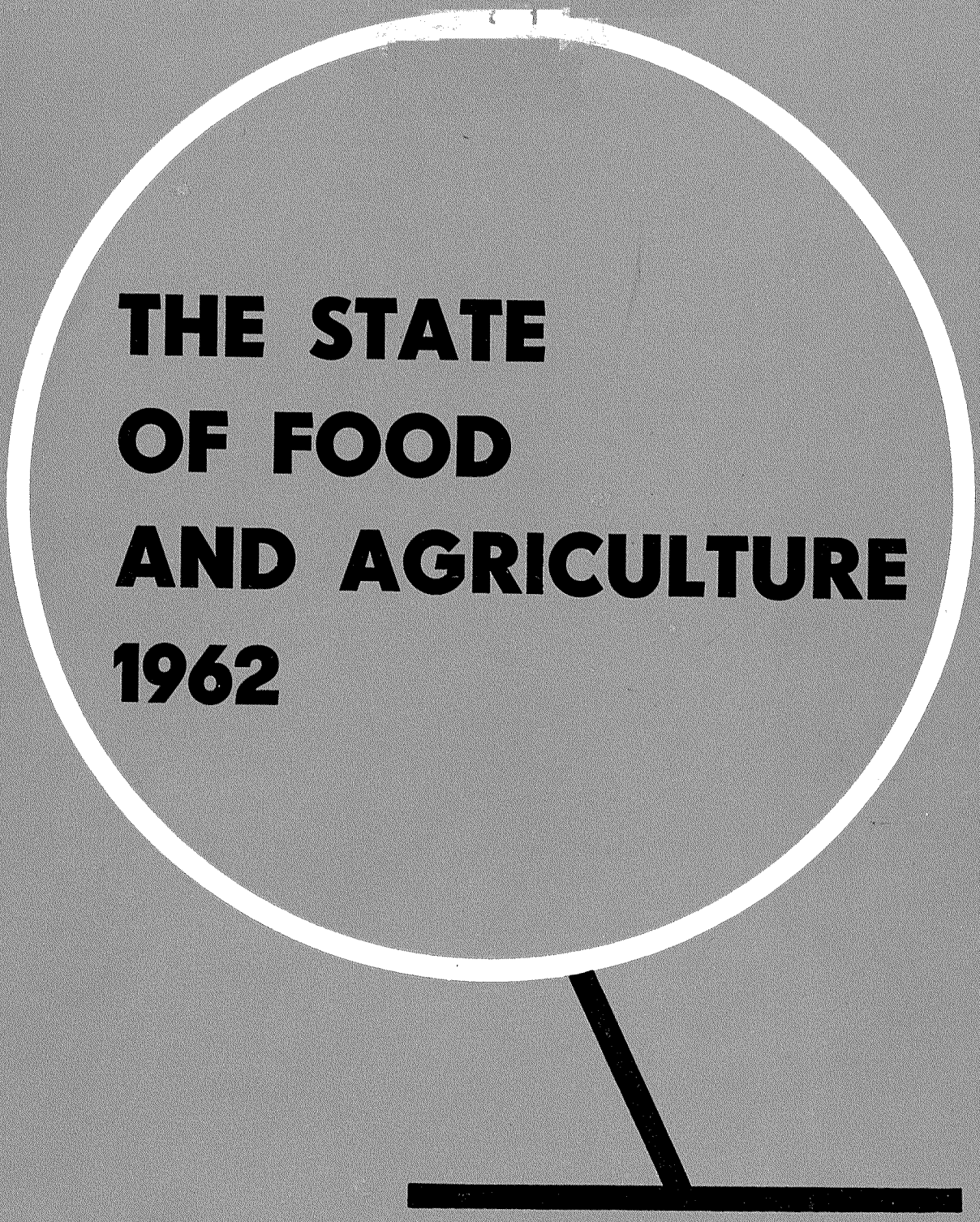
THE STATE OF FOOD AND AGRICULTURE 1962



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

THE STATE OF FOOD AND AGRICULTURE 1962

CL 39/2

THE STATE OF FOOD AND AGRICULTURE 1962

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME 1962

The statistical material in this publication has been prepared from the information available to FAO up to 30 June 1962

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Food and Agriculture Organization of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

Printed in Italy

CONTENTS

Annex tables

List of figures

FOREWORD

Broadly it may be said that the key problems of food and agriculture in the less developed regions of the world are, first, underproduction, hunger and malnutrition, and secondly, the continuing decline of agricultural prices on world markets, which erodes the earning capacity of these regions for foreign exchange and their potentialities for economic growth. In contrast, the problems of the economically more developed countries are more often excess production in relation to commercial outlets, leading to the accumulation of surplus stocks and, closely related, the social discontents resulting from the disparities of income between farm people and those in other occupations – though rural poverty, it goes without saying, is still more acute, if less articulate, in countries at a less advanced stage of economic development.

In regard to these problems, the year 1961/62 could be considered as one of promise rather than achievement. There were encouraging signs of an increased world recognition of the importance of agricultural development, both in itself and as a key component of general economic growth. There were signs, too, of a greater determination to tackle the problems of agriculture before they became still more acute. On the other hand, the year's developments in production and in international trade contributed little to their long-term solution.

On the most basic problem of all, that of hunger, two developments may be mentioned. In the less developed countries themselves there was a considerable extension of planning for agricultural development, and particularly of plans closely integrated into those for general economic development. While it would be too optimistic to suppose that all these plans will be fully realized, they at least indicate a greater awareness of the issues and give promise of more rapid development during the forthcoming United Nations development decade than in the past. Similarly in the more developed countries, under the impact of the world-wide Freedom from Hunger Campaign and related programs, there were increased efforts among governments and the general public to step up the flow of material aid to less developed countries, especially in the food and agricultural sector, including aid from surplus foodstuffs. Here a notable new development is the experimental World Food Program, jointly sponsored by the United Nations and FAO, and expected to come into operation late in 1962. The program is designed to explore methods of using the surplus food production of the more developed countries to aid economic development in less developed countries, and to combat hunger and malnutrition. Though small in relation to some bilateral programs, it is potentially of great significance.

There were indications, too, in 1961/62, of wider and more comprehensive attempts to mitigate the effects of the continuing down-drift of commodity prices. While more than one government is trying to curtail surplus production where it threatens the stability of commodity markets, among the possibilities widely discussed in international forums were schemes of compensatory finance and of more comprehensive forms of world commodity agreements, though FAO itself had in the past advocated the commodity by commodity approach as the more practical method. Some of the commodity agreements under discussion included proposals for increased shipments of surplus foodstuffs to needy countries, for aid to less developed countries in disposing of their excess stocks, and for more effective means of limiting excess production of both temperate and tropical products in excess supply. Such arrangements do not as a rule come quickly to fruition, and it would

be surprising if the current proposals were adopted without prolonged discussions and extensive modifications. But the fact that such questions are now being widely discussed internationally is in itself a hopeful sign. Still more encouraging developments are the renewal of the International Wheat Agreement in 1961/62, and the prospects of a commodity agreement for cocoa and of a broader-based agreement for coffee.

In discussing international exchanges in agricultural products, mention should be made of the uncertainties and anxieties resulting from the various regional agreements or their extensions now under discussion. A study of their possible repercussions on agriculture, especially those of the European Economic Community which inevitably will be most widespread in its effect, was prepared by FAO at the end of 1961,[1] while later policy developments are discussed in some detail in the present report. To these analyses little can be added until present negotiations are more advanced.

Turning to actual developments in 1961/62, preliminary estimates suggest that, because of unfavorable weather, world agricultural production showed little increase during the year, though it already seems probable that the rising trend will be resumed in 1962/63. The most disquieting trend is that per caput food production in Latin America, Africa and the Near East, which increased appreciably during the 1950s, has tended to fall in the last few years as production has lagged behind the growth of population. In the Far East, however, the region where food problems are most acute of all, recent developments have been somewhat more favorable.

The volume of international trade in agricultural products rose by about 4 percent in the calendar year 1961, but this resulted mainly from shipments of cereals to meet the situation arising out of crop failures in China, and to some extent from larger shipments of Cuban sugar and a few other products to the Sino-Soviet group of countries. Agricultural imports into the rest of the world increased hardly at all. Moreover the rise in the volume of agricultural exports was almost precisely offset by a 4 percent fall in average prices, so that their value showed very little increase. Indeed the share of the less developed countries in export earnings declined, since the heavy shipments of cereals to China came mainly from Australia and Canada. Coupled with an exceptionally poor crop in Canada and with an emergency program to limit feed grain production in the United States, they led to an appreciable decline in world grain stocks for the first time in several years.

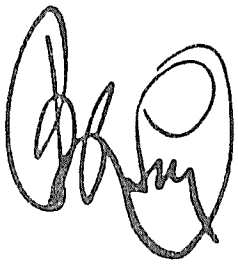
Although the basic problems of agriculture are likely to remain substantially the same for some years or even decades, it is encouraging to note that the world food and agricultural situation is no longer essentially static. Both the level and pattern of the demand for agricultural products are in constant flux as a result of changes in population, consumer incomes and prices, and these changes in demand in turn impose changes on agricultural production. At the same time, it must be noted that not all the changes or activities are in the right direction and of the right emphasis. An analysis of probable trends to 1970 of demand, production and trade in agricultural products has recently been published by FAO.[2] It is in no sense a forecast, but rather an analysis of the likely outcome if present policies remain unchanged. The study is disquieting in that it brings out the danger that, unless drastic action is taken to increase production in the less developed countries, the food supply may fall increasingly behind domestic demand. At the same time, surplus production of export commodities may become even more widespread, while the demand for farm products in world trade may grow only slowly or in some cases even decline. Nevertheless, with rising populations and incomes a rapid increase may be expected in the demand for some commodities, notably forest products and (especially in less developed countries) livestock products.

---

[1] FAO, *Agricultural commodities and the European Common Market*. Rome, 1962.
[2] FAO, *Agricultural commodities: Projections for 1970*. Rome, 1962.

These groups of products are the subject of the two special chapters in this year's issue of The state of food and agriculture. *Chapter III analyzes the growth of demand in developed and less developed countries alike for forest products, including wood, manufactured boards, and paper and pulp, and also the important contribution which forest industries can make to economic development. This is a sector which in the past contributed largely to the economic development of some European countries, and which today might provide a valuable industrial base to not a few of the less developed countries.*

Livestock products, which are discussed in Chapter IV, are especially badly needed in the less developed countries for a more balanced and healthy diet. The demand for them increases dramatically as incomes begin to rise and people have the possibility of some further purchases after satisfying their basic hunger with cereals and other low cost foods. In most of the less developed countries, however, production is handicapped and made much more expensive by a variety of factors: animal diseases, underfeeding, the failure to cull unthrifty animals, social customs, and poor marketing facilities, to mention only some of the more important. The chapter analyzes the problems of expanding livestock production in the less developed countries and gives some indications of developments which may be foreseen in the next decade. While they deal with specific branches of agriculture, both special chapters have also a wider significance in that they provide excellent examples of the major contributions which the agricultural sector can make to economic development as a whole.



B. R. SEN
Director-General

Chapter I. SUMMARY

Chapter II. World review and outlook

AGRICULTURAL PRODUCTION

From the preliminary FAO estimates so far available it seems that there was little increase in world agricultural production in 1961/62. Population is now estimated to be rising by about 1.8 percent a year, so that there was some reduction in per caput production in comparison with the previous year, though the longer-term trend of agricultural production is still ahead of population growth.

The pause in the expansion of production was caused mainly by widespread bad weather. Agricultural production appears to have increased substantially in 1961/62 only in Latin America, and there were smaller increases in eastern Europe and the U.S.S.R., Oceania, and the Far East (excluding Mainland China). There were quite sharp reductions in Africa and the Near East as a result of droughts in a number of countries, and production was also a little lower than in 1960/61 in western Europe and in North America. For Mainland China, again this year no official figures of agricultural production have been published, but all the evidence points to a third successive season of poor crops.

World per caput food production is estimated to have averaged about 13 percent more in 1959/60-1961/62 than before the war. Almost all of this rise, however, has been in the more developed regions, rather than the less developed parts of the world where such improvements are urgently needed to raise levels of living. This is largely because of the much more rapid growth of population in the less developed regions. Although since the war production has been increasing faster than population, in some regions the margin over population growth has not been sufficient to make up, at least on a permanent basis, for the deficit that developed during the war years, so that per caput production in these regions remains less than before the war. Thus, while the prewar level of per caput food production has been regained in each of the less developed regions at some time during the postwar period, in all except the Near East this has so far been only temporary and per caput production has subsequently slipped back.

On a commodity basis, the products mainly responsible for the pause in the expansion of world production in 1961/62 were grains and sugar, the output of which dropped sharply in comparison with the year before. World grain production was affected particularly by droughts in North America, northwest Africa and much of the Near East, and by reductions in maize and sorghum plantings in the United States under the Emergency Feed Grain Program. The fall in sugar production in 1961/62 was due mainly to smaller beet harvests in western Europe and to a sharp reduction in the cane crop in Cuba. The expansion of world cocoa production was arrested in 1961/62. For most other agricultural commodities production continued to rise in 1961/62, though large increases were rather few.

The production of fish again increased substantially in 1961. Preliminary estimates indicate that the world catch rose by about 7 percent to more than 40 million tons. Large gains were registered by each of the main producers, including Japan, Peru, and the U.S.S.R.

World roundwood removals are estimated to have risen only slightly in 1961. The production of fuelwood continued to decline slowly, but total industrial wood removals are estimated to have increased by about 3 percent over the 1960 level.

CHANGES IN STOCKS

Mainly as a result of the check in the expansion of production, the over-all level of stocks of agricultural commodities was reduced in 1961/62, for the first time since 1957/58. Wheat stocks are likely to show a decline of about 15 percent by the

end of the season, because of the lower production in the United States and especially Canada, together with large Canadian sales to Mainland China. The lower output of maize and sorghum under the Emergency Feed Grain Program in the United States, combined with the Canadian drought and sales to Mainland China, are expected to bring a fall of about 12 percent in stocks of coarse grains, the first for more than a decade.

The chief exceptions to the downward movement of stocks in 1961/62 were coffee, soybeans, butter, and cheese. The increase in stocks of the latter three products was mainly in the United States, where it is estimated that nearly 70 percent of the total world stocks of agricultural products are still held. Apart from coarse grains, world stocks of coffee are the largest in relation to international trade, and they are also the main surplus stocks outside North America, being held mainly in Brazil.

Economic activity and the demand for agricultural products

In 1961 there was a revival in economic activity in North America after the mild recession of 1960, continued growth in western Europe and boom conditions in Japan. During the first half of 1962, however, the North American recovery has failed to take economic activity to the high level expected earlier, and in western Europe and Japan the expansion has slowed down.

The comparatively favorable economic situation in the main importing areas in 1961 strengthened the demand for agricultural raw materials, though imports were not always affected correspondingly. Toward the end of the year the demand for forest products reflected the slackening in economic activity. Demand for foodstuffs appears to have been little affected by recent changes in economic activity, but in 1961 and 1962 a main influence was the large import demand for grains by Mainland China, to make good the losses in domestic production.

Food supplies and consumption

Because of the accumulation of stocks, the improvement in actual food consumption levels since before the war has been slightly less than the rise in world per caput production. For the world as a whole the index of per caput food production nevertheless gives a fairly good indication of the course of average food consumption per person. However, for individual regions and countries, food supplies and consumption are affected not only by per caput production but also by changes in imports and exports of foodstuffs, which in some cases have been quite substantial.

Trade has the biggest effect on the food supplies of the more developed regions, and in the less developed regions net imports or exports amount to only a small fraction of domestic production. Nevertheless in the latter group of regions, as a result of larger imports and often smaller exports, the trend of food supplies appears to have been slightly more favorable than that of per caput production. Food supplies per head thus appear to have been maintained at more than the prewar level in each of the less developed regions, in spite of the fact that, except in the Near East, the regaining of the prewar level of per caput production has so far proved only temporary. A slow improvement in per caput food supplies appears to have continued throughout the postwar period in Latin America, the Far East (excluding Mainland China) and the Near East, but in Africa changes in trade do not seem to have been sufficient to compensate for recent declines in per caput production, and in this region per caput supplies may have dropped back slightly in the last few years.

International trade in agricultural products

The year 1961 saw no fundamental change in the tendencies that have characterized international trade in agricultural products over the past several years. Ample exportable supplies continued to compete for outlets that are expanding at only moderate rates, and the general level of agricultural export prices again fell. As a result, in spite of a rise of about 4 percent in the volume of shipments, there was no increase in the total value of agricultural exports, and the agricultural export earnings of the less developed countries in fact fell substantially. In real terms the loss in their export earnings was accentuated by a further increase in the average export prices of manufactured goods. This increase, combined with the fall in the prices of agricultural exports, resulted in a further decline of 6 percent in the "terms of trade" of agricultural exports, which in 1961 were 24 percent lower than in 1952-53.

The volume of agricultural imports into countries

other than the U.S.S.R., eastern Europe and Mainland China, which had started to level off in 1960, showed no increase in 1961. To a large extent this reflects the large harvests in many food importing countries in 1960/61, which halted the increase in food imports into western Europe and most of the less developed regions. In addition imports of raw materials into western Europe, which for some years now have been rather stagnant, declined in 1961, and those of North America remained at the low level of recent years. There was an increase in the imports of beverages and tobacco into nearly all regions, and larger imports of agricultural raw materials into the Far East and other less developed regions, but these increases were barely sufficient to compensate for the reduced volume in the other sectors of imports.

In contrast to the rest of the world, there was a sharp increase in the imports of agricultural products into the U.S.S.R. and Mainland China in 1961, which was largely responsible for the rise of 4 percent in the total volume of world agricultural trade. As a result of the series of poor harvests, Mainland China imported a total of well over 5 million tons of grains from outside the Sino-Soviet area in 1961, while both the U.S.S.R. and Mainland China further expanded their sugar imports from Cuba. The poor harvests in China also affected world markets for rice and vegetable oils, because of reduced Chinese exports of these commodities.

These developments contributed to the strengthening of the prices of a number of products, but for most commodities prices were lower in 1961, and the FAO index of unit values of all agricultural exports fell by over 4 percent. This more than canceled the modest price recovery registered in 1960, and the longer-term decline of agricultural export prices thus continued. The fall in prices in 1961 also almost exactly offset the increase in the volume of exports, so that the total value of world agricultural exports remained more or less unchanged.

While the value of exports from the more developed regions rose substantially in 1961, however, the agricultural export earnings of the less developed regions suffered declines ranging from 4 to 10 percent. This continued a trend that has gone on for some years, the share of the less developed regions in the total value of world agricultural exports having declined from 56 percent in 1952-53 to 52 percent in 1960 and 49 percent in 1961. This trend reflects a number of factors, including the different commodity composition of the exports of the two groups of regions, and the curtailment of food exports from many less developed countries because of the rapidly rising domestic consumption.

In addition, export subsidies, donations and sales on concessional terms have stimulated the volume of exports from some of the more developed countries, though not necessarily at the expense of other countries. Exports under special terms have been of particular importance in the United States, where they have in recent years accounted for nearly one third of total agricultural exports, and more than two thirds in the case of wheat. If the value of such shipments, which do not bring earnings of foreign exchange, is deducted from the total value of the agricultural exports of North America, the trend of exports from this region is found to be much more closely in line with that of the less developed regions.

The concern of primary exporting countries at the continuing unfavorable trend in their agricultural export earnings has been heightened by uncertainty as to the effects of the agricultural and trade policies of the European Economic Community and of the terms under which the United Kingdom may join. During the past year there has been much more active consideration, often on a wider basis than before, of the possibilities of stabilizing commodity prices and export earnings.

Farm prices and incomes

Average farm prices in most of the economically more advanced countries for which information is available were somewhat higher in 1961 than the year before, largely because of higher price supports. Prices paid by farmers also increased, however, and in most cases there was little change in farm price relationships. In the longer run, the ratio between the prices received and prices paid has tended to move against farmers. Of 12 countries for which continuous series of data are available, in only two did the price ratio move in favor of farmers between 1952-53 and 1961. In all other countries the increase in prices received by farmers was exceeded, sometimes substantially, by increases in the prices paid for production requisites, and in living expenses where these were included in the indices.

Comparable data for less developed countries are very scanty, and in the main observations must be based on data for individual commodities. Here

a number of significant increases were registered in the official prices, in particular for the basic products such as cereals; on the other hand, prices for most export products tended to decline.

In the relatively few countries which publish information on farm incomes the general trend of net earnings in 1961 was upward, even though production costs were generally higher. The volume of sales, however, expanded in most countries, and prices for many products were above those of 1960, often because support prices were raised to offset rising production costs. Of the 17 countries for which data were available for 1961 or 1960/61, the net incomes of farmers fell in only four, and in one of these, Canada, the fall in earnings from current output was to a large extent offset by sales from carry-overs from earlier crops.

Consumer prices

The upward trend of retail prices of food, which has persisted almost without a break since the second world war, continued in 1961. In most cases the increases were small. But in nine of the 80 countries for which data are available they exceeded 10 percent, including a few very steep rises in Latin America. Over the longer term, the retail prices of food and the general cost-of-living indices have, in the economically more advanced countries, moved closely together. In the less developed countries, there have been greater divergencies, even though food constitutes a larger part of total consumer expenditures than in countries with higher incomes. A comparison of the movements of the two indices between 1953 and 1961 brings out that, in countries where the general cost-of-living index has risen rapidly, the retail prices of food have usually risen even faster, while in countries where the general price level has remained more stable, food prices and the general cost of living have moved closely together. This suggests that food prices are of key importance as a determinant of the general level of prices, and emphasizes the importance of adequate supplies of food as an anti-inflationary force in developing economies.

Agricultural policies and development plans

There were numerous important agricultural policy developments in 1961/62. In western Europe the Ministerial Council of the European Economic Community (EEC) approved in January 1962 the first commodity regulations for the common agricultural policy of the six countries. The objective of the common agricultural policy is to establish, over a transitional period, a single Community-wide market for agricultural products, protected from outside by a system of import levies. The gradual implementation of this policy is likely to bring about significant shifts in European production and trade patterns, and unavoidably to give rise to problems for many countries which are traditional suppliers of the European market. Prices of farm products are gradually to be brought in line, but the crucial question of the ultimate level of these prices has not yet been decided. Similarly, at the time of writing, the outcome is not yet known of the negotiations concerning the possible membership of the United Kingdom and other countries, which may bring some modifications in the policies of the Community. The negotiations with the United Kingdom have very largely concerned agricultural problems, in the United Kingdom itself and in the Commonwealth agricultural exporting countries in both tropical and temperate zones.

In both Australia and New Zealand concern at the possible consequences of the United Kingdom's joining EEC has been the main agricultural policy issue during the year under review. Both countries have pressed strongly for special treatment in the United Kingdom market and have at the same time attempted to expand sales in other markets.

The United States Government is making even more determined efforts to reduce the costly burden of agricultural surpluses, though progress to date has been limited. The Emergency Feed Grain Program, which was so successful in reducing the production of maize and sorghum in 1961/62, was extended in 1962/63 to barley. A new program of acreage restriction and diversion was also introduced for the 1962/63 wheat crop. More comprehensive measures were submitted to Congress in early 1962 but were narrowly defeated, though it is reported that the Administration intends to resume at a later date its efforts for a more basic solution of the problem of grain surpluses. The United States Sugar Act was extended, the Cuban quota being reallocated to domestic and foreign producers. In Canada there was no major change in agricultural policy in 1961/62.

In the U.S.S.R. a perspective plan has been formulated up to 1970 and 1980. Agricultural produc-

tion is scheduled to increase by 150 percent between 1960 and 1970, and by a further 40 percent by 1980. New directives envisage a shift from fallows and rotational grasses to more intensive cropping with the help of fertilizers. Some important organizational changes have reversed the former trend to give more autonomy to the collective farms. In both the U.S.S.R. and the eastern European countries the prices of livestock products have been sharply increased, partly as a production incentive and partly to restrict demand. The collectivization drive has continued in eastern Europe. In Mainland China, however, the commune system has been further decentralized, giving more authority to local production brigades and teams, and new economic incentives of a limited character have also been introduced.

There has been a continued extension of planning for agricultural development in the less developed countries, often closely integrated into plans for over-all economic development. In the Far East most countries have been formulating, reviewing and implementing such plans, with varying degrees of success, over many years. In the other regions, however, a number of countries have recently prepared or launched their first development plans. The Alliance for Progress has provided a new stimulus for planning in Latin America. In the Near East there is a noteworthy trend toward more comprehensive forms of planning. In Africa, also, the comprehensive approach to development planning is gaining more attention, although most plans in this region are still concerned only with the public sector of the economy.

Agrarian reform is being given special attention under the Alliance for Progress, and during the past year at least six Latin-American countries have approved or prepared legislation to reform the agrarian structure. Important new legislation on land tenure has also been introduced in a number of countries of the Near East. In Africa, also, much interest has been focused on changes in land tenure systems.

Efforts to increase agricultural production for export by means of price incentives have been made in a number of Latin-American countries. In the Far East several countries made substantial changes in agricultural price policies, usually in order to bring production more in line with planned objectives and to give added production incentives to farmers. Among the far-reaching economic measures designed to further socialization that have been introduced in the United Arab Republic, the Egyptian Cotton Commission has been set up to purchase cotton from growers at prices fixed by the Government, and the Egyptian Cotton Organization to sell cotton for export or to local textile manufacturers. Because of the continuing fall in world prices of coffee and cocoa, producer prices of these commodities were reduced in a number of African countries in 1961/62. Ghana is now selling cocoa only in Accra, and Nigeria in Lagos as well as in London.

Further headway has been made with the various schemes for regional economic co-operation in the less developed parts of the world. Additional countries have now joined the Latin American Free Trade Area while, under the Central American Integration Scheme, the Central American Bank for Economic Integration made its first loan to a member country in December 1961. Twenty African countries have agreed in principle on the establishment of a new Inter-African and Malagasy States Organization. In the Near East a draft agreement on Arab economic unity was signed at the June 1962 meeting of the Economic Council of the Arab League, and a fund for Arab economic development has been established by the Government of Kuwait.

Fishery policies in many of the more developed countries have been designed primarily to make the industry more competitive through the modernization of facilities. Until technological improvements result in increased profitability of operations, however, the governments of some countries have had to continue or increase direct financial support, because of special hardships experienced by some sectors of the industry. In some fisheries exclusion from customary fishing grounds following the extension of fishing limits has contributed to a worsening of economic conditions. In the less developed countries development efforts have required more radical forms of assistance, and financial concessions and protective measures have played a more prominent part in the fishery policies of these countries.

Countries continue to elaborate or revise their forest policies or to establish long-term forestry plans, which are tending to be more closely integrated than before with general plans for economic and social development. Insufficient attention, however, seems to be paid to the implementation of these plans, either because governments give them less priority than plans in other sectors, or because basic data, technicians and finance are lacking, and economic and institutional conditions remain unfavorable for forestry development.

Short-term outlook

The economic outlook for the remainder of 1962 and for 1963 in the leading industrialized countries, which account for the bulk of the world import demand for agricultural products, is somewhat unclear at the time of writing. In general, however, the rate of growth of economic activity in these countries seems likely to be slower than had been expected earlier. Supplies of most agricultural products are expected to remain ample, and there seems no reason to expect any great increase in demand that would halt the decline in prices on world markets.

The limited data available so far suggest that in 1962/63 the rising trend of world agricultural production will probably be resumed with a further sizable increase. Climatic conditions seem generally to have been more favorable than in 1961/62, when bad weather was so widespread.

The chapter is concluded with brief notes on the prospects for the main agricultural commodities and for fishery and forestry products.

Chapter III. The role of forest industries in the attack on economic underdevelopment

Governments of developing countries, in deciding on the allocation of scarce investment funds among different sectors of the economy, need to examine each sector from the standpoint of the contribution which its development can make toward promoting the growth of the economy as a whole. The more important categories of data for an evaluation of the economic impact of investment in a particular sector include technological data, investment and cost data, demand data, and facts concerning the secondary and indirect effects of investment in the sector.

Demand for forest products

The structural characteristics of the demand for forest products show that investment in forest industries ranks high as a growth promoter. This is because of the high degree of linkage with other sectors of the economy. The forest industries draw a high proportion of their inputs from other sectors, and a very high proportion of their products go to feed other sectors. Another favorable indication is that income elasticities of demand for forest products are high, especially in low income countries.

At the present time, however, the production of forest products in the world is even more highly concentrated than is consumption. The consequence is that the developing regions, even those favorably endowed with forest resources, are substantial net importers (in value terms) of forest products. In general, they export unprocessed wood and import high value processed wood products.

