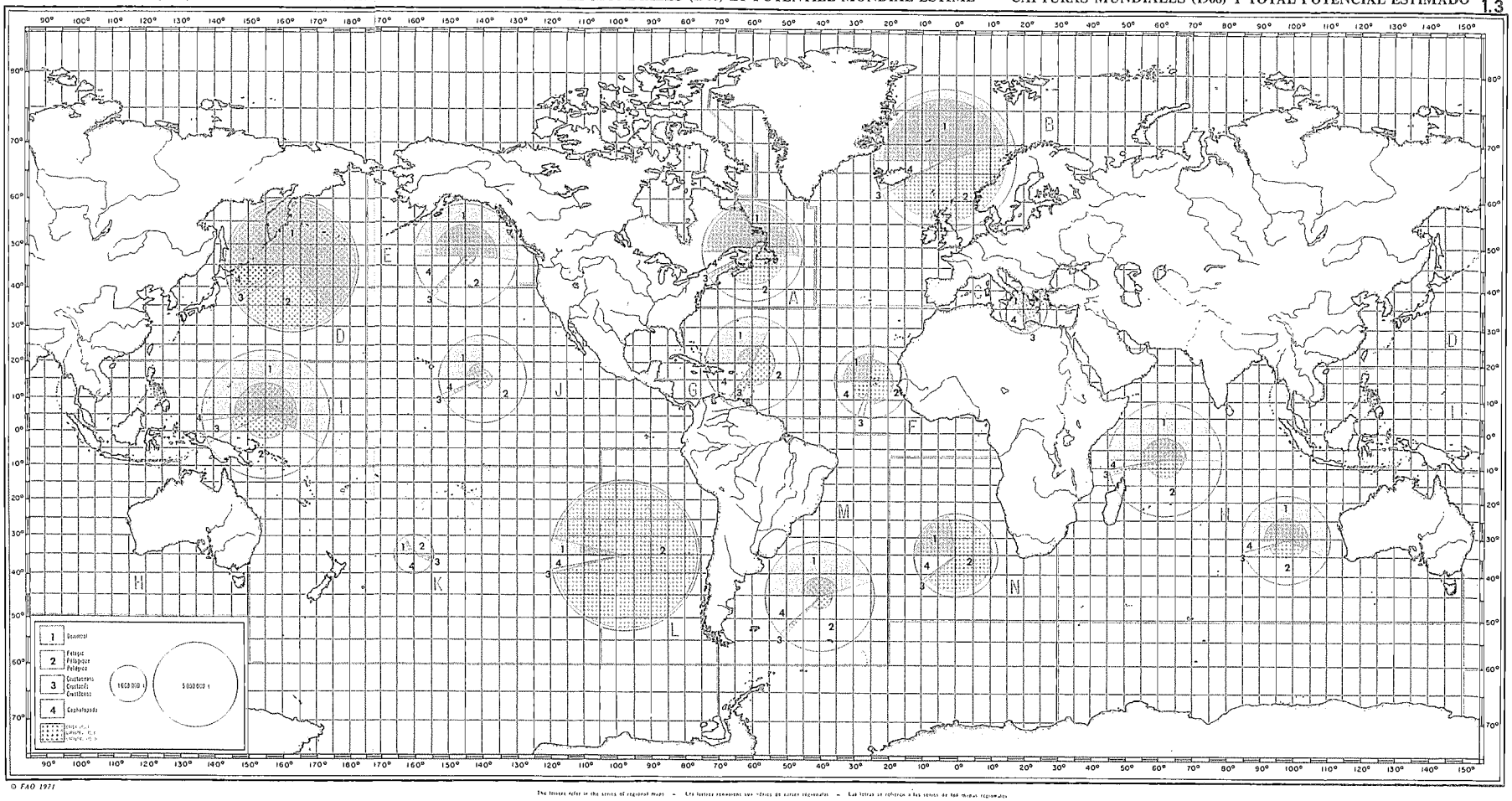
and agri-silviculture developed. High priority should be given to the rational management of grasslands in arid and semi-arid areas and of tropical forests.

With respect to the existing degradation and loss of natural resources, the highest priority attaches to the control of soil erosion, soil salinity and desertification and the conservation of fish stocks and of genetic resources. Soil erosion must be controlled and eroded land reclaimed on a watershed basis, through appropriate practices for the management and conservation of soil and water resources. Salinization should be controlled and saline soils reclaimed through proper irrigation practices and drainage systems. Desertification control requires the management of vegetation according to ecological principles, including massive programmes of reforestation. The pressure on marine fish stocks can be reduced not only by agreed international measures but also by the development and promotion of aquaculture. A further major priority is for the conservation of endangered genetic resources.

Progress in the various areas outlined above requires action at many levels, from government action at the national and international levels to action at the level of the village and the individual producer. But in the final analysis, it is only through the values held and the action taken by the producers who are actually responsible for the day-to-day use of the world's natural resources that it will be possible to use these resources in a way that is conducive to increasing production on a sustained basis.

The vast majority of the world's population, and even more of its agricultural and rural population, is concentrated in the developing countries. The concept of agricultural development in these countries is now being widened to a concept of rural development that will take account of all of the needs of their populations. This concept has to be widened still further, so as to include the rational use and conservation of natural resources so that they provide not only for the present but also for future generations.

WORLD CATCH (1968) AND ESTIMATED WORLD POTENTIAL — CAPTURES MONDIALES (1968) ET POTENTIEL MONDIAL ESTIME — CAPTURAS MUNDIALES (1968) Y TOTAL POTENCIAL ESTIMADO 1.3



The letters refer to the series of regional maps — Les lettres renvoient aux séries de cartes régionales — Las letras se refieren a las series de los mapas regionales

Figure 3-2. World catch and estimated world potential

Key:				
	A	Northwest Atlantic	H	Indian Ocean
	B	Northeast Atlantic	I	West central Pacific
	C	Mediterranean	J	East central Pacific
	D	Northeast Pacific	K	Southwest Pacific
	E	Northeast Pacific	L	Southeast Pacific
	F	East central Atlantic	M	Southwest Atlantic
	G	West central Atlantic	N	Southeast Atlantic

Source: FAO, Atlas of the living resources of the seas, Rome, 1972, Map 1.3.

ANNEX TABLES

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	....THOUSAND METRIC TONS....		.....	.....	.....	.....	.....	PERCENT
WORLD												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	988545	1140123	1180850	1199078	1212807	1316533	1278757	1376051	1334602	1364854	1472095	2.58
WHEAT	254429	298018	331564	314682	318632	354397	347380	376547	360216	355836	418349	2.89
RICE PADDY	253229	276765	286391	296254	308446	308982	296384	323213	320793	347157	337250	2.22
BARLEY	99715	119325	130860	136582	139057	151402	151749	168287	170181	156415	190262	4.41
MAIZE	216305	266492	252266	267210	261898	306562	305523	311324	294228	325521	334653	2.97
MILLET AND SORGHUM	73910	87661	82079	89982	92122	95443	88099	103474	95940	98320	102458	1.99
ROOT CROPS	492753	535600	550958	530358	563490	549873	529965	572960	557396	550603	557930	.38
POTATOES	283627	309013	316650	290667	312696	294482	281112	316619	297199	286381	290057	- .71
CASSAVA	76427	86437	92160	94156	95299	93577	95674	95794	97677	100076	103122	1.46
TOTAL PULSES	42342	41073	44500	44641	46203	45097	45232	46495	47123	44583	50220	1.29
CITRUS FRUIT	25121	33861	32990	36711	37203	39943	42355	45522	47740	49590	51238	5.32
BANANAS	25180	29906	31888	33149	33789	34719	34840	35221	36619	37054	39916	2.62
APPLES	18547	22124	20479	23104	21930	21171	19587	22613	21503	24175	23108	.73
VEGETABLE OILS, OIL EQUIV	28727	32053	32750	33205	35679	37273	36658	40048	39098	42356	40892	3.16
SOYBEANS	32474	40739	44004	45214	46496	48635	52333	62625	56955	68978	62037	5.64
GROUNDNUTS IN SHELL	15785	17473	16074	17009	18278	19064	15879	16929	17391	19442	17954	.78
SUNFLOWER SEED	7349	9992	9923	9888	9929	9782	9546	12071	10959	9408	10155	.52
RAPESEED	4293	5379	5535	5010	6704	8080	6767	7132	7232	8437	7488	4.82
COTTONSEED	20205	20226	21759	21462	22277	23728	25258	25690	26302	23107	23133	1.92
COPRA	3645	3460	3628	3534	3670	4156	4376	3925	3710	4399	5160	3.35
PALM KERNELS	1081	947	1013	1078	1218	1247	1209	1184	1342	1372	1418	4.17
SUGAR (CENTRIFUGAL, RAW)	56934	66160	66283	67043	74067	74684	73120	77763	77279	80839	85640	2.79
COFFEE GREEN	4419	4320	3898	4295	3911	4593	4508	4140	4794	4471	3669	.12
COCOA BEANS	1279	1390	1239	1410	1512	1598	1486	1390	1501	1561	1355	.84
TEA	1094	1204	1265	1299	1351	1365	1482	1538	1544	1587	1626	3.47
COTTON LINT	10926	10717	11462	11538	11789	12670	13608	13809	13842	12320	12253	1.94
JUTE AND SIMILAR FIBRES	3363	3806	2840	3739	3575	3344	3973	4715	3814	3794	4124	2.36
SISAL	671	669	646	681	655	706	715	685	742	659	473	- 1.45
TOBACCO	4381	4884	4762	4619	4667	4534	4862	4933	5291	5447	5623	1.91
NATURAL RUBBER	2185	2433	2696	2990	2940	3037	3015	3444	3408	3292	3553	3.66
TOTAL MEAT	83822	96459	99416	101499	105472	108869	111211	111965	117755	119271	122149	2.67
TOTAL MILK	354855	387211	394870	393816	396049	399083	408129	414630	422423	425731	432634	1.24
TOTAL EGGS	16599	19358	19809	20573	21525	22156	22734	22857	23473	23947	24209	2.58
WOOL GREASY	2611	2735	2737	2792	2844	2778	2730	2570	2531	2646	2620	- .87
FISHERY PRODUCTS [1]												
FRESHWATER + DIADROMOUS	7483	9554	9846	10368	11692	12300	12727	12994	12820	13594	14482	4.60
MARINE FISH	35504	45838	48571	46899	52711	52202	46796	46863	50294	49012	51814	.64
CRUST+ MOLLUS+ CEPHALOP	3957	4610	5052	4871	5117	5226	5460	5544	5632	6073	6219	3.07
AQUATIC MAMMALS	25	23	28	31	31	32	21	19	19	21	21	- 4.32
AQUATIC ANIMALS	72	111	114	82	164	130	160	236	164	118	100	2.51
AQUATIC PLANTS	676	892	921	840	1001	1018	1005	1227	1403	1227	1327	5.44
FOREST PRODUCTS [2]												
SAWLOGS CONIFEROUS	499527	513201	533480	534998	549473	570033	564289	594552	567664	535845	576925	.98
SAWLOGS NONCONIFEROUS	169810	187691	193641	201648	208801	211480	220757	239716	228223	208560	225905	2.00
PULPWOOD+PARTICLES	221490	267157	263694	290624	313597	308080	302759	319961	349536	322242	333376	2.68
FUELWOOD	1051750	1088912	1100002	1106775	1113067	1132500	1145321	1148084	1163576	1180233	1184090	.98
SAWNWOOD CONIFEROUS	276700	292824	305636	310764	312185	325217	332307	341295	321266	304165	328364	.88
SAWNWOOD NONCONIFEROUS	77679	85374	87416	93215	92525	94011	95504	97118	94784	91719	97751	1.10
WOOD-BASED PANELS	39689	54446	61448	65555	69451	78012	87325	95282	87700	81771	92380	5.78
PULP FOR PAPER	69051	86064	92796	99064	102997	103163	109208	115632	119213	104790	114464	2.92
PAPER+PAPERBOARD	86711	106875	115062	123921	128087	129888	138819	148265	151202	134967	150803	3.52
WESTERN EUROPE												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	109364	131750	132593	133981	128556	148447	148136	150761	159097	146770	141680	1.65
WHEAT	44565	52176	51841	50145	47763	56708	56073	55467	62862	52985	56876	1.52
RICE PADDY	1397	1487	1364	1679	1596	1598	1412	1784	1729	1711	1542	1.38
BARLEY	27480	37949	37914	39394	36000	42039	44217	45075	47492	45642	42373	2.42
MAIZE	14236	17886	19321	21727	23449	25563	25436	28934	26439	27374	24007	4.14
MILLET AND SORGHUM	142	265	373	399	416	446	453	523	497	499	455	5.40
ROOT CROPS	72461	69472	66901	60263	64108	61233	56417	56337	58619	47828	45211	- 4.05
POTATOES	72272	69312	66751	60118	63964	61085	56270	56197	58475	47688	45122	- 4.05

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
					THOUSAND METRIC TONS							PERCENT
TOTAL PULSES	2594	2684	2498	2533	2436	2262	2047	1974	2065	1866	1713	- 4.64
CITRUS FRUIT	4114	4925	5127	5910	5220	5586	6480	6531	6665	6716	6770	3.81
BANANAS	372	409	424	470	456	459	406	480	427	385	365	- 1.31
APPLES	10198	12154	10632	12160	11586	10669	8963	11566	9916	11494	10102	- 1.40
VEGETABLE OILS,OIL EQUIV	1709	1926	1884	1902	2012	2238	2207	2417	2247	2608	2230	3.06
SOYBEANS	9	9	3	6	8	7	10	26	53	45	54	35.21
GROUNDNUTS IN SHELL	26	19	18	16	17	18	16	18	16	17	17	- .94
SUNFLOWER SEED	247	299	373	482	482	669	615	841	695	854	775	11.38
RAPESEED	549	936	1020	979	1080	1288	1464	1445	1622	1317	1322	5.23
COTTONSEED	356	318	295	340	323	326	370	288	351	328	317	.39
SUGAR (CENTRIFUGAL,RAW)	8589	10157	10426	11168	10738	12458	11594	12255	11189	12827	13815	2.80
COTTON LINT	191	167	159	178	170	169	199	155	189	177	151	.05
JUTE AND SIMILAR FIBRES	1											-78.84
TOBACCO	313	369	321	294	317	304	334	353	331	400	422	2.32
TOTAL MEAT	16559	19154	19964	20172	21464	22389	22207	22785	24769	24747	25056	3.15
TOTAL MILK	111157	119602	122497	119434	117992	117741	122551	124216	125325	126338	129172	.82
TOTAL EGGS	3740	4155	4264	4479	4747	4728	4906	4808	4878	5022	5041	2.07
WOOL GREASY	189	190	175	166	163	162	160	163	166	163	159	- 1.26
FISHERY PRODUCTS [1]												
FRESHWATER + DIADROMOUS	255	670	770	1010	1651	1701	1978	1943	1667	1682	2569	13.38
MARINE FISH	7841	9839	9405	8530	8446	8422	8193	8363	8648	8260	8338	- 1.44
CRUST+ MOLLUS+ CEPHALOP	631	709	756	802	792	846	966	1005	951	1059	1028	4.59
AQUATIC MAMMALS	5	7	10	9	11	9	7	6	5	7	7	- 4.07
AQUATIC ANIMALS	8	4	4	4	6	7	2	5	5	3	4	- 1.29
AQUATIC PLANTS	124	119	140	132	135	133	126	138	132	132	131	.31
FOREST PRODUCTS [2]												
SAWLOGS CONIFEROUS	71480	74495	74296	79302	84900	86262	85086	95968	93409	74222	84677	1.42
SAWLOGS NONCONIFEROUS	20836	22797	22455	23451	24645	23146	22509	24621	23697	20474	20342	- 1.00
PULPWOOD+PARTICLES	61562	74047	67592	74023	83637	87070	77155	78717	86970	86126	80250	1.79
FUELWOOD	64493	50576	47638	43432	41631	38687	34565	31120	30581	28603	28012	- 6.80
SAWNWOOD CONIFEROUS	40640	41923	43514	46085	47754	49365	49779	53432	51705	42735	47457	1.16
SAWNWOOD NONCONIFEROUS	9659	10905	11188	11533	11973	12587	12432	13249	11823	9816	11483	- .02
WOOD-BASED PANELS	9837	13342	14781	16647	17900	19398	22362	25173	24368	22645	24951	7.34
PULP FOR PAPER	17407	20659	21878	23533	24642	23705	24969	26847	27498	23127	23932	1.71
PAPER+PAPERBOARD	23412	28143	30577	33543	34890	34460	36631	39897	41186	33270	38452	3.01
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	172153	200166	222627	217276	234854	242797	235336	287792	263285	208470	293468	2.78
WHEAT	78994	98063	114451	100614	118985	123455	111857	136680	111752	90309	125570	.86
RICE PADDY	510	1075	1216	1298	1470	1641	1826	1961	2096	2231	2153	8.76
BARLEY	26619	32385	36927	41531	46770	44992	47886	66993	68374	49605	83284	8.99
MAIZE	24582	22266	22202	27582	23178	24533	29150	30060	28309	27788	31078	3.49
MILLET AND SORGHUM	2772	3381	2807	3461	2233	2160	2227	4571	3178	1294	3412	- 2.15
ROOT CROPS	148036	169232	177531	155384	169291	152576	149750	181028	153757	151141	152407	- 1.17
POTATOES	148034	169229	177528	155381	169288	152572	149747	181025	153754	151137	152404	- 1.17
TOTAL PULSES	8562	7838	7996	8779	8529	7856	7820	9104	9490	6107	9357	.17
CITRUS FRUIT	39	38	36	46	140	42	56	58	126	158	132	16.01
APPLES	1588	2509	2263	2888	2331	2263	2222	2609	2271	2941	3508	2.44
VEGETABLE OILS,OIL EQUIV	3551	4678	4625	4288	4484	4447	4105	5149	4860	4314	4523	.10
SOYBEANS	400	585	575	485	693	715	457	711	710	1111	834	5.82
GROUNDNUTS IN SHELL	1	3	3	2	2	2	3	3	3	5	4	6.16
SUNFLOWER SEED	6032	7903	7988	7787	7437	7090	6546	8768	7978	6328	6651	- 1.59
RAPESEED	573	1030	864	441	861	973	834	966	983	1310	1523	6.66
COTTONSEED	3332	3981	3979	3737	4450	4643	4779	5009	5501	5138	5403	4.24
SUGAR (CENTRIFUGAL,RAW)	11752	13464	13678	12646	12925	11959	12672	13758	11849	12076	11653	- 1.36
TEA	45	57	56	60	67	69	71	75	81	86	92	5.68
COTTON LINT	1722	2067	2010	1934	2146	2371	2382	2496	2497	2669	2601	3.57
JUTE AND SIMILAR FIBRES	41	53	45	53	50	57	56	45	39	45	49	- 1.52
TOBACCO	421	540	554	503	536	522	614	615	608	648	682	2.90
TOTAL MEAT	14664	17711	18206	18280	18840	20181	21218	21516	23327	24094	22274	3.51
TOTAL MILK	94262	114225	117033	116442	118041	118600	120120	126592	131048	129672	128261	1.57
TOTAL EGGS	2624	3071	3188	3310	3594	3907	4087	4322	4622	4804	4727	5.62
WOOL GREASY	440	483	508	482	510	519	513	527	558	566	569	1.87

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	....THOUSAND METRIC TONS....	.....	.....	.....	.....	.....	.....	PERCENT
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	795	1170	1094	1040	1220	1302	1322	1475	1498	2090	1986	7.35
MARINE FISH	3671	5233	5731	6235	6899	6980	7449	8231	8959	9236	9416	6.92
CRUST+ MOLLUS+ CEPHALOP	114	136	112	123	114	119	102	105	109	119	108	- 1.63
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	167917	154636	156262	157863	166321	166484	167493	169703	168587	170908	169026	1.11
SAWLOGS NONCONIFEROUS	33351	33160	33040	33716	35110	35640	35650	35813	35984	36975	35590	1.10
PULPWOOD+PARTICLES	27342	37373	38633	40593	44660	46125	47240	53746	56158	58858	56755	5.55
FUELWOOD	117985	112482	106829	103588	101853	101572	101030	97906	96601	95395	95115	- 1.67
SAWNWOOD CONIFEROUS	107344	110174	111347	113076	116480	119127	119346	119731	117271	118105	116743	.73
SAWNWOOD NONCONIFEROUS	19999	19267	19529	19808	20371	20774	20782	18324	19482	20017	19068	- .19
WOOD-BASED PANELS	5237	8033	8635	9134	9872	10666	11392	12600	13460	14360	14796	7.41
PULP FOR PAPER	5653	7500	7838	8098	8578	9397	9719	10157	10689	10763	10910	4.58
PAPER+PAPERBOARD	6778	9115	9604	9773	10587	11136	11649	12288	12811	13430	13934	4.98
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	197287	238246	236941	241251	215412	276666	263722	273948	235359	286120	301852	2.45
WHEAT	48404	57168	60054	57532	45808	58442	56561	62567	62180	75180	82031	3.77
RICE PADDY	3084	4054	4724	4169	3801	3890	3875	4208	5098	5805	5308	3.19
BARLEY	12536	13644	16378	17382	17950	23194	20505	19403	15424	17880	18728	1.82
MAIZE	96634	125341	115099	120939	108097	146236	144096	146238	121038	150896	161664	3.13
MILLET AND SORGHUM	13912	19186	18575	18541	17363	22245	20556	23623	15983	19307	18382	- .01
ROOT CROPS	15133	16622	16424	17192	17903	17251	15998	16326	18650	17336	19197	1.05
POTATOES	14454	16006	15813	16536	17291	16715	15429	15754	18015	16717	18572	1.09
TOTAL PULSES	1169	981	1084	1232	1116	1138	1141	1040	1316	1157	1123	1.09
CITRUS FRUIT	6678	10374	7555	10174	10292	11135	11031	12604	12167	13237	13442	4.81
BANANAS	4	4	3	3	3	3	3	3	3	3	2	- 2.06
APPLES	3101	2898	2880	3484	3244	3149	3055	3198	3347	3675	3299	1.59
VEGETABLE OILS,OIL EQUIV	5471	6306	7307	7573	8039	8247	8613	9937	8105	9847	8145	3.33
SOYBEANS	19741	26795	30373	31048	30958	32285	34956	42504	33363	42446	34676	3.74
GROUNDNUTS IN SHELL	890	1124	1155	1150	1351	1363	1485	1576	1664	1750	1701	5.63
SUNFLOWER SEED	33	120	95	96	111	273	411	394	299	386	413	20.54
RAPESEED	279	561	441	758	1638	2155	1300	1207	1164	1749	838	8.84
COTTONSEED	5556	2912	4209	3690	3690	3846	4892	4550	4091	2919	3764	.69
SUGAR (CENTRIFUGAL,RAW)	4705	4934	5515	5200	5384	5581	5898	5332	5025	6441	6152	1.79
COFFEE GREEN	3	2	2	1	2	1	1	1	1	1	1	-12.85
COTTON LINT	3245	1621	2242	2175	2219	2281	2984	2825	2513	1807	2304	2.06
TOBACCO	1065	989	875	930	965	875	878	907	1019	1096	1064	1.53
TOTAL MEAT	20098	23163	23559	23854	24850	25712	25632	24622	26116	25418	27630	1.55
TOTAL MILK	65355	62123	61509	61161	61367	61697	62413	60004	60047	60063	62285	- .18
TOTAL EGGS	4116	4391	4324	4301	4377	4472	4422	4241	4202	4103	4123	- .70
WOOL GREASY	129	105	98	90	87	84	81	74	66	58	53	- 6.90
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	380	323	385	325	414	356	315	335	317	275	343	- 1.63
MARINE FISH	2592	2266	2474	2533	2657	2671	2472	2437	2359	2396	2594	.18
CRUST+ MOLLUS+ CEPHALOP	979	1057	1038	976	1033	1038	994	1013	1068	1107	1164	1.01
AQUATIC ANIMALS	3	8	4	5	4	2	2	2	4	2	6	- 6.00
AQUATIC PLANTS	25	47	50	56	56	43	34	41	70	42	33	- 2.66
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	197633	214821	233713	227771	227741	246128	239166	255365	237683	222108	253889	1.02
SAWLOGS NONCONIFEROUS	37834	39664	38062	38827	38931	38424	41002	41472	37932	32125	37383	- .95
PULPWOOD+PARTICLES	112192	126181	127782	144216	150005	137726	142366	149291	165000	132931	149486	1.52
FUELWOOD	39723	26784	25979	24862	19430	17894	16836	17623	17672	17217	18633	- 4.85
SAWNWOOD CONIFEROUS	86799	89130	96488	95252	90379	100139	104867	109561	96191	88853	107892	1.11
SAWNWOOD NONCONIFEROUS	17022	18859	18420	21376	18172	17556	17346	17896	17626	14831	17199	- 2.02
WOOD-BASED PANELS	19045	23682	26564	26535	26319	31060	34663	36282	31052	27057	32473	2.97
PULP FOR PAPER	36420	45073	49210	52316	52576	52624	56078	58644	59668	50560	57823	2.13
PAPER+PAPERBOARD	42670	50821	54515	57997	57370	58270	62859	64974	64620	57730	65340	2.24

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	....THOUSAND METRIC TONS....	.....	.....	.....	.....	.....	.....	PERCENT
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	11351	10385	19645	15169	13479	15583	11673	17804	17094	18575	18531	3.68
WHEAT	8470	7894	15246	11003	8177	8930	6979	12385	11605	12185	12252	2.24
RICE PADDY	136	214	221	255	247	300	248	309	409	388	417	8.05
BARLEY	1076	969	1866	1931	2525	3324	2063	2655	2804	3513	3194	10.65
MAIZE	193	208	217	200	251	313	330	241	236	338	363	5.51
MILLET AND SORGHUM	251	340	314	451	581	1355	1254	1044	1096	923	1151	16.11
ROOT CROPS	808	911	977	1135	1021	1108	1074	1003	868	965	958	- .64
POTATOES	803	903	969	1126	1012	1099	1064	991	855	955	947	- .69
TOTAL PULSES	49	53	47	84	80	92	129	92	125	163	188	14.92
CITRUS FRUIT	247	274	325	299	394	372	435	401	433	459	438	5.41
BANANAS	126	131	125	131	131	128	124	125	118	97	113	- 2.27
APPLES	432	481	498	537	557	588	511	574	487	527	430	- .69
VEGETABLE OILS,OIL EQUIV	22	31	34	38	59	73	111	85	93	98	73	13.70
SOYBEANS	1	1	1	2	5	9	34	38	63	74	45	75.44
GROUNDNUTS IN SHELL	18	42	31	17	43	31	46	38	29	32	35	.93
SUNFLOWER SEED	2	2	3	6	13	59	148	102	84	113	80	61.02
COTTONSEED	7	30	54	55	48	31	73	53	50	54	41	2.09
SUGAR (CENTRIFUGAL,RAW)	1801	2372	2768	2214	2525	2793	2835	2526	2848	2854	3296	2.73
COTTON LINT	4	17	32	32	29	20	44	31	31	33	25	2.55
TOBACCO	18	17	15	21	23	23	19	20	20	18	18	.86
TOTAL MEAT	2472	2616	2815	2918	3096	3232	3544	3628	3180	3517	4002	3.94
TOTAL MILK	12381	13752	13184	13614	13716	13411	13514	13155	12645	12712	12980	- .76
TOTAL EGGS	194	218	230	234	247	259	267	265	290	268	250	2.19
WOOL GREASY	1062	1130	1134	1211	1257	1225	1202	1044	986	1088	1066	- 1.46
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	1	1	1	2	2	3	4	3	3	5	4	18.76
MARINE FISH	69	80	81	80	97	97	98	106	117	100	112	4.15
CRUST+ MOLLUS+ CEPHALOP	45	70	79	59	65	81	79	84	86	70	71	1.07
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	5552	6413	7025	7557	7801	7576	7912	8339	6537	6356	7609	.22
SAWLOGS NONCONIFEROUS	7275	7553	7643	7261	6992	7457	6984	6902	7240	6490	6195	- 1.83
PULPWOOD+PARTICLES	2260	2727	2717	3284	3557	3745	3640	5374	5006	7613	7191	12.38
FUELWOOD	3665	3180	3059	3002	2776	2776	2719	2402	2850	1870	1250	- 7.33
SAWNWOOD CONIFEROUS	2272	2307	2398	2462	2540	2312	2515	2836	2882	2821	2931	2.76
SAWNWOOD NONCONIFEROUS	2481	2505	2655	2510	2531	2637	2497	2482	2533	2505	2440	- .43
WOOD-BASED PANELS	416	574	650	686	790	801	748	933	989	920	1099	6.59
PULP FOR PAPER	623	845	870	996	1075	1090	1127	1326	1505	1524	1660	8.02
PAPER+PAPERBOARD	889	1208	1215	1368	1514	1540	1546	1686	1732	1697	1760	4.48
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	37012	39569	42173	42981	42558	43759	45151	37934	44760	45058	48830	1.37
WHEAT	4012	3959	5869	4465	4964	5494	6043	4480	4806	5508	6214	2.31
RICE PADDY	3650	4516	4475	4575	4683	4870	4390	4523	4946	5327	5307	1.74
BARLEY	3280	3395	5645	4266	4229	4681	4973	2634	3886	3599	4553	- 1.41
MAIZE	9103	10571	10625	11443	11289	11508	12716	10765	13498	13269	13799	2.91
MILLET AND SORGHUM	15391	15458	13820	16519	15596	15430	15186	13860	16011	15780	17128	.81
ROOT CROPS	59044	60162	63685	66847	67185	66232	66007	67430	69640	70485	72698	1.60
POTATOES	1251	1461	1455	1555	1703	1773	1928	2031	2030	2186	2284	5.49
CASSAVA	31963	35286	37082	37901	38828	36748	36649	37327	38612	39308	40530	.99
TOTAL PULSES	3275	3577	3839	4104	4354	3824	3971	4172	4539	4509	4566	2.29
CITRUS FRUIT	1478	1790	1925	1969	2197	2141	2252	2366	2385	2144	2374	2.78
BANANAS	2880	2985	2994	3264	3558	3398	3456	3730	3835	3837	4006	3.29
APPLES	37	41	36	38	37	42	40	42	46	54	59	4.59
VEGETABLE OILS,OIL EQUIV	3596	3448	3489	3604	3787	3974	3470	3320	3593	3734	3811	.51
SOYBEANS	63	64	63	68	65	71	74	75	76	75	82	2.76
GROUNDNUTS IN SHELL	4651	4646	4735	4795	4327	4842	3812	3141	3687	3908	4222	- 2.82
SUNFLOWER SEED	31	30	35	38	61	47	71	70	63	87	96	13.00
RAPESEED	20	20	20	20	20	20	20	20	20	20	20	-
COTTONSEED	608	836	799	1038	1123	993	1005	983	924	912	1016	1.04