Characteristics of forest industries

The forest industries sector, which includes sawmilling, pulp and paper manufacture, plywood and veneers, fibreboard, particle board and a wide variety of miscellaneous and secondary industries, shows very great diversity in its raw material needs, its requirements of capital, skilled and unskilled labor, in the technologies it can use, and in economies of scale. In other words, the production function for this group of industries has a wide range and considerable flexibility. These are characteristics which render it specially suitable for investment in developing countries.

Other important advantages derive from the characteristics of forestry, considered in this context in its capacity as "woodshed" for forest industries. Forestry work, too, is highly flexible, and can thus utilize unemployed labor, thereby diversifying and enriching the rural economy.

Certain indirect effects of investment in the forest industries sector are also important. Because of the mutual relations between industries in the sector, initial investments in one branch pave the way for complementary developments, making the sector as a whole to some extent self-propelling. Many forest industries are best located near the forests, which are often some distance from population concentrations. Thus investment in this sector favors decentralization and the establishment of new development zones. Finally, forest industries are closely linked with infrastructural developments such as power and communications, and hence can frequently help to valorize needed infrastructural investment.

Obstacles to be overcome

In the developing countries, many forests because of their heterogeneity lend themselves less readily to industrial development than those in the more advanced countries. However, the prospect of the economic utilization of these forests improves as the raw material basis of the forest industries steadily broadens with technological progress. The process could be considerably accelerated if greater research effort were devoted to the specific problems of developing countries.

Another difficulty lies in the small size of many national markets at the present time, since in certain branches of forest industry the economies of scale are very marked. While time, with expanding markets, will eventually solve this problem, economic integration hastens progress, enlarging investment opportunities. Moreover, economic integration can ensure optimum use of the forest raw materials in a given region.

Scarcity of investment capital is often an impediment; this underlines the need for a more systematic and imaginative approach to capital saving.

Problems of planning

Planning for the forestry and forest industries sectors – the two cannot be divorced – presents many special problems. These relate essentially to the time horizons appropriate for each, given the long production cycle in forestry; to the need for insuring that the important noncrop functions of the forest receive adequate attention; and to the possible areas of conflict between public and private interests. Forests, rightly used, can make an immense contribution to the development process, but if this contribution is to be realized there must be an effective link at all levels between the authorities responsible for the forests and those responsible for planning and encouraging industrial development.

Chapter IV. The livestock industry in underdeveloped countries

Disparities between the diets of the less developed countries and the more adequate diets of the more developed regions of the world are more marked for livestock products than for any other major food group. Recent estimates suggest that, while the calorie value of the average diet in less developed countries is about 70 percent of that of more developed countries, the corresponding figures for meat are about 20 percent, for milk about 14 percent and for eggs about 12 percent. While such broad averages can be no more than indicative, they bring out the essential point that consumption levels in less developed countries are not only low quantitatively, but are also strikingly lacking in many essential nutrients.

Poverty is the main explanation of the low consumption of livestock products in these countries, and the demand for livestock products increases dramatically once incomes begin to rise. The efforts now being made to speed economic development, coupled with the accelerating growth of population, are thus likely to bring about a steep increase in the demand for livestock products in less developed countries. Unless this rising demand is matched by increased production, the result will be higher prices, making them still more inaccessible to the poorest sections of the population who lack them most. This trend is already evident in a number of countries. Estimates based on the expected growth of population and incomes suggest that the demand for livestock products may well grow by some 5 percent annually in the less developed countries. This is estimated to be about twice the recent rate of growth of production.

In general the number of livestock in relation to the human population is not significantly lower in less developed than in more developed regions, and the small production of livestock products stems from their very low productivity. For example, the output of meat and milk per head of the cattle population in Europe is estimated to be about ten times greater than in the Far East, seven times greater than in Africa, and four times greater than in the Near East and Latin America. Increased supplies of livestock products in these regions depend not so much on increasing the number of animals, which are often already too large in relation to available feedstuffs, as on raising the output per animal.

The second section of the chapter discusses the technical problems of increasing the productivity of

livestock. For this three main methods are available: the control of disease, better feeding and better breeding. These three facets of improved management are indivisible. Better feeding will do little if the stock is unthrifty through disease or parasites; genetic improvement will do little unless the improved types of animals are properly fed. Better technical methods, however, will not be adopted unless farmers are made aware of their potentialities through improved education and extension services, and unless economic conditions are favorable. The latter include adequate credit facilities, in many countries improved conditions of land tenure, and also efficient marketing and distribution services to link the farmer with the growing urban demand.

The chapter discusses some of the main problems of animal nutrition, especially in tropical climates, and the conditions necessary for the integration of livestock husbandry with crop production to the gain of both. It emphasizes the importance of fodder conservation and range management, especially in arid areas.

In regard to breeding, the chapter discusses conditions under which the importation of exotic breeds of livestock can contribute to increased production, but also brings out the limitations of the method and stresses the importance of effective controls against the simultaneous importation of new diseases. Emphasis is laid on the importance of breeding and selecting indigenous breeds, already adapted to the local environment and resistant to local diseases. It also discusses the possibilities of crossbreeding.

Indications are given of the immense and largely preventable losses resulting from animal disease, and examples are quoted of successful control or eradication. Disease in livestock is not necessarily a spectacular matter with thousands of animals exhibiting obvious symptoms or with a high death rate. Many forms causing heavy losses, including internal parasitism, infectious infertility, or mineral deficiencies, may be so widespread and insidious as to be accepted as normal.

Much emphasis is laid on the importance of education in animal husbandry and veterinary science, and on the contributions which the more developed countries can make in the earlier stages of livestock development in those which are less developed. This section of the chapter ends with a brief discussion of the many problems of livestock marketing, including transportation.

A third section of the chapter considers separately the problems of cattle, sheep, pigs, poultry, and other main types of livestock, including the conditions under which each are likely to prove of value. A fourth section discusses the main problems of each of the main regions of the world and gives brief indications of recent successful examples of increasing livestock production. A final section briefly reviews possible future developments, including the potentialities of some of the newer techniques now coming into use. It also discusses the possibility of using surplus stocks of feed grains for building up efficient livestock industries in those countries which are economically less developed.

Chapter II. - WORLD REVIEW AND OUTLOOK

Agricultural production

Preliminary estimates suggest that there was little increase in world agricultural production in 1961/62. With population now estimated to be rising by about 1.8 percent per year, this would imply some reduction on a per caput basis (Table II-1). The longer term trend of agricultural production, however, during the past decade and also in comparison with the prewar period, is still ahead of population growth. The pause in the expansion of production, which if confirmed by later figures would be the first since 1957/58, was caused mainly by widespread bad weather, and there is every indication that the rise will be resumed in 1962/63.

Among the main regions of the world, agricultural production appears to have increased substantially in 1961/62 only in Latin America where production had fallen in 1960/61 (Table II-2). It is estimated that there was an increase of about 4 percent in total agricultural production in Latin America in 1961/62, though food production rose by only about 2 percent. In eastern Europe and the U.S.S.R. production is estimated to have risen by about 2 percent in 1961/62, after failing to increase in the previous season. Smaller increases of approximately 1 percent are estimated for Oceania and for the Far East (excluding Mainland China).

In each of the other regions for which data are available there was a decline in agricultural production in 1961/62, according to preliminary estimates. There was a decrease of about 1 percent in western Europe from the very high level of 1960/61, when according to revised figures production had increased by no less than 6 percent. [1] Agricultural production

[1] The preliminary estimates published in last year's issue of this report indicated a rise of only 3 percent in western Europe in 1960/61. There were larger increases than expected in the production of milk and vegetables, both of which are produced continuously throughout the crop year, so that the preliminary estimates for them are particularly subject to error. Similarly revised data for Africa indicate an increase of 4 percent in 1960/61 instead of the 1 percent reported last year. This change appears to be due mainly to sharp revisions in the estimates of grain production, but it should be noted that for this region the data are especially unreliable for all commodities except those which are almost entirely exported. There have also been smaller changes in the data for most other regions, and for the world (excluding Mainland China) it is now estimated that there was an increase of about 2 percent in 1960/61 instead of the 1 percent originally reported. While revisions in the production data are unavoidable, especially in view of the early date at which this report has to be prepared, it is unusual for the figures to be so substantially affected.

TABLE II-1. - INDICES OF WORLD [1] AGRICULTURAL PRODUCTION IN RELATION TO POPULATION

	Prewar average	Average 1948/49-1952/53	Average 1953/54-1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
	Indices, average 1952/53-1956/57 = 100						
TOTAL PRODUCTION							
All agricultural products	77	88	102	113	116	119	119
Food products only	76	88	103	114	116	119	119
POPULATION	81	94	102	107	109	112	114
PER CAPUT PRODUCTION							
All agricultural products	95	95	101	106	106	106	105
Food products only	94	94	101	106	106	107	105

NOTE: The world and regional indices of agricultural production shown in this report have been calculated by applying regional weights, based on 1952/53-1956/57 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 coffee, tea, tobacco, inedible oilseeds, animal and vegetable fibers, and rubber. While the coverage of most of the regional groupings used is self-explanatory, it should be noted that western Europe is defined as including Yugoslavia, and the Near East as extending from Cyprus and Turkey in the northwest to Afghanistan in the east and including from the African continent Libya, Sudan, and the United Arab Republic. For Mainland China no estimates are included until more complete data are available.

[1] Excluding Mainland China.

TABLE II-2. - INDICES OF WORLD [1] AND REGIONAL AGRICULTURAL PRODUCTION IN RELATION TO POPULATION

	Prewar average	Average 1948/49-1952/53	1953/54	1954/55	1955/56	1965/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
	Indices, average 1952/53-1956/57 = 100										
Total production											
ALL AGRICULTURAL PRODUCTS											
Western Europe	82	86	101	100	102	103	107	109	113	120	118
Eastern Europe and U.S.S.R.	82	86	94	96	105	116	118	129	132	132	135
North America	68	93	99	97	101	103	98	105	107	109	108
Oceania	78	90	97	98	103	105	102	117	118	122	123
Latin America	73	89	96	100	102	107	112	118	122	120	124
Far East [1]	84	87	98	100	103	107	106	111	115	119	120
Near East	71	83	100	97	101	108	113	117	120	121	118
Africa	69	88	98	101	101	106	104	109	110	114	111
ALL ABOVE REGIONS	77	88	98	98	102	107	107	113	116	119	119
FOOD PRODUCTS ONLY											
Western Europe	82	86	101	100	102	103	107	110	113	120	119
Eastern Europe and U.S.S.R.	83	86	95	96	104	116	119	130	133	134	137
North America	66	92	98	97	101	104	101	109	109	111	110
Oceania	81	93	99	98	103	100	98	116	114	119	119
Latin America	70	88	96	101	101	108	111	117	117	118	120
Far East [1]	82	87	99	100	103	107	106	111	116	120	120
Near East	71	83	101	97	101	108	113	117	119	119	117
Africa	72	89	98	101	100	106	103	107	107	111	108
ALL ABOVE REGIONS	76	88	98	99	102	107	108	114	116	119	119
Per caput production											
ALL AGRICULTURAL PRODUCTS											
Western Europe	93	89	102	101	102	102	105	106	108	114	112
Eastern Europe and U.S.S.R.	84	91	96	96	103	113	113	122	123	121	122
North America	88	100	101	97	99	100	93	98	98	98	95
Oceania	103	99	99	97	101	100	95	107	106	106	104
Latin America	108	97	98	100	100	102	105	107	108	103	105
Far East [1]	109	93	100	100	101	103	100	102	104	105	104
Near East	93	91	102	98	99	103	105	107	107	105	100
Africa	94	96	100	101	99	102	98	100	99	101	96
ALL ABOVE REGIONS	95	95	100	99	101	103	101	106	106	106	105
FOOD PRODUCTS ONLY											
Western Europe	93	89	102	101	101	101	105	106	109	115	112
Eastern Europe and U.S.S.R.	85	92	96	96	103	112	114	123	124	123	124
North America	85	99	100	97	99	101	96	101	100	99	97
Oceania	108	102	102	98	101	96	92	106	101	104	102
Latin America	103	97	98	101	99	103	104	106	104	102	101
Far East [1]	106	93	101	100	101	103	100	102	105	106	104
Near East	93	91	104	98	99	103	106	107	106	103	99
Africa	97	98	100	101	98	101	97	98	96	98	93
ALL ABOVE REGIONS	94	94	100	99	101	103	102	106	106	107	105

NOTE: See explanatory note to Table II-1.

[1] Excluding Mainland China.

also fell by some 1 percent in 1961/62 in North America, mainly because of drought in the prairie provinces of Canada. In the Near East production is estimated to have dropped by between 2 and 3 percent, as a result of continued droughts in a number of countries and heavy pest damage to the United Arab Republic cotton crop. Estimates for Africa, where there was a large increase the year before, indicate a decline of as much as 3 percent in 1961/62, resulting mainly from drought in Algeria, Morocco and Tunisia.

Again this year no official figures of agricultural production have been published for Mainland China, which is therefore not included in the FAO index of world production. Floods, droughts and pests are reported to have curtailed production for the third consecutive year, and there have been further large imports of grains.

Longer-term trends in agricultural production in relation to population

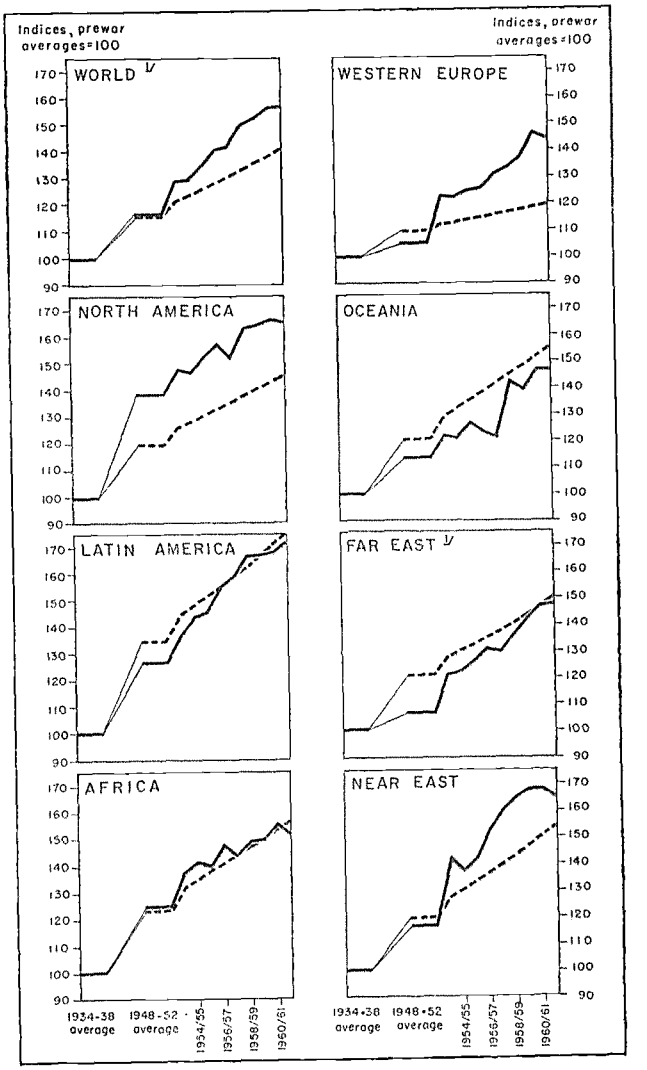
The recent course of per caput production has been somewhat uneven. In 1958/59 there was a sharp increase in world per caput agricultural production (excluding Mainland China). This increased level was approximately maintained in the two following years, but in 1961/62, as noted above, there was probably a slight decline.

Over the past decade, however, production has increased at an average annual rate of about 2.9 percent, while the average rate of population increase over this period has been about 1.8 percent per year. This margin of production over population growth has taken per caput agricultural production to a level about 10 percent higher than before the war, but because of the more rapid population growth in the less developed regions almost all of the improvement over the prewar level has been in the more developed regions of the world.

It is perhaps remarkable that it is still necessary, after more than 20 years, to compare per caput agricultural production with its prewar level. The low levels of per caput production at that time in the less developed regions, only about 40 percent of the average for the more developed regions, [2] are certainly no desirable standard at which to aim. However, it was during the war years that the increase in agricultural production temporarily fell behind population growth in each region of the world except North America, where production was enormously stepped up to make good the deficits elsewhere. There are still some regions where production has been unable to catch up with population after this wartime setback, at least on a permanent basis, and where per caput production therefore remains lower than before the war.

Figure II-1 is almost identical with one published in last year's issue of this report, but it is repeated here (with the addition of data for 1961/62) since it shows particularly clearly how, as a result of the wartime setback, per caput production is less than before the war in some regions even though produc-

FIGURE II-1. TRENDS IN REGIONAL FOOD PRODUCTION IN RELATION TO POPULATION GROWTH, PREWAR TO 1961/62



[1] Excluding Mainland China

[2] This comparison is based on the price-weighted aggregates of the FAO production indices.

tion has been increasing faster than population. The margin of production over population has not been sufficient in these regions to make up for the deficit that developed during the war years. The comparison is shown in terms of food production rather than total agricultural production, for it is in its role of feeding the rapidly growing population that the performance of world agriculture is most anxiously watched.

While the prewar level of per caput food production has been regained in each of the less developed regions at some time during the postwar period, in all except the Near East this has so far been only temporary and per caput production has subsequently slipped back. As is discussed in a later section of this chapter, however, actual supplies of food per caput in these regions appear to have been maintained at higher levels than before the war as a result of larger imports and often smaller exports of food.

Even in the Near East, while per caput food production in the peak year of 1958/59 was about 15 percent more than before the war, this gain has since been approximately halved, chiefly because of the succession of droughts in a large part of the region. In Africa food production per caput is estimated to have reached about 5 percent above the prewar level in 1956/57, but in the last few years it appears once more to have dropped slightly below this level. Per caput food production in Latin America was briefly a little more than before the war from 1956/57 to 1959/60. In the Far East (excluding Mainland China), the most populous region, where production per caput is the lowest in the world, the prewar level was finally regained in 1960/61 following three successive good harvests, but from preliminary estimates it is doubtful if it has been maintained in 1961/62.

Reference to Table II-2 indicates that, while the situation is not very different if the comparison is made in terms of all agricultural products instead of just food, there are some small divergencies in certain regions. In Latin America, for food and nonfood products together the prewar level of per caput production was regained for only a single year; linseed production in this region remains much less than before the war, while coffee production also was below the prewar level until the very rapid increase that began in the late 1950s. In Africa, on the other hand, largely because of the continued rapid expansion of coffee production, total agricultural production is estimated, in contrast to food production, to be still a little more than before the war on a per caput basis. In the Far East (excluding Mainland China), where there has been a slight shift from nonfood crops compared with before the war, it was only for food products that the prewar level of per caput production was briefly regained in 1960/61.

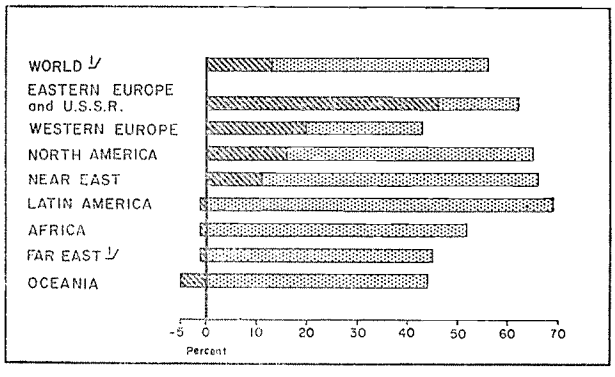
TABLE II-3. - CHANGES IN FOOD PRODUCTION AND POPULATION, 1959/60-1961/62 AVERAGE IN RELATION TO PREWAR PERIOD

	Population	Total food production	Per caput food production
	..... *Percentage increase* [1]		
Western Europe	19	43	20
Eastern Europe and U.S.S.R.	12	62	46
North America	43	65	16
Oceania	52	44	— 5
Four above regions ..	21	56	29
Latin America	71	69	— 1
Far East [2]	46	45	— 1
Near East	50	66	11
Africa	53	52	— 1
Four above regions ..	51	54	2
ALL ABOVE REGIONS	38	56	13

[1] Prewar average to 1959/60-1961/62 average. Minus sign indicates decrease. - [2] Excluding Mainland China.

It is evident from Table II-3 and Figure II-2 that almost all of the rise in world per caput production has been contributed not by the less developed regions, where such improvements are urgently needed to raise levels of living, but by the more developed parts of the world. Increases in per caput production have been far greater in the more developed regions

FIGURE II-2. CHANGES IN TOTAL AND PER CAPUT FOOD PRODUCTION, 1959/60-1961/62 AVERAGE IN RELATION TO PREWAR PERIOD



[1] Excluding Mainland China

than in the Near East, the less developed region where progress in this respect has been the most rapid and in fact the only one where per caput food production was above the prewar level in 1961/62. This is in spite of the fact that recently in North America the expansion of production has been to some extent stemmed by measures designed to prevent the further accumulation of surplus stocks. In Oceania increases in per caput production have been prevented by a particularly high rate of population growth, resulting partly from substantial immigration.

Generally, however, the growth of population has been a great deal more rapid in the less developed than in the more developed regions, and it is this, rather than any marked failure on the part of their agricultural production, that over the longer term has caused the poor showing of production on a per caput basis. Table II-3 indicates that, for the less developed regions as a whole, food production has grown about as much as in the more developed regions. In Latin America, in fact, total food production in 1959/60-1961/62 averaged nearly 70 percent more than before the war, which is a greater increase than in any other region. Population growth, however, was also more rapid than in any other region, with the consequences already noted for per caput production. The rate of population growth has of course diverged even more sharply for individual countries, as is apparent from a comparison of the data of total and per caput food production in Annex Table 1.

Finally it must be noted that the growth of population is tending to accelerate in the less developed regions as the spread of hygiene and medical care brings down death rates. Recent censuses in many countries have revealed rates of increase much higher than those estimated earlier, and it has been necessary to revise the estimate of the annual rate of increase of world population (excluding Mainland China) from 1.6 to 1.8 percent. The accelerating growth of population partly accounts for the slower increase of per caput production in some of the less developed regions in recent years, though the main influence in this case has come from the production side of the equation.

Regional agricultural production

Some of the main features of the recent agricultural production situation in the principal regions of the world are discussed in more detail below. As far as possible information is included on individual countries, but this analysis is inevitably limited as the FAO country production indices are not yet available for 1961/62. Statistics of the regional production of the major commodities are to be found in Annex Tables 3-10.

Western Europe

Following large increases in each of the two preceding years, preliminary estimates indicate a slight fall in agricultural production in western Europe in 1961/62. In 1960/61, when according to revised data the rise had been as much as 6 percent, there were substantial increases in production in all the countries of northwestern Europe, but except for small increases in Portugal and Spain production dropped sharply in the southern part of the region (Table II-4). In 1961/62 declines in production appear to have been quite widespread, and Greece was probably the only country of the region to register a large increase.

The region's grain production is estimated to have fallen by about 6 percent in 1961/62 from the high level of the year before. The wet autumn of 1960 resulted in lower acreages of winter grains in many countries, while the replacement of winter wheat by lower-yielding spring wheat as well as lower yields of other grains also contributed to the decline in production. There were substantial reductions in the production of wheat and rye in northwestern Europe and of maize in southern Europe. The production of sugar beet and of potatoes also fell far short of the bumper root harvest of 1960/61. Excess supplies of sugar and potatoes in 1960/61 led to the planting of smaller areas in most countries in 1961/62, and yields were also affected by dry weather. Among the main crops, only citrus fruit and cotton rose substantially in 1961/62.

While crop production was lower in 1961/62, livestock production continued its rapid increase with a further rise of from 3 to 4 percent. Beef and veal and pigmeat were plentiful in 1961/62, and dairy products were in oversupply. Milk yields continued to increase, and in the winter of 1961/62 the number of milk cows was about 2 percent more than the previous winter, so that the production of milk products, especially butter, rose sharply. Pig numbers rose by about 6 percent in 1961 and have continued to increase during 1962, and the production of pigmeat has risen substantially.

TABLE II-4. - INDICES OF AGRICULTURAL PRODUCTION IN WESTERN EUROPE

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
NORTHWESTERN EUROPE	*Indices, average 1952/53-1956/57 = 100*								
Austria	91	103	96	102	107	112	116	110	122
Belgium-Luxembourg	93	96	104	107	100	106	110	103	116
Denmark	100	101	101	97	101	111	110	107	117
Finland	98	105	100	97	100	109	110	112	124
France	91	99	104	104	102	105	104	111	125
Germany, Federal Republic	95	101	101	100	102	105	111	107	123
Ireland	95	97	105	99	105	115	105	98	111
Netherlands	100	99	100	104	98	105	115	116	128
Norway	97	99	99	97	108	101	101	103	108
Sweden	104	103	101	91	101	99	95	97	100
Switzerland	101	100	103	99	98	99	108	106	112
United Kingdom	96	98	99	99	107	106	102	111	117
Subtotal	95	100	102	101	103	105	107	109	121
SOUTHERN EUROPE									
Greece	79	102	100	109	111	128	121	126	115
Italy	92	104	96	105	103	101	116	116	110
Portugal	87	106	104	102	102	105	99	101	103
Spain	100	95	102	99	104	108	110	117	118
Yugoslavia	70	114	92	120	104	147	119	163	148
Subtotal	90	103	98	105	104	112	114	122	117
REGIONAL TOTAL	93	101	100	102	103	107	109	113	120

NOTE: Country indices are calculated by FAO on a uniform basis. They may differ from national indices produced by the countries themselves because of differences in concepts of production, coverage, weights, and methods of calculation. They are not yet available for 1961/62.

Eastern Europe and U.S.S.R.

In Eastern Europe and the U.S.S.R., where there was no increase in agricultural production in 1960/61, a rise of about 2 percent is estimated for 1961/62. U.S.S.R. production, which had declined in 1960/61, is reported to have increased in 1961/62 but to have failed to reach planned targets; the recent slow growth of agricultural production, in strong contrast to the rapid progress of earlier years, is causing concern. Among the countries of eastern Europe, only Poland appears to have had a good season in 1961/62. The southern countries of the region suffered from drought, and in Eastern Germany labor shortage and other problems, resulting from the rapid collectivization of the previous year, caused considerable losses.

As a result of an increase in area, especially of maize, the U.S.S.R. grain harvest rose slightly in 1961/62, but at 137.3 million tons was considerably below the target of 154 million tons. The season was particularly favorable in the Ukraine, but there was bad weather in many other major producing regions. The production of pulses rose from 2.6 million tons in 1960/61 to 4 million tons in 1961/62. Potato production failed to increase, and the output of other vegetables fell by 6 percent. Sugar beet production also was lower, but cotton and oilseeds, especially sunflowerseed, expanded. The increase in the production of meat and milk in the U.S.S.R. was negligible in 1961. Meat production was 8.8 million tons, as against the 11.8 million tons planned, and state procurements were reduced. Milk production reached only 62.5 million tons, compared with the target of 78.4 million tons. Livestock numbers, however, increased substantially.

In the eastern European countries there was no increase in grain production in 1961/62. Sugar production was 8 percent less than in 1960/61, in spite of a record crop of sugar beet in Poland. The Polish potato crop was also a record one but production was lower in the rest of the region except for Czechoslovakia. Sunflowerseed production in Hungary was 60 percent above the low 1960/61 level, but it declined sharply in Bulgaria and Romania. Fruit production was high in the southern part of the region, but crops

TABLE II-5. - INDICES OF AGRICULTURAL PRODUCTION IN NORTH AMERICA

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
Canada	111	103	78	99	109	92	97	101	107
United States	98	98	99	101	103	99	106	108	109
REGIONAL TOTAL	99	99	97	101	103	98	105	107	109

NOTE: See explanatory note to Table II-4.

were poor in Czechoslovakia and Eastern Germany. Pigmeat production rose by 14 percent in Poland, and pig numbers expanded in all countries except Bulgaria and Czechoslovakia. Cattle numbers increased, except in Eastern Germany, where there were heavy slaughterings in order to maintain meat supplies.

North America

Agricultural production in North America fell by about 1 percent in 1961/62 from the level of the year before, when United States output had set a new record. In 1961/62 United States production is estimated to have been maintained at close to this record level, but in Canada production was reduced by about one fourth as a result of severe drought in the prairie provinces, which at the regional level brought declines especially in the production of grains and linseed.

It is clear from Table II-5 that Canadian agricultural production is subject to considerable year-to-year fluctuations, but the decline in 1961/62 is the biggest for eight years. The wheat crop was the smallest since 1937/38, and the barley crop the smallest since 1949/50. Oilseed production also fell sharply, that of linseed by as much as 35 percent. Forage production was reduced by the drought, and increased numbers of cattle were therefore marketed, many of them going for feeding and slaughtering to the United States, where feed supplies were adequate. The production of beef, veal, mutton, and poultry meat continued to increase in 1961, though there was some decline in the production of pork and eggs.

In the United States, livestock production increased further in 1961, but crop production was slightly lower than the previous season. In spite of record yields, maize and sorghum output fell as a result of lower acreages under the Emergency Feed Grain Program. Wheat production was about 10 percent less than in 1960/61, largely because of drought damage to the spring crop. There were large increases, however, in the production of soybeans, because of the 25 percent increase in the support price, and of sugar, as a result of the curtailment of imports from Cuba. A small increase was registered for tobacco, while cotton production fell slightly. Beef production rose by 3 percent to a record level in 1961, and broiler production by about 12 percent. Pork production declined slightly, but the expansion of milk production continued in spite of a decrease in the number of dairy cows.

Oceania

Preliminary estimates indicate a further increase of about 1 percent in agricultural production in Oceania

TABLE II-6. - INDICES OF AGRICULTURAL PRODUCTION IN OCEANIA

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
Australia	97	97	97	104	105	99	119	118	121
New Zealand	97	95	100	103	105	109	115	119	121
REGIONAL TOTAL	97	97	98	103	105	102	117	118	122

NOTE: See explanatory note to Table II-4.

in 1961/62. In the previous year there had been an expansion of about 3 percent in both Australia and New Zealand (Table II-6). The region's grain production declined by 15 percent in 1961/62, though it remained high in relation to earlier years. There were further sharp increases in the 1961 output of livestock products, in particular a large rise in beef production which checked the decline that had begun in 1959.

While Australian wheat production was at a high level in 1961/62 it was a good deal lower than the record crop of the previous season. Australian beef production increased by more than 20 percent, there was a rise of 3 percent in mutton and lamb output, and the 1961 wool clip recovered from the heavy losses of the previous year, in spite of continuing drought in some areas. In New Zealand there was some increase in the production of milk, wool, beef, and mutton and lamb. Butter production was somewhat lower, as more milk was used in the production of cheese, which rose by 7 percent.

Latin America

In Latin America, according to preliminary estimates, there was an increase in agricultural production of about 4 percent in 1961/62, chiefly as a result of sharp recoveries in the output of wheat, coffee, linseed, and beef. The increase in food production in 1961/62 was only about 2 percent. In 1960/61 total production had fallen by between 1 and 2 percent, almost entirely because of drought in Argentina and Brazil (Table II-7). The data so far available suggest that 1961/62 was again a good season for most countries, though in Cuba, partly because of drought and floods, there was a big drop in production from the high level of the previous year.

Wheat production recovered by about 20 percent in 1961/62, most of the rise being accounted for by Argentina. The coffee crop was nearly 15 percent larger than in 1960/61, when there had been a sharp fall; here too, one country, Brazil, was responsible for almost all of the increase. For linseed the recovery amounted to as much as 35 percent, and again Argentina was the principal country concerned. There were also significant but smaller increases in the production of cotton, cottonseed and soybeans. Sugar production fell sharply, however, as a result of the smaller crop in Cuba.

The output of livestock products is estimated to have risen by about 4 percent in 1961, which represents a substantial recovery from the low levels of the two preceding years. The bulk of the increase was in beef and veal production, especially in Argentina, but the region's total for this commodity remained below the 1958 record.

TABLE II-7. - INDICES OF AGRICULTURAL PRODUCTION IN LATIN AMERICA

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
CENTRAL AMERCA	*Indices, average 1952/53-1956/57 = 100*								
Cuba	99	97	94	99	111	114	115	115	126
Guatemala	93	96	99	102	110	115	120	130	127
Honduras	99	103	95	97	106	110	109	114	114
Mexico	84	89	104	110	113	129	138	136	137
Panama	91	102	99	104	103	113	119	119	115
Subtotal	90	92	100	106	112	123	129	129	132
SOUTH AMERICA									
Argentina	100	97	99	97	107	108	111	103	97
Brazil	93	96	99	106	106	115	124	142	133
Chile	101	95	102	103	99	108	104	105	108
Colombia	98	101	98	101	102	109	112	118	118
Peru	98	100	102	102	98	99	107	113	116
Uruguay	97	108	100	97	98	93	84	83	87
Venezuela	95	96	101	101	107	109	114	110	118
Subtotal	97	97	99	102	105	109	114	119	114
REGIONAL TOTAL	95	96	100	102	107	112	118	122	120

NOTE: See explanatory note to Table II-4.

Far East

After increases of some 3 percent for three successive seasons, it appears from preliminary data that the rise in agricultural production in the Far East (excluding Mainland China) was limited to about 1 percent in 1961/62. The 1960/61 season had been particularly favorable for almost every country in the region (Table II-8), but in 1961/62 adverse weather conditions affected production in several countries, including Burma, Indonesia, and South Viet-Nam.

There was a further large increase in wheat production in 1961/62, but the rice crop is estimated to have been slightly below the high level of the previous year, so that total grain production was virtually unchanged from 1960/61. Rice harvests were lower in Burma, Cambodia, Indonesia, and South Viet-Nam, but production was high in most other countries. Groundnut production increased sharply, with a big rise in India. Jute production was up by almost 40 percent over the exceptionally low level in 1960/61 and was a record in both India and Pakistan. Rubber production also rose substantially, mainly because of sharply expanded smallholder output in Indonesia, though the coming into bearing of higher-yielding trees is also having an effect. For most other commodities, however, there was little increase in production; in particular, it is estimated that the output of livestock products showed only a negligible rise in 1961 above the 1960 level, in spite of a continued rapid increase in Japan. There were decreases in the region's production of cotton and coffee, in both cases because of lower crops in India.

For Mainland China, while no official production figures have been announced, all the evidence points to a third successive season of poor harvests in 1961. Food consumption levels and individual rations have apparently decreased further, and malnutrition is reported to continue to affect workers' output. As described later in this report, China has been importing very large quantities of grains in 1961 and 1962 in an effort to mitigate the food shortages.

Near East

Following an increase of less than 1 percent in 1960/61, preliminary estimates indicate that agricultural production in the Near East declined by between 2 and 3 percent in 1961/62. The recent poor performance of agricultural production in the region has resulted in particular from a succession of droughts in Iraq, Jordan, and Syria (Table II-9).

In 1961/62 grain production fell by nearly 2 million tons from the already low level of the previous year and would have been even lower had there not been some slight improvement in Iraq, Jordan, and Syria and a good sorghum harvest in Sudan. In Turkey the grain harvest was 14 percent less than in 1960/61. In the United Arab Republic wheat and maize production was lower, and owing to water shortage the rice area was reduced and production fell by more than 20 percent. The region's production of pulses, sugar and citrus fruit

TABLE II-8. - INDICES OF AGRICULTURAL PRODUCTION IN THE FAR EAST [1]

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
Burma	102	98	96	96	107	93	107	110	110
Ceylon	94	95	101	108	102	106	110	111	114
China: Taiwan	95	96	99	101	109	115	120	115	122
Federation of Malaya	95	93	99	105	108	108	110	118	123
India	90	100	100	102	108	106	111	114	119
Indonesia	92	101	105	101	102	104	106	108	112
Japan	96	85	94	114	110	115	118	124	125
Korea, Republic of	86	105	104	106	99	108	111	116	117
Pakistan	99	98	102	98	104	102	102	108	112
Philippines	93	98	99	101	109	111	115	116	121
Thailand	88	106	86	105	115	95	107	113	120
REGIONAL TOTAL [1]	92	98	100	103	107	106	111	115	119

NOTE: See explanatory note to Table II-4.
[1] Excluding Mainland China.

TABLE II-9. - INDICES OF AGRICULTURAL PRODUCTION IN THE NEAR EAST

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
Iran	90	98	98	104	109	115	115	117	115
Iraq	85	105	119	88	103	124	105	98	100
Israel	81	92	100	104	124	129	150	167	163
Syria	88	98	115	80	120	136	96	100	101
Turkey	100	108	86	99	107	105	121	123	124
United Arab Republic	96	92	102	103	107	116	116	120	123
REGIONAL TOTAL	94	100	97	101	108	113	117	120	121

NOTE: See explanatory note to Table II-4.

also declined, and olive oil was the only principal crop to show a sharp increase in production. There was a fall in tobacco production in Turkey. Because of leafworm attack and bad weather, the 1961/62 cotton crop in the United Arab Republic was 30 percent less than in 1960/61. For the region as a whole, however, the fall in cotton production was small, principally because of a very sharp increase in Sudan.

Africa

Revised estimates indicate that agricultural production in Africa increased by about 4 percent in 1960/61, but according to the preliminary data so far available for 1961/62 this was followed by a fall of almost the same magnitude, so that production in 1961/62 was only slightly higher than in 1959/60. In both of the last two seasons the regional situation seems to have been substantially influenced by events in the three countries of northwest Africa, which generally account for approximately one sixth of the region's total production. [3] In 1960/61 there was some recovery in production in Algeria, Morocco, and especially Tunisia (Table II-10), but in 1961/62, for which complete country data are not yet avail-

[3] Based on the price-weighted aggregates of the FAO production indices.

TABLE II-10. - INDICES OF AGRICULTURAL PRODUCTION IN AFRICA

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
NORTHWEST AFRICA									
Algeria	91	100	106	96	106	99	94	99	103
Morocco	[1] 91	[1] 101	[1] 108	[1] 97	[1] 103	[1] 80	[1] 106	100	102
Tunisia	94	109	103	81	112	99	134	111	128
Subtotal	91	102	106	94	106	92	104	101	106
SOUTH OF SAHARA									
Ethiopia [2]	99	100	100	101	100	100	100	104	103
South Africa	90	97	101	102	110	106	111	112	120
Subtotal [3]	94	97	100	103	106	106	110	112	116
REGIONAL TOTAL	94	98	101	101	106	104	109	110	114

NOTE: See explanatory note to Table II-4.
[1] Former French zone only. - [2] Excluding Eritrea. - [3] Derived by subtraction of subtotal for northwest Africa from regional total.

able, severe droughts in these countries appear to have been the major contributor to the decline in the region's total agricultural production.

Total grain production is estimated as almost 10 percent lower than in 1960/61, with declines of as much as 36 percent for wheat and 55 percent for barley, which are produced principally in northwest Africa. Maize production increased further, however, with another large crop in South Africa and the Federation of Rhodesia and Nyasaland, though in parts of east Africa and also Dahomey there were food shortages following poor maize crops as a result of drought. In addition to their drought-affected grain production, the countries of northwest Africa had their lowest olive oil harvests for many years. Among the crops produced mainly south of the Sahara, the region's cotton production is estimated to have fallen by almost 20 percent in 1961/62, mainly because of drought in Uganda. Cocoa and coffee production also fell slightly, and the only crop to show a substantial increase in 1961/62 was sugar, which rose by 24 percent with the recovery of production in Mauritius from the cyclone damage of the previous year.

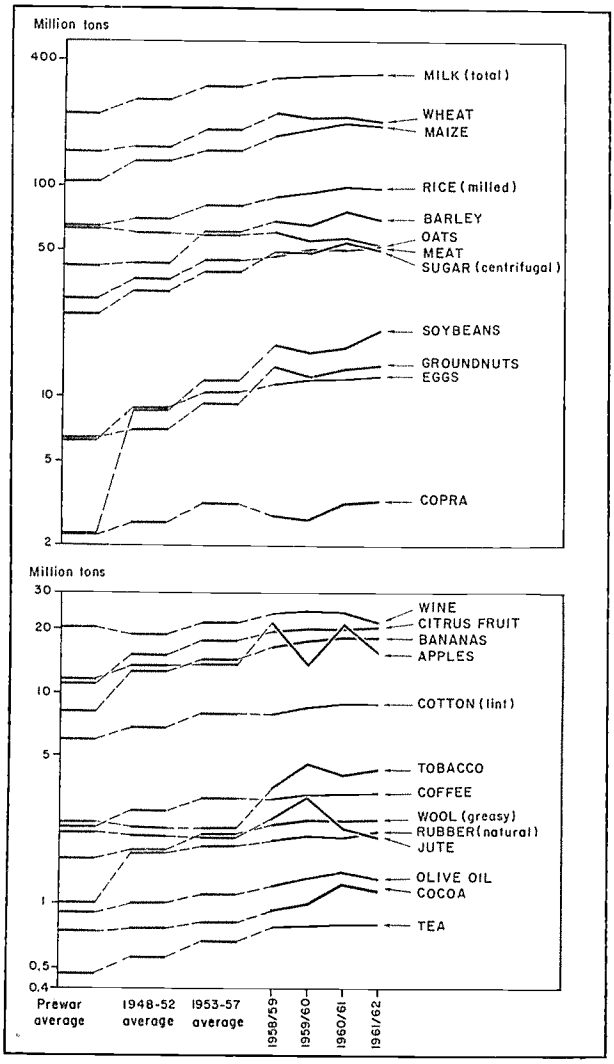
Main agricultural commodities

On a commodity basis the chief contributors to the pause in the expansion of world production in 1961/62 were grains and sugar, the output of which dropped considerably in comparison with the year before (Figure II-3 and Annex Table 2A). For most other agricultural products world production continued to expand in 1961/62, though large increases were rather few. The following paragraphs briefly review recent trends in the world production (excluding Mainland China) of the main commodities. [4]

The production of each of the main grains was smaller than in 1960/61. Wheat production fell by about 4 percent, mainly because of the droughts in the prairie provinces of Canada, the spring wheat areas of the United States, northwest Africa and much of the Near East. The same factors were largely responsible for a decline of about 7 percent in barley production in 1961/62. For three years now world wheat production has been well below the peak level reached in 1958/59, but barley production appears to be fluctuating about a slowly rising trend.

[4] For a full review of the agricultural commodity situation, see *FAO commodity review 1962*, Rome, 1962.

FIGURE II-3. WORLD [1] PRODUCTION OF MAJOR AGRICULTURAL COMMODITIES, PREWAR TO 1961/62
(Semilogarithmic scale)



[1] Excluding Mainland China.

The rapid upward trend of world maize production was halted in 1961/62, largely because of reduced acreage in the United States under the Emergency Feed Grain Program, which also brought a decline in the world production of sorghum. The production of oats fell sharply, reflecting the long-term trend toward lower acreages in western Europe as well as the droughts in North America. Rice production is estimated to have declined slightly from the high level of 1960/61, the principal reductions being in Burma, Cambodia, Indonesia, South Viet-Nam, and the United Arab Republic.

World sugar production fell back by about 7 percent from the record 1960/61 level, but was still much larger than in earlier years and more than

twice the prewar level. Beet harvests in western Europe declined and there was a sharp reduction in the cane crop in Cuba, which was the smallest for many years.

There was a small increase in citrus fruit production, resuming the upward trend which had been halted in 1960/61. The production of oranges in Spain, Italy, and Algeria rose especially sharply in 1961/62. For apples, however, the biennial production cycle caused a sharp downturn in production in most European countries except Italy, and world output dropped steeply. Banana production, which had hitherto been rising rapidly, is estimated to have been slightly reduced in 1961/62, according to the limited data available. There was a substantial increase in the production of dried fruit, with a recovery of about 24 percent in raisin output from the low level of 1960/61.

World output of vegetable oils and oilseeds is estimated to have increased by about 4 percent in 1961/62. The United States soybean crop was exceptionally large, following a 25 percent increase in the support price. Olive oil output declined with the " off-season " in western Europe and northwest Africa. Groundnut harvests were large in west Africa and India.

Wine production, which tends to fluctuate sharply, is estimated to have decreased by about 12 percent in 1961/62. World tobacco production was only slightly larger than in 1960/61: production gains in the United States, Brazil, and Cuba were offset by widespread outbreaks of downy mildew, especially in Italy and other countries of southern Europe.

The expansion in cocoa production was arrested in 1961/62. The 1961/62 crop in Ghana was about 7 percent smaller and in Nigeria much the same as the exceptionally high levels of the year before. Coffee production recovered partially from the setback of 1960/61, when the rapid postwar expansion of this crop was interrupted for the first time. World tea production is estimated at about the same level as in 1960/61.

Cotton production in 1961/62 was somewhat below the record level of the year before. United States production fell slightly, while in the United Arab Republic leaf worm damage reduced the crop by 30 percent. Jute production recovered sharply, with much larger acreages in both India and Pakistan. Hard fiber production remained virtually unchanged for the third year running, some expansion in sisal and henequen offsetting a decline in abaca and the minor fibers. Wool output increased slightly to reach a new record level, with the recovery of the Australian clip from the heavy losses of 1960/61. Natural rubber production rose by about 5 percent, chiefly because of a sharp recovery in Indonesian smallholder production, combined with the effect of the coming into bearing of higher-yielding trees.

For livestock products, production statistics in most of the less developed countries are considerably less reliable than those for crops. The available data, however, indicate that, in contrast to the rather erratic movements in the production of the main crops in 1961/62, there was a continued steady increase in the output of each of the principal livestock products in 1961. This tendency is particularly encouraging in view of the likely development of demand over the coming years.

Milk production increased in 1961, especially in most countries of western Europe, in Japan, and in Canada. Total meat production is estimated to have increased by about 3 percent. Beef production continued to rise in western Europe and North America and recovered in Latin America and Oceania. There was some slackening in the expansion of mutton and lamb production in Oceania. As in most recent years, the quickest increase was in poultry meat, for which the bulk of the increase in 1961 was in North America. The rise in world egg production continued in 1961, notably in the U.S.S.R.

Fishery production

The production of fish again increased substantially in 1961. Preliminary estimates indicate that the world catch rose by about 7 percent to more than 40 million tons, or approximately twice the level of the immediate prewar and postwar years (Table II-11 and Annex Table 11). Large gains were registered by most of the leading producers, including Japan, Peru, and the U.S.S.R.

Japan, with a production of well over 6 million tons, continues to be the largest producer. In Mainland China, now the second fishing nation of the world, production is believed to be over 5 million tons and to have doubled during the last five years. Almost half of China's total comes from inland waters, with the output from ponds and paddy fields probably more important than that from rivers and lakes; the development of marine fisheries is said to be less spectacular than that of inland fisheries, partly because of a shortage of capital for larger vessels equipped for high-seas fishing.

Peru's production again showed a remarkable

TABLE II-11. - ESTIMATED WORLD [1] CATCH OF FISH, CRUSTACEANS, AND MOLLUSKS

	1938	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million metric tons, live weight										
Western Europe	5.44	6.19	6.77	7.24	7.35	7.77	7.33	7.18	7.61	7.41	7.6
Eastern Europe and U.S.S.R.	1.70	1.99	2.28	2.58	2.84	2.99	2.94	3.05	3.21	3.53	3.8
North America	3.15	3.60	3.62	3.83	3.79	4.13	3.80	3.76	3.99	3.77	4.0
Oceania	0.09	0.09	0.11	0.11	0.10	0.10	0.11	0.11	0.12	0.13	0.1
Latin America	0.24	0.50	0.73	0.80	0.97	1.09	1.33	1.83	3.19	4.60	5.8
Far East [1]	9.10	7.42	9.78	10.46	11.27	11.61	13.06	13.93	15.10	15.78	16.5
Near East	0.33	0.38	0.43	0.43	0.40	0.43	0.41	0.43	0.43	0.42	0.4
Africa	0.45	1.03	1.52	1.56	1.59	1.71	1.83	1.84	1.95	2.09	2.3
WORLD TOTAL [1]	20.50	21.20	25.24	27.01	28.31	29.83	30.81	32.13	35.60	37.73	40.5

[1] Including estimates for Mainland China.

increase in 1961, and this country, which a few years ago was only a very minor producer, moved closer to the leading fishing nations. Fish meal production in Peru rose to some 800,000 tons (equivalent to at least 4.5 million tons of raw fish) in 1961, as against about 570,000 tons the year before.

Catches by the U.S.S.R., including whales, totaled about 3.6 million tons in 1961. Almost four fifths of the total was taken in the open ocean, with important increases in the tuna, sardine, ocean perch, and Atlantic herring fisheries. The fishing fleets continue to be expanded, and increased reliance is being placed on deep-sea factory ships, with up-to-date facilities for freezing, canning and processing.

The United States increased its landings only slightly in 1961. Gains were registered primarily in the menhaden, tuna, jack mackerel, salmon, and king crab fisheries, but there were significant declines in catches of herring, sardine, shrimp, and whiting. United States production of fish meal was at a high level. Canned tuna production was a record, and the production of several other canned products, such as salmon and mackerel, was also the largest for some years. In Canada considerably improved salmon catches on the Pacific coast boosted total landings, but Atlantic coast results, in particular in the cod fishery, were below average.

Catch results in Europe varied in 1961. Icelandic catches were about 20 percent more than in 1960, owing to an exceptional recovery in the herring fishery which was only partly offset by reduced landings of cod and redfish. Production was also larger in Denmark, mainly because of increased catches of flatfish and herring. Norwegian production was approximately 5 percent lower than in 1960. The winter herring fishery, which only a few years ago yielded close to one million tons, was virtually a complete failure, and the total catch of herring and sprats was the lowest since 1946 in spite of a larger output of other than winter herring. Norwegian cod fishing results were good, in contrast to those of the United Kingdom. The United Kingdom's total fish production was lower in 1961 than the year before. Production in the Federal Republic of Germany was also lower in 1961, because of smaller catches of herring following a decision to reduce the size of the fleet fishing for this species.

Fisheries development is progressing rapidly throughout Africa. South Africa (including South West Africa), which has more than doubled its output of most processed items in four years, produced a record of over 1 million tons in 1961. In Morocco, which has important pelagic fisheries, processing establishments were also able to expand production in 1961. In tropical Africa as a whole, catches have reached at least 1 million tons annually. About a quarter of this total is supplied by Angola where, in spite of a decline in recent years, the catch is still nearly ten times its prewar level. Much progress has also been made in other countries, such as Chad, Ghana, and Senegal.

FORESTRY PRODUCTION

World roundwood removals are estimated to have risen only slightly in 1961 and to have reached about 1,750 million cubic meters (Table II-12). The production of fuelwood continued to decline slowly, but total industrial wood removals are estimated to have increased by about 3 percent over the 1960 level.

World output of sawn softwood in 1961 was only

TABLE II-12. - ESTIMATED WORLD [1] ROUNDWOOD REMOVALS AND PRODUCTION OF FOREST PRODUCTS

	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
ROUNDWOOD REMOVALS	*Million cubic meters*									
Total industrial wood ..	730	774	839	910	941	933	938	1 001	1 022	1 050
Fuelwood	711	697	714	727	729	740	725	732	710	700
TOTAL	1 441	1 471	1 553	1 637	1 670	1 673	1 663	1 733	1 732	1 750
PRODUCTION OF FOREST PRODUCTS										
Sawnwood	242.3	270.6	278.2	302.0	299.6	294.0	305.8	326.0	330.0	330.7
Plywood	5.9	8.3	9.0	10.9	11.4	11.9	13.1	14.9	15.4	15.8
	Million metric tons									
Fibreboard	2.0	2.4	2.9	3.2	3.3	3.4	3.6	4.1	4.3	4.4
Wood pulp	33.1	39.1	42.4	46.5	49.6	50.1	50.0	55.0	58.9	61.3
Newsprint	8.6	9.8	10.4	11.2	12.0	12.3	12.1	13.1	14.0	14.4
Other paper and board..	32.6	38.5	40.8	45.6	48.2	49.3	50.7	56.0	59.9	63.6

[1] Including estimates for Mainland China.

very slightly greater than in 1960. European production was about the same as in 1960, but the output in the U.S.S.R. is estimated to have increased by 5 percent over the previous year. In North America the production of sawn softwood fell considerably, but the situation gradually improved during the year. In Japan a high level of building activity caused sharp increases in the prices of raw materials including wood which, together with balance of payments difficulties, brought an increased output of sawn softwood during 1961, partly because of greater volumes of coniferous logs imported from the U.S.S.R. and North America, and partly because of heavier fellings at home. Australian output of sawn softwood in 1961 was more or less unchanged from the level of the previous year, and anti-inflationary measures resulted in heavily reduced imports during the first half of the year, but exports of sawn hardwood were considerably higher than in 1960.

The increase in the production of hardwood logs in Africa and Asia in 1960 resulted in heavier stocks in the main consuming and importing countries of Europe throughout 1961. European output of sawn hardwood increased by almost 6 percent, but a large part of the increase went into stocks. In North America the production of sawn hardwood fell by almost one fourth in 1961. As a result of these trends, world output of sawn hardwoods in 1961, at 64.6 million cubic meters, was about 4 percent less than in 1960.

The world production of plywood is estimated to have risen by 3 percent in 1961. In North America, the main producing region, gains were only slight. European production increased by about 2 percent, and there was a further gain in the U.S.S.R. Japanese output of plywood slightly decreased. A reason for the limited progress in the production of plywood may be found in the competition from particle board, output of which in Europe, for example, rose by roughly 25 percent in 1961.

Pulpwood production is estimated to have increased by about 4 percent in 1961. In Europe, in many roundwood producing areas, the use of pulpwood has increased so much as to compete for raw material with alternative wood uses, and at the same time competition is often increasing between the alternative end-uses of pulpwood for the paper industry or for board manufacturing. For wood pulp, the major feature of the year has been the transition from a suppliers' market to a buyers' market for pulp, largely because of the considerable volume of new pulping capacity brought into operation during the year, notably in Canada, Finland, and Sweden. By the end of 1961 it was estimated that world pulping capacity already exceeded requirements by some 2 million tons, half the surplus being located in Canada and most of the other half in Sweden and Finland. World output of wood pulp (chemical and mechanical) in 1961 exceeded 62 million tons, an increase of more than 5 percent

over 1960. All regions contributed to this increase, but it was especially marked in North America because of both improving home demand and larger exports. European output of pulp in 1961 was about 6 percent higher than in 1960, with especially large increases in chemical pulp.

All major regions contributed to the increase of more than 5 percent in world paper and paperboard production in 1961, though North America and Europe continue to be dominant in the world's output of paper products. In recent years the rate of production increase has slowed down in North America, but increases were still relatively large in Europe, the U.S.S.R., and the Far East.

World production of newsprint increased by about 3 percent. North America showed only a slight increase. As in the case of pulp, world newsprint capacity has expanded faster than demand in recent years with the result that, by the end of 1961, capacity, estimated at 17.8 million tons, exceeded output by about 2.4 million tons. In 1961 no less than five newsprint machines commenced operation in Finland, resulting in a 50 percent increase in capacity. Whereas Latin-American countries in aggregate produced only 14 percent of the region's newsprint requirements in 1957, by 1960 they supplied 23 percent of the region's needs, even though consumption rose by 100,000 tons over these years. Newsprint was produced for the first time on the African continent in 1961; about 27,000 tons of South African newsprint was used by local newspapers, and the quantity is expected to rise to 45,000 tons in 1962.

Fibreboard production rose in all regions of the world except North America, and world production increased by about 6 percent. European production rose by almost 6 percent and nearly equaled that of North America. Together these two regions produced in 1961 nearly 85 percent of the world production. World production in 1961 stood at 30 percent above the 1957 level. Further increases of considerable magnitude (in some countries 20 to 40 percent) are reported in the world production of particle board. Since 1955, when world production was estimated at 400,000 metric tons, particle board production has risen to over 2 million tons in 1961. The increase has been particularly large in Europe, where the production of the Federal Republic of Germany and France, Europe's two major producers, again showed a considerable increase. In North America, production of particle board was influenced by the reduced economic activity that prevailed in the early period of 1961.

Changes in Stocks

Mainly as a result of the check in the expansion of world production, the over-all level of stocks of agricultural commodities was reduced in 1961/62 for the first time since 1957/58, when production had suffered a similar setback. However, the decline in stocks was a good deal greater in 1961/62 than in 1957/58, because of the additional factor in 1961 of a substantial import demand for grains by Mainland China. Stocks of grains, the "surplus" commodities of longest standing, were appreciably reduced in 1961/62. Stocks of coffee, soybeans, butter and cheese were the principal exceptions to the downward movement.

The wheat stocks of the four leading exporters will probably show a decline of as much as 15 percent by the end of the 1961/62 season (Table II-13). This would bring them back close to the level that prevailed for some years before the renewed expansion of the United States wheat stocks in 1958/59. Canadian stocks of wheat were reduced by about one half to their lowest level since 1952, because of the drought in the prairie provinces as well as large sales to Mainland China. In the United States, the lower output brought a fall of about 3 percent in wheat stocks, which remain, however, more than five times as large as in 1952, when the postwar accumulation of surpluses began. Little change is expected in the wheat stocks of Argentina and Australia, which had already been substantially reduced during 1960/61 as a result of the small harvest in Argentina and Australian sales to Mainland China.