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS											PERCENT
COPRA	148	146	155	151	155	154	147	158	156	159	180	1.38
PALM KERNELS	805	599	634	681	764	746	673	611	707	672	676	.55
SUGAR (CENTRIFUGAL,RAW)	1780	2203	2325	2509	2560	2768	2850	2927	2927	2731	3081	3.29
COFFEE GREEN	996	1085	1184	1256	1345	1171	1255	1368	1291	1188	1247	.93
COCOA BEANS	930	982	844	999	1092	1163	1013	942	1016	996	863	- .30
TEA	62	83	98	111	121	119	149	155	153	151	156	7.12
COTTON LINT	308	428	421	543	577	511	529	514	489	495	543	1.48
JUTE AND SIMILAR FIBRES	13	13	15	17	23	19	19	19	20	20	21	3.74
SISAL	408	392	376	389	366	344	330	337	355	258	226	- 4.92
TOBACCO	192	182	154	150	162	178	188	172	198	228	223	3.84
NATURAL RUBBER	160	164	181	183	202	229	238	242	248	245	231	4.54
TOTAL MEAT	2809	3161	3260	3363	3468	3420	3388	3366	3383	3485	3635	1.01
TOTAL MILK	5442	6129	6352	6523	6656	6572	6368	6160	6195	6484	6745	.29
TOTAL EGGS	307	363	374	386	401	416	425	430	445	467	485	3.14
WOOL GREASY	47	57	55	59	55	54	60	66	62	65	67	2.10
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	635	818	869	926	1138	1159	1278	1293	1316	1355	1387	6.31
MARINE FISH	883	1143	1098	1266	1517	1567	1932	1931	1803	1571	1603	5.13
CRUST+ MOLLUS+ CEPHALOP	13	23	27	34	29	32	38	39	53	60	66	11.92
AQUATIC ANIMALS	1	1	2	3	1	2	2	1	1	1	1	- 5.18
AQUATIC PLANTS	3	4	4	3	7	7	6	7	5	7	7	7.88
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	553	737	795	844	917	1043	1014	1042	1051	993	971	3.38
SAWLOGS NONCONIFEROUS	9892	11672	12759	14880	14672	15654	15984	18014	15574	14711	16958	3.22
PULPWOOD+PARTICLES	514	785	806	894	958	1307	1428	1375	1498	2137	2131	12.59
FUELWOOD	199028	216156	221259	226908	233602	237038	243898	248091	253528	259693	261039	2.20
SAWNWOOD CONIFEROUS	260	338	327	344	383	408	410	397	382	396	409	2.26
SAWNWOOD NONCONIFEROUS	1789	1858	2200	2546	2633	2716	2559	3071	3051	3164	3109	5.28
WOOD-BASED PANELS	266	367	399	466	534	600	695	749	767	694	734	8.70
PULP FOR PAPER	121	186	202	221	231	239	255	281	290	305	294	5.60
PAPER+PARERBOARD	92	128	136	156	168	180	187	182	201	230	239	6.81
LATIN AMERICA												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	53191	63881	61880	64238	71278	72620	68061	75125	78438	79416	86558	3.43
WHEAT	11757	11743	10478	12380	11512	11563	12442	12103	13471	15009	19550	4.81
RICE PADDY	9018	10319	10132	10202	11778	10681	10925	11795	11895	13653	15139	3.91
BARLEY	1427	1358	1400	1317	1216	1394	1786	1677	1300	1604	1841	2.97
MAIZE	27018	34960	33552	33230	38036	39512	35250	37869	39441	38265	38240	1.50
MILLET AND SORGHUM	2485	4115	5055	5972	7723	8371	6045	10152	11273	9726	10531	10.66
ROOT CROPS	37121	44841	46865	49039	49211	49814	48358	44431	44192	45684	46403	- .44
POTATOES	7553	8267	8692	9349	9750	9659	8617	8685	10099	9296	9549	1.03
CASSAVA	25746	31808	33654	34889	34668	35231	34893	31250	29896	31909	32364	- .79
TOTAL PULSES	3788	4779	4494	4258	4381	4889	4877	4547	4616	4707	4493	.17
CITRUS FRUIT	6126	7797	8168	8607	8596	9546	9822	10848	12966	13835	14746	7.67
BANANAS	12968	15602	17598	18312	18858	19656	20129	19488	19702	19314	20562	2.22
APPLES	786	908	860	822	849	882	912	635	1286	1155	1140	3.40
VEGETABLE OILS,OIL EQUIV	2301	2613	2640	2773	3075	3031	3230	3591	4243	4477	4716	7.33
SOYBEANS	459	968	1068	1500	1889	2553	3883	6101	9219	11450	12692	37.70
GROUNDNUTS IN SHELL	1167	1294	1231	1177	1394	1573	1445	1242	982	1082	1077	- 2.33
SUNFLOWER SEED	727	1229	1032	967	1221	926	917	969	1033	807	1193	- 1.42
RAPESEED	57	67	55	71	77	91	85	46	41	68	112	1.10
COTTONSEED	2766	2522	3013	3086	2919	2533	3010	3069	3328	2848	2447	.02
COPRA	266	265	281	226	229	246	238	205	233	225	217	- 2.14
PALM KERNELS	202	243	253	250	286	288	289	300	304	320	307	3.00
SUGAR (CENTRIFUGAL,RAW)	17329	19979	18557	18426	23450	21721	20964	23316	24330	24050	25958	3.39
COFFEE GREEN	3163	2885	2398	2675	2198	3014	2884	2404	3117	2884	1999	- .62
COCOA BEANS	321	371	358	373	382	393	429	407	432	501	434	2.94
TEA	18	25	25	28	33	39	40	39	30	33	40	4.40
COTTON LINT	1539	1415	1682	1696	1574	1407	1669	1691	1844	1492	1321	- .40
JUTE AND SIMILAR FIBRES	71	69	81	73	65	67	81	113	74	107	109	4.90
SISAL	240	251	242	265	267	342	364	328	365	381	226	2.77
TOBACCO	498	520	545	541	536	531	565	563	666	656	691	3.14
NATURAL RUBBER	30	27	27	30	31	30	32	30	24	25	26	- 1.19
TOTAL MEAT	8401	9499	10042	10695	10722	10164	10609	10694	10962	11538	12277	2.11
TOTAL MILK	19620	22178	23193	23950	24074	25853	26016	25818	27663	30037	31220	3.59

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS											PERCENT
TOTAL EGGS	1030	1305	1353	1451	1530	1590	1675	1716	1789	1815	1847	4.09
WOOL GREASY	343	358	345	351	339	322	309	300	292	300	302	- 2.29
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	215	235	249	264	165	171	205	205	203	213	197	- 1.88
MARINE FISH	8428	12058	12870	11154	14740	13261	6857	4700	6855	6036	7550	- 9.26
CRUST+ MOLLUS+ CEPHALOP	275	352	374	387	433	438	461	456	457	476	491	3.52
AQUATIC MAMMALS	17	7	8	8	8	10	3	7	7	7	7	- 1.57
AQUATIC ANIMALS	8	24	34	16	67	38	61	50	34	48	14	.39
AQUATIC PLANTS	45	93	86	91	88	74	79	81	90	95	107	1.02
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	11018	12996	13991	14930	16239	16605	16810	16359	14860	15176	15182	1.21
SAWLOGS NONCONIFEROUS	14729	15423	15995	16127	17119	18340	18512	19339	19606	20974	21782	3.93
PULPWOOD+PARTICLES	4166	6223	7310	7570	8512	8733	9025	9181	10068	10487	11358	6.01
FUELWOOD	198360	213782	219053	219344	219720	226184	225580	223578	224662	225893	225859	.53
SAWNWOOD CONIFEROUS	5289	6230	6685	6994	7420	7405	7692	7063	6640	6763	6808	.31
SAWNWOOD NONCONIFEROUS	6529	7184	7380	7900	7975	8349	8010	8218	8614	9032	9576	2.75
WOOD-BASED PANELS	767	1206	1360	1474	1664	1938	2496	2561	2674	2811	3049	11.50
PULP FOR PAPER	1109	1661	1804	1921	2137	2212	2442	2678	2974	2928	3338	7.96
PAPER+PAPERBOARD	2105	2897	3125	3409	3787	4079	4251	4672	5173	4734	5118	6.76
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	36593	41956	41148	43094	40017	44418	47531	41002	44805	52069	56506	2.87
WHEAT	17623	20070	20356	21196	19983	23135	25925	21307	24038	28417	31396	4.52
RICE PADDY	3407	4187	4541	4524	4482	4535	4583	4446	4304	4617	4751	.60
BARLEY	6657	7186	7053	7392	6004	6410	7275	5204	6246	7813	8961	.95
MAIZE	3650	4069	4157	4257	4215	4268	4265	4541	4844	5037	5474	3.00
MILLET AND SORGHUM	3680	4723	3490	4131	4019	4397	4039	4165	4199	4785	4528	1.18
ROOT CROPS	2982	3183	3449	3610	3679	3784	4150	4408	4438	4705	5361	5.31
POTATOES	2654	2866	3111	3262	3343	3443	3785	4072	4062	4266	4914	5.51
CASSAVA	125	95	95	93	93	92	92	92	92	130	131	3.13
TOTAL PULSES	1496	1516	1495	1659	1479	1607	1826	1532	1760	1646	1866	1.88
CITRUS FRUIT	1425	2059	2173	2268	2344	2654	2762	2897	3047	2971	3077	4.94
BANANAS	160	194	207	221	223	258	276	276	289	295	300	5.25
APPLES	563	962	1019	856	992	1137	1299	1262	1399	1356	1482	5.73
VEGETABLE OILS,OIL EQUIV	926	1010	1051	1093	1197	1245	1561	1271	1532	1422	1542	4.98
SOYBEANS	5	8	11	14	18	18	23	27	45	87	111	31.80
GROUNDNUTS IN SHELL	418	415	360	499	447	502	684	656	1036	1042	956	12.93
SUNFLOWER SEED	118	235	244	347	435	511	613	616	476	546	611	10.87
RAPESEED	6	8	7	8	3	3	1	1	1		6	-19.77
COTTONSEED	2140	2229	2405	2617	2570	2823	2961	2780	2959	2537	2353	1.07
SUGAR (CENTRIFUGAL,RAW)	1128	1729	1769	1751	1869	2332	2194	2224	2330	2470	2920	5.57
COFFEE GREEN	6	5	5	5	5	5	6	6	7	7	7	5.62
TEA	22	38	48	53	53	50	69	66	67	77	82	7.79
COTTON LINT	1193	1299	1407	1523	1488	1636	1709	1608	1722	1449	1386	1.02
JUTE AND SIMILAR FIBRES	3	2	3	3	2	2	2	3	2	2	2	- 2.04
TOBACCO	178	246	219	198	204	235	241	213	258	252	373	3.84
TOTAL MEAT	1791	2030	2150	2236	2307	2391	2429	2496	2618	2709	2774	3.37
TOTAL MILK	10055	10760	11345	11214	11087	11125	11548	11818	12240	12688	13153	1.99
TOTAL EGGS	215	279	305	307	317	336	376	394	411	457	512	6.58
WOOL GREASY	127	140	144	152	148	144	146	147	155	156	160	1.11
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	111	127	123	132	128	122	127	129	124	126	130	.08
MARINE FISH	346	405	368	408	501	490	490	504	630	573	629	5.76
CRUST+ MOLLUS+ CEPHALOP	22	30	29	31	30	37	38	38	36	34	29	1.42
AQUATIC MAMMALS	1		2	8	3	4	4	4	4	4	4	17.51
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1949	2844	3089	3447	3251	3670	3600	4241	4547	4739	4463	5.74
SAWLOGS NONCONIFEROUS	832	1047	1293	1445	1263	1416	1774	1517	1722	1196	1376	2.19
PULPWOOD+PARTICLES	151	207	254	438	874	672	960	1133	1363	869	966	19.42
FUELWOOD	33129	38006	38720	40252	38984	38563	39507	36265	39802	41307	39870	.39
SAWNWOOD CONIFEROUS	1067	1788	1956	2169	2197	2194	2184	2307	2294	2245	2589	2.90
SAWNWOOD NONCONIFEROUS	389	557	558	610	670	579	711	741	734	704	600	2.29
WOOD-BASED PANELS	136	212	254	269	293	318	349	359	364	430	500	8.60
PULP FOR PAPER	94	134	146	144	177	290	349	437	394	338	316	13.92

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
						THOUSAND METRIC TONS						PERCENT
PAPER+PAPERBOARD	190	258	265	291	329	413	513	594	604	636	656	12.99
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	163273	176474	193012	202452	211749	209463	200176	225541	212219	239152	235082	2.74
WHEAT	15771	16250	23538	25900	28065	30911	33873	32772	30009	32448	38347	7.07
RICE PADDY	114933	122704	132298	138970	141713	142308	133028	150959	143948	162835	154363	2.34
BARLEY	3903	4037	5338	4236	4462	4445	4335	3981	3948	5019	5132	.61
MAIZE	11074	13394	13750	13410	16071	13748	13565	15985	15792	17755	16090	2.60
MILLET AND SORGHUM	17519	20014	17989	19843	21351	17977	15301	21770	18453	21024	21077	.66
ROOT CROPS	30340	31516	35577	36636	36754	37245	38848	41652	43884	45990	48113	4.29
POTATOES	4351	5341	6216	6855	6102	7031	6863	6574	6959	8695	9855	5.06
CASSAVA	17056	17768	19806	19813	20236	20037	22470	25472	27372	27070	28420	5.50
TOTAL PULSES	13414	10479	13667	12358	13847	13204	12678	12712	11597	12632	14877	1.21
CITRUS FRUIT	1639	1902	1912	1909	1926	1936	1912	1984	2030	2243	2207	1.74
BANANAS	6960	8367	8343	8548	8435	8689	8377	8952	10139	11112	12500	4.09
APPLES	202	338	386	453	523	609	729	858	946	1054	1067	14.76
VEGETABLE OILS,OIL EQUIV	6757	7058	7027	7139	7934	8799	8198	8860	8787	10283	10301	4.57
SOYBEANS	600	684	725	682	799	816	841	925	1094	1160	1028	6.11
GROUNDNUTS IN SHELL	6070	6800	5806	6294	7359	7419	5236	7129	6405	8244	6701	1.20
SUNFLOWER SEED						1	1	1	1	2	2	28.68
RAPESEED	1597	1553	1986	1737	1968	2421	1869	2221	2131	2648	2348	4.25
COTTONSEED	2920	3447	3305	3261	3061	4007	3809	3777	3935	3419	2931	.18
COPRA	2906	2739	2886	2819	2973	3432	3689	3269	2999	3649	4433	4.11
PALM KERNELS	64	87	104	121	142	184	212	234	291	337	388	18.32
SUGAR (CENTRIFUGAL,RAW)	5641	5363	5305	7094	8532	8292	7178	8594	9804	10522	11287	8.19
COFFEE GREEN	233	314	283	322	322	363	320	312	321	336	360	1.34
COCOA BEANS	7	9	9	10	12	13	14	17	21	25	24	13.06
TEA	681	709	732	718	729	726	757	781	796	803	818	1.65
COTTON LINT	1461	1724	1653	1630	1532	2006	1906	1889	1969	1715	1471	.22
JUTE AND SIMILAR FIBRES	2833	3139	2154	3026	2832	2568	2886	3308	2252	2194	2478	- 1.74
SISAL	11	12	12	11	8	5	5	4	3	3	3	-17.22
TOBACCO	735	848	907	901	863	814	923	872	968	897	884	.50
NATURAL RUBBER	1868	2137	2398	2693	2652	2729	2701	3128	3089	2986	3255	4.01
TOTAL MEAT	2701	3082	3157	3248	3398	3509	3641	3700	3788	3821	3905	2.78
TOTAL MILK	26432	26874	27499	28602	29655	30724	31813	33016	33432	33871	34250	2.94
TOTAL EGGS	559	656	710	792	809	866	953	994	1020	1066	1107	5.95
WOOL GREASY	56	61	61	59	61	65	60	59	58	59	59	- .56
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	1870	2180	2254	2400	2325	2359	2376	2422	2512	2612	2663	1.95
MARINE FISH	2896	4000	4470	4744	4800	5244	5566	6116	6629	6746	7510	6.90
CRUST+ MOLLUS+ CEPHALOP	509	689	839	843	1089	1168	1092	1206	1189	1460	1524	8.18
AQUATIC ANIMALS	2	8	8	8	36	34	50	129	79	26	35	25.86
AQUATIC PLANTS	53	89	130	107	129	133	145	238	352	263	325	15.98
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1718	2339	2369	2438	2105	2409	2265	2396	2584	2985	3083	2.90
SAWLOGS NONCONIFEROUS	29797	39400	45207	48414	53521	54600	60704	73459	68136	57478	67596	5.80
PULPWOOD+PARTICLES	265	602	625	684	741	880	1110	1892	1993	2016	2127	18.46
FUELWOOD	245779	270792	278608	284581	291525	306207	314034	322221	325951	335088	339144	2.65
SAWNWOOD CONIFEROUS	1048	1263	1472	1483	1443	1707	1643	1530	1985	1839	1839	4.04
SAWNWOOD NONCONIFEROUS	8715	10598	10595	11355	11937	11515	13406	14048	12809	14551	16143	4.49
WOOD-BASED PANELS	657	1389	1995	2070	2216	2586	3190	3833	3181	3315	3926	10.79
PULP FOR PAPER	513	802	870	927	983	1067	1110	1252	1347	1336	1446	6.85
PAPER+PAPERBOARD	846	1107	1209	1353	1490	1660	1883	2030	2096	2071	2179	8.27
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS												
TOTAL CEREALS	182032	204521	202618	211488	228968	236313	230479	242924	249068	259721	263537	3.07
WHEAT	22575	28398	27295	29217	31379	33449	35296	36471	37391	41519	43446	5.29
RICE PADDY	100626	109407	108616	112359	122156	124987	120622	127429	130371	133467	132954	2.47
BARLEY	15252	17262	17257	18280	19285	20371	18318	20399	20395	21445	21906	2.62
MAIZE	24462	27967	27967	29033	31136	32243	31192	32297	33492	35628	36594	3.02
MILLET AND SORGHUM	17349	19392	19398	20418	22420	22460	22466	23489	24511	24527	25496	3.18
ROOT CROPS	114597	129377	129130	131058	145227	152340	140832	152508	155827	158739	159981	2.63
POTATOES	27984	31379	31386	32253	35854	37062	33087	37123	39160	41292	42282	3.43

see notes at end of table

ANNEX TABLE 1. VOLUME OF PRODUCTION OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS											PERCENT
CASSAVA	1371	1304	1342	1276	1284	1275	1373	1451	1499	1451	1466	1.74
TOTAL PULSES	7587	8693	8973	9291	9597	9925	10347	10965	11252	11512	11772	3.62
CITRUS FRUIT	822	1025	1046	1076	1149	1195	1203	1283	1325	1312	1325	3.25
BANANAS	908	1339	1316	1283	1189	1162	1110	1173	1104	972	988	- 3.39
APPLES	406	452	497	503	518	523	543	573	603	619	641	3.65
VEGETABLE OILS,OIL EQUIV	3825	4402	4203	4240	4574	4664	4594	4872	4923	4987	4986	1.98
SOYBEANS	10891	11431	11012	11266	11931	12035	11923	12094	12179	12384	12387	1.20
GROUNDNUTS IN SHELL	2156	2536	2356	2553	2867	2779	2593	2805	2898	3000	2997	2.26
SUNFLOWER SEED	65	70	70	70	70	70	70	70	70	70	70	
RAPESEED	1035	1125	1074	943	992	1052	1152	1202	1251	1304	1305	2.94
COTTONSEED	2472	3873	3616	3527	4003	4435	4261	5086	4998	4781	4710	3.79
COPRA	31	29	29	25	29	30	30	32	31	30	30	1.24
PALM KERNELS	10	18	22	25	26	29	32	35	36	38	40	8.74
SUGAR (CENTRIFUGAL,RAW)	2410	3201	3379	3465	3613	3977	4035	4117	4327	4288	4552	3.93
COFFEE GREEN	7	11	9	10	10	11	10	12	12	13	13	3.17
TEA	186	206	222	239	255	268	299	317	318	325	334	5.73
COTTON LINT	1236	1936	1808	1764	2002	2218	2131	2543	2499	2391	2379	3.85
JUTE AND SIMILAR FIBRES	398	528	540	565	601	630	929	1226	1425	1424	1464	15.05
SISAL	10	10	9	10	8	9	8	8	10	9	9	- .71
TOBACCO	760	930	934	864	868	863	918	1024	1037	1047	1067	2.15
NATURAL RUBBER	123	100	83	78	49	42	38	37	41	30	35	-11.85
TOTAL MEAT	12747	14046	14218	14479	14864	15119	15568	15963	16355	16649	17217	2.32
TOTAL MILK	4655	4886	4932	4997	5226	5281	5374	5517	5627	5747	5947	2.21
TOTAL EGGS	2812	3388	3440	3493	3524	3571	3633	3687	3788	3907	4035	1.85
WOOL GREASY	78	78	77	77	79	80	79	81	82	82	82	.80
FISHERY PRODUCTS 1/												
FRESHWATER + DIADROMOUS	2977	3756	3855	3988	4386	4837	4858	4895	4888	4896	4902	3.34
MARINE FISH	2788	3466	3640	3206	3975	4240	4316	4334	4296	4359	4427	3.21
CRUST+ MOLLUS+ CEPHALOP	71	102	108	150	175	215	261	301	290	301	328	14.80
AQUATIC PLANTS	1	2	3	2	3	3	4	6	6	7	7	16.00
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	12744	14266	14627	15093	15342	15772	16232	16767	17007	18187	18187	2.83
SAWLOGS NONCONIFEROUS	8381	9284	9359	9960	9454	9499	10514	11509	11749	12269	12675	3.84
PULPWOOD+PARTICLES	1492	1920	2125	2220	2550	2680	2810	2930	4000	4291	4291	9.89
FUELWOOD	132549	144670	147330	150120	153650	156300	159965	162118	165151	168345	168345	1.81
SAWNWOOD CONIFEROUS	7406	8637	9000	9381	9664	10004	10354	10604	11074	11724	11724	3.54
SAWNWOOD NONCONIFEROUS	4862	5588	5820	6196	6143	6351	6571	6753	6734	6739	6739	2.11
WOOD-BASED PANELS	377	657	748	858	1042	1407	1569	1871	1358	1368	1507	10.09
PULP FOR PAPER	2572	3014	3147	3316	3487	3604	3722	3837	4693	5025	5042	6.22
PAPER+PAPERBOARD	2987	3616	3833	4067	4290	4536	4817	5027	6127	6638	6721	7.55

1/ Nominal catch (live weight) excluding whales

2/ See General Notes on Annex Tables

ANNEX TABLE 2. INDICES OF FOOD PRODUCTION

	TOTAL						PER CAPUT					
	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976
	1961-65=100					PERCENT	1961-65=100					PERCENT
FOOD PRODUCTION												
WORLD	123	129	131	135	139	2.96	104	108	107	108	109	.93
DEVELOPED COUNTRIES	122	129	131	132	136	3.03	112	118	118	118	121	2.54
WESTERN EUROPE	119	123	129	128	126	- 1.56	111	115	120	118	116	- 1.69
EUROPEAN ECON COMMUNITY	117	122	127	125	122	- 2.40	110	114	118	116	112	- 3.45
BELGIUM-LUXEMBOURG	121	126	131	129	121	- 6.20	116	120	125	122	114	- 6.56
DENMARK	96	95	109	103	98	- 4.85	90	89	101	96	90	- 6.25
FRANCE	120	127	128	124	122	- 1.61	110	116	116	111	110	- .90
GERMANY FED.REP. OF	115	117	122	119	117	- 1.68	108	110	114	111	109	- 1.80
IRELAND	118	115	132	151	131	- 13.25	112	107	121	137	118	- 13.87
ITALY	113	120	126	127	123	- 3.15	106	112	116	116	112	- 3.45
NETHERLANDS	138	146	155	160	159	- .63	124	130	137	140	138	- 1.43
UNITED KINGDOM	121	123	129	122	118	- 3.28	116	118	123	117	113	- 3.42
OTHER WESTERN EUROPE	123	126	135	136	139	2.21	115	117	125	125	127	1.60
AUSTRIA	109	115	119	121	122	.83	104	109	114	115	117	1.74
FINLAND	117	108	112	120	135	12.50	115	105	108	115	129	12.17
GREECE	142	144	159	160	166	3.75	137	139	153	153	156	1.96
ICELAND	110	110	115	118	119	.85	97	96	99	100	99	- 1.00
MALTA	171	164	171	151	166	9.93	175	166	171	150	164	9.33
NORWAY	104	105	121	107	107		97	97	111	98	97	- 1.02
PORTUGAL	100	104	104	104	99	- 4.81	106	110	109	108	103	- 4.63
SPAIN	133	139	145	149	150	.67	121	125	130	132	132	
SWEDEN	108	104	123	111	116	4.50	101	97	115	103	107	3.88
SWITZERLAND	110	115	116	121	123	1.65	98	101	102	107	110	2.80
YUGOSLAVIA	128	135	151	151	156	3.31	117	122	135	135	137	1.48
USSR AND EASTERN EUROPE	122	141	136	130	140	7.69	112	128	123	116	124	6.90
EASTERN EUROPE	131	135	139	140	143	2.14	124	127	130	130	132	1.54
ALBANIA	142	154	158	159	179	12.58	112	118	118	115	126	9.57
BULGARIA	140	135	121	130	144	10.77	132	126	112	121	133	9.92
CZECHOSLOVAKIA	125	137	141	137	138	.73	121	131	134	130	130	
GERMAN DEMOCRATIC REP.	123	127	140	137	131	- 4.38	123	127	141	139	133	- 4.32
HUNGARY	143	147	150	154	143	- 7.14	139	142	144	148	137	- 7.43
POLAND	122	130	135	135	133	- 1.48	113	119	123	122	119	- 2.46
ROMANIA	151	145	146	151	181	19.87	138	131	131	134	160	19.40
USSR	118	143	134	125	138	10.40	107	129	119	110	121	10.00
NORTH AMERICA DEVELOPED	122	124	126	135	141	4.44	110	111	112	119	123	3.36
CANADA	116	117	108	120	138	15.00	101	100	91	100	113	13.00
UNITED STATES	123	125	128	137	141	2.92	111	112	114	121	124	2.48
OCEANIA DEVELOPED	126	139	132	141	150	6.38	107	116	109	115	121	5.22
AUSTRALIA	126	143	137	146	153	4.79	106	119	113	118	123	4.24
NEW ZEALAND	125	125	116	125	141	12.80	109	107	98	103	116	12.62
DEVELOPING COUNTRIES	125	130	133	139	143	2.88	102	104	104	107	107	
AFRICA DEVELOPING	117	113	120	123	127	3.25	94	88	91	91	91	
NORTH WESTERN AFRICA	131	119	133	136	147	8.09	101	89	97	96	101	5.21
ALGERIA	109	99	102	124	128	3.23	81	71	71	84	84	
MOROCCO	144	123	147	126	154	22.22	112	93	108	90	107	18.89
TUNISIA	146	151	164	189	171	- 9.52	121	122	130	146	130	- 10.96
WESTERN AFRICA	106	100	109	114	117	2.63	86	78	84	85	85	
BENIN	123	123	121	100	123	23.00	98	95	91	74	88	18.92
GAMBIA	111	114	146	147	132	- 10.20	95	95	119	118	104	- 11.86
GHANA	115	110	121	118	110	- 6.78	93	87	93	88	79	- 10.23
GUINEA	115	105	109	113	123	8.85	95	84	85	86	92	6.98
IVORY COAST	146	153	170	185	180	- 2.70	118	121	131	139	132	- 5.04
LIBERIA	111	127	135	132	134	1.52	92	103	107	103	102	- .97
MALI	91	78	85	106	116	9.43	75	63	66	81	86	6.17
MAURITANIA	94	80	79	82	90	9.76	78	66	63	64	69	7.81
NIGER	105	76	90	86	115	33.72	83	58	67	63	81	28.57
NIGERIA	104	95	104	107	111	3.74	83	74	79	79	80	1.27
SENEGAL	69	85	114	142	123	- 13.38	56	67	88	107	91	- 14.95
SIERRA LEONE	127	127	128	135	136	.74	104	102	100	103	101	- 1.94
TOGO	98	101	82	86	88	2.33	76	76	60	61	61	
UPPER VOLTA	104	96	108	120	118	- 1.67	86	77	86	93	89	- 4.30
CENTRAL AFRICA	114	116	121	121	124	2.48	93	93	94	92	92	
ANGOLA	118	122	121	117	120	2.56	97	98	95	90	90	
CAMEROON	133	131	142	137	137		114	110	117	111	109	- 1.80
CENTRAL AFRICAN EMPIRE	123	128	126	121	123	1.65	103	104	101	95	94	- 1.05
CHAD	83	77	86	88	92	4.55	73	66	73	73	75	2.74
CONGO	124	127	122	132	146	10.61	102	102	95	101	109	7.92
GABON	126	128	129	130	133	2.31	119	120	120	120	121	.83
ZAIRE	113	117	121	123	129	4.88	89	90	90	90	91	1.11
EASTERN AFRICA	126	123	127	128	133	3.91	100	95	95	93	94	1.08
BURUNDI	122	131	131	128	132	3.13	109	113	110	106	106	
ETHIOPIA	118	107	104	109	109		95	84	80	82	80	- 2.44
KENYA	124	123	123	128	130	1.56	92	88	86	86	85	- 1.16
MADAGASCAR	116	118	125	125	126	.80	92	90	93	90	88	- 2.22
MALAWI	162	156	158	145	163	12.41	134	126	125	112	123	9.82
MAURITIUS	114	119	118	85	119	40.00	97	99	97	68	94	38.24