For coarse grains North American stocks have declined for the first time for more than a decade, and are expected to be about 12 percent lower than at the beginning of the 1961/62 season. In Canada the reduction will be as much as two thirds, and as with wheat the causes are the combined effects of drought and of purchases by Mainland China. In contrast to wheat, however, much the greater decline (in absolute terms) is in the United States, where

TABLE II-13. - ESTIMATED STOCKS OF MAJOR AGRICULTURAL AND FOREST PRODUCTS

	Date	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962 (Forecast)
		Million metric tons										
WHEAT												
United States	1 July	7.0	16.5	25.4	28.2	28.1	24.7	24.0	35.2	35.8	38.4	37.2
Canada	1 Aug.	5.9	10.4	16.8	14.6	15.8	19.9	17.4	14.9	14.6	14.3	7.4
Argentina	1 Dec.	0.1	2.0	1.6	2.4	1.2	1.6	1.9	1.8	1.6	0.7	0.7
Australia	1 Dec.	0.5	1.0	2.6	2.6	2.4	1.1	0.5	1.8	1.7	0.8	0.6
Total 4 major exporters		13.5	29.9	46.4	47.8	47.5	47.3	43.8	53.7	53.7	54.2	45.9
RICE (milled equivalent)												
Asian exporters [1]	31 Dec.	0.7	1.4	1.6	0.8	0.7	0.6	0.5	0.5	0.3	0.2	0.2
United States	31 July	0.1	—	0.2	0.8	1.1	0.6	0.6	0.5	0.4	0.3	0.2
Total of above		0.8	1.4	1.8	1.6	1.8	1.2	1.1	1.0	0.7	0.5	0.4
COARSE GRAINS [2]												
United States	1 July [3]	18.5	24.7	29.4	37.3	39.3	44.4	53.8	61.7	67.9	77.2	70.4
Canada	1 Aug.	3.6	5.1	5.6	3.7	4.3	6.6	5.2	4.9	4.3	4.2	1.4
Total 2 major exporters		22.1	29.8	35.0	41.0	43.6	51.0	59.0	66.6	72.2	81.4	71.8
BUTTER												
United States [4]		0.03	0.13	0.17	0.07	0.01	0.05	0.03	0.01	0.03	0.17	...
Canada		0.02	0.03	0.04	0.05	0.04	0.03	0.04	0.05	0.05	0.06	...
European countries [5]		0.04	0.06	0.05	0.04	0.10	0.12	0.08	0.06	0.12	0.14	...
Australia and New Zealand		0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.05	0.07	0.07	...
Total of above	31 Dec.	0.14	0.27	0.32	0.22	0.20	0.26	0.21	0.17	0.27	0.44	...
CHEESE												
United States [4]	31 Dec.	0.11	0.20	0.25	0.24	0.20	0.19	0.13	0.14	0.15	0.24	...
CONDENSED AND EVAPORATED MILK												
United States	31 Dec.	0.18	0.12	0.10	0.10	0.11	0.10	0.09	0.10	0.10	0.10	...
DRIED SKIM MILK												
United States [4]	31 Dec.	0.08	0.23	0.06	0.04	0.04	0.05	0.06	0.04	0.14	0.15	...
LINSEED AND OIL (oil equivalent)												
United States	1 July	0.41	0.38	0.29	0.17	0.10	0.22	0.13	0.18	0.07	0.09	...
Argentina	1 Dec.	0.30	0.23	0.08	0.03	0.06	0.06	0.06	0.05	0.10	0.03	...
Total of above		0.71	0.61	0.37	0.20	0.16	0.28	0.19	0.23	0.17	0.12	...
LIQUID EDIBLE VEGETABLE OILS AND OILSEEDS (oil equivalent)												
United States	1 Oct. [6]	0.24	0.63	0.52	0.35	0.29	0.29	0.33	0.56	0.39	0.50	0.80
SUGAR (raw value)												
Cuba	31 Dec.	2.2	1.5	1.9	1.6	0.6	0.7	0.5	1.2	1.1	1.1	...
World total [7]	31 Aug.	10.6	9.9	11.3	11.1	9.7	8.7	8.3	11.8	12.2	13.8	...
COFFEE												
Brazil		0.18	0.20	0.20	0.20	0.63	0.44	0.84	1.45	2.32	3.03	3.40
Total [8]	30 June	0.53	0.51	0.49	0.38	0.84	0.69	1.17	1.86	2.88	3.69	4.0–4.1

(continued on next page)

TABLE II-13. - ESTIMATED STOCKS OF MAJOR AGRICULTURAL AND FOREST PRODUCTS (*concluded*)

	Date	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962 (Forecast)
		Million metric tons										
TOBACCO (farm weight)												
United States	1 Oct.[9]	1.56	1.66	1.69	1.83	1.89	2.00	1.89	1.81	1.74	1.70	1.68
COTTON (lint)												
United States		0.60	1.22	2.11	2.43	3.14	2.47	1.89	1.93	1.64	1.55	1.64
Other net exporters		1.00	1.08	0.78	0.80	0.56	0.65	0.85	0.76	0.69	0.73	0.73
Importers		1.34	1.21	1.26	1.26	1.08	1.30	1.32	1.14	1.30	1.40	1.12
World total[10]	31 July	2.94	3.51	4.15	4.49	4.78	4.42	4.07	3.83	3.63	3.68	3.49
NATURAL RUBBER												
World total[11]	31 Dec.	0.73	0.72	0.73	0.76	0.74	0.76	0.75	0.70	0.77	0.77	...
NEWSPRINT												
North America[12]	31 Dec.	0.89	0.80	0.77	0.69	0.92	0.92	0.99	0.98	0.93	0.93	...
		Million cubic meters										
SAWN SOFTWOOD												
European importers[13]	31 Dec.	5.74	6.19	5.10	6.10	5.32	5.63	5.42	5.12	6.19	6.04	...
European exporters[14]	31 Dec.	4.31	3.63	4.05	4.50	4.26	3.75	4.42	3.60	3.80	3.94	...
North America	31 Dec.	14.01	15.68	14.23	14.18	16.23	15.88	14.96	15.18	17.48	16.95	...
SAWN HARDWOOD												
European importers[15]	31 Dec.	1.29	1.13	1.06	1.22	1.29	1.24	1.25	1.18	1.25	1.33	...
European exporters[16]	31 Dec.	0.31	0.28	0.27	0.32	0.47	0.45	0.41	0.39	0.38	0.52	...
North America	31 Dec.	5.11	5.41	4.62	4.17	4.76	4.73	4.77	4.79	5.06	4.46	..

NOTE: Quantities shown include normal carry-over stocks.

[1] Burma. Thailand. Viet-Nam. - [2] Barley. oats. maize. sorghum and rye. - [3] Maize and sorghum, 1 October. - [4] Manufacturers' stocks and CCC uncommitted supplies. - [5] Austria. Belgium. Finland. Federal Republic of Germany. Ireland. Netherlands. Norway. Sweden. Switzerland. United Kingdom. and (from 1957) France. - [6] Cottonseed. 1 August. - [7] Excluding U.S.S.R. and Mainland China. - [8] Including also Colombia. Ivory Coast. Uganda. and United States. - [9] Flue-cured types. 1 July. - [10] Excluding the U.S.S.R., eastern Europe and Mainland China. and including estimates of cotton afloat. - [11] Including estimates of rubber afloat. but excluding strategic stockpiles. - [12] United States and Canadian mills and United States consumers. - [13] Belgium-Luxembourg. Denmark. Federal Republic of Germany, Netherlands. Switzerland. United Kingdom. -[14] Austria. Norway. Sweden. Yugoslavia. - [15] Belgium-Luxembourg. Federal Republic of Germany. United Kingdom. - [16] Austria and Yugoslavia.

coarse grain stocks fell by 6.8 million tons, or 9 percent, as a result of the lower output of maize and sorghum under the Emergency Feed Grain Program.

The expansion of total agricultural production in the United States has for many years proved very difficult to check, in spite of a variety of government measures, and generally any reduction that has been achieved in the production and stocks of one commodity has been offset, at least partly, by an increase for some other product. In 1961/62 much of the acreage diverted from maize and sorghum was planted with soybeans, encouraged by a 25 percent increase in the support price for this crop. United States stocks of soybeans are expected to exceed 2 million tons by October 1962, though stocks of soybean oil may be reduced slightly. With the sharp drop in Chinese exports of soybeans and oil, however, these stocks may not prove difficult to dispose of.

There were large increases in stocks of butter and cheese during 1961, and for butter the rise appears to have continued in 1962. Here too most of the accumulation is in the United States where, as a result of a sharp expansion of dairy production, stocks of butter are estimated to have increased more than fivefold during 1961 and of cheese by 60 percent. The increase in European butter stocks, which had doubled in 1960, was smaller, but there were significant increases in France, the Netherlands and the United Kingdom. United States stocks of dried milk have remained at the high level of 1960.

Apart from coarse grains, world stocks of coffee are the largest in relation to the level of international trade. They are also the main surplus stocks out-

side North America, being held chiefly in Brazil. It appears likely that stocks of coffee increased by a further 10 percent or so during 1961/62, in spite of the policy of destroying or denaturing low-grade holdings in Brazil, though there was some decline in Africa as a result of the lower crops. The mid-1962 world stocks, estimated at about 4 million tons, are about one and a half times as large as annual world exports, which in the case of this commodity constitute the major part of total world consumption.

World cocoa production has continued to run ahead of consumption, although the latter appears to be increasing fairly rapidly. While there are no reliable statistics, stocks of cocoa beans in mid-1961 were estimated to have reached about six months' consumption, and since then they have probably remained close to this level.

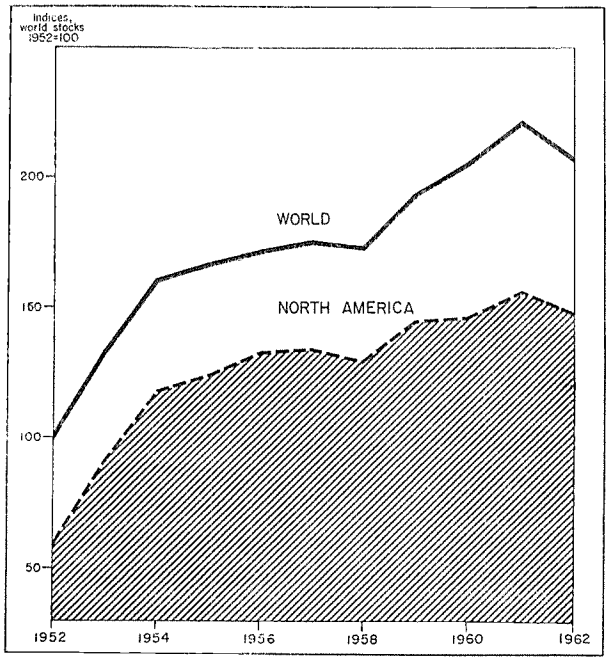
Sugar stocks rose sharply in Europe during 1961, following the exceptionally large beet harvests of 1960/61. By the end of the 1961/62 season, however, when production was much lower, they should be considerably reduced. In Cuba the small harvest of 1961/62 is likely to have taken stocks well below a million tons for the first time in three years.

There was a reduction of about 5 percent in cotton stocks during 1961/62. Importers' stocks, which had been at an exceptionally high level, were drawn on heavily, and as a result of the consequent fall in import demand there was some increase in United States holdings, the first for some years.

Among forest products, stocks of sawn softwood in Europe at the end of 1961 were at about the same level as a year earlier, though they fell in the United Kingdom by about 7 percent. Stocks of tropical (especially west African) hardwoods, however, rose substantially. In Africa stocks of round and sawn timber rose slightly despite a small increase in local demand. In northern Europe, notwithstanding increasing demand, producers' stocks of pulp rose during the year. Canadian producers were able to keep their stocks at reasonable levels because of satisfactory demand from the United States.

Figure II-4 brings together, in the form of a price-weighted index, the movements in the stocks of individual commodities (excluding forest products) discussed above. It brings out the significant reduction in world stocks in 1961/62, and also indicates that, while there has been some reduction in the proportion of total stocks located in North America, this proportion is still close to 70 percent on the basis of price-weighted aggregates. With the large reduction in Canadian grain stocks in 1961/62, the North American stocks must now be almost entirely in the United States. The sharp decline in maize stocks in 1961/62 brought a further reduction of about 3 percent in the total value of the holdings of the United States Commodity Credit Corporation (Annex Table 12). As of 30 April 1962 these stocks were valued (under the CCC's new accounting policy) at $7,184 million.

FIGURE II-4. INDICES OF THE MAIN STOCKS OF AGRICULTURAL COMMODITIES IN THE WORLD AND IN NORTH AMERICA



NOTE: Indices are based on stocks shown in Table II-13 only, and exclude forest products

Economic activity and the demand for agricultural products

Economic activity in the industrialized countries in 1961 was characterized by a revival in North America after the mild recession of 1960, continued growth in western Europe, and boom conditions in Japan. During the first half of 1962, however, the North American recovery has failed to take economic activity to the high level that had been expected earlier, while in western Europe and Japan

the expansion of recent years has slowed down.

Industrial production in the United States, which continued to decline until February 1961, rose by some 9 percent in the six months from March to August 1961 but by less than 5 percent in the ten months from September 1961 to June 1962. New orders for manufacturers' durable goods declined steadily in the first six months of 1962 and inventory accumulation remained disappointing. This was in spite of a continuous expansion of retail sales, which the increase in personal incomes had taken 8 percent higher in May 1962 than a year earlier, and larger exports. Private housing starts were almost one third more in April 1962 than 12 months before, while plans for new plant and equipment in 1962 have now been revised upward to a level 11 percent higher than in 1961. Unemployment in June 1962, although still 5.5 percent of the civilian labor force, was considerably below the peak of 6.9 percent reached a year before.

In Canada the level of domestic economic activity in 1961 was adversely affected by the overvaluation of the Canadian dollar. While the devaluation of May 1962 has made exports more competitive, it has also resulted in a net capital outflow, and emergency measures were therefore introduced in June 1962, including a surcharge on certain classes of import, tightening of credit, reductions in government expenditure, and the reinforcement of foreign exchange reserves by drawings from the International Monetary Fund and other arrangements.

In western Europe the rate of growth in the countries of the European Economic Community has slowed down somewhat after the exceptional expansion of 1960, when industrial production had risen by as much as 13 percent in one year. In 1961 the increase in industrial production was about 6 percent. During the early months of 1962, the slower rise of gross national product, exports, investment, personal incomes and private consumption have continued in western Europe. In particular, investment has shown signs of weakening, owing to reduced profits and some labor scarcities. Wages and prices have continued to rise, and some governments are trying to slow down the rate of expansion in order to avoid the inflationary effects of a too rapid increase in domestic demand. In the United Kingdom, mainly on account of the balance-of-payments position, economic activity has been held back by deflationary measures.

The economic recovery in Australia has progressed rather slowly in the first months of 1962, and unemployment has remained heavy. In Japan the boom carried industrial production 17 percent higher in the second than in the first half of 1961. The continued increase in employment and wages has caused further price rises and a greater demand for consumer goods, while rising imports have strained the balance of payments position. Measures have therefore been introduced to limit imports and to reduce the rate of growth of gross national product to 5 percent in 1962, as compared with 13 percent in 1961.

The steady expansion of economic activity appears to have continued in the U.S.S.R. and eastern Europe. Between the first half of 1960 and the same period of 1961 there were increases ranging from 9 to 17 percent in gross industrial product in the U.S.S.R. and most parts of eastern Europe except Eastern Germany, where the rise was about 5 percent. In some parts of eastern Europe, especially in Eastern Germany, shortages of agricultural products have developed in relation to the rapidly rising demand.

Little up-to-date information is available for the less developed countries, but generally speaking the execution of development plans and projects has continued at a rapid tempo, and economic activity and demand have been maintained at high levels. India, however, is having considerable difficulty in obtaining the foreign exchange needed for the execution of the third five-year plan, and has had recourse to a further standby credit from the International Monetary Fund. In Latin America a new stimulus has been provided by the Alliance for Progress, which started to gain momentum during 1961/62.

The comparatively favorable economic situation in the main importing areas in 1961 strengthened the demand for agricultural raw materials, although imports were not always affected correspondingly. Trade in rubber was maintained by a heavy demand from the Sino-Soviet area, especially at the time of the Berlin crisis. For wool, the demand at auctions was reduced early in the 1961/62 season by the retrenchment measures in Japan, but Japanese demand later recovered and, together with Chinese participation, has been a major strengthening factor at the Australian auctions. Demand for jute has been strong, with the replenishment of depleted stocks and the resumption of a more normal level of mill activity than was possible during the supply difficulties of 1960/61. Import demand for cotton, on the other hand, has been affected by the high level of stocks in consuming countries at the beginning of the 1961/62 season.

The demand for forest products has a complex relationship with the level of economic activity; the building industry is the largest user of sawnwood, the major primary forest product but, with economic growth, demand is steadily shifting toward more highly processed wood products. In the United States in 1961 the demand for sawnwood was much weaker than in previous years. The demand for other wood products, though also affected by the slower expansion of the economy toward the end of the year, remained at or slightly above 1960 levels. In Europe the strong demand for wood and wood products continued during most of 1961, though in the latter part of the year demand reflected the slackening in economic activity. In the U.S.S.R. the development of residential and industrial construction has maintained a rapid and steady growth in the demand for forest products.

For foodstuffs, the changes that have occurred in economic activity appear to have had little effect on domestic demand. Moreover the import demand for these products is influenced less by general economic conditions than by the level of production in importing countries, the availability of supplies on concessional terms, and balance-of-payments considerations. In 1961 and 1962 the main factor of this nature has been the large import demand for grains by Mainland China, to make good the losses in domestic production. Purchases by the U.S.S.R. and Mainland China from Cuba have also substantially increased the world import demand for sugar.

Food supplies and consumption

World per caput food production (excluding Mainland China) is estimated to have averaged about 13 percent more in 1959/60-1961/62 than before the war (*see* Table II-3). Because of the accumulation of stocks, the improvement in actual consumption levels must have been slightly slower than the rise in per caput production. Nevertheless, for the world as a whole the index of per caput food production gives a fairly good indication of the course of average food consumption per person.

Such broad averages, of course, mean rather little in a world where production is very unevenly distributed in relation to population. Moreover, for individual regions and countries, food supplies and consumption are affected not only by per caput production but also by changes in imports and exports of foodstuffs, which in some cases have been quite substantial. Figure II-5 attempts to take account of these changes for the main regions of the world.[5] Averages for periods of several years are considered, so as to minimize the effect of year-to-year fluctuations in production and changes in stocks. Allowances for stock changes have been possible only for North America, and deductions for imports of animal feedstuffs only for western Europe, but each of these factors is of much less importance elsewhere.

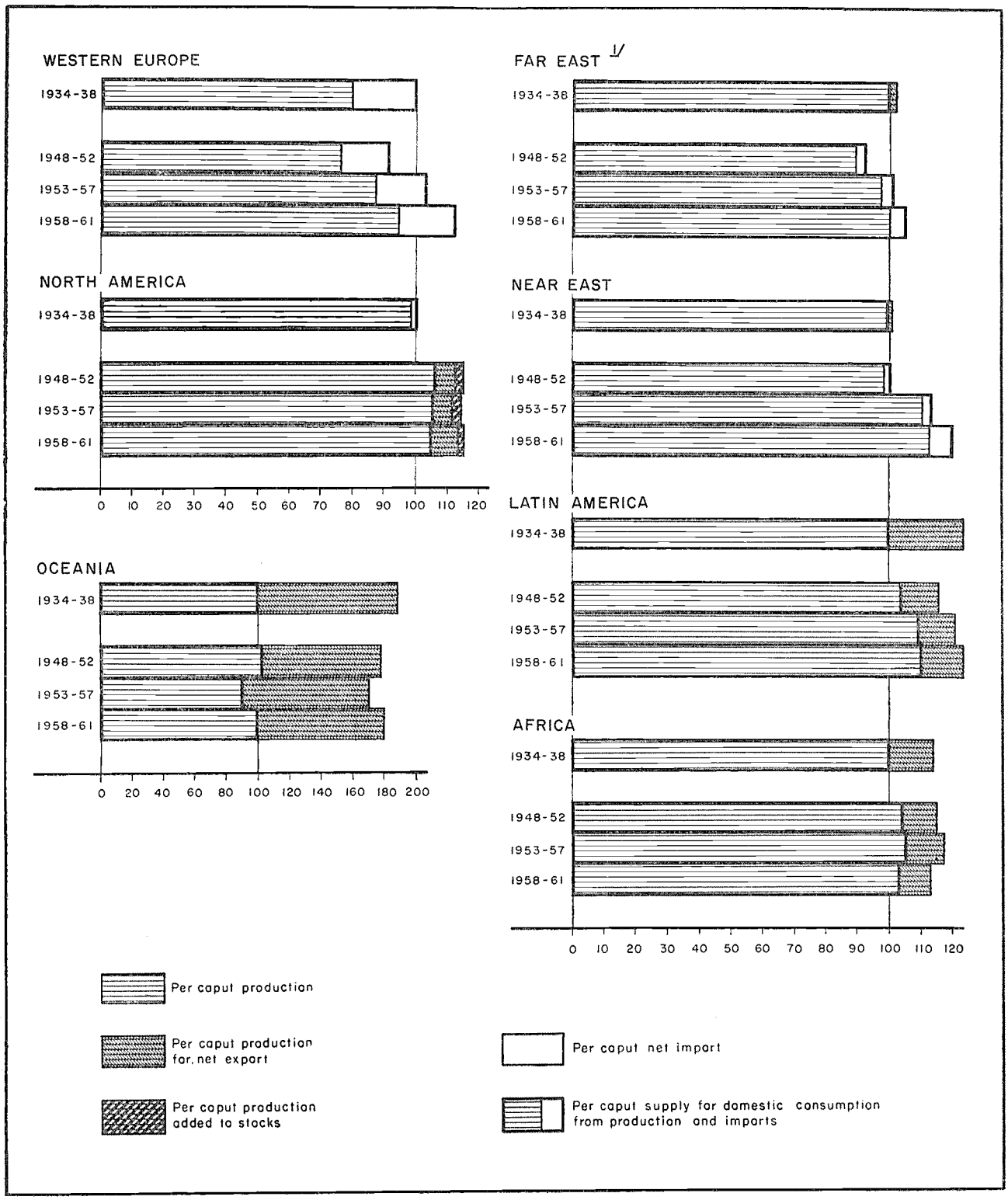
Trade has the biggest effect on the food supplies of the more developed regions, and in the less developed regions net imports or exports amount to only a small fraction of domestic production. Western Europe's net imports of food were equivalent to about one fifth of the region's total production in 1958/59-1961/62. Before the war, however, they amounted to about one fourth, and it is significant that net food imports have hardly increased (on a per caput basis they have declined sharply), so that the rise in per caput food supplies in this region has come entirely from larger domestic production.

North America's small prewar net import of food changed during the war to a large net export, which has recently averaged about 7 percent of domestic production. In Oceania the large net export has increased slightly less rapidly than food production, of which in recent years it has represented about 45 percent.

Thus in the more developed regions, with the exception of Oceania, per caput food supplies have risen less rapidly than per caput production. In the less developed regions, on the other hand, the opposite is the case, and as a result of changes in imports and exports the trend of food supplies appears to have been slightly more favorable than that of per caput production. Food supplies per head appear to have been maintained at more than the prewar level in each of these regions, in spite of the fact that, except in the Near East, the regaining of the prewar level of per caput production has so far proved only temporary.

[5] In addition to Mainland China, it has been necessary to exclude Europe and the U.S.S.R., because of inadequate data on the trade between these countries.

FIGURE II-5. ESTIMATED PER CAPUT FOOD PRODUCTION, NET TRADE, AND SUPPLIES, BY REGIONS
(Indices, prewar average of per caput supplies = 100)



[1] Excluding Mainland China.

In Latin America the net export of food has only recently begun again to approach its prewar magnitude, and in 1958/59-1961/62 amounted to about one tenth of production, as against about one fifth before the war. In the Far East (excluding Mainland China) the small prewar net export of food changed to a rapidly growing net import in the postwar years, which is now equivalent to some 5 percent of domestic production. The same change to a net import basis occurred in the Near East. In Africa net export has hardly increased over the prewar level.

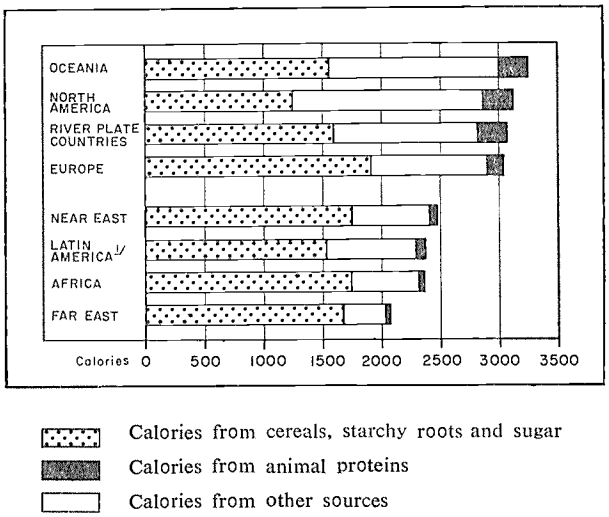
A slow improvement in per caput food supplies appears to have continued throughout the postwar period in Latin America, the Far East (excluding Mainland China) and the Near East. In Africa, on the other hand, changes in trade do not seem to have been quite sufficient to compensate for recent declines in per caput production. In addition, however, the available data suggest that in the drought-stricken countries of the Near East there may have been quite serious falls in per caput supplies, chiefly of grains, in the last few years and especially in 1961/62, even though the regional average for 1958/59-1961/62 remains higher than the averages for earlier years.

While changes in trade have tended to mitigate slightly the disparities in per caput production between the more and the less developed regions, they have been far smaller than the changes in production and, above all, in population, that have worked in the other direction. As was shown in Table II-3, per caput food production has increased sharply over the prewar period in each of the more developed regions except Oceania, while the Near East is the only one of the less developed regions to show even a moderate increase, far smaller than those in the other group of regions. Thus recent trends have tended to accentuate the already wide gulf between the per caput food supplies of these two groups.

The data shown in Figure II-5 are, of course, not based on nutritional considerations, but are price-weighted indices. They reflect mainly the relative cost of the diet, though in fact this is roughly related to its quality, and particularly to the share of the more expensive livestock products. Figure II-6, on the other hand, shows estimates of the energy and nutrient content of the diet in the various regions of the world. It brings out very clearly the wide variation in calorie supplies per caput between the more and less developed regions, which is much wider than the variation in estimated calorie requirements. Even more strikingly, the figure shows how heavily the starchy staple crops predominate in the diets of the less developed countries, since their supplies of calories from other sources, in particular from animal proteins, are very small. The per caput supplies of animal proteins in the less developed countries are estimated to average only about one fifth of those in more developed countries. For total protein supplies the figure is about two thirds, as part of the deficit is made up by proteins from vegetable sources.

Within the broad regions discussed above, there are naturally considerable variations between individual countries, but information on a country basis is available for rather few of the less developed countries. Annex Table 13 shows the usual estimates of the food supplies available for human consumption and their calorie and protein content in those countries for which food balance sheets can be calculated.

FIGURE II-6. ESTIMATED PER CAPUT CALORIE SUPPLIES, BY REGIONS, 1956-58 AVERAGE
(Calories per caput per day)



1/ Excluding River Plate countries

International trade in agricultural products

The year 1961 saw no fundamental change in the tendencies that have dominated world agricultural trade in the past several years. Ample exportable supplies continued to compete for outlets that are

expanding at only moderate rate, and the general level of agricultural export prices again fell. Another increase in prices of manufactured exports further eroded the purchasing power of agricultural export earnings; these in any case have been rising only slowly, especially those of the primary producing countries. Special measures to expand the outlets for agricultural surplus products of industrial countries continued to play an important role in international trade. At the same time, the markets for a number of products were kept reasonably stable only with the help of national and international efforts to regulate exports.