ANNEX TABLE 2. INDICES OF FOOD PRODUCTION

	TOTAL						PER CAPUT					
	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976
	1961-65=100					PERCENT	1961-65=100					PERCENT
FOOD PRODUCTION												
MOZAMBIQUE	131	136	130	114	123	7.89	109	110	104	89	94	5.62
RHODESIA	152	127	162	155	157	1.29	109	88	109	101	99	- 1.98
RWANDA	146	152	150	167	175	4.79	114	115	111	120	122	1.67
TANZANIA	126	129	140	152	154	1.32	99	98	104	109	107	- 1.83
UGANDA	119	122	123	120	128	6.67	93	93	91	86	89	3.49
ZAMBIA	138	139	160	162	169	4.32	107	104	117	115	115	
SOUTHERN AFRICA	138	148	153	150	157	4.67	113	118	119	114	116	1.75
BOTSWANA	126	140	146	145	161	11.03	105	113	115	112	121	8.04
LESOTHO	96	132	117	104	106	1.92	82	110	96	83	84	1.20
SWAZILAND	168	164	187	182	194	6.59	134	128	142	134	139	3.73
SOUTH AFRICA	156	127	162	148	146	- 1.35	119	95	117	104	99	- 4.81
LATIN AMERICA	128	132	139	144	155	7.64	101	101	103	104	109	4.81
CENTRAL AMERICA	144	146	148	155	161	3.87	108	106	104	106	106	
COSTA RICA	165	170	169	192	194	1.04	125	127	123	136	134	- 1.47
EL SALVADOR	133	153	151	166	159	- 4.22	98	110	105	112	104	- 7.14
GUATEMALA	149	150	152	162	177	9.26	115	113	111	115	122	6.09
HONDURAS	162	151	145	162	163	.62	123	111	103	111	108	- 2.70
MEXICO	142	144	146	151	158	4.64	106	104	102	103	103	
NICARAGUA	141	140	139	156	162	3.85	108	104	100	108	109	.93
PANAMA	155	156	161	171	167	- 2.34	119	117	117	121	115	- 4.96
CARIBBEAN	105	112	118	122	124	1.64	88	93	96	97	96	- 1.03
BARBADOS	83	92	89	88	94	6.82	80	89	85	84	89	5.95
CUBA	98	113	122	129	129		83	93	98	102	100	- 1.96
DOMINICAN REPUBLIC	139	141	147	146	150	2.74	105	102	103	99	98	- 1.01
HAITI	119	121	124	125	128	2.40	105	105	106	105	106	.95
JAMAICA	108	104	109	111	113	1.80	95	90	93	93	93	
SOUTH AMERICA	128	131	139	143	157	9.79	101	101	104	105	111	5.71
ARGENTINA	107	113	119	119	138	15.97	94	98	102	101	116	14.85
BOLIVIA	142	151	154	168	172	2.38	115	119	119	126	126	
BRAZIL	150	153	162	169	185	9.47	116	115	119	120	128	6.67
CHILE	116	104	123	126	119	- 5.56	98	86	99	100	93	- 7.00
COLOMBIA	134	134	142	152	160	5.26	100	97	100	103	105	1.94
ECUADOR	128	131	145	146	145	- .68	95	94	101	99	95	- 4.04
GUYANA	110	102	125	123	122	- .81	89	81	98	94	91	- 3.19
PARAGUAY	128	127	134	131	138	5.34	101	97	100	95	97	2.11
PERU	125	125	129	133	136	2.26	96	94	94	94	94	
URUGUAY	94	98	108	111	126	13.51	85	88	96	98	110	12.24
VENEZUELA	155	162	168	173	173		118	120	120	121	117	- 3.31
NEAR EAST DEVELOPING	137	130	141	151	158	4.64	108	100	105	109	111	1.83
NEAR EAST IN AFRICA	135	137	145	151	153	1.32	107	105	108	110	109	- .91
EGYPT	132	134	135	140	144	2.86	105	104	103	104	105	.96
LIBYA	171	183	175	204	203	- .49	125	130	121	136	132	- 2.94
SUDAN	141	142	164	172	168	- 2.33	108	106	119	120	114	- 5.00
NEAR EAST IN ASIA	138	128	140	150	160	6.67	108	98	104	108	112	3.70
AFGHANISTAN	112	120	118	126	130	3.17	91	95	91	95	96	1.05
CYPRUS	195	170	184	129	145	12.40	176	151	162	112	124	10.71
IRAN	151	155	161	169	182	7.69	118	117	118	120	126	5.00
IRAQ	167	121	127	116	139	19.83	125	88	89	79	91	15.19
JORDAN	76	41	87	50	51	2.00	58	30	62	34	34	
LEBANON	155	139	158	148	160	8.11	120	105	115	104	110	5.77
SAUDI ARABIA	108	123	135	143	143		85	94	100	102	100	- 1.96
SYRIA	140	78	140	145	166	14.48	106	57	99	100	111	11.00
TURKEY	137	129	141	159	166	4.40	110	101	108	119	121	1.68
YEMEN ARAB REPUBLIC	106	107	103	117	111	- 5.13	82	81	76	83	77	- 7.23
YEMEN DEMOCRATIC	117	129	139	138	141	2.17	92	98	103	99	98	- 1.01
ISRAEL	179	178	192	191	201	5.24	138	132	138	135	137	1.48
FAR EAST DEVELOPING	122	133	131	143	143		98	104	99	106	103	- 2.83
SOUTH ASIA	119	130	123	138	135	- 2.17	96	102	95	103	98	- 4.85
BANGLADESH	106	119	115	128	122	- 4.69	84	93	89	97	90	- 7.22
INDIA	118	129	121	137	133	- 2.92	95	101	93	102	97	- 4.90
NEPAL	103	116	118	121	117	- 3.31	84	93	93	93	89	- 4.30
PAKISTAN	150	158	160	162	170	4.94	116	119	116	114	116	1.75
SRI LANKA	118	120	141	139	132	- 5.04	96	95	109	106	98	- 7.55
EAST SOUTH-EAST ASIA	129	142	148	155	162	4.52	102	109	110	113	115	1.77
BURMA	102	114	115	120	123	2.50	83	91	89	91	91	
INDONESIA	133	144	156	155	159	2.58	106	112	118	114	114	
KOREA REP	133	134	143	154	162	5.19	109	108	112	118	123	4.24
MALAYSIA PENINSULAR	172	186	203	212	217	2.36	135	142	151	153	153	
MALAYSIA SABAH	218	217	242	296	281	- 5.07	158	152	163	195	176	- 9.74
SOMALIA	146	141	142	148	159	7.43	109	101	98	99	102	3.03
PHILIPPINES	128	145	148	162	182	12.35	96	105	104	110	120	9.09
THAILAND	131	153	149	161	168	4.35	99	112	105	111	112	.90
JAPAN	125	126	127	135	130	- 3.70	113	112	112	117	112	- 4.27
ASIAN CENT PLANNED ECON	125	130	134	138	140	1.45	108	111	112	113	114	.88
CHINA	126	132	135	139	142	2.16	110	113	114	115	116	.87
KAMPUCHEA,DEMOCRATIC	89	62	48	73	80	9.59	69	47	36	52	56	7.69
KOREA DPR	119	132	141	149	153	2.68	93	100	105	108	108	
LAO	143	149	155	159	155	- 2.52	117	120	122	122	117	- 4.10
MONGOLIA	105	114	117	125	122	- 2.40	80	85	84	87	83	- 4.60
VIET NAM	116	120	120	127	120	- 5.51	94	95	93	96	89	- 7.29

ANNEX TABLE 3. INDICES OF AGRICULTURAL PRODUCTION

	TOTAL						PER CAPUT					
	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976
	1961-65=100					PERCENT	1961-65=100					PERCENT
AGRICULTURAL PRODUCTION												
WORLD	122	128	130	133	137	3.01	103	106	106	106	108	1.89
DEVELOPED COUNTRIES	120	127	128	129	133	3.10	110	115	115	115	118	2.61
WESTERN EUROPE	113	123	129	127	126	- .79	111	115	120	118	116	- 1.69
EUROPEAN ECON COMMUNITY	117	122	127	125	122	- 2.40	110	114	118	116	112	- 3.45
BELGIUM-LUXEMBOURG	119	124	129	127	119	- 6.30	114	118	123	120	112	- 6.67
DENMARK	96	95	109	103	98	- 4.85	90	89	101	96	90	- 6.25
FRANCE	119	127	128	124	122	- 1.61	110	116	116	111	110	- .90
GERMANY FED.REP. OF	115	117	122	119	117	- 1.68	108	110	114	111	109	- 1.80
IRELAND	118	115	131	150	131	- 12.67	111	107	121	136	117	- 13.97
ITALY	113	120	126	127	123	- 3.15	106	112	116	116	112	- 3.45
NETHERLANDS	137	146	155	160	159	- .63	123	130	137	140	138	- 1.43
UNITED KINGDOM	121	123	128	122	118	- 3.28	116	117	123	117	112	- 4.27
OTHER WESTERN EUROPE	121	125	134	135	137	1.48	114	116	123	124	125	.81
AUSTRIA	109	115	120	121	122	.83	104	109	114	115	117	1.74
FINLAND	118	108	112	120	136	13.33	115	105	108	115	130	13.04
GREECE	136	136	150	154	158	2.60	132	131	144	146	149	2.05
ICELAND	106	107	111	114	115	.88	94	93	96	97	96	- 1.03
MALTA	171	164	170	151	165	9.27	175	166	170	149	163	9.40
NORWAY	105	106	121	108	107	- .93	98	98	111	98	97	- 1.02
PORTUGAL	99	103	103	102	98	- 3.92	105	109	108	107	102	- 4.67
SPAIN	131	136	142	146	147	.68	119	123	127	129	129	
SWEDEN	107	103	123	111	116	4.50	101	97	115	103	107	3.88
SWITZERLAND	110	115	116	121	123	1.65	98	101	102	107	110	2.80
YUGOSLAVIA	127	134	149	150	154	2.67	116	121	134	134	136	1.49
USSR AND EASTERN EUROPE	123	140	135	131	140	6.87	113	128	122	117	124	5.98
EASTERN EUROPE	131	134	138	140	143	2.14	123	126	129	129	131	1.55
ALBANIA	135	146	148	149	165	10.74	106	112	110	108	117	8.33
BULGARIA	140	134	122	132	144	9.09	132	125	114	122	132	8.20
CZECHOSLOVAKIA	124	137	140	136	137	.74	120	131	133	129	129	
GERMAN DEMOCRATIC REP.	122	126	139	136	131	- 3.68	122	127	141	138	133	- 3.62
HUNGARY	141	144	147	151	141	- 6.62	136	140	141	145	135	- 6.90
POLAND	121	129	134	135	133	- 1.48	113	119	122	122	119	- 2.46
ROMANIA	150	144	146	150	180	20.00	137	130	130	133	158	18.80
USSR	119	143	134	127	139	9.45	108	128	120	112	122	8.93
NORTH AMERICA DEVELOPED	118	120	121	128	134	4.69	106	107	108	113	117	3.54
CANADA	115	117	108	119	136	14.29	100	101	91	99	111	12.12
UNITED STATES	118	120	123	129	133	3.10	107	108	109	114	117	2.63
OCEANIA DEVELOPED	122	126	120	129	135	4.65	104	106	99	105	109	3.81
AUSTRALIA	123	129	124	133	136	2.26	104	107	102	108	109	.93
NEW ZEALAND	121	119	111	118	130	10.17	105	102	93	97	107	10.31
DEVELOPING COUNTRIES	125	129	133	138	142	2.90	102	104	104	106	106	
AFRICA DEVELOPING	119	115	122	123	128	4.07	95	90	92	91	92	1.10
NORTH WESTERN AFRICA	132	120	133	137	148	8.03	102	90	97	97	101	4.12
ALGERIA	110	100	103	125	129	3.20	81	72	72	85	84	- 1.18
MOROCCO	144	124	146	127	154	21.26	112	94	108	91	107	17.58
TUNISIA	145	151	164	188	172	- 8.51	121	122	130	146	130	- 10.96
WESTERN AFRICA	108	103	110	116	119	2.59	87	81	85	87	87	
BENIN	131	128	124	103	129	25.24	105	100	93	76	92	21.05
GAMBIA	111	114	146	147	132	- 10.20	95	95	119	118	104	- 11.86
GHANA	115	111	121	118	110	- 6.78	93	87	93	88	80	- 9.09
GUINEA	113	102	106	109	119	9.17	92	82	83	83	89	7.23
IVORY COAST	148	159	154	176	179	1.70	120	125	118	132	131	- .76
LIBERIA	134	148	151	146	143	- 2.05	112	120	120	113	108	- 4.42
MALI	96	81	89	113	123	8.85	79	65	70	87	92	5.75
MAURITANIA	94	80	79	82	90	9.76	78	66	63	64	69	7.81
NIGER	105	76	90	87	115	32.18	83	58	68	63	82	30.16
NIGERIA	104	96	105	108	112	3.70	83	75	79	80	80	
SENEGAL	71	87	117	144	126	- 12.50	58	69	90	109	93	- 14.68
SIERRA LEONE	131	131	126	135	135		108	105	98	103	100	- 2.91
TOGO	96	97	81	86	89	3.49	74	73	60	61	61	
UPPER VOLTA	106	99	111	122	122		88	80	88	95	92	- 3.16
CENTRAL AFRICA	117	118	124	116	119	2.59	95	94	97	88	89	1.14
ANGOLA	120	120	124	90	91	1.11	99	96	97	69	68	- 1.45
CAMEROON	138	135	148	138	138		118	113	122	112	109	- 2.68
CENTRAL AFRICAN EMPIRE	126	130	128	124	125	.81	105	106	102	97	96	- 1.03
CHAD	87	82	93	98	99	1.02	75	70	78	81	81	
CONGO	125	127	122	134	148	10.45	103	102	96	103	110	6.80
GABON	125	126	127	129	131	1.55	118	118	118	118	119	.85
ZAIRE	115	119	123	123	128	4.07	90	91	92	89	91	2.25
EASTERN AFRICA	125	125	128	129	133	3.10	99	96	96	94	94	
BURUNDI	124	133	135	129	134	3.88	110	115	114	106	108	1.89
ETHIOPIA	114	106	106	111	111		92	84	81	83	81	- 2.41
KENYA	131	132	134	135	140	3.70	97	95	93	91	91	
MADAGASCAR	116	118	125	126	127	.79	91	91	93	91	89	- 2.20
MALAWI	164	162	161	157	173	10.19	135	131	127	121	130	7.44
MAURITIUS	118	123	122	88	123	39.77	100	102	100	70	97	38.57

ANNEX TABLE 3. INDICES OF AGRICULTURAL PRODUCTION

	TOTAL						PER CAPUT					
	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976	1972	1973	1974	1975	1976	CHANGE 1975 TO 1976
	1961-65=100					PERCENT	1961-65=100					PERCENT
AGRICULTURAL PRODUCTION												
MOZAMBIQUE	133	135	130	113	120	6.19	110	110	104	88	91	3.41
RHODESIA	135	111	142	144	141	- 2.08	97	77	96	93	89	- 4.30
RWANDA	147	154	155	172	181	5.23	114	117	115	123	126	2.44
TANZANIA	123	125	134	142	145	2.11	97	95	99	102	101	- .98
UGANDA	124	131	126	124	130	4.84	98	100	93	89	91	2.25
ZAMBIA	135	135	156	159	165	3.77	104	102	114	112	112	
SOUTHERN AFRICA	134	145	150	148	154	4.05	110	116	117	112	114	1.79
BOTSWANA	125	139	145	144	160	11.11	104	113	114	111	120	8.11
LESOTHO	93	126	111	103	106	2.91	80	106	91	83	83	
SWAZILAND	169	166	191	186	198	6.45	135	129	144	137	141	2.92
SOUTH AFRICA	149	123	154	142	139	- 2.11	113	91	111	100	95	- 5.00
LATIN AMERICA	124	126	134	136	144	5.88	97	96	99	99	101	2.02
CENTRAL AMERICA	136	137	142	144	148	2.78	102	100	100	98	98	
COSTA RICA	159	167	164	183	186	1.64	121	125	119	130	129	- .77
EL SALVADOR	124	132	146	155	140	- 9.68	92	95	102	105	91	- 13.33
GUATEMALA	150	156	161	164	176	7.32	116	117	117	116	121	4.31
HONDURAS	157	148	144	161	164	1.86	119	108	102	110	108	- 1.82
MEXICO	133	133	138	136	142	4.41	99	96	97	93	93	
NICARAGUA	139	140	155	159	160	.63	106	104	111	111	108	- 2.70
PANAMA	154	155	159	170	166	- 2.35	119	116	116	120	114	- 5.00
CARIBBEAN	103	111	116	119	121	1.68	87	92	94	95	95	
BARBADOS	83	92	89	88	94	6.82	80	89	85	84	89	5.95
CUBA	97	112	120	127	127		82	92	97	100	98	- 2.00
DOMINICAN REPUBLIC	135	142	144	140	145	3.57	101	103	101	95	95	
HAITI	115	117	120	121	123	1.65	101	101	102	102	101	- .98
JAMAICA	107	103	108	110	112	1.82	94	89	92	93	92	- 1.08
SOUTH AMERICA	123	125	133	136	145	6.62	97	96	100	99	103	4.04
ARGENTINA	104	109	115	116	134	15.52	92	95	99	99	112	13.13
BOLIVIA	147	163	162	173	174	.58	119	128	125	130	127	- 2.31
BRAZIL	141	140	151	155	160	3.23	109	105	111	110	111	.91
CHILE	114	102	120	124	117	- 5.65	95	84	97	98	91	- 7.14
COLOMBIA	130	133	139	147	155	5.44	97	96	97	100	101	1.00
ECUADOR	127	131	147	147	146	- .68	94	94	102	99	95	- 4.04
GUYANA	110	102	125	123	122	- .81	89	81	98	94	91	- 3.19
PARAGUAY	127	130	139	140	148	5.71	100	100	103	101	104	2.97
PERU	115	118	120	121	124	2.48	89	88	87	85	85	
URUGUAY	88	90	96	100	112	12.00	80	81	86	88	98	11.36
VENEZUELA	152	160	164	172	169	- 1.74	116	119	118	120	115	- 4.17
NEAR EAST DEVELOPING	138	131	142	148	156	5.41	108	100	105	107	110	2.80
NEAR EAST IN AFRICA	134	134	140	144	144		105	103	105	105	102	- 2.86
EGYPT	129	130	129	132	136	3.03	103	101	99	98	99	1.02
LIBYA	168	182	173	200	200		123	129	119	133	129	- 3.01
SUDAN	142	141	163	170	158	- 7.06	109	105	118	119	107	- 10.08
NEAR EAST IN ASIA	139	130	142	150	160	6.67	109	99	105	108	112	3.70
AFGHANISTAN	112	119	118	127	131	3.15	91	95	91	95	96	1.05
CYPRUS	192	166	180	126	142	12.70	173	148	158	110	122	10.91
IRAN	151	154	161	163	177	8.59	118	116	117	116	122	5.17
IRAQ	165	121	126	116	138	18.97	124	88	89	79	90	13.92
JORDAN	78	44	89	53	53		59	32	63	36	35	- 2.78
LEBANON	156	141	159	149	161	8.05	121	106	116	106	110	3.77
SAUDI ARABIA	109	123	136	143	144	.70	85	94	100	102	100	- 1.96
SYRIA	133	84	132	135	153	13.33	100	62	94	93	102	9.68
TURKEY	141	132	146	161	170	5.59	113	103	111	119	123	3.36
YEMEN ARAB REPUBLIC	108	110	106	120	114	- 5.00	84	83	78	86	79	- 8.14
YEMEN DEMOCRATIC	113	125	135	134	133	- .75	88	95	100	96	93	- 3.13
ISRAEL	181	179	195	194	204	5.15	140	132	140	137	140	2.19
FAR EAST DEVELOPING	122	133	131	141	141		98	104	99	104	102	- 1.92
SOUTH ASIA	119	128	123	135	132	- 2.22	95	101	94	101	96	- 4.95
BANGLADESH	105	117	110	122	118	- 3.28	83	92	85	92	87	- 5.43
INDIA	118	128	121	135	132	- 2.22	95	101	93	101	96	- 4.95
NEPAL	103	116	118	121	118	- 2.48	85	93	93	93	89	- 4.30
PAKISTAN	152	158	159	158	162	2.53	118	118	116	111	110	- .90
SRI LANKA	110	109	115	118	112	- 5.08	89	87	90	90	83	- 7.78
EAST SOUTH-EAST ASIA	130	144	148	153	161	5.23	103	111	111	112	114	1.79
BURMA	103	116	116	121	124	2.48	84	92	90	92	92	
INDONESIA	130	141	150	150	154	2.67	103	109	113	110	110	
KOREA REP	139	140	148	159	168	5.66	113	112	116	122	127	4.10
MALAYSIA PENINSULAR	166	187	196	195	208	6.67	130	142	145	140	146	4.29
MALAYSIA SABAH	173	188	196	230	227	- 1.30	126	131	132	151	142	- 5.96
SOMALIA	95	120	109	107	126	17.76	71	86	75	72	81	12.50
PHILIPPINES	127	143	146	159	180	13.21	96	104	103	108	118	9.26
THAILAND	132	155	150	159	166	4.40	100	114	106	109	110	.92
JAPAN	123	124	125	133	128	- 3.76	111	110	110	115	110	- 4.35
ASIAN CENT PLANNED ECON	126	132	135	139	142	2.16	109	113	114	115	115	
CHINA	127	134	137	141	144	2.13	111	115	116	117	117	
KAMPUCHEA, DEMOCRATIC	86	61	48	70	78	11.43	67	46	36	50	54	8.00
KOREA DPR	119	131	140	148	151	2.03	93	100	104	107	107	
LAO	142	148	155	158	155	- 1.90	117	119	122	121	116	- 4.13
MONGOLIA	106	115	118	125	122	- 2.40	91	85	85	87	83	- 4.60
VIET NAM	114	117	118	124	117	- 5.65	92	93	91	94	87	- 7.45

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	THOUSAND METRIC TONS	.....	.....	.....	.....	.....	.....	PERCENT
WORLD												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	51353	52910	53301	48629	57145	58499	64942	81576	65367	73570	67518	4.40
RICE MILLED	7656	8188	7969	8433	8876	9349	9053	9186	8784	8610	9571	1.36
BARLEY	6881	7196	6390	7141	10469	11003	13817	12344	11590	12412	13445	8.47
MAIZE	20476	27584	28904	27471	29432	30966	37397	48053	49655	50932	61889	10.09
MILLET	231	332	261	240	180	262	213	233	215	240	270	- 1.45
SORGHUM	3539	7280	4782	4388	6190	6181	6153	8937	10347	9836	10838	8.87
POTATOES	3296	3365	3406	3592	3783	3264	5126	3911	3871	3859	4405	2.59
SUGAR,TOTAL (RAW EQUIV.)	18630	20155	20311	19426	21854	21361	22112	23120	23247	21717	22753	1.63
PULSES	1557	1686	1813	2170	1780	1802	1942	2014	1701	1809	1850	.03
SOYBEANS	5520	8142	8755	9332	12622	12332	13788	15594	17229	16459	19736	10.32
SOYBEAN OIL	622	670	603	666	1120	1333	1102	1053	1546	1363	1825	11.91
GROUNDNUTS SHELLED BASIS	1395	1490	1566	1282	995	868	910	954	847	872	995	- 5.81
GROUNDNUT OIL	375	424	510	381	429	360	525	501	372	397	538	.67
COPRA	1548	1241	1252	1107	916	1067	1360	1045	531	1093	1116	- 2.95
COCONUT OIL	440	474	573	481	616	714	867	738	669	1043	1353	10.20
PALM NUTS KERNELS	689	371	442	438	459	491	407	331	390	336	424	- 1.49
PALM OIL	611	574	689	861	906	1239	1386	1515	1684	2018	2127	15.87
OILSEED CAKE AND MEAL	6880	8920	9266	9707	11061	11703	12706	14232	14628	14301	17961	7.69
BANANAS	4267	5216	5663	5668	5804	6534	6768	6760	6592	6418	6578	2.59
ORANGES+TANGER+CLEMEN	3219	3815	3725	3919	4272	4136	4498	4892	4804	4953	4966	3.63
LEMONS AND LIMES	533	663	672	711	725	756	729	782	817	805	953	3.34
COFFEE GREEN+ROASTED	2876	3177	3388	3432	3281	3318	3575	3802	3391	3566	3647	1.26
COCOA BEANS	1096	1094	1064	1020	1134	1190	1248	1114	1193	1167	1150	1.14
TEA	626	693	734	688	745	766	776	790	801	811	842	2.08
COTTON LINT	3729	3858	3849	3756	3975	4071	4112	4718	3800	4005	3959	.66
JUTE AND SIMILAR FIBRES	1048	1093	1089	926	872	809	800	885	894	563	683	- 5.30
TOBACCO UNMANUFACTURED	931	996	1007	1010	1000	1040	1215	1205	1336	1226	1273	3.52
NATURAL RUBBER	2305	2412	2685	2951	2852	2927	2891	3410	3247	3041	3236	2.78
WOOL GREASY	1231	1169	1246	1264	1254	1141	1202	1116	828	851	1004	- 3.84
BOVINE CATTLE 1/	5120	5508	6222	6543	6902	6998	7760	6904	5912	7056	7192	1.76
SHEEP AND GOATS 1/	8113	9063	9782	9949	10208	10632	11141	10816	10334	11774	11410	2.32
PIGS 1/	2894	3193	3395	3926	4523	5280	5965	5778	6019	6281	6609	8.75
TOTAL MEAT	3100	3831	3980	4315	4573	4739	5352	5627	5130	5461	6199	5.07
MILK DRY	146	169	168	189	199	254	268	333	324	326	399	10.62
TOTAL EGGS IN SHELL	428	333	344	367	413	431	437	460	511	567	545	6.20
FISHERY PRODUCTS												
FISH FRESH FROZEN	1462	1738	1892	1890	2259	2309	2482	2823	2770	2952	3139	6.95
FISH CURED	573	555	543	550	572	540	566	539	473	470	484	- 1.88
SHELLFISH	269	343	350	399	467	551	678	702	702	761	814	11.16
FISH CANNED AND PREPARED	521	540	550	593	614	608	674	744	748	709	774	4.24
SHELLFISH CANNED+PREPAR	51	67	72	75	78	78	91	94	93	95	103	4.69
FISH BODY AND LIVER OIL	665	812	822	702	634	709	749	550	558	596	572	- 4.11
FISH MEAL	1950	3020	3559	3040	2996	3033	3011	1630	1960	2165	2208	- 6.06
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	8480	16778	20970	20427	24380	21615	25489	28761	26206	23865	28319	4.66
SAWLOGS NONCONIFEROUS	17583	25227	30162	35050	38756	40701	42822	52406	45172	36433	44719	5.41
PULPWOOD+PARTICLE	14119	19537	20296	22611	26594	24110	23071	29208	32642	31312	32076	5.97
FUELWOOD	2740	2327	2392	2892	2781	2282	1828	2221	2515	2211	1921	- 2.32
SAWNWOOD CONIFEROUS	40885	42831	47528	47342	49349	51670	57095	60908	51830	43208	56329	1.82
SAWNWOOD NONCONIFEROUS	4778	5707	6340	6897	7185	7234	8398	10613	8956	7993	10887	6.29
WOOD-BASED PANELS	4731	6811	8153	8931	9406	10616	12394	14439	12696	12164	14009	7.86
PULP FOR PAPER	9658	11938	13273	14463	15116	13197	14756	16811	17392	13696	15619	2.45
PAPER AND PAPERBOARD	14238	18204	19892	22494	23379	23532	25309	27626	29911	22859	27474	4.13
WESTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	4855	6156	8416	10905	9392	7130	10140	12714	12393	14407	14307	8.36
RICE MILLED	269	356	418	303	507	556	517	386	605	613	657	6.74
BARLEY	2461	4085	4207	4324	4387	3780	5311	5586	5966	5686	5066	4.16
MAIZE	1111	2782	2537	3242	3883	5300	4593	5613	6012	5666	5876	10.45
MILLET	2	1	1	2	2	2	1	2	1	1	1	- .99
SORGHUM	44	143	102	93	162	97	185	163	308	412	483	18.01
POTATOES	1835	1864	1850	2415	2220	2138	2763	2485	2358	2579	2296	2.88
SUGAR,TOTAL (RAW EQUIV.)	1465	1149	1661	1448	1980	2025	2817	2827	2638	2249	2951	9.52