The highlights of the developments in world agricultural trade in 1961 (Table II-14) were:

1. The volume of agricultural imports into countries other than the U.S.S.R., eastern Europe and Mainland China, which had started to level off in 1960, showed no increase in 1961.
2. There was, however, a sharp increase in the volume of agricultural imports into the Sino-Soviet area from outside sources, and largely because of this the total volume of agricultural exports of the rest of the world rose by about 4 percent.
3. Most agricultural products were in plentiful supply, and for many the import demand rose only slightly, if at all; the long-term falling trend in agricultural prices was therefore resumed. The average decline of over 4 percent more than canceled the small recovery in prices in 1960. It also almost exactly balanced the rise in the volume of exports, so that the value of exports was nearly the same as in 1960.
4. Average prices of manufactured goods on world markets rose by about 2 percent from 1960 to 1961, thus somewhat intensifying the fall in the "terms of trade" for agricultural products. These have now declined for seven years in succession and in 1961 were 24 percent lower than in 1952-53.
5. Although the global value of agricultural exports was about the same as in 1960 there were significant shifts between regions. Both the volume and value of exports from the more industrialized regions rose, partly because of increased sales under special terms. In contrast the value of exports from the less developed regions fell by about 4 percent in Latin America and Africa and by about 10 percent in the Far East and the Near East. This continued a trend under which the share of these regions in the value of world agricultural exports has declined from 56 percent in 1952-53 to 52 percent in 1960 and 49 percent in 1961.
6. Exports under special terms remained an important factor in world agricultural trade, particularly in exports of the United States. They are of special importance in wheat, where they

TABLE II-14 - INDICES OF THE VOLUME, UNIT VALUE AND TOTAL VALUE OF WORLD TRADE [1]

	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)	Change, 1960 to 1961
	Indices, average 1952-53 = 100									Percent
TOTAL VOLUME OF WORLD TRADE [2] (agricultural and nonagricultural)	87	108	118	128	135	133	143	159	167	+5.2
TRADE IN AGRICULTURAL PRODUCTS										
Volume of exports	95	102	109	119	122	119	128	136	142	+4.5
Volume of commercial exports [3]	95	102	103	110	113	112	120	127	132	+3.9
AVERAGE EXPORT UNIT VALUE										
At current prices	100	99	94	92	94	87	85	85	81	— 4.6
In real terms [4] (terms of trade)	104	103	97	91	90	84	82	81	76	— 6.4
TOTAL VALUE OF EXPORTS										
At current prices	94	101	103	109	114	105	108	115	116	+0.5
In real terms [4]	98	105	106	108	110	101	105	110	108	— 1.4
VALUE OF COMMERCIAL EXPORTS [3]										
In real terms [4]	98	105	101	100	103	95	99	103	101	— 2.0

[1] Excluding trade between the U.S.S.R., eastern European countries, Mainland China, North Korea, North Viet-Nam and Mongolia, but including the trade of the rest of the world with these countries. - [2] United Nations index of the volume of world trade, adjusted to 1952-53 base. - [3] Excluding United States shipments under special terms. - [4] Deflated by United Nations index of unit value of exports of manufactured goods.

TABLE II-15. - INDICES OF THE VOLUME OF WORLD [1] IMPORTS OF AGRICULTURAL PRODUCTS, BY COMMODITY GROUPS

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100									
ALL AGRICULTURAL PRODUCTS	100	94	101	107	116	121	118	126	132	132
FOOD AND FEEDSTUFFS	99	92	100	108	120	126	129	135	141	138
Cereals	98	91	90	94	114	115	116	123	130	129
Sugar	78	89	104	106	108	115	119	116	117	110
Oilseeds and vegetable oils (edible)	129	94	115	127	139	146	144	153	172	155
Fruit, fresh and dried	87	83	109	116	111	125	125	139	146	146
Meats, dairy products and cattle	104	96	104	118	129	142	146	150	155	155
BEVERAGES AND TOBACCO	87	94	100	109	113	117	116	121	126	132
AGRICULTURAL RAW MATERIALS	110	96	102	103	110	115	101	112	118	120

[1] Excluding imports of the U.S.S.R., eastern Europe and Mainland China.

now account for more than one third of world exports.

7. The concern of primary exporters about the unfavorable trends of their export earnings was heightened by uncertainty of the effects of the agricultural and trade policies of the European Economic Community and of the terms under which the United Kingdom may join. More intensive international consideration is, however, being given to the problem of stabilizing commodity prices and earnings from exports.

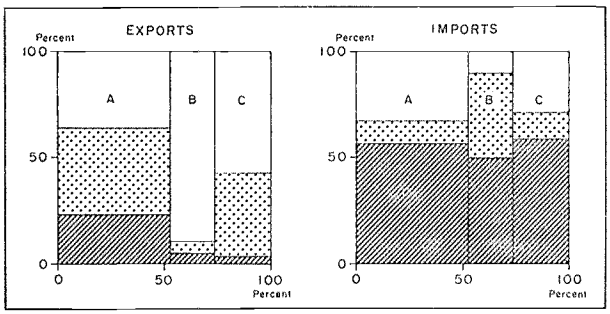
VOLUME OF IMPORTS INTO NON-COMMUNIST AREAS

Despite the generally favorable economic climate, the volume of agricultural imports into countries other than the U.S.S.R., eastern Europe and Mainland China was unchanged in 1961. To a large extent this reflects developments in three important trade flows (see Table II-15, Annex Table 14 A and Figures II - 7 and II - 8). In the first place, western Europe's gross imports of food and feedstuffs, which constitute the largest and one of the most rapidly expanding sectors of world agricultural trade, showed no increase in 1961. Secondly, the food imports of the less developed regions, another fast rising and important sector, fell somewhat in 1961. Thirdly, the agricultural raw material imports of western Europe declined while those of North America remained at the rather low level of recent years. There was an increase in the imports of beverages and tobacco into nearly all regions, while raw material imports into the Far East and other less developed regions also rose, but these increases served merely to compensate for a reduced volume of trade in other sectors.

Foodstuffs

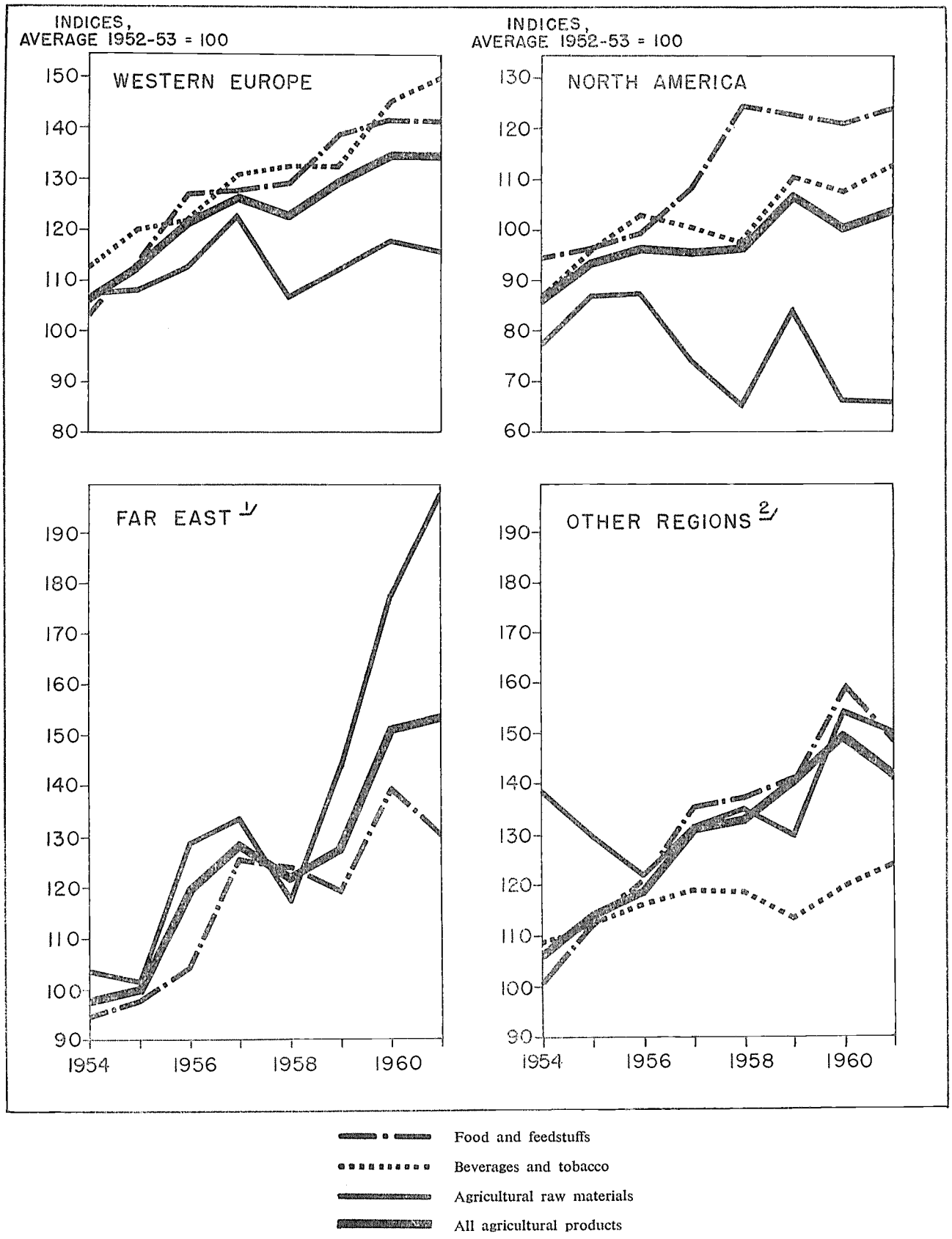
The small decline in the combined food imports of western Europe and the less developed regions

FIGURE II-7. DISTRIBUTION OF WORLD [1] AGRICULTURAL EXPORTS AND IMPORTS, BY VOLUME, 1959-61 AVERAGE



[1] Excluding trade between the U.S.S.R., Eastern Europe and Mainland China.

FIGURE II-8. INDICES OF VOLUME OF AGRICULTURAL IMPORTS, BY REGIONS AND COMMODITY GROUPS



[1] Excluding Mainland China. - [2] Latin America, Near East, Africa, and Oceania

was mainly the result of a sharp increase in food production in these areas in 1960/61. In western Europe, food production had in 1960/61 risen by as much as 6 percent (see Table II-2), and with substantial increases in the output of coarse grains, sugar, dairy products and beef, imports of each of these products were reduced in 1961. Imports of fats and oils were limited also by a reduction in the manufacture of margarine, because of a transfer of demand to butter, the prices of which were falling in many countries. In the Far East, where there had been large increases in domestic food production both in 1959/60 and 1960/61, the fall of 7 percent in food imports was entirely accounted for by smaller imports of cereals. The main decline was also in cereals in Latin America, where larger grain crops were harvested in Brazil and Chile, two main importing countries, though production was lower in Argentina, the main exporting country. In the Near East, although food production showed no increase in 1960/61, imports of food grains fell in 1961 from the exceptionally high level of 1960.

The food imports of western Europe and the less developed regions, which together account for nearly half the total volume of world agricultural trade, have shown a rising trend throughout most of the postwar period, and there is no reason to think that the pause in 1961 was more than a temporary reflection of the sharp jump in output in 1960/61, except perhaps in Latin America. In that region food imports, which until 1958 had risen almost without interruption, have tended to fall in recent years. In 1961 their volume was about one fifth below the peak in 1958. However, recent studies of longer-term trends and prospects [6] indicate that in western Europe a more rapid increase in the production than in the consumption of certain foodstuffs is likely in the 1960s, and this may well lead to some slowing down in the growth of the region's food imports. Thus the imports of wheat and sugar, which had been rather stable in the late 1950s, are likely to fall, while the until now rapid increase in imports of feed grains, vegetable fats and oils, dairy products and meat is likely to slow down. On the other hand, in most of the less developed regions food production would have to increase very much faster in the 1960s than hitherto in order to keep up with the rapid rate of growth of demand expected to result from rising population and higher incomes. In Latin America (other than Argentina and Uruguay) the rate of increase of production may now be sufficient to keep imports from rising further. In the other less developed regions, however, the gap remains wide. In the Far East (other than Japan) and also in the Near East and Africa (other than South Africa), demand is expected to rise by some 4 percent a year. This compares with an estimated average annual increase of production of between 2 and 3 percent during the 1950s. To what extent the resulting gap will be made up by imports from outside sources will depend partly on the export earnings of the importing countries in the less developed regions, and partly on the continuing availability of cereals and other surplus products as grants or on concessional terms. It seems likely, however, that the food imports of the less developed countries, with the possible exception of Latin America, will remain one of the faster growing sectors of world agricultural trade.

Agricultural raw materials

The reduction in western Europe's raw material imports in 1961, despite a high level of economic activity in most of the region, was accounted for in part by special factors, such as the scarcity of jute in world trade because of smaller export supplies from Pakistan and a decline in the import demand for cotton in the EEC countries, particularly the Federal Republic of Germany, where stocks were being reduced. But in the longer term, too, the raw material imports of western Europe, and still more of North America, have been among the least dynamic sectors of world agricultural trade. Between 1952-53 and 1961, when the volume of world agricultural imports increased by over 30 percent, raw material imports into western Europe rose at only half the rate, and those into North America fell by one third, mainly owing to declining imports of rubber and wool.

Among the factors responsible, the substitution of synthetic for natural raw materials is the best known and easiest to measure. Thus in western Europe the total consumption of all rubber increased more than four fifths between 1952-53 and 1961, but that of natural rubber rose by only 13 percent, as the share of synthetic jumped from 7 to 42 percent of total rubber usage. In North America the

[6] *FAO commodity review, 1962, special supplement: Agricultural commodity projections for 1970.* Rome, 1962.

share of synthetic rubber in total consumption had by 1952-53 already risen to about 60 percent, and it increased further to 72 percent in 1961. Of textile fibers, rayon, the first of the important man-made fibers, had already made much of its impact before the war, and its share in the total mill consumption has in the last decade remained stable in North America and risen only moderately in western Europe. Of the postwar synthetics, nylon has affected mainly the consumption of silk, and to a less extent rayon and cotton, while some of the still newer fibers have tended to substitute for wool. In North America these were the only fibers whose consumption showed any increase at all between 1952-53 and 1959-60. In western Europe they have so far had less impact, although their share in the total fiber consumption rose from 1 to 6 percent.

Factors other than the substitution of synthetic for natural products have also slowed down the growth of imports. One is the slow increase in North American consumption of all types of rubber — by only 17 percent between 1952-53 and 1961 — which has magnified the effect of the substitution on imports. The trend of imports since the first half of the 1950s has also been affected by the cessation of purchases of rubber for the United States Government strategic stockpiles in 1954, and their gradual disposal since 1959. As a result, while the consumption of natural rubber in the region fell by 15 percent between 1952-53 and 1961, its imports were almost halved.

For wool, too, the effects of substitution have been magnified by the slow increase in final consumption of apparel fibers in North America. Between 1952-53 and 1959-60 the total consumption of all fibers rose by only 5 percent, and a relatively small increase in the share of synthetic fibers in the total was sufficient to cause a 3 percent fall in the consumption of wool. The effect on raw wool imports was further magnified by an 8 percent increase in the domestic clip in North America, and a substantial rise in the imports of wool tops, yarn and textiles. The imports of raw wool consequently fell by more than one fourth.

In western Europe, cotton imports have been much affected by the growth of textile industries in the less developed countries, and the recovery of textile manufacturing in Japan. Gross exports of cotton manufactures from Europe have risen hardly at all since 1952-53, while gross imports have more than doubled. The consequent two thirds reduction in net exports of cotton manufactures has affected mill consumption and therefore imports of raw cotton. While the final use of cotton fiber in western Europe has grown by nearly 30 percent, mill consumption and imports of raw cotton have risen by only 12 to 13 percent.

Most of the small increase in the total volume of trade in agricultural raw materials in 1961 was thus due to a rise of some 10 percent in imports into the Far East region, where Japan is the main importer. Other less developed regions also increased their imports, but in the world picture these imports are of minor importance. Far Eastern imports, now nearly twice as high as in the early 1950s and several times larger than those of North America, consist mainly of cotton and wool. Japan's cotton imports were particularly high in 1961, but wool imports also rose substantially.

Beverages and tobacco

Little need be said about developments in the other sectors of world agricultural imports. There was a general expansion in imports of the group beverages and tobacco, in particular of cocoa. The consumption of cocoa is rising as a result of the fall in prices, but some of the 10 percent increase in the volume of imports in 1961 was added to stocks. Imports of coffee and tea rose more moderately, the greatest increases occurring in continental western Europe for coffee and in the United Kingdom for tea.

Fishery products

Trade in fishery products also expanded in 1961. Important exporting countries, such as Denmark, Iceland, and the Netherlands, were able to increase their shipments of fresh and frozen fish. Canned fish exports from several countries, among them Portugal and South Africa, also increased.

Moreover, there was a substantial rise in the exports of fishmeal, which reached a total of 1.2 million tons, one fourth more than in 1960. The increase in the fishmeal trade was made possible by further strides in the development of the industry, particularly in Peru, which since 1959 has been the largest exporter, but also in other countries of South America and in South Africa. The demand for fish meal has been stimulated by the general trend toward improved methods of animal feeding. In

1961, moreover, the crop failures in Mainland China resulted in a sharp curtailment of soybean meal shipments to eastern Europe, causing these countries to substitute other feed concentrates, including fish meal.

Forest products

World trade in forest products, which is strongly influenced by the economic conditions in the industrial countries of the world, benefited in 1961 from the widespread prosperity. The total volume of trade increased by 3 percent. Mainly because of expanding import demand in western Europe and Japan, there were still larger increases in the trade in roundwood and in wood pulp and its manufactures. European imports of sawn softwoods were slowed down, despite a high rate of consumption, by unfavorable winter shipping conditions and by the unusually large stocks in early 1961 in the United Kingdom, the main European importing country. Other regions, including the Far East, increased their imports somewhat, so that the world total showed little change. Trade in sawn hardwoods expanded slightly, with good demand for tropical varieties in both Japan and western Europe, but with a reduction in European imports for sleepers due to the growing replacement of wooden sleepers by other material.

Foreign trade in newsprint increased again moderately, but trade in wood pulp was affected by sluggish demand in Europe. Production of mechanical and chemical pulp in that region has increased so much that the Scandinavian countries have decided to cut their output in 1962 by 1 million tons, or 15 percent, to reduce stocks. Nevertheless, expanding trade in the other regions resulted in a small increase in world trade in 1961. European plywood imports were also slightly down partly owing to larger stocks in importing countries, and partly to the increasing substitution of particle boards and nonwood materials in some of the traditional uses of plywood.

IMPORTS INTO MAINLAND CHINA, THE U.S.S.R. AND EASTERN EUROPE

Just as the sharp rise of production in western Europe and many of the less developed regions in 1960/61 checked the growth of food imports, so the series of poor harvests in Mainland China led directly to greatly increased cereal imports. Acute shortages in China also influenced world trade in vegetable fats and oils and rice. The large increase in sugar imports into the U.S.S.R. and China, the other main trade development among this group of countries in 1961, resulted mainly from the situation in Cuba (Table II - 16).

Mainland China, which in 1960/61 had a second successive below-average harvest, found it necessary to import large quantities of wheat and other grains from countries outside the Sino-Soviet area, mainly Australia and Canada. Altogether in 1961 it took a total of 3.9 million tons of wheat and some 1.4 million tons of other cereals, mainly barley. The 1961/62 harvest apparently has again been poor, and further purchases already made will result in the imports of at least 3.7 million tons of grains, and probably more, in 1962, while substantial deliveries have also been agreed on for the following years.

The reduction by more than a half in China's rice exports to destinations other than the U.S.S.R. affected markets elsewhere mainly through higher prices, as exportable supplies in most other countries were also smaller than in 1960. There was no increase in the volume of shipments despite a good import demand in Asia's rice deficit countries. Similarly exports of vegetable fats and oils from Mainland China (mainly soybeans) fell from over 500,000 tons (oil equivalent) in 1959, and some 450,000 tons in 1960, to less than 200,000 tons in 1961. Countries both within the Sino-Soviet area and elsewhere, who normally buy a part of their supplies from Mainland China, had to make larger purchases in other countries. Coupled with a decline in the export supplies from the United States, this led to a steep rise in soybean and soybean oil prices in the early part of 1961, but abundant supplies from the large 1961/62 harvest in the United States caused the prices to fall again later in the year.

The rise in the Sino-Soviet area's sugar imports from Cuba continued in 1961. Altogether, the U.S.S.R., Mainland China and eastern Europe purchased in 1961 some 5.7 million tons, thus becoming the world's largest sugar importing region. This compares with gross imports of about 2.5 million tons in 1960, the first year when trade in sugar was affected by the breach between Cuba and the United States, and an average of about 500,000 tons in the preceding years. With 75 percent of Cuba's crop going to the Sino-Soviet area, the

TABLE II-16. - GROSS IMPORTS AND EXPORTS OF SELECTED AGRICULTURAL COMMODITIES BY THE U.S.S.R., EASTERN EUROPE AND MAINLAND CHINA, 1959-61

	1959	1960	1961 [1]
Gross imports	..... *Million metric tons*		
GRAINS (excl. rice)			
Mainland China	—	—	5.3
of which; wheat and wheat flour [2]	(—)	(—)	(3.9)
barley	(—)	(—)	(1.3)
SUGAR (raw value)			
U.S.S.R.	0.3	1.7	3.6
Mainland China	—	0.5	1.6
Eastern Europe	0.2	0.3	0.5
TOTAL	0.5	2.5	5.7
NATURAL RUBBER			
U.S.S.R.	0.24	0.17	0.33
Mainland China	0.15	0.14	0.08
Eastern Europe	0.07	0.11	0.12
TOTAL	0.46	0.42	0.53
Gross exports			
RICE			
Mainland China	1.7	1.2	...
of which to: U.S.S.R.	(0.7)	(0.4)	(...)
other destinations [3]	(1.0)	(0.8)	(0.35)
OILSEEDS AND VEGETABLE FATS AND OILS (oil equivalent)			
Mainland China	0.51	0.45	0.18
of which to: U.S.S.R. and eastern Europe	(0.35)	(0.26)	(0.11) [4]
other destinations	(0.16)	(0.19)	(0.07)
SUGAR (raw value)			
U.S.S.R.	0.2	0.2	0.9
Eastern Europe	1.2	1.1	1.9
TOTAL	1.4	1.3	2.8

[1] Preliminary, partly estimated. - [2] As wheat equivalent. - [3] Including re-exports. - [4] Nearly all to eastern Europe.

outlets of other exporters increased, although greater domestic production in western Europe and the United States made good some of the difference.

Natural rubber imports into the U.S.S.R. also expanded markedly, probably responding to the low prices, though there may have been some demand for stockpiling. At 530,000 tons, the combined rubber imports of the U.S.S.R., eastern Europe and Mainland China accounted for just over one fourth of the world total, compared with only one tenth in the early 1950s. As the growth of imports into North America and western Europe is limited by the increased use of synthetic rubber, the imports of the Sino-Soviet area countries have become an important factor in the world rubber trade. There, too, however, the demand is likely to be increasingly affected in the longer run by synthetic rubber.

Imports of other tropical products into the U.S.S.R. and eastern Europe have continued the upward trend which has been evident in the last several years as a result of rising consumption and closer trade links with many of the less developed countries. Imports of coffee increased in both 1960 and 1961, reaching 80,000 tons, four times as much as in mid-1950s, though barely 3 percent of world trade. At 100,000 tons, however, imports of cocoa into this area now account for about one tenth of world trade.

PRICES IN WORLD MARKETS

Owing largely to developments in trade with the Sino-Soviet countries, there was an over-all expansion in the volume of world agricultural exports by about 4 percent, including an increase of 12 percent in exports of foodstuffs from North America, and of 26 percent from Oceania. The total volume of exports of beverages and tobacco also increased slightly, but not those of raw materials (Table II-17 and Annex Table 14B).

The developments in Mainland China contributed to a rise in the export unit values of wheat, rice, soybeans and, toward the end of the year, barley. There were also moderate increases in the prices of some other products, but most commodity prices were lower in 1961 than in 1960 and the FAO index of unit values of all agricultural exports fell by over 4 percent. This more than canceled the modest price recovery registered in 1960, and the falling trend of agricultural export prices evident for most of the past decade thus continued (Table II-18). It also offset the effect of the 4 percent expansion in volume.

The decline in prices was smallest, at around 2 percent, for foods and feedstuffs. The index for the beverages and tobacco group, which had fallen substantially in the preceding years, fell by a further 5 to 6 percent. Unit values for agricultural raw materials as a whole fell by 7 to 8 percent, thus losing the better part of their gain in 1960.

The main general factor behind this continued weakness of agricultural prices is the abundant export supplies of most agricultural commodities. The list of surplus products is lengthening, and to

TABLE II-17. - REGIONAL INDICES OF THE VOLUME OF GROSS AND NET TRADE IN AGRICULTURAL PRODUCTS

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100									
GROSS EXPORTS (All agricultural products)										
Western Europe	95	79	117	128	126	141	143	145	158	170
North America	61	102	89	90	126	136	123	128	158	164
Oceania	79	97	94	105	110	113	103	125	121	138
Latin America	105	100	103	108	117	111	117	126	128	129
Far East (excl. Mainland China)	159	95	102	113	113	112	108	113	113	120
Near East	83	86	108	104	104	113	106	128	126	118
Africa	76	90	113	121	128	130	130	138	141	146
GROSS IMPORTS (All agricultural products)										
Western Europe	113	95	106	112	122	126	123	129	134	135
North America	81	100	86	93	96	96	97	107	101	104
Oceania	66	95	122	128	123	129	138	129	131	120
Latin America	57	91	106	106	101	118	122	114	118	103
Far East (excl. Mainland China)	106	80	98	99	120	128	122	127	151	153
Near East	50	91	96	117	137	151	155	183	199	189
Africa	66	85	110	120	133	137	130	150	164	171
NET EXPORTS (All agricultural products)										
North America [1]	[2]	[2]	–	[2]	100	139	87	64	200	210
Oceania	80	97	91	103	109	111	100	124	120	139
Latin America	116	102	103	109	120	109	116	129	131	134
Far East (excl. Mainland China)	491	184	132	197	71	11	24	24	[2]	[2]
Near East	119	81	122	89	67	71	52	67	45	40
Africa	79	91	114	122	126	128	130	135	134	139
NET IMPORTS (All agricultural products)										
Western Europe	118	100	103	108	120	122	117	125	128	124
North America [3]	228	21	[4]	64	[4]	[4]	[4]	[4]	[4]	[4]
NET EXPORTS (Food and feedstuffs)										
North America	[2]	95	65	86	142	126	119	142	162	189
Oceania	87	95	94	105	114	106	96	121	115	146
Latin America	178	122	126	128	147	150	162	156	179	184
Africa	94	94	133	123	124	114	148	108	85	91
NET IMPORTS (Food and feedstuffs)										
Western Europe	125	106	94	102	129	119	122	134	130	124
Far East (excl. Mainland China)	[4]	61	78	57	100	122	141	119	147	117
Near East	[4]	115	[4]	171	228	278	295	497	532	504

[1] 1956 = 100. - [2] Net importer. - [3] 1953 = 100. - [4] Net exporter.

the original items wheat, coarse grains, and cotton has been added coffee, while supplies of tea, cocoa, sugar, and butter are also pressing heavily on the market.

Among individual commodities, a number of which are shown in Figure II-9 and in Annex Table 15 the price of sugar traded under the International Sugar Agreement, until its quota provisions ceased to operate at the end of 1961, fell on the average by 10 percent, and the unit value of sugar exports as a whole (including shipments under bilateral agreements) fell by 3 percent. The average prices in world trade for all vegetable fats and oils fell by about 7 percent. Reduced demand in western Europe, together with somewhat larger supplies, caused prices of copra and coconut oil to fall steeply, and some other oils reacted in sympathy. This more than offset the steep rise in the prices of soybeans and soybean oil in the early part of the year.

Among livestock products, prices of exported beef and veal declined moderately, while a more serious fall took place in prices of butter. Large supplies of butter were shipped to the United Kingdom following increased output and higher export subsidies paid by some western European countries. The average export unit value for the year fell 14 percent below that of 1960. Towards the end of 1961 the United Kingdom imposed quantity ceilings on the imports from the various countries to prevent a further fall in prices and to safeguard the outlets of traditional exporters.

Some of the sharpest falls in prices were among beverage crops. The average export unit value of tea fell by 14 percent during the year. There was also a further slide in coffee prices, despite intensified efforts under the International Coffee Agreement and by regional producers' organizations to regulate the market. The average export price of cocoa fell still more, by nearly 20 percent. The 1960/61 crop had been even larger than the record of the previous year, and a further increase was expected in 1961/62. Consumption has been rising in response to falling prices, but not fast enough to catch up with the growth of output, and since 1958 stocks equal to half a year's consumption have accumulated, mainly in importing countries. In the meantime, the main lines of an International Cocoa Agreement have been worked out by the governments participating in the FAO Cocoa Study Group, and a negotiating conference is envisaged early in 1963.