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS											PERCENT
PULSES	184	238	290	284	259	256	291	288	253	324	240	.43
SOYBEANS	2		6	8	19	17	269	113	16	111	184	78.76
SOYBEAN OIL	85	123	131	224	384	445	395	470	720	719	742	23.17
GROUNDNUTS SHELLED BASIS	14	16	13	13	16	14	17	17	17	13	24	3.56
GROUNDNUT OIL	37	35	52	48	34	31	32	54	51	74	47	4.23
COPRA	3	3	1	2	1	1	7	6		1	17	11.78
COCONUT OIL	47	50	56	70	52	79	143	117	78	203	268	18.30
PALM NUTS KERNELS						2	1	1	5	1	1	37.30
PALM OIL	19	18	21	26	30	55	77	80	68	86	98	22.12
OILSEED CAKE AND MEAL	970	1254	1195	1342	1567	1793	2150	2710	2875	2258	2495	10.37
BANANAS	117	76	53	43	45	41	30	23	27	35	25	-10.13
ORANGES+TANGER+CLEMEN	1316	1506	1373	1444	1815	1514	1838	1943	1933	1999	2066	4.54
LEMONS AND LIMES	356	431	427	483	475	470	424	384	444	461	534	.79
COFFEE GREEN+ROASTED	15	21	25	32	38	38	47	62	76	86	89	18.27
COCOA BEANS	6	4	5	6	4	4	2	3	6	11	15	10.25
TEA	18	40	51	39	41	53	47	58	61	43	46	2.09
COTTON LINT	78	126	95	75	98	99	74	101	79	65	91	- 3.33
JUTE AND SIMILAR FIBRES	33	42	43	40	39	38	29	28	25	23	18	- 9.05
TOBACCO UNMANUFACTURED	106	129	111	112	119	122	154	141	196	177	177	5.99
NATURAL RUBBER	62	23	25	16	18	17	25	31	40	30	33	6.98
WOOL GREASY	68	57	64	61	59	55	66	55	43	55	64	- 1.03
BOVINE CATTLE 1/	1730	2003	2343	2478	2601	2736	3093	2566	2312	3416	3024	3.76
SHEEP AND GOATS 1/	1182	724	929	980	629	718	790	619	575	1152	1120	1.71
PIGS 1/	600	881	1168	1896	2348	2175	2445	2552	2576	2596	3107	12.09
TOTAL MEAT	880	1224	1319	1357	1556	1812	1823	1934	2217	2441	2392	8.49
MILK DRY	120	156	152	174	183	224	221	277	274	276	329	9.11
TOTAL EGGS IN SHELL	233	125	156	190	229	224	237	262	308	345	333	11.01
FISHERY PRODUCTS												
FISH FRESH FROZEN	818	863	929	954	1105	1038	1066	1097	1021	1090	1147	2.47
FISH CURED	349	330	330	338	339	314	349	328	281	277	285	- 2.08
SHELLFISH	106	115	130	133	149	186	244	197	225	250	270	10.14
FISH CANNED AND PREPARED	197	181	181	178	188	177	199	236	227	210	242	3.49
SHELLFISH CANNED+PREPAR	9	12	14	17	19	22	27	29	25	27	33	10.67
FISH BODY AND LIVER OIL	221	391	258	270	169	149	195	271	197	249	329	- 1.02
FISH MEAL	367	811	789	658	606	724	840	797	803	864	1083	3.20
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1108	1549	1368	1225	1463	1354	1380	2236	2784	1704	2426	6.88
SAWLOGS NONCONIFEROUS	963	1166	1200	1233	1354	1474	1549	1850	1930	1663	2014	6.53
PULPWOOD+PARTICLE	4554	4930	5391	6531	8288	7755	6089	7114	7741	8230	7767	4.46
FUELWOOD	1585	957	993	1182	1268	814	752	1021	1165	1069	847	- .84
SAWNWOOD CONIFEROUS	14029	12836	15054	16237	16213	16529	17929	20295	17258	12640	16795	1.38
SAWNWOOD NONCONIFEROUS	1044	1232	1345	1444	1504	1522	1766	2274	1852	1607	2171	5.59
WOOD-BASED PANELS	2504	3213	3557	3966	4219	4609	5259	6322	5837	5085	6024	7.18
PULP FOR PAPER	5599	6417	6897	7089	7156	5842	6639	8054	7454	5198	5693	- 1.40
PAPER AND PAPERBOARD	6056	7771	8802	10171	10730	10845	12019	13760	14904	10637	13546	5.66
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	4196	7727	6951	8003	6827	9276	5883	7036	8307	5261	3002	- 6.24
RICE MILLED	30	6	29	5	10	17	92	90	149	16	11	17.42
BARLEY	1089	532	682	849	724	802	664	460	1046	902	772	2.95
MAIZE	1762	1595	735	1544	1116	884	946	1570	1727	983	1746	2.76
MILLET	4	3	1	4	5	4	4	6	14	8	13	24.04
POTATOES	721	704	707	311	631	344	1510	534	648	490	548	- .10
SUGAR,TOTAL (RAW EQUIV.)	2469	2424	2684	2149	2114	1706	962	819	787	438	574	-18.67
PULSES	191	213	242	487	157	249	127	118	119	119	109	-11.21
SOYBEANS		4	10	4	1	50	10	6	27	11	10	15.62
SOYBEAN OIL		1	11	9		3	3	6	8	1	5	4.59
GROUNDNUTS SHELLED BASIS	2	2	1	1	2	3	1		1			-79.05
GROUNDNUT OIL	1											-69.90
OILSEED CAKE AND MEAL	254	404	341	338	69	58	65	75	42	45	42	-23.72
BANANAS					3							-43.22
ORANGES+TANGER+CLEMEN	3	5	9	13	2							-44.95
LEMONS AND LIMES	2	2										-81.39
COCOA BEANS	2											97.65
TEA	8	10	14	13	10	11	12	13	14	17	15	3.94
COTTON LINT	386	566	576	465	528	571	662	734	740	801	880	6.08
JUTE AND SIMILAR FIBRES	1	1	1	1	6	2	3	4				-97.65
TOBACCO UNMANUFACTURED	101	118	110	97	94	92	88	97	100	102	98	- 1.17

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
					THOUSAND METRIC TONS							PERCENT
NATURAL RUBBER	24	25										-97.13
WOOL GREASY	1	3	3	6	2	1	1	1	1	1	1	-16.19
BOVINE CATTLE 1/	217	525	628	729	735	811	789	769	610	613	622	.35
SHEEP AND GOATS 1/	708	1596	1932	2301	2935	3104	3164	3103	2787	3351	3158	6.99
PIGS 1/	702	366	297	136	147	542	738	336	575	808	516	12.96
TOTAL MEAT	291	492	504	439	329	374	394	433	509	622	595	2.96
TOTAL EGGS IN SHELL	101	112	96	86	98	114	108	102	111	122	99	1.22
FISHERY PRODUCTS												
FISH FRESH FROZEN	80	209	238	235	319	351	345	379	494	601	604	13.06
FISH CURED	37	36	25	23	22	17	16	15	13	19	12	- 9.02
SHELLFISH	1	11	2	2	5	5	4	7	3	1	1	-12.38
FISH CANNED AND PREPARED	22	24	27	29	30	28	29	31	32	43	45	5.88
SHELLFISH CANNED+PREPAR	4	5	5	3	4	4	3	2	2	3	2	-10.04
FISH BODY AND LIVER OIL	32	58	60	64	35	15	17	6	6	4	2	-33.18
FISH MEAL	5	38	31	33	14	12	18	13	11	18	18	- 9.06
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	3131	5005	6115	6382	7572	7383	7982	10195	9829	8884	9533	7.25
SAWLOGS NONCONIFEROUS	70	176	249	252	288	275	290	334	397	354	201	3.98
PULPWOOD+PARTICLE	5373	8432	7885	8232	9334	8437	8021	11019	12480	12170	12611	5.73
FUELWOOD	391	424	301	326	282	212	221	239	308	230	194	- 5.72
SAWNWOOD CONIFEROUS	9464	10882	10933	10735	11006	10764	11059	11085	9865	10362	11357	- .22
SAWNWOOD NONCONIFEROUS	686	793	870	894	936	948	827	825	767	749	771	- 1.55
WOOD-BASED PANELS	519	907	1046	1063	1114	1109	1262	1493	1471	1601	1705	7.08
PULP FOR PAPER	348	503	534	632	554	569	672	691	684	673	855	4.72
PAPER AND PAPERBOARD	340	634	728	930	1079	1107	1180	1264	1304	1095	1404	7.70
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR, WHEAT EQUIV.	31865	29111	27841	21101	30585	31171	37245	51359	36738	43401	38773	6.37
RICE MILLED	1193	1848	1898	1920	1741	1479	2037	1630	1726	2139	2107	.98
BARLEY	1993	2017	1034	800	4146	5161	5749	5168	3547	4015	5432	17.51
MAIZE	11365	12938	14961	13968	14412	12918	22409	33216	29875	33507	44626	15.41
SORGHUM	2864	5832	3597	2752	3772	2849	3858	5629	5722	5848	5800	5.30
POTATOES	274	292	303	327	321	254	300	313	356	362	852	7.14
SUGAR, TOTAL (RAW EQUIV.)	24	23	25	17	16	13	20	71	105	291	121	32.38
PULSES	269	295	274	347	403	340	359	416	339	379	391	2.98
SOYBEANS	5000	7234	8054	8493	11868	11555	12034	13250	13953	12505	15357	8.01
SOYBEAN OIL	507	532	441	413	696	823	618	439	766	355	506	- .32
GROUNDNUTS SHELLED BASIS	33	78	57	25	51	109	192	189	255	241	130	20.54
GROUNDNUT OIL	14	3	1	15	15	39	28	47	21	12	48	31.99
COCONUT OIL	3	5	3	4	5	10	6	11	5	8	26	17.15
OILSEED CAKE AND MEAL	1615	2751	3003	3283	3968	4435	4012	4971	5215	4030	5162	6.65
BANANAS	50	61	78	87	191	180	188	188	195	187	201	13.46
ORANGES+TANGER+CLEMEN	196	303	153	280	266	257	303	292	328	481	461	8.23
LEMONS AND LIMES	95	117	120	108	128	137	157	201	202	183	225	8.53
COFFEE GREEN+ROASTED	36	28	31	27	28	25	34	72	85	55	69	13.56
COCOA BEANS	7	7	6	9	6	5	4	9	17	9	10	6.13
TEA	1	2	3	3	3	3	3	3	3	4	3	5.32
COTTON LINT	1075	906	878	544	677	936	701	1246	1172	871	748	2.21
JUTE AND SIMILAR FIBRES	3	1	1	1	1	1	1	1	1	1	1	4.96
TOBACCO UNMANUFACTURED	245	285	301	295	264	249	314	313	335	292	292	.85
NATURAL RUBBER	26	44	42	26	16	25	21	27	26	29	29	- 2.98
WOOL GREASY	2	1	1	1	1	1	1	1		1		-10.71
BOVINE CATTLE 1/	459	319	390	282	335	338	405	699	352	421	684	6.82
SHEEP AND GOATS 1/	43	134	144	129	140	220	174	214	293	344	250	10.73
PIGS 1/	19	33	35	36	114	106	101	107	213	47	55	9.77
TOTAL MEAT	265	254	286	315	319	341	369	441	403	465	689	9.30
MILK DRY	18	6	9	7	6	11	18	23	21	16	16	14.72
TOTAL EGGS IN SHELL	10	16	14	12	15	11	11	18	21	22	22	6.08
FISHERY PRODUCTS												
FISH FRESH FROZEN	167	213	242	225	211	225	234	264	200	236	250	.87
FISH CURED	54	49	50	50	53	58	52	49	49	47	62	.73
SHELLFISH	22	24	27	38	36	38	36	47	39	42	48	6.39
FISH CANNED AND PREPARED	32	43	36	37	32	33	43	52	39	36	46	1.65
SHELLFISH CANNED+PREPAR	6	11	9	10	9	10	9	10	8	8	9	- 2.07
FISH BODY AND LIVER OIL	79	47	38	104	93	118	95	121	101	93	91	8.03
FISH MEAL	50	49	65	73	77	72	42	63	85	35	63	- 1.40

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
					THOUSAND METRIC TONS							PERCENT
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	3786	9247	11839	10926	13391	10854	14104	14248	12118	12196	14808	3.33
SAWLOGS NONCONIFEROUS	388	522	508	432	368	339	497	567	622	328	469	- .33
PULPWOOD+PARTICLE	3876	5837	6618	7130	7777	6473	6768	7837	8309	6770	8220	2.50
SAWNWOOD CONIFEROUS	15851	17250	19162	18274	20057	22023	25705	27339	22944	18553	26328	3.58
SAWNWOOD NONCONIFEROUS	633	808	660	752	674	787	1006	1072	705	807	709	.94
WOOD-BASED PANELS	493	776	872	986	884	979	1225	1558	1518	1508	1566	9.01
PULP FOR PAPER	3481	4594	5338	6183	6823	6125	6628	7185	8076	6672	7640	4.78
PAPER AND PAPERBOARD	7346	9066	9537	10435	10504	10573	10972	11256	12259	9691	10932	1.74
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	6083	6970	6993	5374	7376	9484	8712	5659	5331	8201	7897	.80
RICE MILLED	56	89	102	110	129	102	179	157	136	169	218	8.74
BARLEY	498	425	132	452	631	1123	1828	844	808	1760	2013	24.67
MAIZE	2	2	3		1	22	38	19	3	1	69	36.49
MILLET	10	18	11	9	14	27	40	25	27	21	25	9.46
SORGHUM	16	45	19	69	54	509	993	736	748	856	830	55.75
POTATOES	16	20	13	19	30	22	16	21	16	13	27	.07
SUGAR,TOTAL (RAW EQUIV.)	1052	1666	1625	2066	1389	1574	2012	2087	1784	1999	2016	2.39
PULSES	20	24	25	32	37	46	37	44	42	37	32	4.49
GROUNDNUTS SHELLED BASIS			1	1		1	1	5	7	2	5	55.01
OILSEED CAKE AND MEAL	2	2	3	1	2	1	3	2	2	2	2	.60
ORANGES+TANGER+CLEMEN	17	26	24	30	21	26	34	32	24	15	18	- 3.68
LEMONS AND LIMES		1			1		1	1	1	1	1	4.28
COCOA BEANS							1	1	1			-74.03
TEA	1	1	1	1	1	1	1	1	1	1	1	1.27
TOBACCO UNMANUFACTURED				1	1	1						- 3.40
WOOL GREASY	820	811	852	910	941	863	905	860	635	588	750	- 3.17
BOVINE CATTLE 1/	9	6	8	6	3	4	6	17	34	13	19	18.01
SHEEP AND GOATS 1/	247	351	375	376	566	781	889	1145	1159	1454	1350	19.58
PIGS 1/		1	1	2	1	2	2	1	1	1	1	- .16
TOTAL MEAT	857	897	982	1038	1183	1203	1368	1540	1209	1180	1431	4.45
MILK DRY	5	5	4	4	6	10	13	14	15	13	13	17.33
TOTAL EGGS IN SHELL	3	3	4	4	3	3	4	4	2	2	2	- 6.16
FISHERY PRODUCTS												
FISH FRESH FROZEN	4	4	4	4	8	10	14	14	13	12	19	20.48
SHELLFISH	6	10	13	13	14	16	18	17	16	16	15	4.24
FISH CANNED AND PREPARED			1	1		1		2		1		3.01
SHELLFISH CANNED+PREPAR		1	2	2	2	3	4	3	2	2	2	5.67
FISH BODY AND LIVER OIL	7	4	7	6	4	6	6	8	8	4	8	3.75
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	321	796	1432	1661	1809	1797	1844	1916	1302	534	946	- 3.78
SAWLOGS NONCONIFEROUS	19	1	12	11	11	13	14	9	12	3	1	- 5.47
SAWNWOOD CONIFEROUS	81	97	217	250	259	301	266	248	245	160	254	3.81
SAWNWOOD NONCONIFEROUS	41	29	28	36	40	28	27	54	51	32	22	.73
WOOD-BASED PANELS	22	39	47	64	68	88	76	93	52	61	16	- 3.86
PULP FOR PAPER	64	74	94	80	98	100	114	142	232	335	374	19.99
PAPER AND PAPERBOARD	98	148	165	182	186	187	204	200	187	203	274	4.62
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	218	77	95	87	138	56	77	81	46	33	27	-12.25
RICE MILLED	56	61	90	80	88	58	52	43	29	13	27	-15.70
BARLEY	147	6	2	132	236	12		65	2	5		-27.91
MAIZE	403	734	844	619	274	347	541	507	325	212	182	-13.10
MILLET	47	65	64	71	73	73	55	36	58	61	53	- 3.31
SORGHUM	9	6	2	13	5	2			2	15		-82.91
POTATOES	144	136	144	108	119	119	124	107	86	92	95	- 4.59
SUGAR,TOTAL (RAW EQUIV.)	1166	1276	1398	1444	1475	1258	1440	1571	1428	1136	1267	- .75
PULSES	314	267	396	365	403	299	462	459	397	317	342	1.17
SOYBEANS	18	8	15	8	12	6	2	1	1	2	2	-26.24
GROUNDNUTS SHELLED BASIS	1050	1053	1186	910	617	389	354	367	190	162	291	-19.11
GROUNDNUT OIL	214	274	347	247	276	151	318	241	158	227	264	- 3.10
COPRA	85	74	80	78	74	69	59	69	62	46	22	- 9.55
COCONUT OIL	12	14	14	14	14	13	11	17	18	9	8	- 3.48

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
						THOUSAND METRIC TONS						PERCENT
PALM NUTS KERNELS	626	298	357	344	382	414	334	270	329	272	359	- 1.05
PALM OIL	317	167	135	179	178	201	156	135	199	220	169	1.82
OILSEED CAKE AND MEAL	587	811	839	817	807	658	904	713	599	661	721	- 2.60
BANANAS	446	384	375	376	394	395	462	428	459	353	325	- .31
ORANGES+TANGER+CLEMEN	654	682	734	772	771	697	752	871	689	576	642	- 1.42
LEMONS AND LIMES	12	10	8	7	6	5	6	7	4	3	3	-12.33
COFFEE GREEN+ROASTED	785	900	994	985	1010	988	1083	1186	1174	1099	1164	2.75
COCOA BEANS	884	838	815	755	866	918	976	894	869	824	869	.76
TEA	58	77	90	102	109	112	134	139	135	131	143	6.56
COTTON LINT	265	338	330	358	449	403	382	404	294	282	331	- 1.60
JUTE AND SIMILAR FIBRES	3	2	1	4	3	1	2	1	1	1	1	- 6.65
TOBACCO UNMANUFACTURED	128	77	69	66	76	93	109	96	83	81	90	2.74
NATURAL RUBBER	156	160	174	182	201	201	192	197	205	186	160	.61
WOOL GREASY	6	6	7	7	7	4	5	5	6	5	6	- 1.85
BOVINE CATTLE 1/	1138	1116	1171	1143	1267	1385	1543	1447	1338	1326	1330	2.29
SHEEP AND GOATS 1/	2794	3211	3597	3739	3426	3393	3847	3408	3187	3575	3714	.35
PIGS 1/	17	1	2	16	22	23	20	15	12	11	13	19.90
TOTAL MEAT	52	59	51	54	64	72	72	93	71	64	64	2.98
TOTAL EGGS IN SHELL	2	1			1	1	1	1	1	1	1	3.91
FISHERY PRODUCTS												
FISH FRESH FROZEN	25	17	19	18	32	42	63	106	102	71	67	23.08
FISH CURED	58	61	64	61	72	71	70	59	52	56	54	- 2.11
SHELLFISH	3	5	6	7	12	14	16	20	31	40	42	27.95
FISH CANNED AND PREPARED	53	52	61	62	60	69	61	82	80	60	73	3.02
FISH BODY AND LIVER OIL	9	13	15	17	17	13	25	31	18	12	9	- 1.05
FISH MEAL	65	63	85	123	93	80	150	142	95	83	60	- .08
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS			43	47		65	13	14	14	15	15	29.13
SAWLOGS NONCONIFEROUS	5216	5613	6461	7839	6847	6804	7377	8801	6935	5169	5744	- .68
FUELWOOD	238	434	328	563	344	354	68	188	175	58	49	-22.04
SAWNWOOD CONIFEROUS	32	65	67	82	97	100	74	104	108	98	106	5.18
SAWNWOOD NONCONIFEROUS	636	709	755	736	759	657	722	892	829	698	748	.68
WOOD-BASED PANELS	180	219	263	278	306	290	344	347	295	172	204	- 1.68
PULP FOR PAPER	93	149	170	176	191	195	204	217	235	170	368	6.22
PAPER AND PAPERBOARD	33	26	25	26	28	21	20	22	34	24	21	- .93
LATIN AMERICA												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR, WHEAT EQUIV.	3549	2374	2452	2788	2466	1164	1812	3143	1942	2050	3320	.69
RICE MILLED	279	333	473	364	408	424	185	320	337	571	616	3.02
BARLEY	240	65	182	216	112	104	122	170	119	28	72	- 8.03
MAIZE	3302	6051	5082	5524	6782	7764	3645	4113	6663	5065	4509	- 2.39
MILLET	145	213	152	119	60	129	81	118	78	94	121	- 5.27
SORGHUM	413	930	693	1388	2026	2319	635	2113	3157	2193	3490	14.87
POTATOES	27	13	57	68	83	37	36	11	17	33	72	- .74
SUGAR, TOTAL (RAW EQUIV.)	8878	10246	9513	9235	11647	10715	10895	11947	12108	11148	10552	1.73
PULSES	91	137	171	142	87	97	163	167	182	269	340	9.58
SOYBEANS	57	306	69	311	291	225	1079	1841	2831	3435	3918	51.42
GROUNDNUTS SHELLED BASIS	21	20	13	33	57	41	60	56	52	59	27	10.12
GROUNDNUT OIL	48	70	61	41	74	102	114	124	101	38	140	5.58
COPRA	19	12	7	7	4	3	2	1	3	2	2	-18.11
COCONUT OIL	3	3	3	4	5	9	11	9	5	5	5	8.35
PALM NUTS KERNELS	2	2	2	2	4	1	5	6	5	4	4	11.90
PALM OIL	3	4	3	6	4	6	3	6	6	3	4	- .84
OILSEED CAKE AND MEAL	1434	1555	1508	1713	2180	2379	2636	2800	3252	4482	5858	15.39
BANANAS	3386	4194	4716	4687	4749	5197	5328	5344	5027	4828	5057	1.57
ORANGES+TANGER+CLEMEN	202	172	191	145	145	179	217	222	217	193	178	2.38
LEMONS AND LIMES	6	1	1	2	2	3	8	11	15	25	28	51.39
COFFEE GREEN+ROASTED	1865	1940	2117	2098	1951	2035	2165	2230	1809	2053	2020	- .08
COCOA BEANS	176	216	205	214	226	226	226	173	255	271	206	.98
TEA	10	15	18	18	23	28	24	25	30	23	32	7.15
COTTON LINT	934	796	887	1173	924	677	862	828	670	806	614	- 3.51
JUTE AND SIMILAR FIBRES	5	4	4	6	3	7	4	4	3	1		-31.40
TOBACCO UNMANUFACTURED	127	121	117	140	150	160	184	185	244	245	259	9.86
NATURAL RUBBER	11	12	10	10	12	10	10	9	6	6	4	-10.02
WOOL GREASY	166	148	167	133	129	113	81	83	65	110	86	- 7.62
BOVINE CATTLE 1/	1120	1071	1202	1363	1476	1281	1491	1031	923	965	1195	- 2.05
SHEEP AND GOATS 1/	98	92	252	151	217	158	81	48	65	88	84	-10.09

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
						THOUSAND METRIC TONS						PERCENT
PIGS 1/	62	40	37	23	31	27	42	30	36	47	71	6.06
TOTAL MEAT	669	722	687	936	941	742	1047	891	507	453	760	- 3.19
MILK DRY		1	1		2	6	12	15	9	14	32	62.24
TOTAL EGGS IN SHELL	6	2	3	4	4	4	1	1	1	1	1	-17.51
FISHERY PRODUCTS												
FISH FRESH FROZEN	31	40	40	47	56	60	64	100	132	142	158	18.54
FISH CURED	1	1	1	1	2	2	3	7	9	5	5	32.58
SHELLFISH	62	71	66	74	88	90	96	94	91	96	97	4.11
FISH CANNED AND PREPARED	19	9	9	8	9	16	21	20	20	15	21	12.25
SHELLFISH CANNED+PREPAR	4	3	4	5	4	3	2	1	1	3	5	- 5.55
FISH BODY AND LIVER OIL	143	211	345	175	218	308	318	10	93	148	27	-20.05
FISH MEAL	1221	1728	2270	1862	1997	1957	1714	399	756	892	802	-12.97
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	37	14	14	17	10	8	9	14	9	15	18	.57
SAWLOGS NONCONIFEROUS	418	394	390	378	362	302	217	524	202	40	46	-20.43
PULPWOOD+PARTICLE	313	331	363	418	380	373	382	284	183	107	107	-13.38
FUELWOOD	47	15	10	18	13	18	5	10	7	8	8	- 8.23
SAWNWOOD CONIFEROUS	1272	1520	1935	1600	1523	1724	1718	1530	1132	1135	1091	- 4.99
SAWNWOOD NONCONIFEROUS	273	341	400	505	585	552	622	872	837	592	696	8.20
WOOD-BASED PANELS	74	110	131	158	168	219	266	297	267	254	318	12.00
PULP FOR PAPER	42	98	142	164	158	150	267	300	318	332	382	15.70
PAPER AND PAPERBOARD	40	92	88	123	134	120	118	195	221	155	203	9.60
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	187	122	242	69	44	31	626	606	30	18	23	-14.79
RICE MILLED	358	456	592	787	681	546	493	326	151	114	221	-15.91
BARLEY	451	65	150	363	226	17	142	17	7	11	74	-22.72
MAIZE	4	3	2	1	2	3	7	3	2	3	2	1.87
MILLET	15	14	11	10	4	3	7	9	4	4	3	-12.33
SORGHUM	83	2	55	3	3	37	61	104	98	45	17	34.68
POTATOES	193	245	211	247	294	255	284	324	299	189	363	2.54
SUGAR,TOTAL (RAW EQUIV.)	238	109	107	260	144	163	160	55	53	58	46	-12.92
PULSES	190	181	126	137	110	123	143	169	102	99	112	- 3.63
GROUNDNUTS SHELLED BASIS	140	121	103	100	90	143	136	160	140	216	263	9.87
OILSEED CAKE AND MEAL	484	598	697	697	704	581	751	546	443	450	344	- 6.34
BANANAS	18	16	12	14	14	14	16	11	6	11	10	- 5.86
ORANGES+TANGER+CLEMEN	138	192	254	322	338	490	397	626	532	521	496	11.33
LEMONS AND LIMES	43	78	87	85	88	114	108	153	125	107	138	6.28
COFFEE GREEN+ROASTED	10	4	4	5	7	7	10	8	6	4	4	.21
TEA	2	10	11	14	18	23	19	26	19	3	3	- 9.65
COTTON LINT	766	895	866	863	1089	1101	1049	1097	706	856	1034	.11
JUTE AND SIMILAR FIBRES						1						-82.04
TOBACCO UNMANUFACTURED	75	100	88	80	87	94	137	120	122	76	85	.55
WOOL GREASY	16	17	14	14	12	15	21	25	10	8	5	- 7.93
BOVINE CATTLE 1/	167	120	128	165	155	134	92	54	77	18	20	-20.22
SHEEP AND GOATS 1/	1489	1231	1359	1198	1233	1146	932	1005	981	722	748	- 6.30
TOTAL MEAT		1	3	6	6	8	13	32	23	16	9	33.14
TOTAL EGGS IN SHELL	3	11	14	13	15	19	21	15	17	18	19	4.86
FISHERY PRODUCTS												
FISH FRESH FROZEN	11	10	10	11	11	8	14	20	16	6	5	- 3.36
FISH CURED	15	18	14	16	18	23	21	17	20	20	19	2.31
SHELLFISH	3	4	5	4	4	7	14	17	14	9	11	15.82
FISH CANNED AND PREPARED	1	1	1	1	2	1	1	1	1	2		1.90
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	2	1	1	1	4	17	14	7	5	4	3	24.29
SAWLOGS NONCONIFEROUS	23	20	17	20	23	20	22	24	8	17	10	- 6.52
FUELWOOD	6	27	33	28	34	23	33	31	20	21	22	- 4.11
SAWNWOOD CONIFEROUS	1	2	5	10	30	57	37	29	57	19	15	26.28
SAWNWOOD NONCONIFEROUS	15	19	14	13	18	22	28	23	21	1	1	-20.78
WOOD-BASED PANELS	5	13	18	21	25	14	26	32	31	27	29	8.40
PAPER AND PAPERBOARD	1	2	4	5	4	5	4	11	22	9	10	22.16

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	THOUSAND METRIC TONS	.....	.....	.....	.....	.....	.....	PERCENT
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	140	229	164	221	274	137	347	562	156	127	75	- 6.16
RICE MILLED	3945	2798	2111	2240	2544	2913	3188	2204	2021	1861	3343	- .08
BARLEY				3	6	5	1	19	95		1	22.59
MAIZE	807	1327	1641	1731	1716	2140	1953	1630	2555	2280	2450	5.94
MILLET	3	2	2	6	5	2	1	4	2	1	1	-17.26
SORGHUM	14	99	59	62	88	141	134	135	189	213	187	13.93
POTATOES	29	24	34	32	21	33	36	41	36	48	86	10.66
SUGAR,TOTAL (RAW EQUIV.)	1701	1223	1166	1204	1620	2227	1862	2049	2629	2970	3731	13.58
PULSES	216	191	167	218	221	254	226	227	167	173	181	- .97
SOYBEANS	18	25	23	15	20	18	20	59	18	32	41	6.86
SOYBEAN OIL	2			1	8	22	9	8	7	4	2	37.94
GROUNDNUTS SHELLED BASIS	47	26	62	87	66	61	51	64	110	88	187	13.63
GROUNDNUT OIL	44	7	6	6	8	8	7	11	8	11	13	6.88
COPRA	1231	950	987	810	657	791	1113	802	285	838	885	- 3.61
COCONUT OIL	330	363	446	339	487	548	643	527	510	761	994	9.69
PALM NUTS KERNELS	59	70	83	91	73	73	67	54	50	58	57	- 4.95
PALM OIL	271	385	530	649	694	977	1147	1284	1400	1690	1829	18.49
OILSEED CAKE AND MEAL	1413	1363	1474	1299	1550	1574	1840	2086	1816	1856	2891	6.96
BANANAS	35	27	28	52	138	302	461	503	705	872	848	55.02
ORANGES+TANGER+CLEMEN	26	28	29	28	33	33	38	46	44	141	82	15.62
LEMONS AND LIMES			1									-25.00
COFFEE GREEN+ROASTED	156	265	194	261	216	198	234	206	203	226	256	- .34
COCOA BEANS	3	3	4	4	4	5	8	10	14	15	16	22.30
TEA	474	485	489	441	484	467	468	462	460	506	513	.49
COTTON LINT	215	213	199	239	152	237	341	246	96	244	181	- 1.65
JUTE AND SIMILAR FIBRES	999	1037	1035	870	815	755	758	847	863	537	662	- 5.05
TOBACCO UNMANUFACTURED	118	135	164	166	167	185	182	197	211	198	217	4.54
NATURAL RUBBER 3/	1907	2053	2352	2641	2560	2634	2606	3101	2915	2766	2959	3.38
WOOL GREASY	22	7	5	4	2	3	2	2	3	1	2	-10.61
BOVINE CATTLE 1/	100	90	104	114	146	134	148	123	114	74	71	- 2.92
SHEEP AND GOATS 1/	68	27	36	29	28	31	47	20	28	28	80	4.62
PIGS 1/	150	39	19	11	11	15	7	13	5	10	12	-10.98
TOTAL MEAT	4	5	7	7	7	7	15	19	26	33	39	27.51
MILK DRY	1	2	3	2	2	3	4	4	5	7	8	17.04
TOTAL EGGS IN SHELL	13	3	5	9	7	7	7	4	3	6	6	- .54
FISHERY PRODUCTS												
FISH FRESH FROZEN	76	111	142	164	198	218	230	302	282	443	496	16.69
FISH CURED	41	42	45	48	57	43	44	54	37	35	33	- 3.09
SHELLFISH	43	68	66	80	103	130	169	212	205	230	248	18.11
FISH CANNED AND PREPARED	6	4	6	10	8	8	7	11	17	18	22	16.73
SHELLFISH CANNED+PREPAR	10	11	16	13	16	14	21	25	29	30	31	12.57
FISH BODY AND LIVER OIL			1						1	1		- 4.71
FISH MEAL	14	26	27	32	45	44	65	79	65	51	73	12.43
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	33	56	76	37	1	4		14	9	356	424	.58
SAWLOGS NONCONIFEROUS	10362	17073	20967	24493	29032	30775	32177	39607	34184	28274	35637	7.13
PULPWOOD+PARTICLE		7	15	296	629	506	763	754	986	906	592	57.67
FUELWOOD	442	461	599	683	730	771	654	617	725	610	630	1.57
SAWNWOOD CONIFEROUS	9	11	5	8	7	8	109	189	117	134	246	59.53
SAWNWOOD NONCONIFEROUS	1176	1586	2072	2325	2518	2506	3120	4357	3676	3314	5570	12.03
WOOD-BASED PANELS	303	731	1241	1335	1561	1975	2503	2974	2279	2433	3113	14.67
PULP FOR PAPER				5	8	3	4	14	9	2	2	31.36
PAPER AND PAPERBOARD	26	52	62	68	58	59	99	197	116	109	152	13.11
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	169	77	14	10	8	5	5	12	5	4	3	-21.54
RICE MILLED	1469	2240	2254	2261	2170	2338	2127	3483	3317	3102	2370	3.69
BARLEY		1	1	1	1			16		6	2	15.50
MAIZE	244	147	144	74	45	120	110	65	330	315	330	13.73
MILLET	4	15	18	19	17	23	24	33	30	50	52	14.54
POTATOES	20	50	66	49	44	47	46	51	44	41	37	- 3.63
SUGAR,TOTAL (RAW EQUIV.)	999	964	928	704	500	655	656	647	612	509	572	- 5.22
PULSES	74	135	118	154	94	132	128	115	86	87	94	- 4.56

see notes at end of table

ANNEX TABLE 4. VOLUME OF EXPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	THOUSAND METRIC TONS	.....	.....	.....	.....	.....	.....	PERCENT
SOYBEANS	423	565	577	492	411	461	373	321	376	356	191	- 8.95
SOYBEAN OIL	2	3	4	3	3	2						-56.52
GROUNDNUTS SHELLED BASIS	26	80	62	51	20	25	41	36	29	24	31	- 9.18
GROUNDNUT OIL	5	24	28	12	8	12	15	13	16	13	17	- 3.78
COPRA								1				71.48
COCONUT OIL	1	2	3	1								-97.59
PALM NUTS KERNELS	2											
OILSEED CAKE AND MEAL	21	38	46	44	35	43	42	41	32	30	21	- 5.72
BANANAS	168	410	360	383	241	379	265	254	165	122	103	-13.78
ORANGES+TANGER+CLEMEN	41	67	79	83	75	87	88	78	65	49	45	- 4.75
COFFEE GREEN+ROASTED	1	5	3	3	3	3	4	6	6	6	6	8.00
TEA	49	51	56	55	54	66	66	57	70	76	78	4.54
COTTON LINT	6	4	8	22	22	22	22	22	22	43	43	22.74
JUTE AND SIMILAR FIBRES	4	5	4	4	4	4	2					-29.35
TOBACCO UNMANUFACTURED	17	17	31	35	28	30	32	42	36	47	45	8.40
NATURAL RUBBER	112	88	76	70	38	33	32	40	49	18	45	-10.28
WOOL GREASY	20	23	26	24	18	16	16	18	16	19	19	- 3.68
BOVINE CATTLE 1/	155	242	232	246	160	157	171	172	131	189	205	- 3.41
SHEEP AND GOATS 1/	1387	1626	1097	955	958	1042	1186	1220	1224	1025	871	- 2.39
PIGS 1/	1345	1833	1836	1806	1850	2390	2609	2724	2601	2760	2835	6.15
TOTAL MEAT	43	130	97	120	115	118	177	173	139	145	159	4.36
TOTAL EGGS IN SHELL	33	42	41	40	38	45	41	47	42	44	51	1.92
FISHERY PRODUCTS												
FISH FRESH FROZEN	19	47	45	52	136	148	161	173	137	137	137	15.00
FISH CURED	5	7	4	5	4	6	4	4	4	4	3	- 5.90
SHELLFISH	5	10	9	19	23	29	37	43	40	36	45	19.66
FISH CANNED AND PREPARED			1	1	1	2	1	10	6	6	6	42.80
SHELLFISH CANNED+PREPAR	1	2	2	4	4	6	7	6	7	6	9	18.98
FISH MEAL	1	2	2	3	2	2	3	3	3	1		-18.76
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	48	88	57	97	100	106	119	98	125	145	103	5.86
SAWLOGS NONCONIFEROUS	87	56	75	78	43	12	28	5	3	17	3	-30.30
PULPWOOD+PARTICLE	1			1								-59.00
SAWNWOOD CONIFEROUS	34	58	51	64	72	70	139	53	66	70	93	3.94
SAWNWOOD NONCONIFEROUS	46	46	62	61	43	111	177	160	118	111	119	13.09
WOOD-BASED PANELS	159	320	417	523	591	811	953	959	687	770	769	9.61
PULP FOR PAPER	14	25	18	28	43	63	66	26	25	33	33	2.87
PAPER AND PAPERBOARD	62	89	81	82	103	113	115	116	107	132	132	5.39

1/ Thousand head

2/ See General Notes on Annex Tables

3/ Excluding exports of Singapore

ANNEX TABLE 5. WORLD AVERAGE EXPORT UNIT VALUES OF SELECTED AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	US $ PER METRIC TON	.....	.....	.....	.....	.....	.....	PERCENT
AGRICULTURAL PRODUCTS												
WHEAT	65	68	64	65	62	68	59	106	171	169	153	13.27
WHEAT FLOUR	85	86	85	85	86	91	93	135	210	237	215	13.79
RICE MILLED	121	157	173	157	129	120	134	221	395	360	287	10.78
BARLEY	58	67	64	58	53	60	59	94	135	141	138	11.50
MAIZE	55	57	52	55	60	63	63	92	128	137	124	12.40
POTATOES	59	54	54	69	74	62	71	114	110	150	244	14.93
SUGAR CENTRIFUGAL RAW	116	100	101	107	118	128	147	187	385	514	312	19.61
SOYBEANS	101	109	103	98	103	115	126	216	246	225	216	11.89
SOYBEAN OIL	259	272	222	225	278	317	288	358	701	695	454	12.17
GROUNDNUTS SHELLED	177	173	159	190	208	230	249	342	507	517	450	15.19
GROUNDNUT OIL	320	321	272	316	340	391	377	444	933	811	715	13.59
COPRA	157	160	189	161	185	167	118	210	502	242	185	5.45
COCONUT OIL	262	262	316	274	307	288	208	358	929	418	361	6.95
PALM NUTS KERNELS	135	126	158	140	150	140	112	175	356	177	162	4.94
PALM OIL	208	197	149	144	222	225	189	253	530	464	367	13.08
PALM KERNEL OIL	244	253	330	267	308	302	243	341	826	456	400	7.62
OLIVE OIL	602	680	698	646	678	700	802	1159	1769	1854	1326	12.63
CASTOR BEANS	114	117	145	127	117	121	158	384	332	205	262	11.74
CASTOR BEAN OIL	251	321	333	259	265	325	453	965	838	575	548	12.01
COTTONSEED	67	77	72	62	65	78	74	100	139	143	168	10.92
COTTONSEED OIL	284	292	268	271	289	358	316	355	602	676	556	10.69
LINSEED	126	121	127	122	112	105	120	259	427	339	286	15.33
LINSEED OIL	219	174	210	213	213	197	194	315	900	759	524	17.98
APPLES	139	153	147	157	157	168	187	249	241	316	279	9.12
RAISINS	299	326	322	334	334	301	362	709	901	717	654	12.39
DATES	108	110	125	105	109	124	153	168	212	237	224	10.12
COFFEE GREEN	720	713	754	720	937	826	903	1132	1254	1174	2254	10.78
COCOA BEANS	455	542	603	783	764	625	567	843	1330	1392	1546	11.62
TEA	1124	1051	963	908	933	927	964	923	1082	1271	1246	2.68
COTTON LINT	628	599	631	616	629	693	778	880	1277	1108	1253	9.75
JUTE	223	286	225	254	249	250	279	246	239	273	262	.20
JUTE-LIKE FIBRES	154	141	116	148	136	166	205	194	168	215	254	7.24
TOBACCO UNMANUFACTURED	1190	1277	1263	1303	1287	1273	1374	1495	1762	2064	2172	6.41
NATURAL RUBBER	425	286	254	296	341	296	261	454	609	475	665	10.39
RUBBER NATURAL DRY	524	399	369	485	418	346	331	604	760	577	727	7.44
WOOL GREASY	1230	1170	988	1055	964	801	925	2054	2804	1759	1816	9.71
CATTLE 1/	129	138	135	150	155	171	229	281	264	293	275	10.54
BEEF AND VEAL	619	753	778	809	902	1064	1257	1637	1685	1554	1476	10.53
MUTTON AND LAMB	434	492	462	481	549	554	586	872	1223	1069	1050	12.07
PIGS 1/	39	36	40	45	49	47	57	79	82	91	92	12.08
BACON HAM OF SWINE	705	828	741	807	864	854	1025	1506	1620	2020	1971	13.00
MEAT CHIKENS	651	632	639	677	666	663	748	1056	1038	1151	1206	8.58
MEAT PREPARATIONS	786	867	904	893	932	1149	1234	1456	1692	1532	1585	8.68
EVAP COND WHOLE COW MILK	323	325	307	310	311	362	436	488	564	686	681	10.73
MILK OF COWS SKIMMED DRY	243	360	292	321	313	443	574	654	828	953	814	14.84
BUTTER OF COWMILK	832	791	742	752	728	979	1223	994	1318	1732	1705	10.72
CHEESE OF WHOLE COWMILK	743	877	853	926	965	1097	1273	1475	1728	2040	2009	11.60
FISHERY PRODUCTS												
FISH FRESH FROZEN	307	333	333	382	402	453	537	663	668	704	849	11.61
FISH CURED	355	442	415	440	480	567	639	878	1163	1194	1342	15.79
SHELLFISH	825	982	1100	1194	1178	1276	1384	1751	1765	1970	2384	9.71
FISH CANNED AND PREPARED	664	743	727	716	773	838	949	1182	1329	1351	1483	9.55
SHELLFISH CANNED+PREPAR	1192	1423	1261	1459	1523	1657	1690	2151	2550	2826	2914	10.15
FISH BODY AND LIVER OIL	160	128	94	123	201	211	158	272	467	338	356	16.68
FISH MEAL	109	119	108	129	164	166	168	401	376	244	305	14.41
FOREST PRODUCTS												
SAWLOGS CONIFEROUS 2/	18	19	21	22	24	24	27	46	52	51	52	14.02
SAWLOGS NONCONIFEROUS 2/	24	24	25	25	23	23	25	39	49	41	50	9.58
PULPWOOD+PARTICLE 2/	11	10	10	11	12	13	14	17	22	25	24	12.12
FUELWOOD 2/	8	8	8	7	9	9	10	12	18	20	23	13.99
SAWNWOOD CONIFEROUS 2/	37	38	39	43	44	47	53	74	95	88	94	12.54
SAWNWOOD NONCONIFEROUS 2/	61	62	61	64	65	65	80	105	131	127	138	11.23
WOOD-BASED PANELS 2/	114	116	116	120	122	121	135	170	192	187	197	7.26
PULP FOR PAPER	115	118	116	122	142	149	147	175	285	351	335	14.26
PAPER AND PAPERBOARD	163	171	171	176	185	195	209	253	351	418	398	11.74

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

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	....THOUSAND METRIC TONS.	.....	.....	.....	.....	.....	.....	PERCENT
WORLD												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	49543	51292	52504	48501	54917	57583	61084	76814	66431	73431	70618	4.88
RICE MILLED	7517	8254	8198	8129	9042	9297	9185	9666	8829	8291	9172	.99
BARLEY	7000	7037	6463	7059	10723	10759	13994	12098	12429	12555	13236	8.72
MAIZE	19857	27321	28311	27017	28976	30778	37960	47048	49213	51819	62060	10.37
MILLET	218	334	281	252	263	295	264	369	363	306	336	2.07
SORGHUM	2590	6838	4203	4227	5376	6075	5316	7165	9331	8572	8892	7.57
POTATOES	3217	3216	3276	3393	3755	3191	4897	3846	3806	3737	4453	3.03
SUGAR,TOTAL (RAW EQUIV.)	18335	20011	19591	18992	22077	21282	21799	23324	22714	22069	22725	1.87
PULSES	1444	1771	1771	2078	1864	1793	2087	2020	1694	1851	1924	.26
SOYBEANS	5430	8273	8347	9378	12295	12708	13877	14695	17503	16327	19924	10.42
SOYBEAN OIL	642	556	553	680	1040	1337	1106	1054	1471	1405	1643	12.87
GROUNDNUTS SHELLED BASIS	1376	1424	1590	1259	1052	868	851	963	861	858	1019	- 5.60
GROUNDNUT OIL	382	464	479	409	431	387	513	535	391	420	514	.42
COPRA	1504	1248	1143	1116	867	1065	1315	1063	545	1038	1193	- 2.30
COCONUT OIL	421	465	552	493	594	669	847	767	617	988	1363	10.10
PALM NUTS KERNELS	694	373	409	442	435	493	404	316	369	306	381	- 2.32
PALM OIL	593	627	672	857	891	1209	1373	1549	1557	1920	2030	14.74
OILSEED CAKE AND MEAL	7083	9332	9584	10562	12105	13184	14399	15394	14717	14850	18239	7.26
BANANAS	4078	5045	5232	5350	5600	5986	6373	6364	6315	6280	6317	2.81
ORANGES+TANGER+CLEMEN	3231	3689	3666	4035	4308	4196	4688	4924	4831	4955	4988	3.85
LEMONS AND LIMES	525	651	660	694	697	751	734	781	841	820	927	3.69
COFFEE GREEN+ROASTED	2892	3014	3415	3244	3248	3367	3458	3627	3419	3655	3711	1.82
COCOA BEANS	1073	1104	1080	1039	1110	1219	1250	1172	1151	1201	1162	1.16
TEA	623	688	715	705	739	742	748	753	815	803	835	2.04
COTTON LINT	4106	3894	3948	3722	4047	3979	3960	4694	4103	4037	4108	.95
JUTE AND SIMILAR FIBRES	957	1009	1090	830	868	797	807	838	839	573	705	- 4.60
TOBACCO UNMANUFACTURED	912	1012	1005	1030	1017	1062	1217	1239	1284	1302	1299	3.64
NATURAL RUBBER	2279	2391	2698	2899	2860	2878	2918	3241	3309	3108	3283	3.01
WOOL GREASY	1191	1102	1197	1251	1206	1116	1201	951	748	846	1037	- 3.67
BOVINE CATTLE 1/	5200	5662	6440	6870	6977	7116	7802	7088	5915	6837	7066	1.10
SHEEP AND GOATS 1/	8357	8398	10040	10064	9874	10002	11123	10691	9735	11391	11179	2.23
PIGS 1/	2793	3178	3375	3976	4411	5409	5973	5780	5986	6260	6567	8.73
TOTAL MEAT	3029	3716	3836	4260	4520	4783	5278	5497	5050	5521	5936	5.16
MILK DRY	151	180	203	214	224	206	205	205	204	201	235	1.10
TOTAL EGGS IN SHELL	405	313	321	346	400	422	431	440	501	515	510	6.17
FISHERY PRODUCTS												
FISH FRESH FROZEN	1426	1662	1852	1818	2035	2114	2376	2702	2779	2694	2841	6.59
FISH CURED	533	516	493	495	504	502	460	408	380	368	375	- 4.13
SHELLFISH	291	406	407	436	499	566	683	715	767	805	920	10.33
FISH CANNED AND PREPARED	519	543	611	586	621	627	684	728	758	716	803	4.00
SHELLFISH CANNED+PREPAR	61	90	96	94	102	103	115	132	130	130	147	5.64
FISH BODY AND LIVER OIL	729	844	870	773	695	741	739	630	644	631	616	- 3.73
FISH MEAL	1925	2907	3531	3172	3003	2990	3107	1719	1908	2255	2250	- 5.67
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	9001	16414	21274	20911	24343	21706	26505	29946	26960	24027	28420	4.89
SAWLOGS NONCONIFEROUS	16806	25726	28748	33094	36039	38833	41755	48853	44308	35182	43419	5.33
PULPWOOD+PARTICLE	13905	18578	21502	22899	27989	23686	22633	28520	33629	31137	31062	5.70
FUELWOOD	3658	2636	2300	2705	2986	2967	2788	3559	3911	3464	3468	4.74
SAWNWOOD CONIFEROUS	40070	42284	46752	47025	48906	50872	56802	60721	51734	42580	53639	1.66
SAWNWOOD NONCONIFEROUS	4601	5611	6336	6778	6786	6774	7831	10610	9263	7887	10212	6.23
WOOD-BASED PANELS	4710	6868	8350	9216	9768	10483	12813	15290	13301	12194	14111	7.87
PULP FOR PAPER	10024	12067	13469	14761	15252	13237	14838	16511	17279	13327	15232	1.93
PAPER AND PAPERBOARD	14105	17976	19713	22091	23069	23877	24990	27070	28796	23220	26612	4.04
WESTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	12787	10452	10962	13572	13572	13348	13490	13594	12558	12460	13201	1.60
RICE MILLED	584	581	705	697	651	729	764	797	794	797	1212	5.46
BARLEY	4378	4955	4100	4617	6400	6684	5694	5364	6345	5477	6335	3.16
MAIZE	13531	19374	18760	16625	17473	19599	20166	22641	24324	25301	26856	4.80
MILLET	64	206	158	74	51	92	88	84	81	75	65	- 7.95
SORGHUM	1426	1652	929	494	737	1213	514	974	1985	2050	2089	9.24
POTATOES	1818	1945	1850	2357	2320	2047	2549	2390	2235	2372	3146	3.77
SUGAR,TOTAL (RAW EQUIV.)	4627	4839	4667	4431	4486	4661	4969	4950	5335	5263	4649	1.08

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS											PERCENT
PULSES	686	831	970	1174	937	887	1098	1103	786	794	830	- 1.64
SOYBEANS	2934	4762	4737	5246	7220	7515	8323	8327	11275	10524	11734	11.57
SOYBEAN OIL	247	155	113	172	335	469	368	316	545	576	531	18.38
GROUNDNUTS SHELLED BASIS	1104	1175	1311	1038	811	633	592	694	614	603	725	- 7.54
GROUNDNUT OIL	288	390	406	336	357	321	435	422	327	338	353	- .90
COPRA	786	711	603	612	450	624	822	630	354	816	961	2.07
COCONUT OIL	141	153	184	148	164	208	287	277	176	281	428	9.50
PALM NUTS KERNELS	618	318	359	371	367	435	350	251	329	260	324	- 2.43
PALM OIL	417	394	432	499	520	686	693	752	698	797	859	8.92
OILSEED CAKE AND MEAL	5867	7484	7436	8154	9104	9800	10384	11026	9900	10092	12539	5.21
BANANAS	1802	2279	2231	2224	2119	2310	2554	2556	2430	2332	2258	.81
ORANGES+TANGER+CLEMEN	2642	2806	2755	3044	3223	3035	3309	3459	3200	3203	3173	1.66
LEMONS AND LIMES	341	380	388	387	389	398	368	378	386	398	432	.69
COFFEE GREEN+ROASTED	1105	1234	1387	1475	1496	1512	1606	1674	1642	1747	1809	3.47
COCOA BEANS	554	546	541	552	533	552	602	584	574	564	565	.70
TEA	292	319	340	278	316	306	289	298	313	289	298	- .86
COTTON LINT	1483	1449	1420	1438	1349	1262	1281	1543	1145	1188	1315	- 1.71
JUTE AND SIMILAR FIBRES	519	561	584	442	468	357	398	353	373	188	231	-10.08
TOBACCO UNMANUFACTURED	518	561	535	573	582	627	649	681	660	677	694	2.93
NATURAL RUBBER	765	727	789	851	901	909	912	949	959	878	940	2.34
WOOL GREASY	715	596	633	668	630	557	597	423	370	391	529	- 5.04
BOVINE CATTLE 1/	1881	2557	2988	3329	3287	3529	3933	3305	2691	3444	3280	1.40
SHEEP AND GOATS 1/	1371	1745	2162	2499	2545	2461	3011	2529	1968	2570	2369	1.80
PIGS 1/	979	1144	1298	1826	2129	2371	2999	2819	3009	3314	3621	13.24
TOTAL MEAT	1922	2437	2431	2684	2709	2858	3351	3446	2876	3108	3279	3.46
MILK DRY	72	88	103	107	125	120	118	102	85	84	121	- .19
TOTAL EGGS IN SHELL	309	176	190	215	241	246	247	270	318	311	306	6.71
FISHERY PRODUCTS												
FISH FRESH FROZEN	711	821	880	826	931	973	1025	1143	1230	1133	1142	4.58
FISH CURED	203	214	199	197	211	222	233	186	181	158	159	- 3.01
SHELLFISH	121	142	151	160	177	196	249	245	260	294	330	10.10
FISH CANNED AND PREPARED	258	260	272	256	249	257	283	311	288	277	308	1.84
SHELLFISH CANNED+PREPAR	23	33	36	37	42	46	46	57	56	60	64	8.07
FISH BODY AND LIVER OIL	595	739	764	660	599	620	665	569	570	558	540	- 3.48
FISH MEAL	1275	1722	1994	2084	1885	1736	1855	1106	1087	1236	1188	- 6.72
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	2290	2511	2532	2379	2523	2252	2767	4316	4756	3221	4479	7.66
SAWLOGS NONCONIFEROUS	6067	6295	6998	8337	7784	8184	9070	10952	8668	6799	8530	2.36
PULPWOOD+PARTICLE	8728	11200	12056	13179	16917	14522	11855	14902	18090	17782	16171	4.35
FUELWOOD	1775	1274	1189	1598	1512	1415	1166	1772	2131	1979	2078	6.05
SAWNWOOD CONIFEROUS	21867	22088	23663	23880	24408	23558	25396	28214	23709	17177	24135	- .59
SAWNWOOD NONCONIFEROUS	2243	2647	3098	3363	3541	3426	3995	5677	4033	3619	5463	6.30
WOOD-BASED PANELS	2718	3992	4504	4782	5257	5274	6139	8101	6954	6083	7579	7.02
PULP FOR PAPER	6061	7017	7773	8525	9095	7218	8462	9386	9683	7293	8443	1.29
PAPER AND PAPERBOARD	5355	6953	8041	9394	9847	10213	11310	12528	13396	9807	12281	5.68
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	8755	6173	5850	4899	6872	8745	13121	20057	7501	13457	12582	11.52
RICE MILLED	485	645	511	574	548	611	503	417	441	543	647	- 1.13
BARLEY	1070	776	968	857	2161	1319	5487	3416	2368	3283	3638	20.18
MAIZE	1072	1101	1342	1354	1065	2506	6090	7816	6927	9131	17570	38.20
POTATOES	535	503	584	220	634	385	1365	584	600	514	469	2.77
SUGAR,TOTAL (RAW EQUIV.)	2933	3209	2685	2004	4339	2868	2841	3578	2914	4027	4540	4.49
PULSES	52	28	39	66	54	28	34	31	49	58	48	2.99
SOYBEANS	126	145	98	210	179	208	478	914	265	520	2074	29.40
SOYBEAN OIL	70	38	28	23	26	69	87	34	37	31	39	2.84
GROUNDNUTS SHELLED BASIS	113	65	90	56	57	64	69	52	66	60	54	- 2.32
GROUNDNUT OIL	3	2					1	1	4	4	8	36.69
COPRA	19	3	6	4	1	3	35	28	29	29	10	30.91
COCONUT OIL	27	23	52	23	36	43	38	24	28	42	93	6.62
PALM NUTS KERNELS	26	20	12	23	18	9	6	13	2	4	4	-20.48
PALM OIL	5	5	4	6	6	11	13	10	22	17	23	21.64
OILSEED CAKE AND MEAL	609	1212	1371	1463	1852	2172	2790	3009	3402	3543	3772	14.81
BANANAS	49	75	111	102	99	116	174	189	198	267	220	13.92
ORANGES+TANGER+CLEMEN	181	395	414	468	480	523	686	678	758	716	704	8.03
LEMONS AND LIMES	139	199	198	222	208	245	253	275	311	310	346	6.68
COFFEE GREEN+ROASTED	91	117	137	158	167	164	185	170	183	204	199	5.26
COCOA BEANS	111	156	193	174	180	225	239	215	250	280	250	5.73
TEA	33	34	33	40	42	57	64	54	69	88	85	11.99

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	THOUSAND METRIC TONS.	.....	.....	.....	.....	.....	.....	PERCENT
COTTON LINT	683	678	697	675	870	804	744	710	748	769	691	.42
JUTE AND SIMILAR FIBRES	82	90	94	75	97	74	88	85	67	83	88	- 1.09
TOBACCO UNMANUFACTURED	156	134	126	107	120	130	160	151	142	147	129	1.86
NATURAL RUBBER	446	439	503	478	519	440	450	495	548	473	457	.29
WOOL GREASY	110	106	128	137	139	144	143	148	151	162	167	3.96
BOVINE CATTLE 1/	130	114	102	113	90	70	61	90	233	491	192	12.33
SHEEP AND GOATS 1/	1786	2071	1449	1403	1400	1316	1601	1907	1745	1360	1165	- 2.04
PIGS 1/	232	74	151	258	288	462	145	126	104	70	57	- 9.25
TOTAL MEAT	364	323	293	273	454	535	282	269	600	539	384	4.68
TOTAL EGGS IN SHELL	25	52	44	34	43	60	63	51	51	50	39	.58
FISHERY PRODUCTS												
FISH FRESH FROZEN	155	142	139	134	156	114	109	102	119	132	131	- 1.79
FISH CURED	49	23	28	20	14	31	20	18	18	21	25	- .88
FISH CANNED AND PREPARED	28	27	38	32	30	30	27	27	26	37	46	2.09
FISH BODY AND LIVER OIL	69	28	17	20	21	17	21	15	28	34	29	3.70
FISH MEAL	157	294	344	340	451	563	445	292	458	479	492	4.26
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	424	744	945	1026	1113	1128	865	1278	1328	920	1971	6.26
SAWLOGS NONCONIFEROUS	197	441	538	555	395	399	395	487	461	498	485	.01
PULPWOOD+PARTICLE	1188	1419	1393	1526	1288	1480	1397	1208	1533	1722	1619	1.49
FUELWOOD	635	276	83	37	53	36	33	32	31	32	31	-15.99
SAWNWOOD CONIFEROUS	2352	2651	2860	2814	3097	3299	2999	2841	3438	3599	2710	1.50
SAWNWOOD NONCONIFEROUS	399	484	460	416	398	385	371	354	441	442	371	- 1.67
WOOD-BASED PANELS	231	407	509	601	747	749	848	954	1161	1272	1368	13.90
PULP FOR PAPER	355	600	696	707	875	894	857	913	869	1024	1065	5.60
PAPER AND PAPERBOARD	420	814	973	1182	1402	1351	1440	1420	1507	1713	1757	7.68
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	113	11	13	38	43	10	3	4	83	17	23	2.61
RICE MILLED	57	56	58	58	83	144	94	92	71	74	80	3.55
BARLEY	220	156	162	215	232	205	360	181	328	307	195	5.24
MAIZE	634	760	813	691	547	249	448	825	1320	818	838	3.69
POTATOES	150	178	186	199	189	163	141	175	239	208	223	2.02
SUGAR,TOTAL (RAW EQUIV.)	4541	5183	5390	5289	5717	5725	5656	5707	6137	4485	5035	- .50
PULSES	19	18	19	17	19	26	29	32	66	44	34	13.16
SOYBEANS	402	438	299	405	442	425	309	232	391	385	401	- .88
SOYBEAN OIL	12	10	10	10	23	24	17	19	34	23	31	13.35
GROUNDNUTS SHELLED BASIS	42	54	52	50	49	52	54	60	60	61	62	2.39
GROUNDNUT OIL	6	12	13	8	9	5	7	7	6	7	8	- 5.54
COPRA	287	277	292	272	198	190	209	199	27			-97.04
COCONUT OIL	167	215	241	240	282	298	374	280	271	435	603	8.99
PALM OIL	24	39	55	89	76	116	226	196	217	483	416	30.91
OILSEED CAKE AND MEAL	276	262	257	262	252	213	238	216	300	301	388	3.05
BANANAS	1612	1817	1862	1824	2045	2125	2146	2169	2268	2187	2411	3.04
ORANGES+TANGER+CLEMEN	203	225	238	242	242	241	259	265	259	264	339	3.13
LEMONS AND LIMES	17	17	17	18	19	17	18	19	20	23	24	3.75
COFFEE GREEN+ROASTED	1456	1363	1614	1301	1267	1398	1343	1405	1246	1324	1290	- 1.10
COCOA BEANS	329	305	250	236	301	338	308	268	238	248	252	- 1.32
TEA	78	86	94	86	83	103	93	102	105	96	107	2.22
COTTON LINT	118	140	99	89	77	90	93	86	72	61	73	- 5.82
JUTE AND SIMILAR FIBRES	73	48	52	37	33	20	16	33	31	23	25	- 7.50
TOBACCO UNMANUFACTURED	84	123	121	107	101	87	153	158	163	177	161	5.70
NATURAL RUBBER	443	495	579	627	593	655	651	701	737	727	793	4.43
WOOL GREASY	87	59	83	62	50	34	30	18	8	13	17	-20.32
BOVINE CATTLE 1/	974	783	1045	1051	1220	1081	1260	1264	716	516	1183	- 1.73
SHEEP AND GOATS 1/	43	38	71	45	40	43	58	71	33	61	71	3.16
PIGS 1/	4	21	21	18	72	78	90	88	197	30	46	14.54
TOTAL MEAT	445	491	562	664	711	668	797	785	637	719	862	4.36
TOTAL EGGS IN SHELL	4	9	8	7	18	7	6	12	15	11	13	4.95
FISHERY PRODUCTS												
FISH FRESH FROZEN	331	386	497	492	525	531	728	792	689	611	709	6.35
FISH CURED	37	33	33	30	38	34	32	33	31	30	37	.03
SHELLFISH	102	116	123	130	140	132	149	140	148	139	157	2.65
FISH CANNED AND PREPARED	68	82	88	83	101	87	108	104	131	82	103	2.54
SHELLFISH CANNED+PREPAR	18	25	26	26	28	25	31	32	33	27	35	3.03
FISH BODY AND LIVER OIL	48	46	32	27	31	28	10	11	8	7	11	-18.35
FISH MEAL	290	595	780	327	228	257	357	63	62	108	128	-21.29