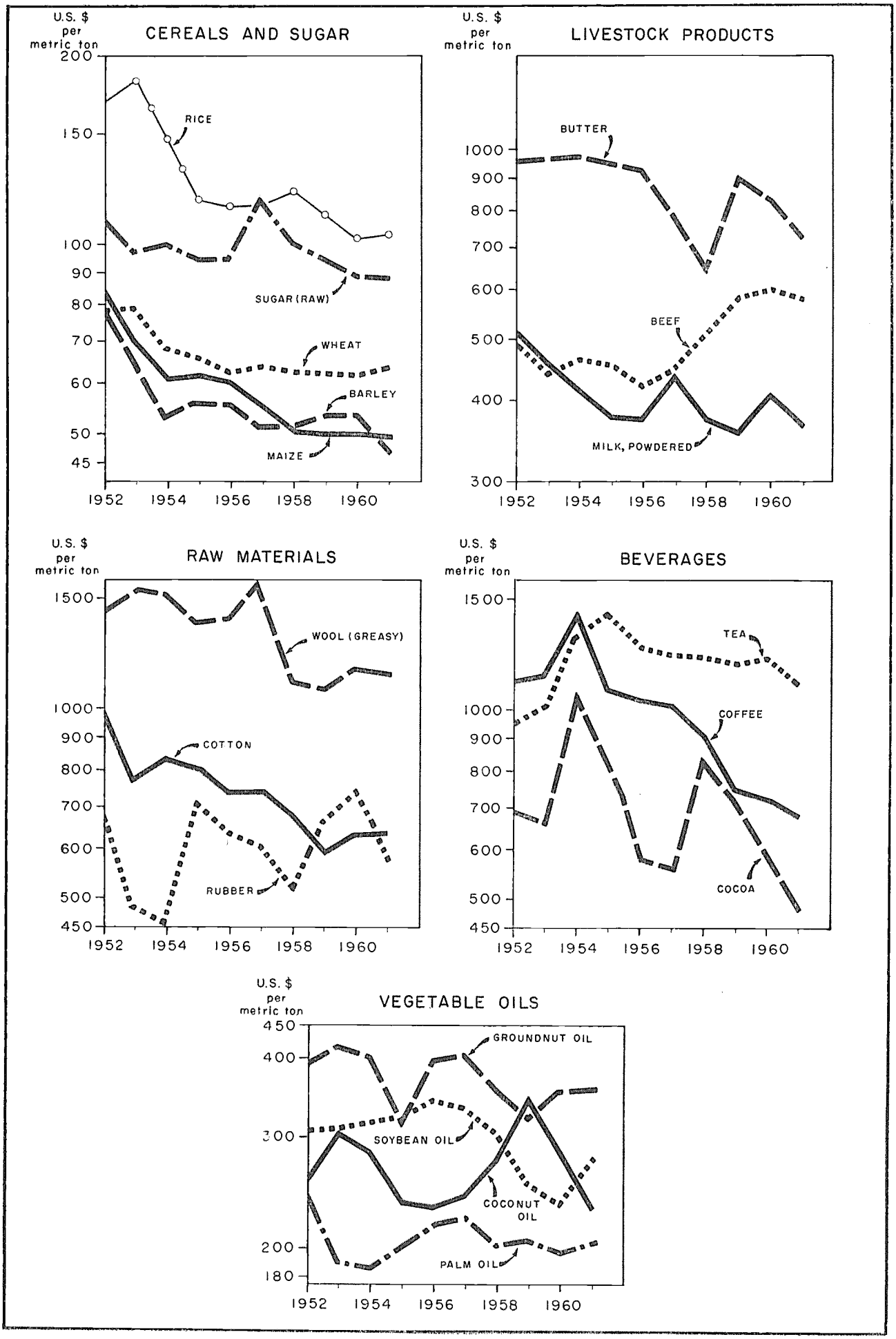
Among raw materials, prices of silk, jute, and medium staple cotton rose, while those of long and extra long staple cotton, wool, and particularly rubber fell. Jute, as already mentioned, was affected by the reduction in export availability from Pakistan. Although prices fell rapidly after the first months of the year with the prospects of a larger crop in 1961/62, the average export unit value was nearly one fifth higher in 1961 than the year before. Prices of United States cotton tended to rise, owing to a recovery in domestic demand coupled with smaller current output. Prices of long staple cottons from the United Arab Republic and Sudan however fell,

TABLE II-18. - AVERAGE WORLD EXPORT UNIT VALUE OF AGRICULTURAL AND FOREST PRODUCTS, BY COMMODITY GROUPS

	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
AT CURRENT PRICES	*Indices, average 1952-53 = 100*								
All agricultural products	100	99	94	92	94	87	85	85	81
Food and feedstuffs	102	93	89	89	91	87	87	86	84
Beverages and tobacco	87	123	105	98	98	99	87	84	79
Agricultural raw materials	107	92	96	91	95	79	78	86	80
Forest products [1]	93	93	94	95	94	90	88	91	92
Manufactured goods [2]	96	96	97	101	104	104	103	105	107
IN REAL TERMS [3]									
All agricultural products	104	103	97	91	90	84	82	81	76
Food and feedstuffs	106	97	92	89	88	84	85	82	78
Beverages and tobacco	90	128	108	97	94	95	84	80	74
Agricultural raw materials	111	96	98	90	91	76	76	82	74
Forest products [1]	97	97	97	94	90	87	86	87	86

[1] Not included in "All agricultural products". - [2] United Nations index of average unit value of manufactured goods in international trade, adjusted to 1952-53 base. - [3] Indices of current prices deflated by index of average unit values of manufactured goods.

FIGURE II-9. AVERAGE EXPORT UNIT VALUES (AVERAGE PRICES) OF SELECTED AGRICULTURAL PRODUCTS IN WORLD TRADE
(Semilogarithmic scale)



largely because of the declining demand from western Europe and India. Wool prices went through both a rising and a falling phase during 1961.

The largest change in prices of raw materials was in rubber. After rising steeply from mid-1958 till mid-1960, rubber prices fell rapidly in the second half of 1960, and again, after a period of stability, in the late months of 1961. The average unit value for 1961 was nearly 30 percent less than in 1960, and not far above that of 1958, when prices were depressed by the recession in the United States. In part the precipitous drop of rubber prices was merely a reaction to the high level reached earlier. With technical improvements and increased manufacturing capacity for synthetic rubber, prolonged periods of high prices for natural rubber have become increasingly unlikely. Other factors, however, were an increase of 5 percent in the production of natural rubber, and the expectation of faster disposals from the United States and the United Kingdom stockpiles from late 1961 onwards.

Fishery products

Prices for fishery products in international markets were on the whole somewhat higher in 1961 than in 1960. With good demand in the main importing countries, the prices for most types of fresh, frozen and canned fish improved. There was also a substantial recovery in the prices of fishmeal, which in the course of the two previous years had fallen drastically. At the end of 1961, United States menhaden meal was quoted at $120 a short ton, compared with only $90 a year earlier. More active demand and more orderly selling were in the main responsible for the improvement. The major exceptions to the tendency for firmer prices were salted cod and fish and whale oils. The latter were affected by increased marketing of fish oil resulting from the expansion of the fish meal industry in Peru and elsewhere.

Forest products

The average export unit value of forest products continued to rise in 1961, though at a lower rate than the year before (see Table II-18). This was the composite result of divergent changes in the prices of the various products. Sluggish demand in North America and the presence of considerable stocks in western Europe caused the prices of sawn softwood to fall in both regions, in North America to their lowest level since 1950. In general, hardwoods fared somewhat better, although North American prices decreased steadily during 1961 to the low 1957-58 level and prices for most tropical species also weakened toward the end of 1961 when considerable shipments from west Africa exceeded current demand in Europe.

On the other hand, coniferous log prices in Europe were generally higher than in 1960, reflecting an increase of sawmilling capacity in central Europe out of proportion to the supply of raw material. In Japan, the main market in the Far East, prices of structural timber rose by 25 percent, owing to very high demand for housing construction.

Pulp and paper prices were on the whole rather stable. World prices for mechanical wood pulp remained at the 1960 level throughout the year. In Europe, however, prices of chemical pulp fell sharply in the second half of the year in the face of excess production capacity, high stocks in the exporting countries and less optimistic expectations of future demand. Newsprint prices remained generally firm throughout the year. Canadian prices averaged 4 percent above 1960 level and at the end of the year Scandinavian manufacturers raised their prices by $4 per ton.

The contrast between firm or rising prices for almost all categories of industrial roundwood and the weaker trend in most processed forest products is worth noting. This development was observed for the most important forest industries, that is for logs versus sawnwood and for pulpwood versus pulp and paper categories.

Agricultural export earnings

With the reduction in the average prices more or less canceling the expansion in the export volume, the value of world agricultural exports remained in 1961 nearly unchanged at the previous year's level. In real terms, moreover, even the very modest increase in the current value of exports was eliminated by a two point rise in the average export unit value of manufactured goods, so that the purchasing power of agricultural exports for imported manufactures showed no increase at all.

The situation was more satisfactory for western Europe, North America and Oceania than for the less developed primary exporting countries. The

value of exports from western Europe, mainly intra-regional, which have grown rapidly since the end of the war, again rose by 4 percent, and those of North America and Oceania by 9 percent. In contrast, the export earnings of each of the less developed regions fell, in Latin America and Africa by about 4 percent, and in the Far East and the Near East by nearly 10 percent. In the Near East, both the volume and price of exports fell, but in other regions the reduction in export earnings was due entirely to lower prices (Table II-19 and Annex Table 14B).

Although much of this divergence in 1961 was due to the large cereal shipments to Mainland China from Australia and Canada, it was also in line with the postwar tendency for the agricultural exports of the industrialized regions to grow faster than those of the primary exporting regions. The trend was less evident in the earlier postwar years, but since the first half of the 1950s the disparity has been very marked (Table II-20). Thus from 1952-53 and 1960-61, the value of agricultural exports from the primary producing regions as a whole rose by only 5 percent, compared with an increase of 36 percent in the value of the agricultural exports from North America and western Europe. This disparity resulted mainly from the faster growth of the volume of exports from the industrialized regions, which from 1952-53 to 1960-61 rose by more than 60 percent, while those of the primary producing regions showed an increase of only 28 percent, though exports from Africa rose much faster than exports from other primary exporting regions. The course of export prices has on the whole been rather more uniform, most regions losing on average between 10 and 20 percent.

Only a detailed analysis could account in full for the disparities in the rate of growth of exports from

TABLE II-19. - VALUE OF AGRICULTURAL EXPORTS, BY REGION

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100									
WESTERN EUROPE										
at current prices	41	83	109	118	120	136	130	130	144	151
in real terms [1]	81	86	114	122	119	131	125	127	138	141
NORTH AMERICA (total)										
at current prices	24	102	84	82	110	117	104	103	124	134
in real terms [1]	47	106	87	85	109	127	100	100	118	126
NORTH AMERICA (commercial) [2]										
at current prices	24	102	84	58	71	79	75	71	88	96
in real terms [1]	47	106	87	60	70	76	72	69	84	90
LATIN AMERICA										
at current prices	26	92	110	102	106	105	98	95	99	95
in real terms [1]	51	95	114	105	104	101	95	93	94	89
FAR EAST [3]										
at current prices	47	102	97	114	107	106	97	111	112	103
in real terms [1]	94	105	100	117	106	102	94	108	107	96
NEAR EAST										
at current prices	30	97	105	100	105	118	99	105	111	99
in real terms [1]	60	101	109	102	104	113	95	102	106	93
AFRICA										
at current prices	23	86	116	112	114	116	121	117	116	112
in real terms [1]	46	89	121	115	124	112	116	114	111	105
OCEANIA										
at current prices	29	95	93	98	101	113	87	107	104	114
in real terms [1]	59	98	97	100	100	109	83	104	99	106
WORLD [4]										
at current prices	31	94	101	103	109	114	105	108	115	116
in real terms	62	98	105	106	108	110	101	105	110	108

[1] Deflated by United Nations index of unit value of exports of manufactured goods. - [2] Excluding exports under special terms from 1955 onward. - [3] Excluding Mainland China. - [4] Excluding the U.S.S.R., eastern Europe, and Mainland China.

TABLE II-20. - CHANGES IN THE VOLUME, VALUE AND UNIT VALUE OF GROSS AGRICULTURAL EXPORTS FROM THE INDUSTRIAL AND PRIMARY PRODUCING REGIONS. 1952-53 TO 1960-61

	Volume	Value	Unit value	Share in total volume, 1961
	..... *Percent*			
Western Europe.....	+64	+48	—10	14
North America	+61	+29	—20	23
Industrial regions	+62	+36	—16	37
Latin America	+28	— 3	—25	21
Far East [1]	+16	+ 7	— 8	14
Near East	+22	+ 5	—14	4
Africa	+43	+14	—21	13
Oceania	+29	+ 9	—16	11
Primary producing regions.....	+28	+ 5	—18	63
WORLD [2]	+39	+15	—17	100

[1] Excluding Mainland China. - [2] Excluding the U.S.S.R., eastern Europe and Mainland China.

different regions, but among the major factors affecting the picture may be noted:

(*a*) the availability of supplies: food exports from many less developed countries have been curtailed because of the rapid growth of domestic needs, while in a number of more developed countries production has grown much more rapidly than demand;

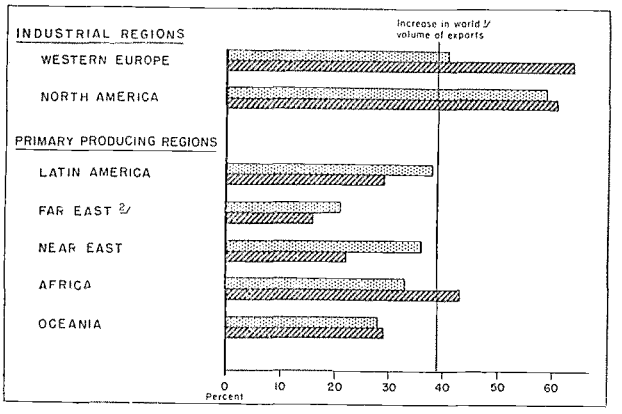
(*b*) differences in the competitive position of countries, reflecting differences in costs and productivity;

(*c*) differences in the commodity composition of exports between regions: import demand for some commodities (e.g., feedgrains, meats, fats, and oils) has grown quickly during the past decade, while demand for others (e.g., tea, wool, jute and rubber) has tended to lag;

(*d*) export subsidies and sales under special terms which have stimulated exports from some countries, though not necessarily at the expense of others: many shipments of foodstuffs under special terms to less developed countries, for example, would probably not have been possible under commercial conditions.

Of these, the effect of the first two factors is impossible to measure statistically. Some indication of the effect of differences in the commodity composition of exports, however, may be obtained by comparing the actual growth of export with that which would have resulted if each region's exports of the various commodities had risen at the same rate as world exports of these products (Figure II-10).

FIGURE II-10. ACTUAL AND HYPOTHETICAL INCREASE IN THE VOLUME OF AGRICULTURAL EXPORTS FROM INDUSTRIAL AND PRIMARY PRODUCING REGIONS, 1952-53 AVERAGE TO 1960-61 AVERAGE



[1] Excluding the U.S.S.R., eastern Europe, and Mainland China. - [2] Excluding Mainland China. - [3] Volume which would have resulted if the exports of the main products of each region had increased af the same rate as world trade in these products

EXPORTS UNDER SPECIAL TERMS

Among government measures to assist agricultural exports, export subsidies are undoubtedly of great importance, although their effect on the volume of trade cannot be estimated in quantitative terms. In 1960/61, for example, the United States spent some $300 million to subsidize the exports of wheat and cotton. In western Europe export subsidies paid in 10 countries for which data are available amounted in the three years 1958-60 to $125, $140 and $350 million, respectively.

Another major factor has been the rapid growth of exports under special terms, which now make up an appreciable part of world agricultural trade. They include a considerable proportion of exports as gifts for relief purposes, barter trade and exports against foreign currencies (much of which is then lent to the importing countries on favorable terms). To these may be added commercial exports assisted by the provision (or guarantee) of credits. For example, the recent large sales of Canadian wheat

to Mainland China were facilitated by government credit, while in the United States substantial quantities of farm products are sold under the Export Credit Sales program of the Commodity Credit Corporation.

All these methods, which as a rule less developed countries cannot afford, tend to increase the exports of the more developed countries, and to a large extent also the total volume of world shipments of agricultural products. In the reverse direction, exports of some less developed countries have been stimulated by the provision of guaranteed outlets on favorable terms in certain import markets, for example, in some of the former metropolitan countries or under the Commonwealth and United States sugar import arrangements. But the effect of such measures is small in relation to the assisted exports of the industrialized countries, and in any case they are likely to result largely in a shift in the pattern of trade rather than an over-all expansion.

At this point a clear distinction should be made between the volume and also the total value of agricultural exports as shown in Table II-20, and export earnings of foreign exchange. For clearly, while gifts and sales under special terms swell the volume and nominal value of the exports of the more industrialized countries, they do not bring in foreign exchange. On the other hand, the exports of the less developed countries are in the main commercial exports, and the f.o.b. receipts from such exports do in fact represent earnings of foreign currency. To estimate the earnings of foreign currency of the industrialized regions from agricultural exports it would be necessary to deduct the value of sales under special terms.

Comprehensive statistics on the magnitude of such sales are published only by the United States (Table II-21), although some information is also available from Canada and some other exporters. If the United States exports under special terms are deducted from the figures for North America in Table II-20, the growth in the volume of exports is only about 13 percent, while the value of exports fell by 8 percent. This gives a more realistic estimate of the development of earnings of foreign exchange, and brings the figures below those for the less developed regions of the world. No comparable data are available

TABLE II-21. - UNITED STATES AGRICULTURAL EXPORTS UNDER GOVERNMENT PROGRAMS IN RELATION TO TOTAL UNITED STATES AGRICULTURAL EXPORTS

	Total shipments under Public Law 480 and Mutual Security Programs								
	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	July/Dec. 1960	July/Dec. 1961
	Million dollars								
Wheat	322.9	425.9	656.9	474.9	554.4	646.2	818.9	360.5	430.5
Coarse grains	66.7	235.2	226.0	103.9	114.6	150.2	145.7	66.6	76.4
Rice	4.2	45.2	136.4	44.9	36.2	73.4	80.2	39.7	9.7
Dairy products	137.7	165.1	175.3	155.9	94.4	61.6	64.9	26.3	35.9
Fats, oils and oilseeds	84.4	143.7	178.4	114.0	139.8	125.9	106.0	57.4	47.0
Cotton	221.0	211.3	455.2	288.1	260.2	155.9	229.5	130.8	98.8
Tobacco	15.3	57.1	35.9	25.9	34.0	68.7	72.4	28.3	27.9
Other agricultural exports	14.0	83.3	93.5	43.9	26.3	22.2	23.8	0.3	2.1
TOTAL	866.2	1 366.8	1 957.6	1 251.5	1 259.9	1 304.1	1 541.4	709.9	728.3
	Shipments under special programs as percentage of total U.S. agricultural exports								
	Percentage of total value								
Wheat	66	72	69	66	72	74	71	70	65
Coarse grains	29	61	66	26	21	28	27	25	29
Rice	7	52	73	47	36	54	61	60	22
Dairy products	71	67	76	79	65	51	61	52	69
Fats, oils and oilseeds	19	25	28	21	27	20	17	17	15
Cotton	32	57	41	34	63	19	24	31	28
Tobacco	5	15	11	8	10	20	19	10	10
Other agricultural exports	2	10	10	5	3	2	2	1	8
TOTAL	28	39	41	31	34	29	31	36	36

for western Europe where, however, exports under special terms of this type are relatively small.

Exports under concessional terms are especially important for wheat, and the secretariat of the International Wheat Council has published estimates of the significance of various types of arrangements, based on the shipments of 10 leading exporters [7] covering some 95 percent of world trade. The percentage of total world exports made under various types of special arrangements were estimated as shown in Table II-22.

TABLE II-22. - PERCENTAGE OF WORLD WHEAT EXPORTS MADE UNDER CERTAIN SPECIAL ARRANGEMENTS

	1957/58	1958/59	1959/60	1960/61
	..... *Percent*			
Sales for local currencies	17	20	23	25
Gifts and donations	4	3	3	5
Barter agreements	4	5	6	3
Sales with noncommercial credit	1	1	–	2
TOTAL	26	29	32	35

The report also shows exports under other categories, such as "sales under special currency arrangements" and "trade type arrangements," which bring the total to 46 percent in 1957/58 rising to 52 percent in 1960/61.

The sum of $4,500 million has been authorized by the United States legislation for operations under Title I of P.L. 480 (sales against local currencies) in the calendar years 1962-64. Title II authorizations (famine relief) have been continued at the annual rate of $300 million. These funds will permit disposals in the three years covered at approximately the same rate as in 1958-59, when the authorizations under Title I averaged $1,500 million a year. In 1960-61 supplementary appropriations had brought the annual average of Title I authorizations to $2,500 million. Unless, therefore, further appropriations are made, or exports under Titles III and IV (foreign donations and barter, and long-term supply and dollar credit sales) expand markedly, the shipments in 1962-64 will not be quite as large as they were in the preceding two years. Up to the end of 1961 only three agreements, stipulating the exports of goods valued at 40 million, had been signed under Title IV. Title III exports have in the last few years fluctuated around 260-270 million, and have not shown any tendency to rise since the reduction in barter operations after 1956/57.

Additional food exports on concessional terms — in this case as donations — will in the next three years be made under the newly established UN/FAO World Food Program. Expected to start its operations toward the end of 1962, the Program will use foodstuffs and cash donated by participating countries to meet emergency food needs, to help schoolfeeding programs, and to implement labor intensive development projects. With a fund of up to $100 million, of which two thirds are to be in commodities, the program is modest compared with the bilateral programs and its special significance lies in its experimental nature. It may be extended after the end of the initial three-year period if the Program proves successful.

INTERNATIONAL TRADE POLICIES

The serious effect on the economic development of primary exporting countries of the continuing decline of commodity prices has for long given rise to international concern. In 1961 the anxieties of many countries were increased by uncertainties of the effect of regional integration schemes on their export prospects. In particular, the detailed working out of the agricultural policies of the countries of the European Economic Community, and the conditions under which the United Kingdom may join the Community, are of great importance to agricultural exporters. This applies particularly to Commonwealth countries, both those exporting the products of temperate agriculture, and the African and other exporters of tropical products. In 1958-60, for example, the EEC and the United Kingdom together took nearly 80 percent of all butter exported, around 50 percent of all citrus fruit, meat, feed grains, and wool, about 50 percent of all fats and oils, tea, and jute, and between 25 and 40 percent of all cotton, bananas, wheat, coffee, rubber, and sugar.

During the past year there has been much more active consideration of these problems, often on a wider basis than before, and a more evident determination to find ways of mitigating harmful effects of falling prices. Significant among efforts to ensure a freer entry of agricultural exports to the Eu-

[7] Data from INTERNATIONAL WHEAT COUNCIL, *Trade arrangements involving wheat*, London, December 1961. Countries covered were Argentina, Australia, Canada, France, Federal Republic of Germany, Italy, Spain, Sweden, United States, and U.S.S.R.

ropean Economic Community were the tariff negotiations between the United States and the EEC during the 1960-61 Tariff Conference of GATT. As a result, the European Economic Community agreed to bind or reduce the common external tariff of a number of agricultural items, including, cotton, unmanufactured tobacco, various vegetable fats and oils, meats and meat products. The same concessions became automatically valid for all other countries enjoying most-favored nation treatment with the EEC. Further efforts of the United States Administration to lower the general level of tariffs and to facilitate the entry of agricultural exports to the EEC are contained in the proposed Trade Expansion Act of 1962, which was being considered by the United States Congress at the time of writing. Among other provisions, the Act would authorize the President to make tariff reductions on groups of products rather than individual items as under the present law, thus giving greater freedom of maneuver. The Act would also authorize the President to reduce or eliminate duties on tropical agricultural and forest products not produced in the United States, provided the EEC took similar action on a nondiscriminatory basis.

In regard to international commodity arrangements, the International Wheat Agreement was renewed in 1961/62. As already indicated, a negotiating conference for an international cocoa agreement is envisaged early in 1963. There are prospects, too, of a wider coffee agreement, embracing importing as well as exporting countries, and some hope that the sugar agreement may be revived in the not too distant future.

Discussion has also been initiated in various international forums on possible world-wide commodity trade arrangements of a new type. Groups to study the possible form of such arrangements for cereals and meat have been appointed under the auspices of GATT, and the idea has also been suggested in the course of the negotiations for the entry of the United Kingdom in the European Economic Community, as a means of safeguarding the trade interests of the overseas Commonwealth exporters. As at present visualized, the scheme for cereals would combine arrangements for world trade at higher prices than those now prevailing with a centralized program of food aid to the less developed countries as a means of disposing of surpluses not marketable at the higher price.

Another type of scheme now under discussion is the proposal for a scheme of "compensatory financing" as a means of evening-out the fluctuations in the export earnings of primary producing countries. A report by a group of experts on the subject was discussed in the United Nations Commission on International Commodity Trade in May 1961 and again, together with supporting studies, in May 1962 at a joint UN/FAO meeting. In the experts' report, proposals had been drawn up for the establishment of a development insurance fund, to operate along the principles of a social insurance scheme, with the developed nations' contributions exceeding their direct benefits from the fund.

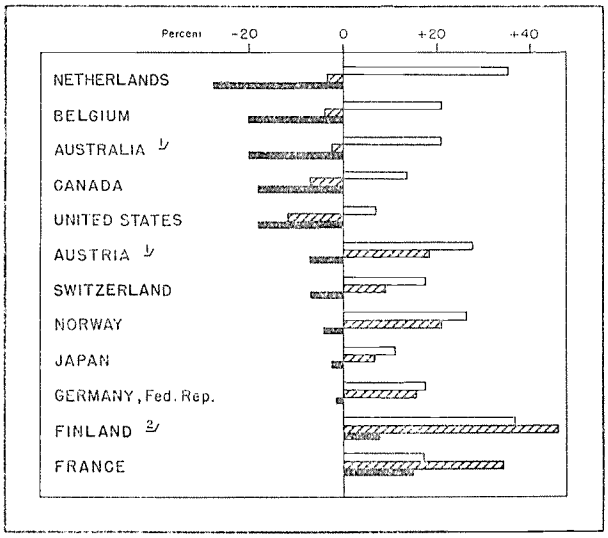
In view of their complex nature and the diversity of the interests to be reconciled no early decisions on these new types of arrangements can be expected. Serious consideration of them does, however, indicate the growing appreciation of the importance of agricultural trade as a major factor in general economic development, and of the contribution which the expansion of such trade could make to the objectives of the United Nations development decade.

Farm prices and incomes

Reasonably comprehensive information on farm prices and incomes is generally available only for some of the more industrialized countries. In these countries domestic farm prices are to a large extent insulated from prices on international markets by various measures of agricultural support and therefore do not reflect closely the continuing downward drift of prices of agricultural products in world trade. In most of the countries for which data are available farm prices in 1961 were in fact somewhat higher than in 1960, and in more than half of them farm prices were significantly higher than they had been a decade earlier.

It does not follow from this, however, that prices have moved in favor of farmers. On the contrary, in every country for which they are available indices of prices paid by farmers for production purposes, including wages, interest, and taxes (sometimes in-

FIGURE II-11. CHANGES IN INDICES OF PRICES PAID AND RECEIVED BY FARMERS AND IN RELATIONSHIP BETWEEN THE TWO INDICES, 1961 IN RELATION TO THE 1952-53 AVERAGE



Index of prices paid by farmers
Index of prices received by farmers
Ratio of prices received/prices paid

[1] First half of year. - [2] First nine months.

cluding living expenses as well) have risen significantly in recent years. Except in a few countries, price relationships have become less favorable for agricultural products in spite of subsidies and other measures to raise or stabilize farm prices.

Changes in price relationships in twelve countries from 1952-53 to 1961 are shown in Figure II-11. The indices themselves are national indices and not sufficiently comparable for close intercountry comparisons, particularly of prices paid. Within each country, however, they show the general trend of prices and price relationships. In the first five,[8] four of them exporting countries for agricultural products, the weakness of agricultural prices during the period is apparent in falls ranging from 1 to 12 percent in prices received by farmers. During the same period prices paid by farmers increased in these countries by from 7 to 35 percent. In consequence the ratio of prices received to prices paid moved against farmers by as much as 17 percent in the United States rising to 27 percent in the Netherlands.