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS.											PERCENT
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	1233	1298	1576	1501	1786	1787	2387	1954	1737	1728	2025	3.66
SAWLOGS NONCONIFEROUS	350	587	534	469	477	415	459	459	492	318	282	- 5.88
PULPWOOD+PARTICLE	3377	3536	3239	2437	2552	1996	2081	1863	2187	1859	2343	- 5.33
FUELWOOD	90	103	116	146	176	209	187	158	191	209	182	6.34
SAWNWOOD CONIFEROUS	11316	11693	13983	14058	13859	17378	21522	21750	16639	14716	18760	4.35
SAWNWOOD NONCONIFEROUS	969	1198	1091	1355	1008	1116	1429	1732	1412	963	1250	.97
WOOD-BASED PANELS	1334	1880	2694	3059	2724	3482	4667	4148	3246	3100	3434	5.13
PULP FOR PAPER	2369	2647	2953	3407	2979	2973	3266	3531	3587	2712	3270	1.32
PAPER AND PAPERBOARD	5495	6401	6289	6644	6557	6858	7143	7546	7602	6144	6915	1.02
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	175	100	48	5	16	80	47		50	134	112	2.05
RICE MILLED	4	5	6	6	7	5	5	6	6	7	6	1.61
BARLEY			3	30	14	24	13	4	5			- .14
MAIZE	1	2	2	1	1	2	1	1	1	1	1	- 9.19
POTATOES	2								1			3.75
SUGAR,TOTAL (RAW EQUIV.)	126	130	146	154	139	157	177	138	110	192	173	1.74
PULSES	9	18	17	17	14	16	16	12	16	20	21	1.06
SOYBEANS	2				1	11			33	16	7	44.10
SOYBEAN OIL	5	6	9	7	11	10	4	7	11	18	41	13.91
GROUNDNUTS SHELLED BASIS	5	4	4	6	11	5	6	5	6	5	5	- .01
GROUNDNUT OIL	9	9	7	6	8	6	6	3	5	4	4	- 9.08
COPRA	36	38	35	37	33	35	26	24	20	12	8	-14.60
COCONUT OIL		1	1	1	1	2	8	9	13	11	11	43.34
PALM OIL	3	3	3	4	5	7	8	7	14	16	17	23.81
OILSEED CAKE AND MEAL	5	20	32	21	30	30	24	12	20	11	11	- 9.35
BANANAS	30	30	29	23	24	22	24	30	35	39	29	2.90
ORANGES+TANGER+CLEMEN	14	16	13	17	14	15	16	16	17	16	15	1.18
COFFEE GREEN+ROASTED	15	21	21	23	28	30	29	29	32	35	35	6.11
COCOA BEANS	15	21	19	12	20	17	18	21	18	25	16	.92
TEA	37	37	35	39	35	34	37	36	34	35	31	- 1.17
COTTON LINT	21	9	12	6	5	7	9	4	9	4	4	- 8.17
JUTE AND SIMILAR FIBRES	9	10	10	11	12	13	19	16	26	17	12	6.63
TOBACCO UNMANUFACTURED	16	15	13	17	17	17	15	14	17	17	16	.88
NATURAL RUBBER	41	45	47	51	52	45	50	56	74	53	63	3.80
WOOL GREASY	2	2	1	3	2	4	5	6	6	1	2	3.56
BOVINE CATTLE 1/					1	2	3	3	3	1	1	73.81
SHEEP AND GOATS 1/				1	2	2	1	1				- 4.10
TOTAL MEAT	1	1	2	1	1	1	1	2	4	2	2	13.40
FISHERY PRODUCTS												
FISH FRESH FROZEN	14	20	21	23	22	29	22	18	22	19	19	- 1.01
FISH CURED	5	3	4	5	4	4	4	3	6	4	4	1.09
SHELLFISH	1	1	1	1	1	1	1	2	1	1	3	11.12
FISH CANNED AND PREPARED	13	14	13	13	13	14	15	25	27	23	20	7.77
SHELLFISH CANNED+PREPAR	1	2	2	2	3	3	3	4	6	5	6	17.07
FISH BODY AND LIVER OIL	4	4	5	4	5	5	1	1	1	1	1	-19.62
FISH MEAL	8	14	28	30	27	32	27	14	14	24	13	- 4.65
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	7	18	18	13	4	4	5	1	3		5	-78.33
SAWLOGS NONCONIFEROUS	145	70	110	116	127	93	95	101	106	41	46	- 6.92
FUELWOOD	1	1	1	1	1	1	1	1	1	9	4	27.38
SAWNWOOD CONIFEROUS	620	647	633	709	654	675	672	793	886	637	690	1.41
SAWNWOOD NONCONIFEROUS	207	169	235	229	278	273	254	338	449	282	368	7.64
WOOD-BASED PANELS	26	45	53	58	65	73	73	92	131	123	133	13.43
PULP FOR PAPER	203	270	254	271	323	298	242	315	352	302	234	.56
PAPER AND PAPERBOARD	428	462	496	506	528	557	531	631	677	664	487	2.75
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	1795	3077	2780	2189	2867	3500	3735	4563	4589	6278	5460	10.20
RICE MILLED	576	590	597	622	698	869	793	976	980	607	828	3.92
BARLEY	144	116	54	68	25	30	78	107	115	185	74	7.96
MAIZE	243	210	148	303	386	621	462	458	794	942	740	19.44

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
					THOUSAND METRIC TONS							PERCENT
MILLET	95	105	107	145	167	169	132	195	163	160	151	4.25
SORGHUM	42	18	62	45	68	42	98	128	184	126	110	20.75
POTATOES	233	131	160	144	163	147	130	196	208	196	172	3.78
SUGAR,TOTAL (RAW EQUIV.)	1209	1307	1242	981	1297	1388	1398	1422	1353	1230	1464	1.74
PULSES	76	102	73	55	62	116	105	85	62	72	67	- 1.45
SOYBEANS	10	1	1	1	4		2	13	10	8	16	46.05
SOYBEAN OIL	55	49	54	46	87	132	97	86	141	144	104	12.10
GROUNDNUTS SHELLED BASIS	24	20	23	27	27	16	20	24	12	16	18	- 4.51
GROUNDNUT OIL	15	12	11	12	13	10	23	38	9	8	30	5.22
COPRA	4	4	4	4	3	7	5	6	2	2	2	- 6.53
COCONUT OIL	12	10	9	8	14	16	17	15	15	13	15	6.40
PALM NUTS KERNELS	11	2	1		1	1				1	1	-13.95
PALM OIL	11	10	16	24	19	29	28	42	39	26	58	15.69
OILSEED CAKE AND MEAL	16	29	30	37	50	54	53	49	64	63	52	8.18
BANANAS	38	40	30	43	38	37	56	61	48	46	46	4.14
ORANGES+TANGER+CLEMEN	9	9	9	10	11	9	10	11	11	13	13	3.54
LEMONS AND LIMES	1							1	1		1	6.87
COFFEE GREEN+ROASTED	46	42	50	41	39	30	34	37	51	69	64	4.50
COCOA BEANS	1	2	1	1	1	1	2	2	2	1	2	2.38
TEA	34	37	37	40	40	39	40	35	40	43	37	.47
COTTON LINT	16	30	42	28	31	28	33	41	49	56	48	6.26
JUTE AND SIMILAR FIBRES	20	34	45	37	42	59	58	74	94	73	84	11.50
TOBACCO UNMANUFACTURED	32	35	30	29	34	37	41	47	57	48	48	6.84
NATURAL RUBBER	7	12	13	14	16	17	17	22	27	26	29	10.71
WOOL GREASY			1	1	1	1	1	1	1	1	1	6.70
BOVINE CATTLE 1/	858	823	876	982	951	938	915	893	737	652	705	- 3.06
SHEEP AND GOATS 1/	1757	1630	1574	1510	1398	1498	1375	1282	1268	1396	1400	- 2.06
PIGS 1/	10	1	3	3	5	9	8	4	1		1	-16.23
TOTAL MEAT	52	39	38	44	46	53	54	47	47	58	75	5.73
MILK DRY		3	2	4	4	5	4	9	24	11	12	24.34
TOTAL EGGS IN SHELL	4	1	1	1	1	1	2	2	4	5	11	32.65
FISHERY PRODUCTS												
FISH FRESH FROZEN	66	75	62	79	107	142	147	183	251	279	279	19.78
FISH CURED	94	88	69	74	80	74	64	62	51	59	55	- 4.78
SHELLFISH	2	1	1	1	5	2	1	1	3	1	1	- 1.57
FISH CANNED AND PREPARED	33	26	35	32	55	51	57	66	65	62	63	10.37
FISH BODY AND LIVER OIL	1		1	2	2	2	3	4	5	1	2	13.47
FISH MEAL	7	5	5	9	11	11	13	9	14	12	9	8.34
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	8	1	9	25	37	7	20	8	15	44	47	25.29
SAWLOGS NONCONIFEROUS	103	137	125	162	232	221	197	221	256	145	171	3.10
PULPWOOD+PARTICLE		5	1		5	14	5					-86.24
FUELWOOD	46	126	87	82	95	73	77	32	23	18	18	-20.49
SAWNWOOD CONIFEROUS	479	568	400	709	914	937	648	628	685	603	812	2.72
SAWNWOOD NONCONIFEROUS	133	169	184	169	190	157	165	144	183	163	142	- 1.70
WOOD-BASED PANELS	80	111	144	149	153	190	140	150	183	200	193	4.94
PULP FOR PAPER	20	13	26	28	47	34	34	54	71	59	66	16.44
PAPER AND PAPERBOARD	227	305	312	371	453	480	444	542	632	534	543	7.59
LATIN AMERICA												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	5026	6390	6782	6700	5672	6282	6989	8688	8579	7199	9087	3.83
RICE MILLED	416	363	386	391	383	470	414	381	682	579	564	5.89
BARLEY	129	93	132	126	162	137	120	186	320	264	221	11.23
MAIZE	465	374	640	668	1418	667	907	2548	2921	4033	2630	27.34
SORGHUM	66	16	67	19	216	375	651	466	1085	1358	588	59.33
POTATOES	210	190	230	223	221	183	470	260	229	166	196	- .29
SUGAR,TOTAL (RAW EQUIV.)	302	259	179	413	184	257	361	429	252	171	142	- 3.17
PULSES	163	207	210	209	233	212	220	248	271	312	335	5.40
SOYBEANS	50	64	81	88	191	199	164	204	590	140	440	20.39
SOYBEAN OIL	54	72	89	84	114	129	102	158	239	143	225	12.59
GROUNDNUTS SHELLED BASIS	3	32	9	5	5	6	10	6	13	29	26	7.78
GROUNDNUT OIL	15	11	8	17	15	13	10	30	12	30	51	15.11
COPRA	78	41	27	8	2	12	1		1	21		-31.78
COCONUT OIL	10	6	10	9	19	12	18	32	28	68	50	28.06
PALM NUTS KERNELS					1	1			2			-35.50
PALM OIL	6	5	3	6	3	10	9	23	8	3	15	11.43
OILSEED CAKE AND MEAL	93	95	108	147	175	307	245	252	319	306	445	17.05
BANANAS	247	228	239	286	303	252	225	219	253	198	168	- 3.43
ORANGES+TANGER+CLEMEN	17	9	8	8	10	11	11	16	14	15	13	7.67

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	THOUSAND METRIC TONS											PERCENT
LEMONS AND LIMES	3	3	3	2	2	2	2	1	3	1	1	- 6.88
COFFEE GREEN+ROASTED	46	46	45	58	47	50	53	56	65	58	48	2.01
COCOA BEANS	20	22	20	18	26	28	20	16	20	16	18	- 2.94
TEA	9	11	11	15	13	12	12	13	20	15	17	4.92
COTTON LINT	68	74	82	79	74	85	83	95	67	78	69	- .63
JUTE AND SIMILAR FIBRES	14	15	14	13	25	11	13	26	45	40	34	13.90
TOBACCO UNMANUFACTURED	16	16	15	15	14	13	10	13	21	16	17	.90
NATURAL RUBBER	84	80	90	95	102	117	138	141	169	146	159	8.61
WOOL GREASY	14	17	20	19	14	18	14	5	4	7	7	-14.65
BOVINE CATTLE 1/	608	611	537	568	548	597	582	491	527	699	675	1.23
SHEEP AND GOATS 1/	142	114	135	128	141	180	105	65	227	211	76	- .31
PIGS 1/	67	37	37	23	32	38	48	39	42	47	56	5.73
TOTAL MEAT	64	95	104	102	119	135	150	128	237	162	177	8.34
MILK DRY	54	34	37	44	41	24	32	40	33	45	36	.40
TOTAL EGGS IN SHELL	8	6	6	7	7	6	6	5	6	6	7	- .11
FISHERY PRODUCTS												
FISH FRESH FROZEN	12	23	28	29	37	41	43	59	64	72	75	14.82
FISH CURED	72	92	93	102	91	76	77	75	59	62	64	- 5.51
SHELLFISH	1	4	4	7	9	4	4	11	8	3	3	- .42
FISH CANNED AND PREPARED	21	24	25	26	32	36	42	33	37	38	40	5.88
SHELLFISH CANNED+PREPAR		1	1	1		1	1	1	1	1	1	- 4.68
FISH BODY AND LIVER OIL	9	21	37	42	26	56	29	20	25	23	23	- 3.68
FISH MEAL	57	105	137	134	162	224	188	44	70	107	97	- 5.70
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	26	4	2	72	65	19	16	25	27	7	9	6.56
SAWLOGS NONCONIFEROUS	273	308	230	209	224	224	180	135	146	158	125	- 8.32
FUELWOOD	41	39	4	4	5	9	12	19	27	24	24	13.82
SAWNWOOD CONIFEROUS	1212	1355	1599	1601	1569	1631	1499	1460	1230	1229	1341	- 2.13
SAWNWOOD NONCONIFEROUS	88	88	97	143	148	186	181	195	677	739	368	24.16
WOOD-BASED PANELS	56	84	107	119	118	165	150	134	177	161	155	6.67
PULP FOR PAPER	426	420	521	535	607	559	637	636	710	506	487	1.72
PAPER AND PAPERBOARD	938	1296	1576	1654	1917	1721	1773	1754	2040	1780	1766	2.73
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	3936	4646	4599	3431	4941	7841	4864	5441	7786	8351	7027	7.42
RICE MILLED	344	329	354	393	469	645	517	468	864	1004	1014	13.66
BARLEY	144	204	102	180	510	925	296	591	528	497	479	15.27
MAIZE	315	335	354	201	260	317	460	423	803	783	946	15.40
MILLET	16	2	5		1	4	5	6	32	8	51	51.54
SORGHUM	3	10	5	4	1	10	2	4	2	72	101	25.75
POTATOES	108	126	137	124	104	144	121	110	161	165	128	1.62
SUGAR,TOTAL (RAW EQUIV.)	1316	1373	1102	1009	1061	1287	1189	1655	1733	2101	1909	7.18
PULSES	98	145	103	95	101	87	150	108	126	236	217	7.27
SOYBEANS		6	14	5	8	7	14	28	62	28	11	18.53
SOYBEAN OIL	78	62	73	110	146	188	181	108	218	270	351	17.89
GROUNDNUTS SHELLED BASIS	24	11	11	8	8	13	9	7	8	10	11	- 1.29
GROUNDNUT OIL	5	3	3	3	2	2	2	2	1	1	4	- 4.07
COPRA	4	2	2	3	1		1			8		-16.41
COCONUT OIL	5	5	6	7	9	8	8	5	8	22	33	16.82
PALM NUTS KERNELS										1	1	14.07
PALM OIL	36	59	60	62	69	85	91	89	78	137	152	10.32
OILSEED CAKE AND MEAL	30	42	46	54	82	116	136	88	97	84	101	9.82
BANANAS	35	44	48	56	63	80	79	131	164	244	283	24.21
ORANGES+TANGER+CLEMEN	79	98	108	112	167	192	199	262	375	493	504	21.99
LEMONS AND LIMES	15	22	19	23	25	26	13	15	27	23	30	1.81
COFFEE GREEN+ROASTED	38	54	57	39	47	54	58	53	54	48	48	- .18
COCOA BEANS	3	2	3	3	3	3	3	2	2	4	4	3.57
TEA	87	96	93	122	126	102	118	109	136	125	145	3.72
COTTON LINT	12	9	8	6	6	7	8	9	12	35	12	10.74
JUTE AND SIMILAR FIBRES	27	33	34	27	30	20	18	27	31	31	41	.83
TOBACCO UNMANUFACTURED	21	22	24	24	24	25	27	29	32	45	45	8.03
NATURAL RUBBER	20	32	40	34	41	51	52	48	56	53	46	5.03
WOOL GREASY	12	21	19	18	21	18	29	20	23	26	26	3.78
BOVINE CATTLE 1/	208	171	255	193	184	173	189	187	152	163	169	- 2.55
SHEEP AND GOATS 1/	2729	2232	3998	3817	3774	3860	4292	4215	3905	5173	5437	6.48
PIGS 1/					1							-97.18
TOTAL MEAT	20	29	40	53	63	60	72	82	135	224	314	26.76
TOTAL EGGS IN SHELL	8	20	25	29	36	44	53	41	52	71	78	14.98

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
	.....	.....	.....	.....	....THOUSAND METRIC TONS....	.....	.....	.....	.....	.....	.....	PERCENT
FISHERY PRODUCTS												
FISH FRESH FROZEN	8	21	22	19	20	22	21	22	29	40	41	8.00
FISH CURED	4	4	3	3	3	3	5	3	4	4	3	- .60
FISH CANNED AND PREPARED	10	9	9	10	15	14	16	23	27	38	45	20.86
FISH BODY AND LIVER OIL	1	1	1	1	1	2	1	1	1	1		- 2.71
FISH MEAL	1	6	6	5	6	7	18	11	23	25	33	23.54
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	31	40	48	112	120	76	154	152	109	202	156	15.30
SAWLOGS NONCONIFEROUS	60	48	90	37	32	65	44	47	49	84	107	5.54
PULPWOOD+PARTICLE	41	51	35	8	41	17		29	20	102	21	- .38
FUELWOOD	219	277	296	393	322	213	154	344	180	177	177	- 6.82
SAWNWOOD CONIFEROUS	916	1050	897	927	1219	1201	1638	1485	1610	1599	1557	7.06
SAWNWOOD NONCONIFEROUS	83	117	86	156	96	114	103	107	93	184	191	4.50
WOOD-BASED PANELS	72	81	85	118	125	136	237	331	407	473	450	25.21
PULP FOR PAPER	40	45	68	72	60	96	64	70	69	90	188	9.32
PAPER AND PAPERBOARD	282	449	451	523	469	615	592	540	573	785	719	5.58
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR, WHEAT EQUIV.	7946	11227	10601	8137	8615	7504	6697	10951	11511	14575	13047	3.65
RICE MILLED	4172	3581	3377	3504	4477	4145	4435	4616	3075	2992	3405	- 1.08
BARLEY	152	5	156	121	32	77	349	494	497	539	3	12.99
MAIZE	445	727	555	770	768	970	1181	1344	1257	1444	1856	12.51
SORGHUM	12	2107	400	377	33	2		1188	727	261	534	- 2.57
POTATOES	134	105	95	92	91	95	90	96	100	89	92	- .65
SUGAR, TOTAL (RAW EQUIV.)	909	1056	1334	1595	1351	1398	1151	1492	1146	1162	1163	- 1.00
PULSES	167	158	150	178	168	144	190	127	106	107	102	- 5.52
SOYBEANS	67	82	58	73	136	149	146	168	135	153	417	16.42
SOYBEAN OIL	100	124	131	175	252	269	184	178	175	117	251	2.54
GROUNDNUTS SHELLED BASIS	44	32	30	24	24	21	23	23	24	19	41	- .56
GROUNDNUT OIL	38	23	27	25	24	25	25	28	24	24	49	3.91
COPRA	178	53	45	58	46	65	86	36	20	57	96	.77
COCONUT OIL	34	33	26	27	36	41	35	60	31	38	47	4.88
PALM NUTS KERNELS	13	13	13	17	12	8	26	35	22	20	27	9.53
PALM OIL	75	88	69	124	150	224	240	315	356	309	316	19.59
OILSEED CAKE AND MEAL	100	103	128	179	187	199	232	151	272	324	452	13.86
BANANAS	40	44	40	41	53	45	46	55	50	58	50	2.96
ORANGES+TANGER+CLEMEN	83	126	115	129	151	158	179	193	170	208	199	6.55
COFFEE GREEN+ROASTED	60	26	34	67	51	37	25	46	34	31	42	- .22
COCOA BEANS	5	8	9	5	6	8	12	12	9	18	9	7.12
TEA	32	38	41	46	45	49	49	54	52	64	70	6.16
COTTON LINT	428	510	567	488	569	600	538	672	555	750	817	4.49
JUTE AND SIMILAR FIBRES	94	33	75	28	6	112	72	112	66	76	118	15.75
TOBACCO UNMANUFACTURED	38	51	98	109	65	59	60	51	74	56	58	- 3.15
NATURAL RUBBER 3/	112	119	105	133	89	91	92	116	136	131	149	2.72
WOOL GREASY	7	16	15	21	24	20	21	14	16	26	25	3.17
BOVINE CATTLE 1/	207	269	272	296	296	274	329	303	286	287	257	.02
SHEEP AND GOATS 1/	307	264	284	302	321	334	352	244	224	247	273	- 1.77
PIGS 1/	1500	1900	1864	1847	1882	2447	2680	2700	2629	2796	2784	5.74
TOTAL MEAT	47	66	87	90	97	97	100	110	125	149	167	8.98
MILK DRY	25	48	61	59	54	56	50	54	59	59	60	1.01
TOTAL EGGS IN SHELL	47	48	46	47	51	55	52	56	53	58	53	2.11
FISHERY PRODUCTS												
FISH FRESH FROZEN	92	91	102	96	117	119	126	140	131	150	156	6.05
FISH CURED	59	52	57	57	56	52	21	24	24	25	24	-11.71
SHELLFISH	36	36	32	29	38	48	61	68	80	68	78	12.37
FISH CANNED AND PREPARED	69	71	82	87	86	94	86	84	92	109	122	4.35
SHELLFISH CANNED+PREPAR	18	21	24	21	20	15	18	16	14	14	16	- 5.22
FISH BODY AND LIVER OIL	2	2	5	7	9	7	5	7	3	3	7	.63
FISH MEAL	45	55	57	77	78	78	86	53	59	97	94	3.74
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	124	299	472	230	293	435	373	827	773	460	749	10.93
SAWLOGS NONCONIFEROUS	1288	3103	4277	4461	5156	5736	5854	5981	5132	5759	6720	6.38
FUELWOOD	817	448	459	383	435	432	421	409	455	480	466	.81
SAWNWOOD CONIFEROUS	24	20	12	16	13	37	38	41	65	179	180	34.73
SAWNWOOD NONCONIFEROUS	195	392	628	467	469	480	662	1207	1108	977	1502	14.72
WOOD-BASED PANELS	136	139	148	168	184	232	261	344	337	390	481	15.24

see notes at end of table

ANNEX TABLE 6. VOLUME OF IMPORTS OF MAJOR AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	AVERAGE 1961-65	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1967-76
					THOUSAND METRIC TONS							PERCENT
PULP FOR PAPER	203	201	268	308	315	341	502	476	466	296	397	6.60
PAPER AND PAPERBOARD	634	895	1052	1178	1228	1402	1269	1419	1314	1157	1466	3.70
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS												
WHEAT+FLOUR,WHEAT EQUIV.	5326	4358	6313	4772	6909	4934	6564	7710	7956	4719	3635	- .30
RICE MILLED	381	1433	1756	1646	1463	1416	1444	1647	1667	1412	1162	- 1.79
BARLEY	451	27	54	97	244	327	452	279	327	181	314	25.34
MAIZE	288	290	422	491	731	732	2090	3079	2797	1630	1954	27.97
MILLET	11											
POTATOES	2											-31.31
SUGAR,TOTAL (RAW EQUIV.)	878	925	871	938	904	1039	1169	1369	679	723	988	- .58
PULSES	19	22	21	28	29	25	40	40	32	33	44	7.15
SOYBEANS	148	351	385	472	618	525	712	799	1181	856	833	12.22
SOYBEAN OIL	4	19	17	36	21	32	44	123	34	52	41	12.80
GROUNDNUT OIL	1											-30.37
COPRA	14	5	1	4	4	4	4	4	4	3	5	3.66
COCONUT OIL	17	13	14	20	22	30	38	20	20	44	33	10.79
OILSEED CAKE AND MEAL			1	2	2	3	5	6	5	5	33	90.14
COFFEE GREEN+ROASTED	1	1	1	1								-12.35
COCOA BEANS	5	2	1		1	1	2	8	6	8	8	36.81
TEA	6	6	4	4	4	4	4	6	7	6	5	3.92
COTTON LINT	544	201	179	207	267	305	327	632	616	386	383	12.40
JUTE AND SIMILAR FIBRES	40	72	64	51	51	57	63	59	47	32	39	- 6.06
TOBACCO UNMANUFACTURED	6	12	9	8	9	11	24	20	23	12	12	6.40
NATURAL RUBBER	128	164	235	299	210	196	219	301	235	274	302	4.05
WOOL GREASY	13	19	13	18	20	20	25	23	18	17	23	2.76
SHEEP AND GOATS 1/		4	4	4	4	4	4	5	6	6	5	4.73
TOTAL MEAT	1		2			1	2	2	2	29	28	88.15
FISHERY PRODUCTS												
FISH FRESH FROZEN		1			1	1		1	8			3.88
SHELLFISH	1	1	1	1	1	1	1		3	3	3	7.70
FISH MEAL	2	13	15	33	35	45	48	33	40	88	130	22.60
FOREST PRODUCTS 2/												
SAWLOGS CONIFEROUS	561	15	5	1	2	2	122	492	610	196	196	84.70
SAWLOGS NONCONIFEROUS	484	779	1186	1264	1564	2252	4000	3990	3801	3887	4691	22.40
SAWNWOOD CONIFEROUS		2	1		1	16	2			21	28	31.64
SAWNWOOD NONCONIFEROUS	2	4	8	12	10	10	8	9	27	23	23	18.20
WOOD-BASED PANELS	4	12	5	1	1	2	5	1	1	3	2	- 9.48
PULP FOR PAPER	107	249	210	123	99	224	56	57	66	32	32	-20.55
PAPER AND PAPERBOARD	57	87	97	103	157	227	105	60	82	67	68	- 5.72

1/ Thousand head

2/ See General Notes on Annex Tables

3/ Excluding imports of Singapore

ANNEX TABLE 7. INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
WORLD												
AGRICULTURAL PRODUCTS	115	114	115	121	134	143	169	251	314	324	339	13.87
FOOD	119	121	121	128	145	160	189	280	371	399	385	15.48
FEED	139	139	143	150	180	198	232	493	463	403	568	17.20
RAW MATERIALS	102	95	94	101	100	99	114	169	198	164	192	8.27
BEVERAGES	112	109	119	119	143	138	167	218	220	232	354	11.51
FISHERY PRODUCTS	134	133	137	153	184	209	253	341	367	381	474	15.03
FOREST PRODUCTS	124	128	144	163	182	189	223	325	422	375	449	15.18
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	118	120	118	123	140	157	189	291	356	374	381	15.39
FOOD	121	124	123	130	150	171	205	313	390	427	423	16.43
FEED	159	163	169	187	220	253	289	639	642	476	639	17.75
RAW MATERIALS	101	99	94	91	93	92	107	165	204	167	188	8.38
BEVERAGES	128	135	149	163	191	231	309	428	447	491	561	18.06
FISHERY PRODUCTS	130	128	130	144	166	188	231	320	342	340	421	14.21
FOREST PRODUCTS	122	125	139	157	176	181	213	298	405	366	429	14.89
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	121	129	134	153	174	202	252	359	422	481	492	17.56
FOOD	123	132	138	161	182	212	262	367	441	516	517	17.92
FEED	136	140	136	153	189	226	289	697	718	515	635	21.44
RAW MATERIALS	98	96	86	85	88	84	106	151	188	174	201	9.17
BEVERAGES	127	135	148	163	196	242	331	462	463	515	582	18.85
FISHERY PRODUCTS	134	131	127	143	172	199	244	347	381	379	471	15.61
FOREST PRODUCTS	118	119	129	149	169	176	205	303	428	366	430	15.84
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	113	139	135	139	129	144	156	206	265	259	251	9.00
FOOD	110	142	136	146	132	149	154	212	275	256	237	8.73
FEED	129	128	107	115	23	31	25	39	24	74	196	- 5.88
RAW MATERIALS	118	123	127	105	113	118	144	171	217	236	256	8.83
BEVERAGES	151	167	192	215	218	256	310	365	430	511	527	14.14
FISHERY PRODUCTS	152	158	173	172	194	197	223	279	358	449	432	12.23
FOREST PRODUCTS	133	132	140	151	171	177	196	274	368	371	402	13.46
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	123	110	105	97	124	138	161	298	379	376	385	16.69
FOOD	129	111	104	96	127	139	167	320	407	423	424	17.86
FEED	185	186	203	223	275	312	338	734	724	527	722	17.11
RAW MATERIALS	97	98	98	86	93	111	119	168	235	189	200	9.97
BEVERAGES	101	89	101	98	117	106	140	284	403	305	551	19.80
FISHERY PRODUCTS	131	138	143	169	181	205	242	380	336	362	476	14.38
FOREST PRODUCTS	124	131	151	169	186	189	227	299	381	358	436	14.01

ANNEX TABLE 7. INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
	1961-65=100											PERCENT
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	106	110	100	105	118	118	145	213	253	247	263	11.71
FOOD	110	121	114	114	138	157	198	245	305	353	354	14.58
FEED	49	103	105	142	198	152	185	340	378	270	757	23.33
RAW MATERIALS	101	96	83	95	93	72	82	174	192	124	156	6.37
BEVERAGES	115	111	118	112	110	138	176	178	237	265	271	10.77
FISHERY PRODUCTS	174	173	256	302	310	429	557	642	612	621	724	16.66
FOREST PRODUCTS	119	146	181	209	242	290	360	563	713	695	810	22.50
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	111	106	111	118	127	126	144	200	260	261	286	11.60
FOOD	115	115	119	126	134	140	159	218	335	347	314	13.38
FEED	121	117	119	116	143	147	179	358	299	335	503	16.26
RAW MATERIALS	103	91	94	110	107	106	120	173	191	162	195	8.18
BEVERAGES	109	104	113	109	133	118	137	174	172	177	311	9.11
FISHERY PRODUCTS	145	145	160	180	239	274	320	404	441	504	633	17.03
FOREST PRODUCTS	138	148	186	217	234	257	314	562	573	451	630	17.37
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	106	102	111	116	129	119	135	172	220	204	250	9.47
FOOD	104	104	115	121	128	118	134	162	234	223	235	9.41
FEED	125	146	153	139	154	121	162	239	188	170	210	4.61
RAW MATERIALS	86	79	77	84	96	97	103	133	165	125	145	7.27
BEVERAGES	124	109	122	126	154	137	158	218	229	217	360	10.61
FISHERY PRODUCTS	124	112	120	141	146	163	212	349	382	368	407	16.04
FOREST PRODUCTS	113	114	130	157	147	141	177	318	337	260	330	12.66
LATIN AMERICA												
AGRICULTURAL PRODUCTS	113	108	113	121	138	133	159	225	284	304	325	13.13
FOOD	121	122	120	133	154	158	186	265	392	428	353	15.12
FEED	124	119	118	128	162	191	234	521	417	556	878	23.16
RAW MATERIALS	99	82	90	105	92	83	102	140	157	143	153	6.33
BEVERAGES	108	100	115	110	137	117	140	184	165	170	342	9.54
FISHERY PRODUCTS	146	143	160	169	230	251	242	209	283	288	304	8.19
FOREST PRODUCTS	144	139	173	209	214	232	261	385	510	442	457	14.68
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	114	114	119	130	136	147	172	224	239	219	262	9.70
FOOD	105	117	127	156	133	138	181	245	256	249	294	11.00
FEED	136	140	138	138	158	136	187	205	203	134	110	.80
RAW MATERIALS	118	112	113	114	135	152	164	211	228	204	249	9.18
BEVERAGES	106	105	146	160	202	183	245	326	328	219	258	10.95
FISHERY PRODUCTS	143	147	154	166	193	235	307	466	528	489	408	15.95
FOREST PRODUCTS	171	172	209	228	272	276	364	509	786	393	353	12.34

ANNEX TABLE 7. INDICES OF VALUE OF EXPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
	1961-65=100											PERCENT
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	102	96	96	103	107	110	116	165	246	237	264	11.75
FOOD	107	98	102	99	111	128	131	176	349	358	350	15.78
FEED	110	94	98	82	113	111	122	278	247	223	339	13.96
RAW MATERIALS	101	89	90	117	105	97	107	175	199	157	205	8.54
BEVERAGES	94	107	96	88	99	95	98	97	115	139	184	4.78
FISHERY PRODUCTS	156	169	187	233	266	325	465	736	751	1091	1672	27.07
FOREST PRODUCTS	149	168	228	257	292	328	390	782	762	585	931	20.25
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	146	145	148	145	122	148	170	263	348	343	292	10.51
FOOD	152	155	156	148	123	148	162	254	383	374	301	10.51
FEED	121	108	109	108	81	112	110	178	150	156	129	3.75
RAW MATERIALS	128	115	122	145	124	149	212	339	252	253	280	11.00
BEVERAGES	127	109	121	115	117	144	153	149	192	224	227	7.50
FOREST PRODUCTS	179	214	228	286	333	444	666	739	591	539	514	14.01

ANNEX TABLE 8. INDICES OF VOLUME OF EXPORTS OF AGRICULTURAL AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
WORLD												
AGRICULTURAL PRODUCTS	112	111	115	116	124	127	137	148	140	142	153	3.44
FOOD	114	115	118	118	130	134	145	159	153	155	168	4.29
FEED	127	128	137	146	167	177	189	213	218	219	279	7.89
RAW MATERIALS	105	102	106	108	109	108	114	120	106	104	111	.56
BEVERAGES	107	108	114	118	121	121	131	139	129	136	140	2.81
FOREST PRODUCTS	122	126	142	154	163	164	180	202	197	161	194	4.58
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	113	116	120	118	131	138	150	167	159	162	173	4.78
FOOD	115	118	123	122	137	144	156	176	169	174	185	5.36
FEED	143	147	158	176	200	220	227	273	280	243	300	7.97
RAW MATERIALS	101	102	105	98	102	103	110	116	106	99	106	.51
BEVERAGES	119	124	134	141	162	193	226	233	242	265	278	9.91
FOREST PRODUCTS	120	123	136	147	155	153	167	185	185	150	179	3.94
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	112	122	133	141	155	165	179	196	203	209	218	7.11
FOOD	114	124	137	147	161	170	181	201	208	214	222	7.07
FEED	120	129	129	144	170	193	232	292	317	263	295	11.29
RAW MATERIALS	98	101	98	94	94	92	107	104	112	111	117	1.83
BEVERAGES	118	124	133	140	165	202	239	240	243	269	283	10.24
FOREST PRODUCTS	114	116	129	143	149	146	160	188	186	138	171	4.12
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	117	142	143	142	125	134	127	133	145	135	129	.19
FOOD	113	145	145	150	125	135	121	126	141	121	110	- 1.20
FEED	120	114	98	96	21	21	19	21	12	40	62	-14.27
RAW MATERIALS	125	129	131	110	117	120	134	144	143	153	162	2.69
BEVERAGES	152	168	184	202	210	237	247	252	295	322	327	7.99
FOREST PRODUCTS	130	132	140	147	158	155	160	176	171	168	184	3.40
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	118	105	105	94	119	123	141	175	156	159	175	5.83
FOOD	123	105	102	93	123	125	148	185	159	172	192	6.66
FEED	169	168	190	212	252	276	262	318	321	273	346	7.49
RAW MATERIALS	96	100	102	83	87	100	100	120	120	96	92	.90
BEVERAGES	100	92	104	99	104	94	119	208	247	209	247	11.54
FOREST PRODUCTS	123	128	141	151	160	160	175	182	187	154	183	3.74
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	103	108	111	114	124	128	137	131	107	113	133	1.58
FOOD	104	115	115	113	127	143	152	146	127	138	156	3.46
FEED	38	89	92	123	189	112	160	175	106	126	298	12.19
RAW MATERIALS	103	99	106	114	120	111	119	113	83	83	104	- 1.28
BEVERAGES	108	108	116	106	97	116	137	121	137	143	148	3.52
FOREST PRODUCTS	121	154	197	224	246	254	259	280	250	235	285	6.75

ANNEX TABLE 8. INDICES OF VOLUME OF EXPORTS OF AGRICULTURAL AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	110	107	110	114	117	116	123	127	119	120	131	1.68
FOOD	112	108	109	111	118	118	126	129	127	125	140	2.32
FEED	113	110	116	117	134	131	147	149	148	175	231	6.32
RAW MATERIALS	110	102	108	118	115	113	118	124	106	108	114	.43
BEVERAGES	106	107	113	115	114	112	119	126	113	118	121	1.17
FOREST PRODUCTS	141	147	184	207	228	247	277	334	281	253	320	8.22
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	105	98	105	105	110	102	112	113	104	95	100	- .21
FOOD	104	97	105	99	101	95	108	102	95	86	91	- 1.20
FEED	117	132	136	132	137	105	143	117	95	101	116	- 2.15
RAW MATERIALS	98	95	93	95	113	108	107	106	91	84	88	- .84
BEVERAGES	113	101	111	122	128	111	123	143	132	122	128	2.00
FOREST PRODUCTS	112	111	125	144	134	130	140	164	139	104	123	.76
LATIN AMERICA												
AGRICULTURAL PRODUCTS	110	109	111	117	121	115	120	125	117	123	133	1.57
FOOD	115	117	114	121	137	127	130	141	140	137	156	2.79
FEED	117	110	107	121	145	153	161	169	187	248	327	10.35
RAW MATERIALS	107	92	97	116	100	84	90	86	76	88	80	- 2.75
BEVERAGES	103	104	114	113	105	110	117	120	98	111	110	.33
FOREST PRODUCTS	137	133	162	167	169	177	204	246	219	183	212	4.96
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	116	112	113	119	129	131	140	144	108	106	127	.51
FOOD	96	102	109	130	111	115	135	142	120	102	128	1.93
FEED	122	127	142	142	151	125	151	108	92	84	64	- 5.93
RAW MATERIALS	127	118	113	111	136	139	141	144	100	109	129	- .04
BEVERAGES	111	138	173	183	232	267	275	314	232	104	110	.87
FOREST PRODUCTS	161	156	186	219	261	289	292	317	400	269	258	7.24
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	104	100	106	107	111	119	124	128	126	132	150	3.64
FOOD	104	91	95	92	103	121	130	122	128	145	174	5.73
FEED	103	96	109	96	115	119	128	155	145	149	221	7.05
RAW MATERIALS	107	105	117	126	120	125	128	146	134	127	136	2.51
BEVERAGES	97	110	106	102	107	102	103	102	101	112	115	.68
FOREST PRODUCTS	155	169	223	254	295	321	363	462	383	351	467	10.98
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	152	140	135	133	115	130	135	154	142	138	129	- .25
FOOD	160	148	142	136	120	137	135	160	150	142	125	- .72
FEED	100	100	107	112	88	107	102	91	72	67	65	- 4.63
RAW MATERIALS	128	118	111	124	97	100	136	140	106	118	138	.75
BEVERAGES	127	108	115	115	112	136	136	123	148	159	163	3.59
FOREST PRODUCTS	167	170	197	243	273	365	445	408	319	361	362	9.37

ANNEX TABLE 9. INDICES OF VALUE OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
WORLD												
AGRICULTURAL PRODUCTS	116	114	115	121	135	145	169	244	312	334	344	13.94
FOOD	122	122	122	128	145	161	188	272	368	411	394	15.45
FEED	143	134	135	146	178	202	232	463	437	383	515	16.40
RAW MATERIALS	102	95	95	101	102	100	115	167	199	172	199	8.59
BEVERAGES	113	108	116	116	141	142	162	211	222	244	342	11.61
FISHERY PRODUCTS	136	135	144	159	190	216	263	348	394	395	488	15.23
FOREST PRODUCTS	125	128	145	164	182	190	218	320	418	369	446	14.91
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	116	113	113	121	136	146	171	244	293	315	334	13.45
FOOD	122	122	121	132	150	167	197	278	351	400	391	15.16
FEED	145	135	136	146	177	198	230	467	431	374	504	16.03
RAW MATERIALS	101	92	92	98	98	93	109	158	182	155	181	7.65
BEVERAGES	112	107	117	115	143	144	165	217	225	245	349	11.90
FISHERY PRODUCTS	138	137	148	163	195	221	274	365	410	405	509	15.52
FOREST PRODUCTS	123	128	144	163	180	186	217	320	412	358	441	14.81
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	116	113	110	121	132	144	170	238	279	294	310	12.69
FOOD	121	121	116	129	142	163	193	265	324	358	348	14.04
FEED	143	134	131	140	165	186	208	405	362	314	432	13.92
RAW MATERIALS	98	90	87	96	91	87	102	144	164	138	168	6.80
BEVERAGES	113	109	113	117	147	144	172	233	239	257	358	12.52
FISHERY PRODUCTS	130	131	134	150	179	199	226	309	352	347	394	13.59
FOREST PRODUCTS	120	119	130	151	172	174	202	300	415	347	429	15.31
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	114	103	105	107	133	137	167	245	295	411	435	16.94
FOOD	116	104	102	100	130	136	177	266	309	521	546	19.70
FEED	181	185	207	216	289	356	501	1074	1151	1075	1259	26.25
RAW MATERIALS	104	90	95	97	115	108	113	160	213	192	192	9.02
BEVERAGES	134	145	163	204	231	254	300	320	403	493	592	15.87
FISHERY PRODUCTS	128	108	94	104	157	175	179	237	337	292	317	13.70
FOREST PRODUCTS	122	141	157	171	200	216	227	285	392	516	523	16.04
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	111	110	122	122	139	140	156	209	261	242	278	10.74
FOOD	118	124	139	150	172	174	198	262	356	319	313	12.27
FEED	107	102	104	127	154	139	166	299	279	271	379	14.59
RAW MATERIALS	98	88	88	90	77	65	77	113	146	128	170	5.82
BEVERAGES	105	98	114	95	121	126	132	174	170	180	282	9.39
FISHERY PRODUCTS	139	136	161	168	190	209	288	322	352	324	445	12.91
FOREST PRODUCTS	122	118	136	151	139	163	203	248	269	257	342	11.21

ANNEX TABLE 9. INDICES OF VALUE OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	106	100	93	103	113	115	120	138	232	241	235	10.40
FOOD	116	108	103	109	135	140	144	164	306	380	344	14.21
FEED	532	491	687	453	630	676	515	343	972	444	451	- .86
RAW MATERIALS	90	87	74	90	95	86	91	112	198	139	161	7.67
BEVERAGES	114	108	102	110	106	122	128	140	168	204	194	6.93
FISHERY PRODUCTS	153	148	144	158	178	231	234	310	464	418	393	13.57
FOREST PRODUCTS	107	111	118	129	148	155	144	210	292	315	291	12.38
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	117	119	122	120	131	145	160	247	391	409	387	15.72
FOOD	119	121	124	118	131	145	161	255	418	443	404	16.39
FEED	108	116	123	154	191	273	265	393	557	547	702	22.47
RAW MATERIALS	108	112	116	125	129	147	162	235	321	292	327	13.49
BEVERAGES	120	113	112	124	128	125	132	157	194	234	285	8.91
FISHERY PRODUCTS	125	119	125	133	163	182	196	245	299	333	360	12.98
FOREST PRODUCTS	135	132	151	169	198	219	228	320	464	456	481	15.76
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	112	112	108	109	128	147	164	233	364	416	401	16.75
FOOD	114	112	106	107	127	151	168	245	387	440	415	17.52
FEED	180	195	199	235	324	400	348	547	898	703	587	17.05
RAW MATERIALS	132	144	148	142	166	194	231	293	493	483	490	16.49
BEVERAGES	89	100	105	106	114	96	106	124	158	231	275	9.97
FISHERY PRODUCTS	117	89	77	82	116	125	141	175	227	291	291	13.83
FOREST PRODUCTS	128	136	139	170	212	225	211	297	459	469	468	15.79
LATIN AMERICA												
AGRICULTURAL PRODUCTS	113	116	123	124	131	144	165	251	401	364	370	15.33
FOOD	112	119	127	125	132	143	169	262	426	392	391	16.05
FEED	107	113	123	153	169	339	290	548	645	623	872	25.95
RAW MATERIALS	114	101	106	110	112	128	129	163	266	199	211	9.00
BEVERAGES	130	115	116	144	159	161	183	235	278	288	355	11.97
FISHERY PRODUCTS	148	149	163	171	212	236	225	252	299	316	320	9.04
FOREST PRODUCTS	130	126	152	167	191	191	199	234	395	359	331	11.98
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	119	116	115	112	132	182	183	252	553	718	625	22.41
FOOD	118	116	117	110	135	197	190	273	634	830	706	24.43
FEED	186	174	160	192	345	520	509	649	914	720	808	21.12
RAW MATERIALS	110	113	105	119	121	131	160	179	302	411	388	15.38
BEVERAGES	135	113	110	115	117	114	142	156	210	230	282	8.79
FISHERY PRODUCTS	125	137	130	129	175	206	242	335	593	704	729	22.31
FOREST PRODUCTS	133	126	127	143	163	193	237	296	437	649	604	19.57

ANNEX TABLE 9. INDICES OF VALUE OF IMPORTS OF AGRICULTURAL, FISHERY AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	118	126	124	122	126	131	133	217	291	326	318	12.06
FOOD	121	129	123	119	123	124	129	224	305	340	312	12.19
FEED	86	90	100	131	157	179	194	246	415	453	581	21.87
RAW MATERIALS	101	117	130	130	135	154	154	200	248	280	339	12.01
BEVERAGES	138	130	119	147	143	153	110	142	154	194	254	4.74
FISHERY PRODUCTS	112	113	124	130	150	167	184	248	280	308	370	13.50
FOREST PRODUCTS	134	144	173	194	226	262	256	441	555	475	628	17.52
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	123	112	134	124	141	133	185	327	496	349	319	15.08
FOOD	128	114	149	124	148	130	185	316	510	371	316	14.63
FEED	426	1011	902	1015	814	828	1252	1106	1107	1429	2808	11.56
RAW MATERIALS	107	105	94	124	123	145	184	366	466	293	332	16.86
BEVERAGES	127	107	83	69	67	68	79	101	129	97	70	- 1.01
FOREST PRODUCTS	188	131	147	139	180	276	297	460	610	424	490	16.34

ANNEX TABLE 10. INDICES OF VOLUME OF IMPORTS OF AGRICULTURAL AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
	1961-65=100											PERCENT
WORLD												
AGRICULTURAL PRODUCTS	115	110	114	116	124	128	137	146	140	144	154	3.43
FOOD	116	115	117	119	130	136	146	158	154	158	169	4.33
FEED	131	124	129	143	164	177	192	206	197	197	248	6.77
RAW MATERIALS	114	100	105	106	107	106	112	114	105	104	111	.20
BEVERAGES	105	103	114	115	120	121	127	134	129	137	139	3.02
FOREST PRODUCTS	122	126	142	154	163	164	180	202	196	162	190	4.49
DEVELOPED COUNTRIES												
AGRICULTURAL PRODUCTS	112	110	113	116	124	127	137	144	135	139	150	3.20
FOOD	116	115	117	121	131	136	149	159	150	155	169	4.17
FEED	133	125	130	143	163	174	190	207	194	193	242	6.40
RAW MATERIALS	103	100	104	105	107	103	110	108	98	97	103	- .20
BEVERAGES	104	103	115	114	120	122	129	136	129	138	139	3.13
FOREST PRODUCTS	120	125	140	152	160	159	176	199	191	154	183	4.19
WESTERN EUROPE												
AGRICULTURAL PRODUCTS	110	110	111	116	121	124	132	134	129	132	141	2.58
FOOD	114	115	115	120	126	133	141	144	142	145	153	3.24
FEED	131	125	126	138	153	163	174	185	168	168	215	4.88
RAW MATERIALS	100	97	99	102	100	97	101	99	88	86	97	- .94
BEVERAGES	106	105	111	115	125	121	131	140	133	142	143	3.41
FOREST PRODUCTS	114	117	131	144	152	146	161	187	179	138	173	3.95
USSR AND EASTERN EUROPE												
AGRICULTURAL PRODUCTS	112	101	105	105	128	132	156	173	148	173	188	6.54
FOOD	113	96	95	89	116	123	160	195	142	180	210	8.24
FEED	180	179	204	217	278	327	418	450	518	540	576	14.50
RAW MATERIALS	105	97	104	101	117	111	111	110	114	115	109	1.15
BEVERAGES	126	146	169	255	269	289	308	273	305	353	343	10.10
FOREST PRODUCTS	129	150	168	183	207	210	209	215	230	254	257	6.40
NORTH AMERICA DEVELOPED												
AGRICULTURAL PRODUCTS	106	107	117	112	116	118	125	130	125	120	133	1.99
FOOD	112	115	123	126	137	134	145	150	146	133	154	2.85
FEED	91	86	86	105	119	109	115	111	115	120	148	4.38
RAW MATERIALS	102	99	108	100	91	89	100	99	97	99	105	- .09
BEVERAGES	99	98	114	96	96	108	108	117	107	111	115	1.44
FOREST PRODUCTS	120	117	128	138	130	145	167	169	154	132	152	2.65
OCEANIA DEVELOPED												
AGRICULTURAL PRODUCTS	108	104	101	108	114	115	122	119	140	130	126	2.68
FOOD	119	110	108	104	118	123	128	128	155	159	140	3.58
FEED	583	467	700	467	617	650	483	233	400	217	217	- 9.78
RAW MATERIALS	96	93	90	103	106	103	113	106	131	100	111	2.08
BEVERAGES	108	108	105	119	116	119	125	125	128	136	128	2.33
FOREST PRODUCTS	106	109	114	120	131	134	133	162	181	156	136	4.35

ANNEX TABLE 10. INDICES OF VOLUME OF IMPORTS OF AGRICULTURAL AND FOREST PRODUCTS

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	ANNUAL RATE OF CHANGE 1966-76
						1961-65=100						PERCENT
DEVELOPING COUNTRIES												
AGRICULTURAL PRODUCTS	124	114	119	117	126	132	135	155	163	165	170	4.30
FOOD	118	117	121	116	128	134	136	159	168	169	172	4.68
FEED	97	108	118	154	182	241	236	195	254	288	368	13.18
RAW MATERIALS	166	104	116	119	116	125	131	150	152	153	161	2.57
BEVERAGES	111	102	106	119	116	108	111	113	124	127	137	2.07
FOREST PRODUCTS	138	136	157	168	188	202	203	217	229	218	236	5.89
AFRICA DEVELOPING												
AGRICULTURAL PRODUCTS	113	113	113	110	125	136	138	148	158	165	171	4.92
FOOD	116	114	112	110	128	141	143	155	161	167	174	5.07
FEED	175	185	195	225	295	355	305	280	400	310	350	7.70
RAW MATERIALS	127	145	162	144	160	177	193	205	252	250	256	7.45
BEVERAGES	87	95	99	95	91	81	82	78	89	111	116	1.14
FOREST PRODUCTS	124	130	128	157	194	203	174	202	237	205	215	6.39
LATIN AMERICA												
AGRICULTURAL PRODUCTS	110	113	122	124	127	134	141	160	189	174	178	5.66
FOOD	109	114	122	123	128	132	141	165	196	180	184	6.14
FEED	101	107	117	148	172	293	249	234	298	307	431	15.20
RAW MATERIALS	114	109	124	118	121	139	136	133	147	133	134	2.27
BEVERAGES	121	112	116	142	131	131	140	146	170	150	148	3.18
FOREST PRODUCTS	135	129	160	165	191	178	184	179	209	186	180	3.54
NEAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	120	119	121	118	138	172	154	157	205	247	246	8.30
FOOD	118	117	120	114	136	182	151	162	214	261	260	9.22
FEED	154	143	151	184	305	430	414	316	338	303	314	9.89
RAW MATERIALS	118	131	134	135	142	149	183	149	192	266	240	7.46
BEVERAGES	134	117	117	132	140	121	138	128	152	141	158	2.09
FOREST PRODUCTS	130	133	131	152	153	175	197	194	206	257	241	7.37
FAR EAST DEVELOPING												
AGRICULTURAL PRODUCTS	116	121	121	117	121	119	116	142	131	145	154	2.51
FOOD	119	121	116	112	117	113	111	139	128	138	145	2.01
FEED	77	83	97	135	150	171	183	143	198	257	320	13.67
RAW MATERIALS	103	124	144	138	135	143	133	152	139	168	185	3.91
BEVERAGES	110	94	105	130	123	127	121	141	131	148	163	4.26
FOREST PRODUCTS	142	152	188	197	210	237	241	290	271	249	316	7.53
ASIAN CENT PLANNED ECON												
AGRICULTURAL PRODUCTS	155	104	130	124	140	125	162	198	188	147	143	2.92
FOOD	130	110	142	128	154	133	175	209	202	154	145	3.76
FEED	450	1100	950	1100	900	550	800	400	500	800	800	- 2.21
RAW MATERIALS	226	88	94	113	102	103	128	168	150	128	141	1.43
BEVERAGES	126	109	86	68	58	65	74	105	122	97	78	- .64
FOREST PRODUCTS	187	134	148	133	163	261	270	272	280	253	296	8.22

ANNEX TABLE 11. - STOCKS OF SELECTED AGRICULTURAL PRODUCTS

Product / Country	Date	1961-65 average	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977 a/
Wheat		million metric tons										
EXPORTING COUNTRIES												
United States	1 June b/	30.7	14.7	22.2	26.8	22.4	26.8	16.3	9.2	11.7	18.1	30.5
Canada	1 Aug.	13.3	18.1	23.2	27.5	20.0	16.0	9.9	10.1	8.0	8.1	15.2
Argentina	1 Dec.	1.5	1.0	0.3	0.8	0.7	0.5	0.1	1.0	0.8	1.7	3.2
Australia	1 Dec.	0.6	1.4	7.3	7.2	3.5	1.4	0.5	1.9 c/	1.6	2.2	2.2
European Economic Community	1 Aug.	6.5	9.2	9.1	5.5	5.8	7.5	6.1 c/	7.4 c/	10.3	8.0	6.2
TOTAL OF ABOVE		52.6	44.4	62.1	67.8	52.4	52.2	32.9	29.6	32.4	38.1	57.3
IMPORTING COUNTRIES												
India d/	1 April	...	2.1	2.3	1.6	2.4	3.4	0.5	0.8	1.0	4.9	...
Coarse grains e/												
EXPORTING COUNTRIES												
United States f/	1 July	62.7	44.4	46.0	44.6	32.2	46.6	31.7	21.8	15.4	17.3	26.8
Canada	1 Aug.	4.3	4.4	6.7	6.9	5.4	6.2 h/	5.8 h/	6.2 h/	5.5	4.3	4.4
Argentina g/	1 Dec.	0.4	1.8	1.7	0.1	-	0.2 h/	0.1 h/	0.5 h/	0.2	0.2	0.3
Australia	1 Dec.	0.2	0.8	1.2	1.2	1.6	1.0	0.5	0.5	0.5	0.3	0.3
TOTAL OF ABOVE		67.6	51.4	55.6	52.8	39.2	54.0	38.1	29.0	21.6	22.1	31.8
Rice (milled equivalent)												
EXPORTING COUNTRIES												
Pakistan h/	31 Dec.	...	0.19	0.24	0.32	0.11	0.32	0.10	0.37	0.64	0.34	...
Thailand	31 Dec.	...	...	...	...	0.96	0.70	0.17	0.80	0.96	0.95	0.66
United States i/	31 July	0.25	0.22	0.54	0.55	0.62	0.38	0.17	0.26	0.23	1.20	1.30
Japan h/	31 Oct.	-	-	8.50	9.50	7.03	5.22	3.71	3.09	4.45	4.77	...
TOTAL OF ABOVE		...	...	...	...	8.72	6.62	4.15	4.52	6.28	7.26	...
IMPORTING COUNTRIES												
India h/	31 Dec.	0.58	1.21	1.78	1.91	2.40	1.36	1.41	1.09	2.80	5.65	...
Dried skim milk												
United States		0.18	0.13	0.10	0.06	0.04	0.02	0.03	0.14	0.21	0.22	...
European Economic Community		0.03	0.35	0.41	0.20	0.12	0.29	0.33	0.50	1.11	1.15	...
TOTAL OF ABOVE	31 Dec.	0.21	0.48	0.51	0.26	0.16	0.31	0.36	0.64	1.32	1.37	...
Sugar (raw value)												
WORLD TOTAL	1 Sept.	14.1	20.6	19.3	21.4	19.1	17.0	16.0	15.9	17.3	20.4	23.3
Coffee												
EXPORTING COUNTRIES j/	end of crop season k/	4.30 n/	4.73	4.15	3.92	3.28	3.29	3.35	2.46	3.00	2.60	...

a/Estimated. - b/ 1961-69, 1 July. - c/ Commercial stocks. - d/ Government (or official agency) stocks only; 1968-69, 31 December. - e/ Barley, oats, maize, sorghum and rye. - f/ Maize and sorghum, 1 October. - g/ Maize, 1 April. - h/ Government stocks only. - i/ Including paddy converted to milled rice at 72%. - j/ 1961-69; excludes privately held stocks in Brazil. - k/ mainly between 31 March and 30 September. - n/ 1963-65.