In a second group of five countries,[9] all agricultural importing countries, the situation was somewhat different. In each of these countries prices received by farmers rose between 1952-53 and 1961 as a result of various support measures, from 7 percent in Japan and 8 percent in Switzerland to about 20 percent in Austria and Norway. In each case, however, the rise in prices paid by farmers was still greater, so that here too price relationships moved against farmers. In Austria the change amounted to 11 percent, but in Japan and the Federal Republic of Germany the decline over the whole period was only about 2 percent. In Norway approximate parity in relation to 1952-53 was reached at the end of 1961 as a result of increased prices for cereals and dairy products, though the average for the whole year was somewhat less favorable. In Greece, where similar price ratios are available from 1954, approximate parity also appears to have been maintained since that year between prices received and paid by farmers.

Finally, in the last two countries shown in Figure II-11, prices received by farmers have increased appreciably more than the prices paid, in Finland by 7 percent and in France by 15 percent. The same was true in Italy up to 1960, the latest year for which figures are available. It need hardly be added that the data in Figure II-11 show only price movements and give no indication of the level of prices or their profitability. In France, for example, as is well known, there has been much unrest among farmers concerning price relationships in spite of the upward trend in recent years.

So much for the longer term trend of prices. In the short run, from 1960 to 1961, changes in the countries included in Figure II-11 were rather limited. In Belgium, France, Japan, the Netherlands and Switzerland a rise of a few points in prices paid was balanced by a comparable rise in prices received by farmers. In Australia, Canada, Finland and the United States price indices changed hardly at all. Finally price relationships moved slightly in favor of farmers in Norway and the Federal Republic of Germany, but moved sharply against farmers in Austria where prices received declined slightly while prices paid rose by about 5 percent.

General indices of prices received by farmers are available for a few other countries, though their significance is more limited in the absence of data on prices paid. For example, in Ireland and Sweden the index of prices received by farmers remained rather stable in 1961. In Denmark, on the other hand, farm prices were some 5 percent lower in 1961 than in 1960 because of the depressed values of butter and bacon in export markets, though these

[8] Australia, Belgium, Canada, Netherlands, United States.
[9] Austria, Federal Republic of Germany, Japan, Norway, Switzerland.

were partly offset by a change of policy to permit the maintenance of domestic prices at a higher level than those on international markets.

For the less developed countries information on prices is more scanty. An index of agricultural wholesale prices is published for all India which shows a steady rise since 1954, though the increase between 1960 and 1961 was slight. In addition three Indian states publish indices of prices paid and received by farmers; these suggest that price relationships have moved in favor of farmers over recent years in Assam and West Bengal, but have fluctuated with no definite trend in the Punjab. In so large a country as India, where marketing is not yet fully organized, sizable variations between states would not be surprising.

More data are, of course, available on the prices of individual commodities in less developed countries. To mention only a few of the more striking changes, official purchase prices of wheat in 1961 were increased around 20 percent in Argentina and somewhat more in Turkey. Wheat prices in Pakistan appear on the average to have been somewhat higher in 1961, but in the last quarter of the year were appreciably lower than in the same period of 1960. In India wheat prices varied only slightly, but floor prices were introduced early in 1962 to prevent sharp reductions immediately following the harvest. Prices of barley in Korea were raised by more than half and of rice by 27 percent. Prices of barley and oats in Turkey were raised by 10 percent; oats and grain sorghum in Tunisia by 8 percent; maize prices by more than one fourth in Colombia, and 13 percent in Argentina. Prices of rice (paddy) in Madagascar were 10 percent higher than in 1960, while in Colombia the changes in grading and classification increased rice prices from 5 percent for ordinary varieties to as much as 43 percent for some superior grades.

Prices are of course only one component of farm incomes. Gross farm incomes vary with year-to-year changes in the volume of output, and in many countries are considerably affected by direct government payments as well as by price supports. Net farm incomes are influenced by the continuing rise in the volume as well as the prices of inputs, especially in the more developed countries. Finally, per caput incomes in agriculture in the more developed countries tend to rise more quickly than the total incomes of the sector, because of the steady decline in the number of people engaged in agriculture. In the less developed countries the reverse is true as, in spite of a gradual fall in the percentage of the population dependent on agriculture, in absolute numbers the farm population still tends to rise.

The longer-term effects of these factors were discussed at some length in *The state of food and agriculture 1961*, where the growth of farm incomes and national incomes as a whole was compared on both a total and per caput basis. The paragraphs which follow, therefore, are concerned only with developments during the past year.

Preliminary data on farm income in 1961 or 1961/62 are available for several European countries and for Japan, Australia, Canada and the United States. These indicate that net earnings in agriculture rose in most of these countries. A higher volume of sales for domestic consumption and somewhat higher prices for some commodities offset, at least in part, increasing expenditures on production items, taxes and interest. To counterbalance rising production costs and to maintain or improve the relation between agricultural incomes and those in other sectors, guaranteed or fixed prices to farmers for some major crops and livestock were raised in several countries, and larger government expenditures incurred for price support and other subsidies to farmers. Net farm incomes [10] (including government payment) were estimated to have increased by 2 to 3 percent in Belgium, Germany and Switzerland; by 4 to 5 percent in Yugoslavia and in Norway; by about 7 percent in Japan, 9 percent in France and the United States; and by over 10 percent in Austria, Greece, Italy, Poland and the United Kingdom. However, net incomes declined in Australia, Canada, Spain and Portugal because of smaller crops and rising production costs.

In the United States net income from farming in 1961, excluding inventory changes, was estimated at $ 12,700 million, $ 1,000 million more than in 1960. Gross returns on marketings and a higher rate of government payments brought $ 1,500 million more to farmers than in 1961, but the increase in expenditures, particularly on taxes and interest, amounted to $ 500 million more than in the previous year.

[10] In the paragraphs which follow, gross farm income is in general used to indicate gross sales at market prices plus specific government payments to agriculture, while net income represents gross income less current expenses. While these national estimates of farm incomes indicate the trend within the country, they are not strictly comparable between countries. For example, the estimates for the United Kingdom and the Federal Republic of Germany include wages of hired labor in current expenses, and the estimate of " net income " thus comes near to the income of farm operators. In some other countries, however, they approximate to the net income of the farm sector.

A significant cut in the volume of marketings of food and feed grains reduced income from this source, though prices were higher. Receipts from livestock marketings were higher, particularly marketings of pigs, mainly because of an increase of 7 percent in price. Prices of cattle, calves, sheep and lambs were somewhat lower, however, and returns from sales of poultry and eggs dropped significantly because of depressed prices from increased supplies. Soybeans, tobacco, and cotton earned more in 1961 because of an increase in both output and prices. The total volume of marketings of all products increased by 1.5 percent and average prices by 1 percent; total receipts were thus over 2 percent higher than the year before. Government payments to farmers more than doubled in 1961 as a result of the new Feed Grains Program which provided increased compensation to farmers for diverting 20 percent or more of the land area normally under maize and grain sorghum to soil conservation or other approved uses. Where in 1960 income from government payments amounted to $ 693 million, in 1961 it rose to $ 1,484 million.

In Canada farm cash incomes from marketings rose by about 5 percent to over $ 2,900 million in spite of the striking fall in grain production. The large wheat carry-over and the removal of grain delivery quotas at many delivery points for the first time for a decade enabled farmers to maintain marketings at a level only slightly below that of 1960, while incomes were increased by the somewhat higher prices paid by the Canadian Wheat Board. However, net farm income for 1961, excluding receipts from previous years' stocks, fell by 24 percent to the lowest level since 1945. Increased sales of linseed, tobacco, cattle, pigs, dairy products, and poultry products contributed to the increased cash income, but were partly offset by smaller sales of potatoes, oats and barley.

In Australia developments were less favorable in 1961 than the year before. Gross income from farming fell by about 2 percent and net income by 7 percent. Returns from marketings of wool, dairy products, lamb and mutton did increase significantly, but these gains were offset by a smaller cereal harvest and the rise in production costs.

In Japan, according to a preliminary estimate, net income in agriculture in 1961 increased by 7 percent over 1960. Agricultural production had risen by about 3 percent, and agricultural prices averaged about 6 percent higher than in the previous year. However, production expenses rose by an estimated 12.5 percent due to larger purchases of farm machinery, insecticides and animal feed, together with increased prices of feedstuffs.

Net farm income for the year ending 31 May in the United Kingdom was forecast at £ 431.5 million, compared to the revised estimate of £ 389.5 million in the previous year. Exchequer support of agriculture increased by more than 30 percent and was estimated at £ 351 million in 1961/62 compared with £ 263 million in the previous year. This increase was occasioned by a sharp fall in meat prices which necessitated increased deficiency payments to farmers. An increase in farm wages, rents and machinery expenses is estimated to have raised the total cost of farming by £ 19.5 million, about the same amount as in the previous year.

In 1960/61 agricultural receipts in France were about 9 percent higher than in the previous year; both production and prices had increased. Expenses also went up; but because agricultural price relationships had improved, gross output minus expenses was estimated at NF 27.3 thousand million as compared with NF 25.0 thousand million in 1959/60. No information is yet available for 1961/62.

Although receipts from farm sales in the Federal Republic of Germany increased from DM 19,300 million in 1959/60 to DM 20,200 million in 1960/61 and an estimated DM 20,400 million in 1961/62, net income in 1961/62 at DM 6,150 million is estimated to be little higher than the year before and considerably less than the net income of DM 7,060 million in 1959/60. In 1960/61 net incomes were reduced by substantially higher farm expenditures on feedstuffs following the 1959 drought. In 1961 the government spent under the Green Plan 16 percent more for structural improvements and supplementary subsidies, including some nonrecurring payments, to compensate for income losses in 1960. Total expenditures under the Green Plan amounted to DM 1,600 million in 1961, an increase of DM 130 million (nearly 9 percent) over 1960. Appropriations for 1962 have been increased by DM 500 million. From the beginning of the Green Plan in 1954/55 until 1960/61 agricultural labor income per head has increased by 73 percent, and the industrial parity wage by not more than 55 percent. In the first year of the Green Plan agricultural labor income per head amounted to 66 percent of the parity wage, while in 1960/61 it was 74 percent. Thus the gap between earnings in agriculture and those in comparable occupations in industry has narrowed.

The net added value in agriculture and forestry

in Austria increased by 11 percent at current prices from Sch. 16,600 million in 1960 to Sch. 18,400 million in 1961, or by about 7 percent in real terms. Although prices received by farmers had declined slightly, the volume of production and marketings increased and there was a 6 percent rise in subsidy payments from the government, mainly in the dairy sector. A contraction in the labor force by 3 percent was accompanied by an increase of 9 percent in expenditure on agricultural machinery and fertilizers, due partly to higher prices.

Agricultural production in Switzerland fell by 2 percent, but prices averaged 4 percent higher in 1961, partly as a result of higher price supports. In Italy agricultural production was up by some 5 percent, in spite of a decline in agricultural manpower by some 307,000 workers, about three times the number of those who left farms in the previous year. A high level of demand for food and agricultural products was maintained and the gross saleable product of agriculture rose by 9 percent to 3,712 thousand million lire. Prices of production items, interest and taxes remained constant or declined, and total farm expenses, including amortization, rose only 2 percent. Total net income is thus estimated to have risen by 11 percent in 1961.

Farm income developments were unfavorable in Spain and Portugal. In Spain the gross value of output in 1961 rose by 2 percent, but production expenses increased by 4 to 5 percent, and net farm income was estimated at 3 percent less than in 1960. In Portugal receipts from livestock products increased, but there was a sharp decline in returns from cereals, the main source of income. As a result of an increase in the prices of farm products, the income of the rural population in Yugoslavia rose by about 4 percent. In Greece the value of the gross product of agriculture recorded a rise of about 17 percent, while that of industry increased by 8 percent. Government expenditures in support of agriculture were substantially increased in 1961, mainly to improve and promote livestock farming.

Consumer prices

The upward trend of retail prices, which has persisted almost without a break since the second world war, continued in 1961. Of 79 countries for which data are available for 1961, the index of retail food prices remained stable or declined during the year in only 15 of them. In most instances the rise in prices was modest and often amounted to not more than 1 or 2 percent, but in 27 countries there was a rise of more than 5 percent over 1960, while in 9 of these the rise was greater than 10 percent.

The considerable cumulative effect of the continuing rise in food prices and in the cost of living during the 8 years from 1953 to 1961 is evident in Table II-23. In only about one fifth of the 87 countries publishing indices was the rise in the cost of living less than 10 percent; this includes four countries in which the index declined slightly. In another one fifth of the countries there was a strong inflationary trend with prices rising by more than 50 percent. In the remaining three fifths of the countries the rise in prices fell within the range of 10 to 50 percent. While runaway inflation occurred almost entirely in the less developed countries, the rise in consumer prices in more industrialized countries has also been very substantial and, in about one third, exceeded 25 percent.

TABLE II-23. - RISE IN COST OF LIVING IN 87 COUNTRIES, 1953-61

Cost-of-living index 1961 (1953 = 100)	Number of countries		
	Total	More developed	Less developed
Under 110.....	18	4	14
111 - 125.....	32	13	19
126 - 150.....	18	7	11
151 - 200.....	11	1	10
Over 200.....	8	-	8
TOTAL	87	25	62

Food is so large a constituent of the cost of living that there is seldom any great divergence in the long term between the retail food and the cost-of-living indices. Thus in about two thirds of the 25 more developed countries included in Table II-23 the divergence between the two indices over the eight-year period was less than 3 percent.

In the less developed countries, however, the divergence has been rather greater, even though food makes up a larger share of consumers' expenditure than in more developed countries and is thus likely to be more strongly represented in the cost-of-living

TABLE II-24. - RELATION BETWEEN RISE IN COST OF LIVING AND RISE IN RETAIL FOOD PRICES IN LESS DEVELOPED COUNTRIES 1953-61

Cost-of-living index 1961 (1953 = 100)	Number of countries			
	Total	Food prices rose faster than over-all cost of living	Food prices and cost of living rose at about the same rate	Food prices rose more slowly than over-all cost of living
Under 110..	14	3	4	7
111 - 150...	30	9	14	7
Over 150...	18	9	5	4

index. On the whole it appears (Table II-24) that in countries where prices remained fairly stable the retail food price index tended to be close to or lower than the cost-of-living index. Conversely in countries where inflation was marked food prices tended to rise more quickly than the cost of living; this was the case in half the countries where the cost of living rose by over 50 percent. This trend was noticeable, for example, in Argentina, Uruguay and Bolivia, all countries which experienced marked inflation and where the rise in the retail food index exceeded that of the cost-of-living index by 8 percent, 14 percent and 26 percent respectively between 1953 and 1961.

It is likely that in less developed countries, where purchasing power is very limited, food scarcities and mounting food prices would divert expenditures from other things to food, thus intensifying the pressure on food prices and relieving the pressure on prices of other goods. Any resulting divergence in prices would be intensified by, for example, rent and other price controls for, while price controls on foodstuffs are also common, they can seldom be enforced in times of scarcity. Food shortages can thus be a most potent inflationary force in the less developed countries; and conversely adequate supplies in relation to demand are the most effective safeguard against inflation.

In most countries of Europe and North America the changes in the food price index between 1960 and 1961 averaged no more than 2 percent; the price rises occurred mostly in the second half of the year and continued into the first months of 1962. Elsewhere no definite regional pattern emerges in the movement of consumer prices. Inflationary forces tended to be strongest in some countries of Latin America, Africa, and the Far East where there were a few very sharp increases, ranging from 10 to 50 percent in 1961 as compared with 1960. But in many other countries of the same regions food and living costs were relatively stable or even declined.

In Europe and North America increases in support prices to producers for cereals, livestock and dairy products influenced the upward trend in retail prices, while in Europe another important factor was a relative scarcity of fresh fruits and vegetables. The main impact of these developments came in the second half of the year. Thus in France there was relative stability in the first part of the year, but prices rose after midsummer, mainly for fruits, vegetables, wine, bread, and dairy products. The average level of the food price index in the calendar year 1961 was 4 percent higher than the year before, while in January 1962 it was 6 percent higher than a year earlier. Similarly in Denmark, Norway, and Switzerland the food index in 1961 averaged 2 percent above the previous year and in Sweden 3 percent, but because of the rise toward the end of the year the index of food prices in January 1962 stood 6 to 7 percent above the level of January 1961. There was a similar uneven though smaller rise in both Italy and the Federal Republic of Germany. The largest price increase in Europe, however, was a rise of 11 percent in retail food prices in Iceland following officially authorized increases in retail prices of cereals, sugar, fats, and other foodstuffs in late 1961, and the decontrol of prices of canned foods for a trial period of one year beginning in September 1961.

In Australia food prices had shown an uninterrupted rise in the last few years, at a slightly faster rate than the general price index, but in the latter half of 1961 the food price index began to decline and the general cost-of-living index reached a point of stability. In New Zealand, on the other hand, food prices began to rise slightly in the second half of 1961 after an abrupt decline from the peak reached in the previous December; both the food and general price indices averaged only slightly more in 1961 as a whole than in the previous year.

In almost half of the 21 countries in Latin America which publish retail food and cost-of-living indices for 1961 the changes in average levels were less than 2 percent. Sharp increases, however, were registered in nine countries, ranging from 5 percent in Peru and Costa Rica, to 7 percent in Argentina and Jamaica, 10 to 15 percent in Colombia and Uruguay, 35 percent in Brazil, and 50 percent in Paraguay. Poor harvests were only partly responsible, and much was due to the rapid growth of demand.

Poor harvests, difficulties of distribution and rising demand were mainly responsible for marked

increases in the level of food prices in several Near East and African countries. In Iran and Ghana the food price index rose in 1961 by more than 10 percent, and in Tunisia, Senegal and Turkey by about 5 percent. In these countries food prices rose at a faster rate than the general price level, while in Israel food prices rose by 4 percent and the general index by 7 percent compared with 1960. In most other African countries for which data are available, only slight upward changes were reported in the consumer price level.

Good harvests and an improved supply position in several Far Eastern countries such as Ceylon, India, Malaya and Pakistan gave stability to food prices. On the other hand, a setback in rice production and internal distribution difficulties led to marked increases in the food price index in Viet-Nam, Burma and Indonesia. In Japan a sharp rise in the second half of the year in prices of fruits and vegetables, livestock and dairy products, due to seasonal factors and to rapidly rising demand, raised the index of food prices by 7 percent in 1961, while the general cost-of-living index increased by 6 percent. In India the index of food prices scarcely increased in 1961 as increases in the price of fruits and vegetables were offset by the fall in cereals prices; the general cost-of-living index, however, went up by 2 percent. In both India and Japan the food price index continued to rise in January 1962 when it stood 9 percent higher in Japan and 3 percent higher in India than a year earlier.

Continuing inflationary price movements have led to intensified control measures in several countries. Price ceilings introduced in Korea in July 1961, reinforced by other stabilization measures, halted the upward trend of prices; at the beginning of 1962 the retail price index stood at the same level as in January 1961 after reaching a peak of 10 percent above that level in September, while the food index was somewhat lower than a year earlier. The strengthening of price controls in Ceylon has brought about a gradual decline in the food price index which in 1961 was slightly lower than in 1960. Shortage of rice in Viet-Nam led to suspension of export licenses early in 1961 in order to stabilize domestic prices. Cambodia and the United Arab Republic also suspended rice exports to maintain internal price stability. In Liberia retail price ceilings were established by presidential proclamation in 1961. More stringent monetary measures to halt price instability were taken in Brazil following the devaluation of the currency, while price supports to farmers were increased to stimulate production. In Mexico a new agency was created known as the CONASUPO (Compañia Nacional de Subsistencias Populares) to provide rural consumers with necessities at reasonable prices and to replace with more extensive functions a previous agency known as CEIMSA. The new agency operates directly through mobile supply markets, which carry a wide range of staple food and other consumer necessities.

Agricultural policies and development plans

A number of policy developments took place in 1961/62 which are likely to influence the course of world agricultural development for many years to come. In the United States more determined efforts than ever before are being made to reduce the costly burden of agricultural surpluses to more manageable proportions, even though progress to date is limited. In western Europe there have been important developments in the evolution of a common agricultural policy for the European Economic Community, which will become still more significant if the Community is joined by other countries, notably the United Kingdom. Negotiations for membership have been very largely concerned with agricultural problems. In the U.S.S.R. a new perspective plan foreshadows a much more intensive form of agriculture, and production policies have already been drastically modified to hasten its achievement. In the economically less developed countries a steadily increasing emphasis on agricultural planning is evident. More and more countries in Asia, Africa, and Latin America are integrating their agricultural programs into wider plans for general economic growth in an endeavor to bring to an end the age-old ills of poverty and hunger.

In January 1962 a common agricultural policy was inaugurated for the six member countries of the European Economic Community. The objective is to establish, over a transitional period of seven and a half years, a single Community-wide market for agricultural products, protected from the outside by a uniform system of import levies. The

gradual implementation of the common policy is likely to bring about significant shifts in European production and trade patterns, and unavoidably to give rise to problems for many countries which are traditional suppliers of the European market.

One aim of the common agricultural policy, long agreed upon, is to bring about gradually a more efficient use of the agricultural resources of the members of the Community. For the achievement of this aim, principal reliance will be placed on the price mechanism. Prices of farm products are gradually to be brought into line, and at the end of the transition period the intention is to have only one price level for each main commodity throughout the Community. The crucial question of where the ultimate common level will fall has not yet been decided, but target prices for grains in 1962/63 are to be within the present range of prices, and this is likely to apply also to the final common price. There will thus be a controlled movement of prices for all main farm products during the transitional years, upward from current levels in some countries and downward in others. The upward price changes are expected to encourage production and the downward ones to reduce production. In principle, therefore, the pattern of farming in any area within the Community should change gradually toward the lines of production best fitted to local conditions. The process of adjustment will be assisted by measures to improve the farm structure, financed at least in part from a central fund built up by the Community as a whole.

General experience with agricultural price policies suggests that while it is not difficult to raise farm prices, if governments have the financial means, the political obstacles to lowering them are extremely hard to overcome. Moreover within the Community there is a common social policy of raising farm incomes. It will thus be easiest to get agreement on price alignments which involve very little downward price adjustment. A second point for which the strongest evidence comes from the United States is that while upward price movements for farm products usually promote increased output, downward movements do not usually reduce output to any comparable extent, if at all. If a balance of supply and demand is to be achieved in the Community, it appears that such measures as production controls and the promotion of exports, possibly under special terms, may become necessary. These possibilities are already under discussion for some commodities.

In North America the agricultural policy of the United States is still dominated by the problem of surpluses, especially of grains. Previous efforts to restrain production by moderate reduction in farm prices and by allotting reduced acreages for individual crops were defeated because farmers adopted more intensive methods of cultivation to raise yields per acre. In 1961, therefore, a new approach was tried as an emergency measure with maize and sorghums. Farmers received subsidies to divert land under these grains to approved conservation uses and farm prices were raised to protect incomes. But only the output of the allotted areas at normal yields was eligible for price supports, and the incentive to intensify cultivation on the reduced acreage was thus removed.

In 1961 this program was successful in reducing both the acreage and output of maize and sorghums, and in 1962 it was extended to barley and in a modified form to wheat. Legislation aimed at a permanent solution of the problem of grain surpluses was submitted to Congress early in 1962, but narrowly defeated. For the present, therefore, a limited program for coarse grains and wheat on the lines of the 1962 program is likely to be continued, although it is reported that the administration intends to resume at a later date its efforts for a more basic solution of the problem of grain surpluses.

The United States was almost alone in having to place primary emphasis of policy upon reducing output, though this problem begins to become serious in other industrialized countries and also for some tropical export crops. In western Europe, however, the main emphasis is still on internal readjustment under the Community. In other regions of the world the desired balance between production and demand is almost always being sought through an increased output.

In eastern Europe, the U.S.S.R., and Mainland China, the developments of policy toward agriculture in 1961/62 were far from uniform. In the U.S.S.R., which was still faced with lagging agricultural output in relation to demand, a long-term perspective plan of agricultural development to 1970 and 1980 has been formulated. It follows a similar pattern to other countries with rising incomes, envisaging an increased production and consumption of fruits, vegetables and livestock products, and a declining consumption of cereals and potatoes. To build up agricultural production a new farming system is being adopted with a swing from fallows and rotational grasses to more intensive cropping with the

help of fertilizers, while the trend to give more autonomy to collective farms has been reversed. Meantime prices of livestock products have been sharply increased, partly as a production incentive and partly to restrict demand.

In eastern Europe, except Poland, the trend of agriculture is still toward increased socialization, in some cases with increased centralized direction, but with a greater reliance on prices to balance supply and demand. On the contrary, in Mainland China, following a series of harvest failures, the commune system was further decentralized, giving local production brigades and teams more authority to take decisions on what to plant and when. New economic incentives of a limited character have also been introduced. Qualitative statements about increasing output seem for the present to have replaced quantitative production goals.

In other developing regions there has been a continued extension of planning for agricultural development, often closely integrated into plans for overall economic growth. In the Far East most countries have been formulating, reviewing and implementing national economic development plans with varying degrees of success over many years. In Latin America, the Near East, and particularly Africa, however, a number of countries have recently prepared or launched their first development plans. Many of the new plans in these regions are comprehensive in scope, though the majority still cover only the public expenditure sector. Often they are more concerned to provide a framework for the effective utilization of foreign aid than to mobilize fully the modest domestic resources of the country. These new beginnings in economic planning in the less developed countries hold great hopes for future development.

In Latin America the Alliance for Progress has begun to gain momentum. Under this important co-operative ten-year agreement the United States will provide aid resources of a scope and magnitude designed to enable the Latin-American countries to achieve a breakthrough to self-sustaining growth. On their part the Latin-American countries have undertaken to prepare plans for their own development including the use of their own resources and the institution of necessary social reforms. Agriculture has been selected, along with housing and education, as a specially suitable sector for improvement under the Alliance, and Latin-American governments have agreed to initiate reforms in the system of land tenure. In the past year at least six countries of the region approved or were preparing legislation to reform the agrarian structure, and so ease or remove a long-standing handicap to agricultural advance.

In the Near East, as in Latin America, the past year saw the establishment of more comprehensive forms of planning in a number of countries for the first time. Both new and old plans gave considerable attention to the development of the scant water resources characteristic of the region, and their utilization for the intensification of land use. Important new legislation on land tenure has been introduced in a number of countries.

In Africa, too, the comprehensive approach to development planning was gaining attention, although most plans are still concerned only with the public sector. The development of industry is featured in the plans of some countries such as Ghana, Mali and Nigeria, but considerable attention continues to be devoted to improvement of the economic infrastructure and to agriculture, especially export crops. Much interest has been focused on the rationalization of land holding preparatory to the greater participation of Africans in modern agriculture. In Ghana and Mali the trend is toward co-operative and state farming while, in east Africa and Southern Rhodesia, governments are moving to settle qualified African farmers on economic holdings purchased from former European farmers or established in unoccupied areas.

In many of the new plans the proposed rates of growth, both for the over-all economy and for agricultural production, have been pitched very much higher than the rates achieved in the recent past. Such targets reflect the aspirations of the peoples concerned. They call, however, for close attention to the measures that must be taken to ensure the desired break with past slowness or stagnation. In particular, plans must provide for decisive changes at village level – in markets, resources, knowledge, techniques, or communications. Otherwise it will be hard to convince the farmers that a new era has been born, or to encourage the changes in traditional farming decisions which alone will result in fulfillment of the agricultural and economic goals.

North America

United States grains programs

In the United States, policy developments are still dominated by the vast unsold surplus of grain,

despite some reduction in stocks in 1961/62. The objective, as stated by the President, is to reduce farm output below needs for several years, and then allow it to increase to balance demand. This goal is considered the key to success in implementing other United States policies for increasing farm incomes and reducing the burden of surpluses, while conserving agricultural resources.

The objective of reducing grain output is being pursued with resolution. The Emergency Feed Grain Program, approved in March 1961, was successful in reducing production; the 1961 crop of maize was down by 7 percent and of sorghum by 22 percent, while crop acreages were reduced by as much as 18 percent and 29 percent, respectively. For the crops to be harvested in 1962, acreage restrictions for maize and sorghum were maintained and extended to barley. To participate in the barley program producers were required to reduce their acreage by at least 20 percent below 1959/60, and to refrain from increasing acreages under maize and sorghum above the level of that year. The conservation aspects of the 1961 program for maize and sorghum were also continued in 1962 and extended to barley; they provide for payments to producers who divert land from these crops to an approved conservation use.

The latest available information indicates that altogether some 19 percent of the barley acreage at the 1959/60 base period, 27 percent of the maize and 32 percent of the sorghum, may be diverted in 1962. As in the 1961 program, in order to discourage a more intensive cultivation of the reduced crop area, only an output equivalent to normal yields of these grains will be eligible for price support. Producer prices for maize, barley, and sorghum were unchanged from 1961.