ANNEX TABLE 12. - ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1970 to 1975	1973 to 1974	1974 to 1975	1975 to 1976	1960 to 1965	1965 to 1970	1970 to 1975	1973 to 1974	1974 to 1975	1975 to 1976
	Percent per year											
Developed countries												
WESTERN EUROPE												
Austria	3.9	3.3[a]	7.4	9.5	8.5	7.3	4.4	2.1[a]	6.7	8.4	6.3	5.9
Belgium	2.5	3.5	8.3	12.7	12.7	9.2	2.9	3.5	7.5	9.4	11.2	11.8
Denmark	5.5	7.5[b]	9.5	15.2	9.6	9.0	4.2	7.5[b]	10.7	11.9	11.1	10.8
Finland	5.3	4.6[b]	12.0	17.3	17.8	14.4	5.9	5.2[b]	12.4	16.0	20.6	16.3
France	3.8	4.3	8.8	13.7	11.8	9.6	4.3	3.8	9.6	12.6	11.4	10.8
Germany, Fed.Rep.of	2.8	2.4	6.2	7.0	6.0	4.5	2.6	1.3	5.6	4.7	5.3	5.1
Greece	1.6	2.5	13.1	26.9	13.4	13.3	2.5	2.6	14.7	27.7	11.8	13.8
Iceland	11.0	12.8	24.8	43.0	48.9	32.2	15.2	13.3	28.3	45.2	50.8	36.0
Ireland	4.2	5.3	13.0	17.0	20.9	18.0	3.9	4.3	14.3	14.7	21.5	16.5
Italy	4.9	3.0	11.4	19.1	17.0	16.8	4.6	2.2	11.6	17.8	18.0	17.1
Netherlands	3.5	4.8	8.6	9.7	10.2	8.8	4.0	4.3	6.9	7.2	8.0	9.9
Norway	4.1	5.0	8.3	9.4	11.7	9.2	4.5	5.3	8.3	8.4	15.0	10.2
Portugal	2.6	6.4	15.3	25.1	15.2	21.0	2.8	5.2	16.3	32.6	23.6	23.3
Spain	7.0	5.1	12.0	15.7	16.9	17.7	7.7	3.7	12.1	14.3	17.0	18.7
Sweden	3.6	4.5	7.8	9.9	9.8	10.3	5.3	4.5	7.9	6.2	11.7	12.9
Switzerland	3.2	3.4	7.9	9.8	6.7	1.7	2.9	0.9	7.3	10.8	6.2	- 1.5
United Kingdom	3.6	4.6	12.3	15.9	24.3	16.5	3.6	4.6	15.1	18.0	25.7	19.9
Yugoslavia	13.6	10.5	19.3	21.1	24.3	11.7	17.3	9.0	19.4	15.8	24.5	14.1
NORTH AMERICA												
Canada	1.6	3.8	7.4	11.0	10.8	7.5	2.2	3.4	11.1	16.3	12.9	2.6
United States	1.3	4.2	6.7	11.0	9.1	5.8	1.4	4.0	9.5	14.3	8.5	3.1
OCEANIA												
Australia	1.8	3.1	10.2	15.1	15.1	13.6	2.0	2.1	9.8	15.3	7.5	12.3
New Zealand	2.7	4.1	9.8	11.0	14.7	17.0	2.4	4.1	9.4	11.7	10.6	18.5
OTHER DEVELOPED COUNTRIES												
Israel	7.1	4.0	23.9	39.8	39.3	31.3	5.6	3.1	25.1	44.4	46.1	27.7
Japan	6.0	5.4	12.0	24.3	11.9	9.3	7.2	6.1	13.0	27.7	13.0	9.1
South Africa	2.1	3.4	9.3	11.6	13.5	11.2	2.6	3.0	11.7	15.0	14.9	7.4
Developing countries												
LATIN AMERICA												
Argentina	23.0	19.4	59.5	24.2	182.8	444.1	23.0	18.3	58.0	15.1	187.6	458.6
Bolivia	5.1	5.9	23.7[c]	62.9	7.9	4.5	2.1	7.8	27.2[c]	81.6	5.3	57.6
Brazil	60.0	28.0	23.5[c]	24.9	30.2	35.3	60.0	26.0	25.9[c]	28.0	29.2	34.5
Chile	27.0	26.0	225.4	504.7	374.7	211.9	30.0	26.0	245.5	513.7	359.6	212.8
Colombia	12.4	10.1	19.5	24.5	25.7	17.4	13.4	9.2	24.0	27.1	31.0	16.9
Costa Rica	2.3	2.5	14.3	30.1	17.3	3.5	2.2	3.8	14.9	29.3	16.3	- 0.2
Dominican Republic	2.7	1.0	11.1	13.1	14.5	7.8	2.5	0.1	13.3	17.7	17.7	- 2.8
Ecuador	4.0	4.6	13.7	23.4	15.3	10.7	4.9	6.0	18.4	32.4	18.6	9.5
El Salvador	0.2	1.1	8.4	16.9	19.2	7.0	1.1	2.2	8.8	17.4	20.6	6.9
Guatemala	0.1	1.5	2.9	16.0	-24.6	10.7	0.1	1.7	3.3	15.9	- 26.7	9.6
Guyana	1.9	1.5	8.2	15.3	8.0	9.0	2.3	2.8	12.2	25.9	8.4	13.8
Haiti	3.7	1.7	13.7	15.0	16.7	6.7	4.1	1.8	15.5	12.0	18.5	6.9
Honduras	2.7	1.6	6.5	12.6	6.2	5.1	3.2	1.8	8.0	15.4	7.9	6.0
Jamaica	2.9	4.3	14.9	27.2	17.5	9.7	2.4	4.7	17.2	29.1	17.7	9.0
Mexico	1.9	3.5	12.4	23.7	15.0	15.8	1.6	3.8	13.9	29.9	12.6	12.7
Panama	1.1[d]	1.6	7.8	16.8	5.5	2.3	1.4[d]	1.7	9.9	22.8	6.8	1.2
Paraguay	...	1.2	12.6	25.2	6.7	4.5	...	0.3	15.4	24.8	4.6	4.2
Peru	9.4	7.8[e]	12.1	16.8	23.7	33.4	10.5	7.1[e]	13.9	18.8	32.8	32.1

See notes at end of table.

ANNEX TABLE 12. - ANNUAL CHANGES IN CONSUMER PRICES: ALL ITEMS AND FOOD (concluded)

Region and country	All items						Food					
	1960 to 1965	1965 to 1970	1970 to 1975	1973 to 1974	1974 to 1975	1975 to 1976	1960 to 1965	1965 to 1970	1970 to 1975	1973 to 1974	1974 to 1975	1975 to 1976
	Percent per year											
LATIN AMERICA (concluded)												
Puerto Rico	2.2	3.2	8.8	19.8	8.6	2.0	3.0	4.1	12.6	29.9	8.9	- 0.6
Trinidad and Tobago	2.2 f/	3.8	13.7	22.0	17.0	10.3	2.1 f/	3.7	17.1	30.0	16.7	7.4
Uruguay	16.2 d/	60.0	73.4	77.2	81.4	50.7	13.1 d/	60.0	76.0	72.4	70.9	47.6
Venezuela	1.7	1.6	5.5	8.2	10.2	7.7	1.7	0.9	8.5	12.7	14.7	8.8
FAR EAST												
Dem. Kampuchea	4.3	4.5 h/	100.9	284.8 g/	...	...	2.7	6.7 h/	112.8	369.4 g/	...	...
India	6.1	8.9	13.2	28.8	5.6	- 7.8	6.5	9.8	14.2	30.5	4.4	-12.6
Indonesia	...	100.0	21.3	40.7	19.0	19.9	...	100.0	25.2	41.3	20.5	22.1
Korea, Rep. of	15.4	12.3	14.3	24.2	25.4	15.3	18.3	12.5	16.8	27.7	31.9	17.8
Lao People's Dem. Rep.	38.0	6.0 b/	35.2	49.7	84.3	...	39.0	4.0 b/	40.9	52.0	88.0	...
Malaysia (peninsular)	0.5	0.4	6.7	14.4	6.7	2.1 i/	0.6	0.4	10.4	23.8	7.2	0.8 i/
Nepal	...	6.2	10.3	19.8	11.8	- 3.5 i/	...	7.2	9.8	19.6	9.1	- 7.5 i/
Pakistan	2.6	5.6	15.2	29.2	20.9	7.2 j/	3.8	6.0	16.6	30.2	22.6	6.0 j/
Philippines	4.8	3.6 a/	18.7	40.6	9.2	7.0 j/	6.8	5.2 a/	20.1	44.3	6.8	8.2 j/
Sri Lanka	1.7	4.2	8.0	12.3	6.8	1.2	1.3	4.9	9.1	14.1	7.7	- 1.1
Thailand	1.5	2.5	9.8	23.3	4.1	4.9	2.0	4.2	11.9	28.5	4.1	5.5
NEAR EAST												
Cyprus	0.3	2.9 k/	8.0	16.2	4.6	3.8	0.2	3.2 k/	10.2	20.2	9.2	2.6
Egypt	3.2	3.2 k/	5.8	10.8	9.7	10.3	6.5	6.2 k/	8.6	17.0	12.1	14.8
Iran	2.0	1.4	9.6	14.2	12.8	11.3	3.1	0.9	10.0	15.8	12.2	6.9
Iraq	...	3.5 b/	11.3	8.3	9.4	10.4	...	3.1 b/	18.1	11.3	13.5	4.5
Jordan	...	2.8 e/	6.0	20.0	12.0 n/	15.0	...	5.1 e/	9.2	34.8	15.7 n/	21.9
Lebanon	...	1.8 a/	4.5	11.1	7.6	...	...	2.0 a/	- 3.5	16.7	11.4	...
Libya	...	6.1 a/	16.4	7.7	9.2	5.4	...	8.3 a/	15.9	7.0	7.2	12.8
Sudan	3.3	3.4 a/	11.6	26.1	24.0	1.7	4.2 d/	2.8 a/	12.0	25.5	28.1	- 1.8
Syria	1.3 d/	4.2 k/	16.7	15.4	16.1	14.8	1.3 d/	4.7 k/	18.2	15.1	18.9	14.1
Turkey	3.6	7.1	6.2	18.7	20.1	15.3	4.8	8.7	7.7	19.1	30.0	17.9
AFRICA												
Ethiopia	...	3.0 e/	3.7	8.7	6.5	28.5	...	3.5 e/	2.7 o/	8.6	4.4	41.9 p/
Gabon	4.4 d/	3.0	11.4 o/	12.0	28.4	28.5 n/	3.3 d/	2.1	2.7	7.5	-12.5	- 10.4
Ghana	11.8	3.7	17.4	27.7	41.2	169.3	14.0	2.1	20.3	30.2	36.7	64.1
Ivory Coast	2.6	4.9	8.2	17.8	11.4	12.0	2.8	5.9	9.3	18.1	10.4	7.2
Kenya	2.0	1.7	13.9 o/	14.9	18.4	10.9	1.9	2.0	14.7 o/	17.9	21.0	6.3
Liberia	...	4.4	12.1	19.5	13.6	5.6	...	3.4	13.7	26.4	15.4	- 0.6
Madagascar	...	2.3	9.7	22.0	8.3	5.0	...	2.2 i/	12.0	30.1	6.8	3.8
Malawi	... d/	2.0 i/	8.9	15.4	15.5	4.3	... d/	3.4	10.7	16.5	19.1	2.3
Mauritius	1.0 d/	3.0	13.1 q/	29.1	14.7	-42.5	0.6 d/	3.0	14.7 q/	32.4	16.0	-46.1
Morocco	4.0	0.6	5.4	11.0	7.9	8.5	4.6	0.1	7.2	14.4	7.6	10.2
Mozambique	1.9 r/	3.7	10.5	21.7	3.3	4.5	0.7 r/	4.7	11.1	22.0	11.7	8.3
Niger	...	3.8	7.9	3.4	9.1	23.6	...	4.4	10.6	2.8	8.2	25.9
Nigeria	3.2	5.6	11.5	16.9	31.7	21.8	2.0	8.8	13.1	19.9	42.9	25.2
Senegal	...	...	13.0	17.0	30.3	2.7	... s/	...	15.7	13.2	39.4	-
Sierra Leone	3.9 s/	4.3 e/	8.4	14.4	19.9	17.1	0.6 s/	4.8 e/	11.0	18.6	23.2	17.4
Somalia	7.4	2.5 h/	7.5	18.3	19.3	14.1	7.5	2.8 h/	9.1	19.3	20.8	18.4
Tanzania	1.2	3.7 e/	13.1	19.6	26.1	6.9	1.2	2.5 e/	17.7	35.3	30.6	- 0.2
Togo	...	2.1	8.9	12.3	18.3	11.6	...	2.6	9.7	11.7	24.6	11.8
Tunisia	4.5	2.9	4.8	4.1	9.5	5.4	4.8	3.1	5.2	0.8	9.5	6.4
Uganda	5.4	4.0	23.4	67.2	17.0	58.9	7.3	3.5	24.3	75.5	20.7	65.7
Zaire	15.6 r/	23.0 h/	18.6	28.3	27.6	78.0 n/	19.0 r/	22.0 h/	21.2	29.1	30.6	91.8 n/
Zambia	2.4	8.7 h/	7.1	8.4	10.0	18.9	2.4	8.8 h/	7.4	9.2	11.3	22.5

Source: International Labour Office, Bulletin of Labour Statistics, Geneva, third quarter, 1976 and preceding issues
a/ 1965-69. - b/ 1967-70. - c/ 1972-75. - d/ 1962-65. - e/ 1966-70. - f/ 1960-62. - g/ Jan - Oct. - h/ 1965-68.
i/ Jan - Sept. - j/ Jan - May. - k/ 1968-70. - n/ Jan - June. - o/ 1971-74. - p/ Jan - March. - q/ 1970-74.
r/ 1963-65. - s/ 1961-65.

ANNEX TABLE 13. - PER CAPUT DIETARY ENERGY SUPPLIES IN RELATION TO NUTRITIONAL REQUIREMENTS, SELECTED DEVELOPING COUNTRIES AND AREAS

	Average 1969-71	Average 1972-74	1970	1971	1972	1973	1974	Requirements
	Percent of requirements							Kilocalories per caput per day
AFRICA	92	91	92	92	91	90	91	2 340
Algeria	78	86	77	79	84	86	88	2 400
Angola	85	85	85	86	85	84	86	2 350
Benin	96	89	97	95	92	87	87	2 300
Botswana	91	87	90	94	89	87	85	2 320
Burundi	99	101	99	99	101	102	99	2 330
Cameroon	104	103	103	105	104	102	102	2 320
Central African Empire	96	103	97	99	102	104	102	2 260
Chad	88	74	89	83	76	72	75	2 380
Congo	99	102	97	101	106	103	98	2 220
Ethiopia	93	88	94	93	92	89	82	2 330
Gabon	97	97	95	97	97	96	98	2 340
Gambia	97	97	98	97	96	96	98	2 380
Ghana	99	100	99	99	100	99	101	2 300
Guinea	90	86	90	90	88	87	84	2 310
Ivory Coast	113	114	114	113	113	113	115	2 310
Kenya	97	92	98	99	93	92	91	2 320
Lesotho	96	97	95	97	90	99	100	2 280
Liberia	84	86	84	85	84	86	87	2 310
Madagascar	108	104	108	107	105	102	105	2 270
Malawi	101	104	103	104	104	105	103	2 320
Mali	88	75	88	88	75	74	75	2 350
Mauritania	86	81	87	85	79	82	82	2 310
Mauritius	105	107	106	108	109	105	108	2 270
Morocco	102	107	102	105	107	107	108	2 420
Mozambique	86	85	86	85	84	87	84	2 340
Niger	85	79	83	82	79	81	78	2 350
Nigeria	89	88	89	91	90	85	88	2 360
Rhodesia	100	104	96	102	103	99	108	2 390
Rwanda	94	91	96	95	91	91	90	2 320
Senegal	94	92	91	94	84	94	97	2 380
Sierra Leone	100	98	100	100	99	98	97	2 300
Somalia	81	83	80	83	86	84	79	2 310
Swaziland	89	91	90	94	93	92	89	2 320
Tanzania	85	84	88	83	82	85	86	2 320
Togo	94	94	94	96	95	92	96	2 300
Tunisia	93	99	93	96	99	98	102	2 390
Uganda	96	92	97	96	95	91	90	2 330
Upper Volta	78	73	80	73	71	70	78	2 370
Zaire	91	83	92	87	82	83	85	2 220
Zambia	86	87	84	87	87	85	89	2 310
FAR EAST	94	92	94	95	93	90	93	2 220
Bangladesh	84	84	85	82	82	83	88	2 310
Bhutan	89	90	89	89	90	90	90	2 310
Brunei	108	113	108	110	113	113	114	2 240
Burma	101	99	101	101	93	100	103	2 160
Democratic Kampuchea	100	94	97	100	99	99	85	2 220
Hong Kong	114	114	113	118	114	116	111	2 290
India	92	89	92	94	93	85	89	2 210
Indonesia	91	94	92	91	88	95	99	2 160
Korea, Rep. of	115	117	117	121	119	117	115	2 350
Lao People's Dem. Rep.	95	94	96	93	92	94	94	2 220
Malaysia								
Sabah	120	125	119	120	124	125	127	2 230
Sarawak	114	113	115	113	113	113	113	2 230
Peninsular Malaysia	111	113	113	110	111	114	115	2 240

ANNEX TABLE 13. - PER CAPUT DIETARY ENERGY SUPPLIES IN RELATION TO NUTRITIONAL REQUIREMENTS, SELECTED DEVELOPING COUNTRIES AND AREAS (concluded)

	Average 1969-71	Average 1972-74	1970	1971	1972	1973	1974	Requirements
FAR EAST (concluded)	. . . . . Percent of requirements							Kilocalories per caput per day
Nepal	93	92	94	90	87	93	95	2 200
Pakistan	93	92	93	93	93	91	92	2 310
Philippines	86	86	85	85	85	87	87	2 260
Singapore	118	123	119	122	122	124	123	2 300
Sri Lanka	104	94	107	100	95	94	91	2 220
Thailand	103	104	103	104	102	104	107	2 220
Viet Nam, Socialist Rep.of	105	106	106	106	105	107	105	2 160
LATIN AMERICA	106	107	106	106	106	106	107	2 380
Argentina	126	124	128	124	122	121	128	2 650
Bolivia	76	78	76	77	79	77	77	2 390
Brazil	105	106	103	104	106	107	105	2 390
Chile	115	112	113	117	115	106	116	2 440
Colombia	93	93	92	94	93	92	94	2 320
Costa Rica	110	112	111	112	112	111	113	2 240
Cuba	115	118	115	119	119	119	117	2 310
Dominican Republic	90	95	88	90	94	95	98	2 260
Ecuador	90	91	91	88	90	91	93	2 290
El Salvador	80	82	79	82	82	81	84	2 290
Guatemala	92	91	92	91	91	91	91	2 190
Guyana	104	103	104	103	100	106	104	2 270
Haiti	87	90	87	87	90	90	90	2 260
Honduras	96	91	99	94	92	90	90	2 260
Jamaica	111	118	112	116	122	113	119	2 240
Mexico	114	116	115	114	114	116	117	2 330
Nicaragua	107	106	107	106	107	104	106	2 250
Panama	111	101	109	111	99	99	105	2 310
Paraguay	120	118	121	120	119	117	118	2 310
Peru	98	99	99	99	98	99	100	2 350
Uruguay	113	112	114	109	108	112	115	2 670
Venezuela	97	97	97	97	96	97	98	2 470
NEAR EAST	98	99	98	98	99	99	100	2 460
Afghanistan	80	82	78	77	80	83	83	2 440
Cyprus	118	119	116	120	122	122	113	2 480
Egypt	107	105	106	106	106	104	105	2 510
Iran	90	97	90	88	95	97	98	2 410
Iraq	95	99	95	97	98	99	101	2 410
Jordan	94	90	92	93	93	87	90	2 460
Lebanon	100	101	100	101	101	101	101	2 480
Libya	108	114	108	108	111	115	117	2 360
Saudi Arabia	98	100	97	98	96	100	102	2 420
Sudan	89	88	90	91	89	87	88	2 350
Syria	99	102	98	101	101	101	104	2 480
Turkey	112	112	112	114	112	112	113	2 520
Yemen Arab Republic	76	82	71	81	82	83	82	2 420
Yemen, People's Dem.Rep.of	92	85	94	88	85	85	85	2 410

SOURCE: FAO food balance sheets.

ANNEX TABLE 14. - MAIN FEATURES OF CURRENT DEVELOPMENT PLANS

Region and country	Average annual growth rate (from UN/FAO reference data)		Duration and Scope of Plan [a]	Targets indicated in national development plan													
				Planned growth rate of:							Planned investment [b]						
				GDP	Total employment	Agricultural production		Fertilizer consumption	Export earnings		Share of total investment in GDP	Share of public investment in total investment	Share of agriculture in:		Share of expenditure in land and water development in total investment [c]	Share of external resources in total plan outlay
						Total	Cereals		Total	Agriculture			Total investment	Public investment		
	Population	Domestic demand for food															
LATIN AMERICA	Percent per year			Percent per year							Percent						
Argentina	1.3	2.0	1974-77 PS	7.5	2.8	6.5	... [e]	...	19.6	...	9.8 [d]	42.0	...	...	...	...
Barbados	0.5	...	1973-77 C	5.0 [f]	3.1	5.5	4.0 [e]	...	7.7	7.0	20.5 [g]	30.4	...	...	4.0	52.0
Bolivia	2.5	5.0	1976-80 C/AS	7.7 [f]	2.9	7.4	6.8	9.2	...	17.9	28.0 [h]	70.0 [h]	9.6	10.1	...	31.0
Brazil	2.9	4.7	1975-79 C	10.0 [f]	3.5 [i]	7.0 [j]	8.4	14.1	20.0	8.5	25.0 [g]	19.0 [h]	6.0	3.5	...	...
Chile	1.8	0.9	1975-80 AS	6.6 [f]	4.0 [i]	4.8 [j]	7.5	...	...	11.8	13.0 [g]	47.0	...	...	...	...
Costa Rica	2.8	4.1	1974-78 C	6.0-6.5 [k]	5.3	4.7	...	...	9.6	9.1	27.0 [g]	27.9	15.0	...	...	24.8
Dominican Rep.	3.3	5.6	1976-79 AS	...	...	5.2	...	...	...	4.2	...	...	...	...	...	...
Ecuador	3.3	4.7	1973-77 C	10.1 [f]	6.5 [i]	5.3 [o]	5.5	...	16.4	3.9	23.0	40.2	18.9	17.3	5.0	16.0
El Salvador	3.2	3.2	1973-77 AS	6.9 [f]	2.0 [i]	5.3	4.5	6.9	...	4.1	... [g]	...	...	13.0	...	47.9
Guatemala	3.0	4.6	1975-79 C	9.1	3.1	5.0	4.7	13.2	7.0	3.7	13.6 [g]	44.0	...	13.2	...	28.1
Haiti	1.5	2.6	1976-81 C/AS	5.0	... [i]	3.0	4.7	...	9.3	8.0	19.9 [g]	67.0	15.0	18.8	29.0	50.0
Honduras	3.5	3.2	1974-78 C	7.0	6.1 [i]	8.1	5.7	...	...	7.9	...	33.6	13.8	11.2	...	25.8
Nicaragua	3.3	3.6	1975-79 PS	6.1	1.7	6.5	...	... [p]	...	...	...	...	...	...	...	...
Panama	2.9	4.1	1976-80 PS	7.0 [f]	2.5	5.7 [q]	3.7	14.0 [p]	7.2	9.5	16.0 [d]	54.4	4.9	7.6	...	28.0
Peru	3.0	4.9	1975-78 C	6.5 [f]	2.5 [i]	4.5 [k]	...	...	15.6	...	18.5 [g]	50.0	6.4	12.8	7.1	...
Uruguay	1.0	1.1	1973-77 PS	3.8	1.9 [i]	3.8-4.6 [k]	...	...	10.0	...	...	...	...	...	...	...
Venezuela	3.0	2.7	1976-80 PS	8.2	0.5	9.6	10.6	18.0	25.4	11.0	25.0	53.0	9.0	7.0	3.0	16.0
FAR EAST																
Bangladesh	1.7	2.5	1973-78 C	5.5 [f]	...	4.6	6.4 [r]	...	7.5	...	12.8 [g]	87.5	23.8	26.3	...	40.0
Fiji	2.1	...	1975-80 C	7.0 [f]	3.0	4.6	13.4 [r]	6.0	8.3	8.6	22.7 [g]	54.0	...	21.8	16.8	...
India	2.5	1.9	1974-79 C	4.4	...	3.9	3.6	...	8.5	...	18.2	61.0	...	12.0	...	8.4
Indonesia	2.6	5.0	1974-79 C	7.5	...	4.6	4.4	...	23.5	...	21.1 [g]	44.0	...	19.1	...	22.0
Korea, Rep. of	2.0	4.5	1977-81 C	9.0 [f]	3.1	4.0	3.3	...	16.0	...	25.4 [g]	...	11.2	..	..	..
Malaysia	2.8 [s]	3.0	1976-80 C	8.5	3.3	7.3	...	...	13.4	...	27.8 [g]	40.3	10.7	25.5	5.9	12.8
Philippines	3.4	4.3	1974-77 C	7.0 [f]	4.5	5.0	6.1	10.0	10.0	7.7	20.9 [g]	18.8	...	20.0	5.5	11.7
Thailand	3.3	4.8	1977-81 C	7.0	2.3	5.0	...	...	14.0	...	11.1	41.9	15.5	36.9	10.5	12.8
NEAR EAST																
Afghanistan	2.4	3.3	1976-83 C	6.2	2.1	4.7	...	...	8.2	...	19.1	84.7	18.2	24.7	...	65.8
Egypt Arab Rep.	2.3	3.7	1973-82 C	7.2	2.8	3.0	...	...	...	...	30.0	71.0	10.0	...	...	...
Iran	3.0	4.7	1973-78 C	25.9	3.0	7.0	9.0	22.6	...	...	26.0	66.0	11.4	12.8	...	0.0
Jordan	3.2	2.6	1976-80 C	11.5	...	7.0	7.5	...	24.0	13.0	35.0	50.0	18.0	30.0	13.0	36.0
Libya	4.1	4.8	1976-80 C	10.7	6.5	15.8	9.0	...	7.9	...	30.5	87.0	12.0	12.0	...	0.0
Saudi Arabia	3.0	5.5	1975-80 C	10.2	7.8	4.0	...	...	...	...	30.0	...	8.0	...	...	0.0
Somalia	2.6	2.3	1974-78 PS	...	...	...	...	...	...	...	...	...	...	40.0	22.0	66.0
Sudan	3.1	3.5	1977-83 C	7.5	...	6.5	...	...	11.0	11.0	22.0	58.0	26.0	30.0	...	52.0
Syrian Arab Rep.	3.3	4.9	1976-80 C	12.0	4.9	8.0-10.0 [u]	9.7	...	7.0	...	29.0	83.0	3.5	4.3	20.0	...
Turkey	2.5	3.5	1973-77 C	7.9	6.2	4.6	3.4	15.6	9.4	2.8	24.2	56.3	11.7	52.7	5.0	3.6
Yemen Arab Rep.	3.0	4.5	1976-80 C	8.2	1.7	5.5 [u]	5.2	31.0	12.3	...	47.0	48.3	14.2	12.7	56.7	41.2
Yemen, People's Dem. Rep. of	2.9	1.8	1975-79 C	13.4	7.2	10.8	8.6	...	20.0	...	21.4	99.0	36.8	37.0	29.4	55.0
AFRICA																
Algeria	3.1	3.4	1974-77 C	11.2	8.3	4.2	4.7	...	10.2	...	48.0 [d]	...	...	10.9	6.6	...
Burundi	2.4	2.1	1973-77 C	...	...	...	...	...	...	...	...	...	39.0	...	...	80.5
Cameroon	1.9	2.6	1976-81 C	7.1	6.2	...	...	...	...	...	19.5	70.7	17.3	16.6	...	...
Congo	2.5	3.3	1975-77 C	...	...	...	...	...	...	...	29.0	100.0	15.0	...	...	0.0
Gabon	1.0	4.3	1976-80 C	5.5	6.7	3.5	...	...	3.7	...	49.0	68.0	3.5	4.5	...	...
Gambia	1.9	4.3	1975-80 C	...	...	4.7	7.0	...	...	...	...	...	14.9	...	...	...
Ghana	2.7	5.1	1975-80 C	5.5	...	...	...	...	2.0	...	...	...	...	...	...	...
Guinea	2.4	2.5	1973-78 C	...	...	...	...	...	...	...	...	34.4	3.6	9.4	...	...
Ivory Coast	2.5	3.6	1976-80 C	8.7	...	6.9	10.7	...	8.3	5.6	32.0	51.9	13.6	26.2	...	...
Kenya	3.3	1.8	1974-78 C	8.0	3.2	5.2	7.0	...	7.0	2.2	26.3	31.6	...	22.3	...	15.2
Lesotho	1.9	...	1976-80 C	7.9	2.1	6.5	2.3	...	22.0	...	13.5	...	...	32.6	5.0	...
Liberia	2.3	2.8	1976-80 C	6.8	3.0-3.5	...	...	...	13.0	...	9.0 [d]	...	19.3	19.3	...	60.5
Madagascar	3.0	2.3	1973-77 C	3.2	...	3.0	...	...	6.0	...	15.0	61.5	23.2	31.1	...	30.0
Malawi	2.4	6.3	1971-80 C	8.2	...	5.4	...	...	10.0	9.0	23.8	36.7	8.2	19.3	...	...
Mali	2.5	5.4	1974-78 C	7.1	...	4.5	...	...	8.1	...	36.0	...	33.7	...	...	85.0
Mauritius	1.8	2.8	1975-80 C	6.9	4.7	...	...	...	...	...	28.0	...	...	...	...	32.0
Morocco	3.0	3.6	1973-77 C	7.5	4.0	3.6	3.5	...	10.0	4.7	19.5	42.5	15.8	26.2	...	19.8
Niger	2.7	1.2	1976-78 C	...	...	...	...	...	...	...	...	64.7	21.7	33.6	...	60.0
Nigeria	2.7	2.9	1975-80 C	9.5	2.6	5.0	5.0	...	5.0	0.6	26.6	66.7	8.3	6.5	...	0.0
Senegal	2.6	0.5	1973-77 C	5.0	...	3.0	...	...	...	...	...	29.0	23.3	14.5	...	54.8
Sierra Leone	2.4	1.4	1975-79 C	6.2	2.0	4.6	6.5	...	8.2	9.1	22.9	45.6	15.5	25.6	5.9	33.1
Swaziland	2.7	...	1973-77 C	5.0	...	...	...	...	...	...	...	...	...	19.0	...	83.6
Togo	2.8	0.4	1976-80 C	8.0	...	5.2	...	...	...	...	33.0	88.4	21.8	...	...	35.1
Tunisia	2.3	7.1	1977-81 C	7.5	4.0	3.6	3.5	...	10.0	4.7	25.0	43.0	15.8	26.2	...	10.0

[a] C = comprehensive; PS = public sector; AS = agricultural sector. - [b] Where possible, data refer to net investment. In many cases, however, no distinction is made in the plan, and data may refer to gross investment or may include some elements of recurrent expenditure. The agricultural sector includes animal production, fisheries, forestry, irrigation, land reclamation, community development and agricultural extension. - [c] Land and water includes land reclamation and land clearance, irrigation, drainage and flood control projects and dams and dikes which are part of these projects; establishment of perennial pastures; preparation and initial stocking of fish ponds. However, the country data available do not always correspond entirely to this definition. - [d] Share of public investment in GDP. - [e] Total food production. - [f] GNP. - [g] Share of total investment in GNP. - [h] Total investment does not include private investment in agriculture and technology development. Data on investment refer to 1979 only. - [i] Employment in agriculture only. - [j] Not including fisheries, which is planned to grow at an annual rate of 16.9%. - [k] Low and high hypotheses. - [n] 27% of GDP in 1978. - [o] Not including fisheries, which is planned to grow at an annual rate of 9.6%. - [p] Average annual rate 1973-85. - [q] 1975-76. - [r] The planned annual growth rate of total food production is 2.7%. - [s] Peninsular Malaysia only. - [u] Growth rate refers to agricultural GDP.

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