Under the 1962 Wheat Program the national minimum wheat acreage was reduced below the previous minimum of 55 million acres for the first time since the 1930s. The reduction of 10 percent was applied on an individual farm basis. For wheat, too, inducements were provided for voluntary diversions of up to a further 30 percent of the farm wheat allotment to soil conserving uses. Price supports at the same level as in 1961 were made conditional upon diversion. In April 1962 it appeared that the area under wheat would be about 27 percent lower than in 1961 as a result of participation in the Wheat Program. The official June forecast of the 1962 crop anticipated a reduction of about 14 percent.

The above measures for 1961 and 1962 were officially described as emergency programs and a more comprehensive bill was submitted to Congress early in 1962. Among other things it provided for greater powers to divert cropland to other uses, together with acreage allotments and marketing quotas for all grains. The bill was passed with some amendments by the Senate, but narrowly defeated in the House of Representatives. At the time of writing, a "compromise bill" was under consideration, essentially an extension for a further year of the grains programs for 1962.

United States Sugar Act

The Sugar Act which expired at the end of June 1962 was extended to the end of 1966 for domestic growers and for the Philippines, and to the end of 1964 for other foreign suppliers, except Cuba. The new bill allocates about 60 percent of the estimated United States' annual requirement of 9.7 million short tons to domestic growers, which implies an increase of about 625,000 short tons. About 11 percent is allocated to the Philippines and about 13 percent to other foreign countries, except Cuba. A quota of 1,634,000 short tons (almost one half of the 1957-59 average quota) is being reserved for Cuba when diplomatic relations are re-established. In the meantime, this quantity will be purchased at world market prices, giving preference to countries in the Western Hemisphere and to countries purchasing United States agricultural commodities. From this quantity the President has allocated, under the authority given to him in another bill, an additional 130,000 short tons a year to the Dominican Republic, and a new annual quota of 20,000 short tons to Argentina. Except for the Philippines, there will be a gradual reduction in the premium paid over the world price. An import fee of 10 percent of the difference between the world price and the United States price will be levied in 1962, rising to 20 and 30 percent respectively in 1963 and 1964. For the future, 65 percent of any increase in United States requirements will be reserved for domestic producers, instead of 55 percent as at present.

Canadian agricultural support policies

In Canada the Government is proposing to continue acreage payments to western farmers in 1961/62

to offset the effect of the exceptionally small crop. At Can $1.00 per acre up to maximum of 200 acres, payments would be on the same basis as in 1959 and 1960. The powers of the Canadian Wheat Board were extended in March of 1962 for another five years, and will cover the marketings of rapeseed as well as wheat, oats, barley, rye, and flaxseed.

The method of support for the basic commodities underwent no major change in Canada in 1961. Support prices under the Agricultural Stabilization Act were raised slightly for eggs, lambs and grade A hogs for 1961/62. The Agricultural Stabilization Board has been authorized to purchase creamery butter at 64 cents per pound and to resell it at 52 cents per pound. To do this, the board has arranged with the trade to buy all the creamery butter manufactured and to resell it immediately at the lower price. Hence the lower price will be passed on to consumers in an attempt to stimulate consumption, which has been declining. Farmers who produce milk expressly for the butter market will receive an equivalent subsidy, but other dairy farmers will be discouraged from expanding any surplus milk production.

A significant change will take place in the method of support for sugar beets, following a review of sugar policy in the light of the depressed world sugar prices. The support program for 1962 will take the form of a deficiency payment to Canadian beet growers, at the rate of 1.22 cents per pound for each cent that the average declared value of imported raw sugar falls below 4.5 cents per pound.

Western Europe

In January 1962 the Ministerial Council of the European Economic Community approved the first commodity regulations for the common agricultural policy of the six countries.[11] The aims of this policy, as outlined in Article 39 of the Treaty of Rome are: to increase agricultural productivity by encouraging technical progress and by ensuring the rational development of agricultural production and the optimum utilization of the factors of production, particularly labor; to ensure thereby a fair standard of living for the agricultural population, particularly by increasing individual earnings of persons engaged in agriculture; to stabilize markets; to guarantee regular supplies; and to ensure reasonable prices for consumers. The main elements of the common agricultural policy are: a common marketing policy; a common commercial policy toward nonmember countries; a policy for co-ordinating national programs for the structural improvement of agriculture; a social policy for minimizing any adverse effects on farmers arising from the adoption of the common agricultural policy itself, and a common policy for financing its implementation.

At its meeting in December/January (1961/62) the Council took important initial decisions in relation to all these elements of the common agricultural policy. Guiding principles were laid down for the development of a common market for cereals, pork, poultry, eggs, wine, fruit, and vegetables, in the form of regulations which were to come into force on 30 July 1962. Decisions for dairy products, beef, veal, and rice were to be taken before 31 July 1962 and to come into effect on 1 November 1962 (1 October for rice). For sugar, decisions were to be made by 1 November 1962, to come into force on 1 January 1963. Plans for fats and oils, raw tobacco, fish, alcohol, and potatoes were still to be presented at the time of writing. When these are covered, the common policy will apply to more than 80 percent of the total agricultural production of the six countries.

Basically the EEC Council's decisions aim at creating progressively over a period of seven and a half years (that is, by the end of 1969) a unified market for agricultural products, with the characteristics of a protected domestic market, with prices above those prevailing outside. There are variations in the methods adopted for different commodities, but essentially two processes are involved: the protection of the Community agricultural market, and the gradual development of free trade and a uniform price system for domestic agricultural products within the Community as a whole.

Although in the cases of grains and butter action will be taken to support domestic prices, and for wines import quotas will be in effect, the common agricultural policy will depend primarily on a flexible, Community-directed pricing system. This system is intended to encourage increases in production of those commodities for which the region is a net importer, though care is to be taken to discourage the generation of surpluses. The free movement of commodities between member countries is intended to promote " specialization conforming to the eco-

[11] Belgium, France, Federal Republic of Germany, Italy, Luxembourg, Netherlands.

nomic structure and natural conditions within the Community."

Import levies

The Community holds that its farmers need some protection against outside competition, owing to the prevailing structural weaknesses of agriculture in the Community and the subsidization of many commodities in world trade. Hence the decision to maintain the agricultural price level of the Community above that in the world market. Up to June 1962, each of the six countries protected its farmers against imports from the others, as well as from third countries, by a battery of import duties, taxes, quotas, subsidies, and similar measures. With the coming into force of the Council's new regulations in July 1962, these measures are being replaced by a system of import levies.

The system of variable import levies is intended to result in a level of protection which falls within the range of the present national measures. For grains and milk, "target" prices will be established each year,[12] at levels designed to provide producers with equitable prices without conflicting with the movement towards "the economically rational specialization of production within the Community." Levies will then be adjusted so as to ensure that imports sell at these target prices. For pigmeat, poultry, and eggs, levies are designed to compensate for feed price differentials inside and outside the Community, supplemented by a margin to offset differences in other conditions of production. For dairy products levies will be set with a view toward maintaining prices of imports at, or slightly above, domestic price levels of the previous few years. For beef and veal, fixed import duties will be the principal means of protection.

During the transition period levies may also be imposed on trade between member countries, although these are to be gradually reduced until they are completely eliminated in 1970. In all cases they are to be lower than those applied to third countries in line with the principle of Community preference. For fruit, vegetables, and wine there will be no levies, reliance being placed on a common external tariff and quality control provisions which will progressively allow standardized and graded goods to circulate freely within the Community.

Special safeguards

If imports cause "great disturbances or threat of such disturbance in their market," member countries may resort to special safeguards, including the suspension of imports. The application of a safeguard clause by any of the Six is subject to ratification or rejection by the Commission. If rejected, appeal may be made to the Council, but such an appeal does not suspend the Commission's decision except in the case of cereals (for 10 days). Thus the decision of the majority (through the Council) may overrule any objection on the part of an individual country. These safeguard clauses may also be applied to intra-Community trade during the transition period, always with due regard to the maintenance of Community preference. Import licenses will be liable to suspension, if necessary, after the transition period also.

For beef, veal, eggs, poultry, and pigmeat, still further protection from imports is provided by a "lock-gate" price system, and for fruit and vegetables during the transition period by a system of minimum prices. For each product a single lock-gate price has come into effect for the Community as a whole which, like a minimum price, prevents the admission of imports from third countries when their price falls below a certain level; either the price must be raised or the importing state increases the levy correspondingly. Except for pigmeat, where the system is applicable to member country trade during the transition period, the lock-gate prices may be applied only to imports from third countries. For frozen beef, which constitutes the bulk of the supplies coming from Latin America, no lock-gate prices will be in effect. Instead, import certificates will be required, and their issuance may be suspended "whenever home prices are subject to too much pressure."

Agricultural exports

Since exports of agricultural products are important in the trade balance of some of the Six, a logical measure consequent on Community protection is the provision for payment of a refund on exports. For grains the refund will be based on the difference

[12] During the transition period target prices will be set in each country, but from 1970 there is to be only one for the whole Community.

between internal prices in the Community and export prices; and for poultry, eggs, and pigmeat on the difference between internal and external prices of coarse grains, taking into account average feed conversion ratios for the particular product.

Target prices

The second process which will take place during the transition period, the movement towards a unified system of prices, will not be initiated until the 1963/64 season,[13] although the main guiding principles have now been decided. For grains, the key will be the progressive Community-wide alignment of the target prices. During the transition period these will be set by the individual member governments anywhere within limits specified annually by the EEC Council. Each government will also set "intervention prices" tied to its target prices (5 to 10 percent less); these will be the prices at which national marketing organizations will make purchases in their domestic markets as necessary for support purposes. It has been already mentioned that the variable import levies to be fixed by individual governments during the transition period will be based on the target prices. Each year the limits prescribed by the Council within which target prices may be set will be narrowed until, in 1970, a single Community-wide target price, and hence Community-wide levies and support prices, will be in effect. For beef and dairy products roughly similar processes will take place, while for poultry, eggs, and pigmeat, price differentials will disappear as grains prices come together since the import levies on these livestock products are based largely on feed cost differentials.

The limits of the target prices for wheat, rye, and barley were defined for the 1962/63 marketing season as falling between the guaranteed price at the beginning of 1961/62 in the Federal Republic of Germany (upper) and that in France (lower). The controversial issue of the first alignment of the national target prices was thus postponed. The EEC Council was to agree before 1 September 1962 on the general criteria for price harmonization, and apply them to the determination of target prices. This will take place by 1 April 1963 for the 1963/64 season, by 1 September 1963 for the 1964/65 season, and subsequently by 1 July each year.

Neither the speed at which the target prices will be brought together, nor their eventual Community level, has yet been decided. It is these decisions which will determine the degree of protection and the nature of the shifts in production and trade patterns which will take place over the long run. Production of any commodity in any member country, and consequently its imports from third countries, will be encouraged or discouraged to the extent that the Community-wide target prices differ from the present level of producer prices.

The present pattern of national prices is a varied one, and exactly how far prices within the Community will exceed the world level remains to be seen. The establishment of a high level would be easiest politically since it would involve less of a downward adjustment in some member countries. But the level of prices will have to be set not only with a view to preventing hardship among agricultural producers, but also to obtaining increases in productivity and a more efficient pattern of agricultural output in the Community as a whole. Comparatively high prices might not only tend to conflict with these latter aims and, under the method of support adopted by the Community, result in high consumer prices, but might lead to the development of substantial surpluses which would somehow have to be paid for and disposed of. A high price level, moreover, might provoke measures of retaliation against the Six by affected third countries.

The target price range already set for wheat, rye, and barley for the 1962/63 season suggests that in the end prices will probably be set somewhere between the present French and German ones. This would mean that, in the long run, producer prices, for example for wheat, would rise in France, and probably in the Netherlands and Belgium as well, and fall in the Federal Republic of Germany and in Italy, thus stimulating production in the former countries and discouraging it in the latter. However, the response of supply to price increases is likely to be more elastic than the response to price falls, at least in the medium term. Thus, the final effect may well be a stimulation of Community grain output, with some contraction of imports (although substantial amounts of high quality wheat will continue to enter the Community) as well as an increase in supplies for export. Production of animal products is also expected to increase, particularly in the Federal Republic of Germany where

[13] It is not clear from the information on the regulations proposed for beef and dairy products (these have not yet been approved) whether a similar postponement will also be effective for these products.

the common policy will result in some lowering of feed prices.

On the whole, the agricultural price policies which have been worked out are very flexible. Although a "unified price system" will result, this does not mean that prices throughout the Community will be uniform; within certain limits they will be influenced by such factors as supply, demand, and transport costs. Prices will be supported when intervention prices are in operation. On the other hand, the import levies will tend to put a ceiling on prices, since above a certain price level unlimited supplies may enter from the outside.

Thus for grains prices will fluctuate around the target level: import levies will ensure that imports are sold at the target price, and purchases of internal production will take place when prices fall below a given level (the intervention price). A roughly similar system will be in effect for dairy products, although in this case the draft regulation (the full text of which is not yet available) specifies the purchases of butter in quantities "needed to compensate for the seasonal deficit." For the other commodities no price supports are envisaged, although the beef and veal regulation (not approved at the time of writing) specifies their consideration at the end of a three-year period. Stabilization of market prices in the meantime is to be attempted only by the regulation of imports.

Impact on other countries

In all sectors, an expansion of intra-Community production and trade raises questions for many of the present nonmember suppliers of agricultural commodities. Denmark, which has, however, already applied for membership, could be faced with a contracting market for dairy products, pigmeat, poultry meat and eggs as well as competition on outside markets from subsidized exports of growing Community production. The same could apply in many other instances: recent measures to restrict egg production in Israel, for example, reflect some apprehension about export outlets. Even for rice, where it is proposed to maintain Community production at current levels, increased imports into other member countries from Italy could replace some supplies now coming from elsewhere. The EEC countries have made clear their readiness to open negotiations on grain imports from third countries at a future date, and to consult with them on any damage to their trade caused by the application of the common grain policy.

It is, in fact, not yet clear how much difficulty will be experienced by nonmember countries. According to the EEC, the external levies are to create a level of protection no higher than the average of those currently in force, a principle which has been embodied in almost all the regulations so far approved. But although the average may be no higher, difficulties may still arise for many specific nonmember suppliers. During the transition period the effective level of protection will probably be determined largely by the extent to which the safeguard clauses are utilized and if restraint is exercised, the flow of trade between the Community and the rest of the world may not be greatly disturbed. The extent to which the Community protects its agriculture will also be influenced by outside forces pressing for a liberal attitude towards the imports from nonmember countries. Aside from opinions in favor of such an attitude expressed in GATT and other international consultations, the safeguarding of the export outlets of outside countries was one of the main stated objectives of the United States in its tariff negotiations with the Community in 1961/62, and it is also one of the aims of the proposed United States Trade Expansion Act of 1962. In general, however, the present trend of thinking appears to be toward more organization, rather than greater liberalization of world trade, and the Six have already proposed the negotiation of world-wide commodity agreements.

Tropical products

It is not yet fully clear what the impact will be on the producers of tropical products. Of these products, only sugar and vegetable oils will be covered by the regulations of the common agricultural policy. The others, being neither produced within the Community nor competitive with its production, are not included. In most cases, however, imports of tropical products from the former overseas territories of the member countries are being given preferential treatment. At the outset, the intention was to ensure to them benefits at least equivalent to those enjoyed previously. Much emphasis has since been put, however, on the need to protect other producers. The position of Commonwealth producers has been an important aspect of the United Kingdom negotiations for membership, while the United States has exercised some pressure on behalf

of Latin-American producers. Increasing weight is now being given to aid through the Development Fund rather than tariff preferences. The Draft Agreement on Associated African Countries, under discussion between the Ministerial Committee and the African associates, proposed substantially lower external tariffs for coffee, cocoa, tea, spices, etc., with duty-free entry for imports of these and some other tropical products from the associated territories.

Method of financing agricultural measures

The refunds on exports, or payments of export subsidies, to be made on all commodities except fruit, vegetables, and wines, will also have an impact on trade. The refunds will roughly compensate for differences between Community and world market prices and so make any surplus production of the Six competitive on the world markets. Arrangements for financing this policy were approved by the EEC Council in January 1962. It is intended that export subsidies will be paid from a common fund which by 1970 will be fed by the proceeds from import levies and from contributions from general budgets. This seems to imply that the principal benefits will go to the largest surplus producers, and the greatest burden will be borne by the major importing countries. It should make the Community as a whole reluctant to set intervention prices at a level which might in the end result in the accumulation of sizable surpluses.

Financing was a major question taken up by the Council. It was decided in early 1962 that the financial obligations arising from the common agricultural policy would eventually be assumed by the Community as a whole. This would include all outlays for market stabilization measures, export subsidies and for the structural reform of agriculture, insofar as the latter were agreed to arise from implementing the common policy. During the transition period financial responsibility for these measures will be gradually shifted to the Community. For this purpose the European Agricultural Guidance and Guarantee Fund (Fonds européen d'orientation et de garantie agricoles) was established. The Fund's contribution to the above expenditures was programed to rise progressively each year from one sixth of the total in 1962/63 to 100 percent in 1970. It was decided also that the Fund itself would be financed from national budgets in 1962/63, the proceeds from import levies being retained by member countries in the first year. In 1963/64 the levies are to make up 10 percent of the total Fund, 20 percent in 1964/65 and so on progressively until by 1970 all levies are to be paid into the Fund. During the transition period maximum limits have been set on the contributions of all member countries except France, the chief beneficiary: 10.5 percent for Belgium-Luxembourg, 13 percent for the Netherlands, 28 percent for Italy, and 31 percent for the Federal Republic of Germany.

On the administrative side, managing boards (*comités de gestion*) will be created for each commodity group, consisting of representatives of member countries.[14] The powers of the boards will be consultative only – they will advise on proposals submitted by the Commission, which will take the decisions, subject to review by the Council within one month if a board's advice has not been followed. Support operations, including stockpiling, withdrawal of surpluses from the market and their disposal abroad, and other market interventions are to be carried out as heretofore by the various national marketing organizations, adapted as required to bring the common agricultural policy into effect.

Negotiations with other countries

It must be borne in mind that the policies and problems of the Community may be considerably modified if the countries at present negotiating with the Community join, or become associated. At the time of writing negotiations were under way with Denmark, Ireland and the United Kingdom for full membership, and with Turkey for associate membership. Norway has applied for full membership, and negotiations are expected to begin in October. The associate membership of Greece was awaiting formal ratification. In addition, applications for associate membership have been made by Austria, Sweden, Switzerland and Spain, while Portugal has requested negotiations for some form of association.

The admission of the United Kingdom would have a particularly widespread impact, both within the Community and outside, because of the great importance of that country in world agricultural trade, and its links with Commonwealth agricultural exporters in both tropical and temperate zones.

[14] Voting will be weighted according to the scale laid down in Article 148 of the Treaty of Rome, that is, France, Germany and Italy, 4 each; Belgium and the Netherlands, 2 each; Luxembourg, 1.

The outcome of the negotiations with the United Kingdom were far from decided at the time of writing, and no conclusions can yet be drawn on the effect on Commonwealth trade. In very broad terms, however, the offer of some form of association for the tropical exporting countries has been discussed, though no conclusions have been reached. To safeguard the trade of overseas temperate zone exporters, some other types of interim arrangement permissible under the Treaty of Rome have been considered, with the suggestion ultimately of world-wide arrangements for the affected commodities. The first steps for considering such arrangements have already been taken in the form of groups set up within GATT to study the world trade in cereals and meat. Further study groups may be established later.

Structure of agriculture

Although the price and market policies are the core of the Community agricultural policy, the program for promoting structural reform is also important. European agriculture is hampered by many small and often fragmented holdings. Measures to improve this situation have been adopted in most European countries in recent years. Community policy will be directed towards accelerating the trend towards the establishment of more medium-sized farms at the expense of the small ones, both through the co-ordination of national policies and, in part, by making some financial contribution.

The governments of France and Germany gave particular attention in 1961 to increasing the size of individual holdings. In the Federal Republic of Germany, over 40 percent of the DM 2,060 million devoted to agriculture under the green plan will be spent for land consolidation, enlarging small holdings and the dispersion of farmsteads. In France, the fourth modernization plan envisages that some 5 percent of the country's 4,800,000 farmers will leave agriculture during the period 1962-65. The plan provides for a 250 percent increase in expenditure for land consolidation and storage and processing facilities. A law has been passed setting up semipublic buying offices with prior right to purchase land as it comes on the market in order to enable young farmers with few funds to obtain land on lenient terms. Other provisions are aimed at restricting land ownership by persons or concerns not considered to be in the farming profession and at preventing both excessive growth of holdings and their reduction to a size too small for profitable operation. Other legislation revises existing inheritance laws in order to maintain agricultural holdings undivided. In the Netherlands, a three-year land consolidation program with annual targets of 40,000 hectares has been initiated, while in Belgium measures have been taken to speed up a similar program started earlier, and to prevent the breaking up of areas already consolidated. Elsewhere in Europe, similar steps were being taken. The Austrian green plan, for example, envisages a program similar to the German one.

The growing realization of the need for structural reform if production is to be more competitive has been accompanied by efforts to improve production patterns. In Italy, a shift from wheat to livestock and fruits and vegetables is being encouraged, mainly by providing low cost loans or grants to finance the change. In Belgium, taxes on imported feed grains have been adjusted to encourage a shift from wheat to coarse grains. In Greece, the quantities of wheat covered under price support programs have been lowered to shift emphasis from wheat to animal production. Larger subsidies are being given to increase the forage crop acreage and to provide improved seed and breeding animals.

Greater funds for agricultural research and education were provided in France, the Federal Republic of Germany and the United Kingdom. In Greece, the farmers' insurance system will be in full operation in 1962, providing old age pensions, sickness benefits, and compensation for crop damage from hail and frost. In Sweden, a new type of insurance was introduced to compensate farmers if their crop yields fall more than 15.5 percent below established norms. Two thirds of the premium cost will be borne by farmers and the remainder by the government. In France, the basic rate of social security retirement pensions to farmers over the age of 65 was doubled in order to give them additional incentive to transfer their land to younger people.

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

The main developments in agricultural policy in 1961/62 include the preparation of a long-range perspective plan for U.S.S.R. agriculture, and some major changes in its administration and cropping pattern. There has been a continued strengthening of the socialized sector of agriculture in most eastern

European countries and a sharp increase in agricultural prices in both eastern Europe and the U.S.S.R.

U.S.S.R. perspective plan

The U.S.S.R. seven-year plan (1959-65) has been projected in broad outline to 1970 and 1980, in line with the objectives laid down at the twenty-second Congress of the Communist Party in October 1961. The purpose was to assess development needs, taking into account the probable increase of population to about 280 millions by 1980. In the aggregate, agricultural and industrial production in 1970 were both scheduled to reach 2.5 times their 1960 levels. From 1970 to 1980 agricultural production is projected to increase by a further 40 percent, and industrial output to grow at the same rate as from 1960 to 1970.

The increased production in agriculture is to be achieved with a stable agricultural labor force up to 1970,[15] after which the absolute size of the agricultural labor force would decline. Thus the achievement of the plan targets assumes a rapid rise in agricultural productivity, to release workers for the growth of industry.

The projected expansion of agriculture follows the pattern established in other countries where incomes have increased. By 1970 per caput consumption of fruit is expected to increase 5 times; meat 2.5 times; milk, vegetable oils, eggs and vegetables twice, and butter and sugar by 50 percent. On the other hand the consumption per head of grains and potatoes is expected to fall. From 1970 to 1980 the projected increases in per caput food production range mostly from 5 to 15 percent, but egg and fruit production (and presumably consumption) are expected to rise further by more than 50 percent.

The great increases in production and productivity envisaged are to be brought about partly by intensifiying cropping at the expense of grass and fallow, and partly by plowing up more virgin lands, but mainly by a very large increase in yields based mainly on a vast increase in the use of artificial fertilizers, the extension of irrigation and mechanization, and the more rational organization of labor.

Yields of grains in the Russian Soviet Federated Socialist Republic, for example, are projected as rising from 10.2 quintals per hectare in 1956-60 to 20.8 in 1980, and yields of wheat in Kazakhstan from 8.4 to 20.0 quintals per hectare during the same period. The production of chemical fertilizers is scheduled to increase tenfold by 1980.

Cropping patterns in the U.S.S.R.

The desire to fulfil the seven-year plan and the twenty-year program, and to find an immediate solution to the slow growth of agricultural production in the last three years, resulted in the official condemnation at the Party Conference on Agriculture in March 1962 of the farming system in general use during the last 30 years. The land was planted to grass for several years in the crop rotation, to improve the structure and organic matter content of the soil, thus helping to offset the lack of fertilizers which were seldom applied to grains. Thus heavy capital allocations for the fertilizer industry could be postponed. The system was supported under Stalin, and declared "inseparable from Socialist agriculture." The area sown to annual or perennial grasses rose from 3.3 million hectares in 1913 to 36 million in 1961, that is, from 3 percent to 18 percent of the total crop area. The development of the fodder resources of the U.S.S.R. from 1940 to 1961 is set out in Table II-25.

The new directives propose a reduction of the area under grasses and bare fallow, their replacement in the rotation by maize, pulses and fodder beet, and the greatly increased use of chemical fertilizers. Approximately the present 11 million hectares of alfalfa and clover will be retained, but the area under oats is to be reduced. As a first step in 1962, 22 million hectares are to be diverted from grasses or fallow, of which 18 million hectares is for grains and the balance for other crops. If this policy is successful, the 1962 grain harvest should greatly exceed the 1961 level, bringing the 1965 target of 180 million tons within reach. However, such an extension of the grain acreage by nearly 15 percent in one year may create bottlenecks in the supply of farm machinery and manpower.

Agricultural organization

Important institutional changes were also decided on at the March conference. New agricultural

[15] Between 1953 and 1961 the natural growth in rural population was already being absorbed in towns, and the increase in the urban population (28 millions) was practically the same as the increase in total population (29 millions).

TABLE II-25. - PRINCIPAL FORAGE RESOURCES OF THE U.S.S.R.

	1940	1953	1954	1955	1956	1957	1958	1959	1960	1961
	Million metric tons									
Barley and oats	28.8	17.9	18.6	22.2	26.1	21.2	26.4	23.6	28.0	22.1
Maize (dried grain)	5.1	3.7	3.7	11.6	9.9	4.6	10.2	5.7	9.8	16.9
Maize at milky wax stage [1]	—	—	—	3.1	2.6	2.4	6.5	6.4	8.9	7.2
Green maize for silage	5.2	16.4	20.3	43.4	56.5	63.9	145.9	152.6	206.3	186.1
Other silage crops				4.6	7.0	15.0	16.4	17.8	...	...
Forage roots	12.4	10.2	9.7	11.8	11.9	11.3	14.7	10.5	...	...
Hay:										
Perennial grass	10.2	16.2	16.0	17.0	16.1	18.8	21.5	23.9	...	...
Yearly grass	4.2	8.2	7.0	10.7	14.4	16.1	25.9	25.1	...	...
Natural meadows	53.5	43.5	42.5	37.0	37.1	34.3	37.9	31.4	...	...

[1] Converted to dried grain equivalent.

boards are being established to control and guide the activities of the collective farms (*kolkhozes*) and state farms (*sovkhozes*). This decision reverses the measures taken in recent years to give greater autonomy of kolkhozes. Each territorial board will deal with a group of collective or state farms, averaging, for example, about 60 in the R.S.F.S.R. Each board will be assisted by a committee of farm directors, technical experts, and representatives of the Government and the Communist party. The boards are to be served by " inspector-organizers, " one for each group of five to seven collective and state farms. The functions of the boards are very wide, including the formulation of plans integrated with the state plan, the determination and supervision of farm cropping patterns; the control of equipment and livestock, the supervision of the state collection of produce, and direction of the associated agricultural and veterinary laboratories, artificial insemination stations and incubation centers.

Above the territorial boards, provincial boards and committees are being set up, the latter presided over by the Provincial First Secretary of the Party. Each of the federal republics has, therefore, its agricultural committees and its ministries of agricultural production and procurement. On top of this pyramid is the All-Union Agriculture Committee, presided over by a vice-chairman of the Council of Ministers, and including representatives of all the administrations concerned with agriculture. The committee is to examine the plans for production and the state purchase of agricultural products and the building up of state stocks. It is to decide the needs of agriculture for machinery, fertilizers and pesticides, and hence ultimately for manpower and investment. The Agriculture Committee can submit proposals to the Central Committee of the Party and to the Council of Ministers.

Agricultural socialization in eastern Europe

In eastern European countries the most striking development in 1961/62 was the further strengthening of the socialized sector. The formation of collective and state farms was virtually completed in Hungary in 1961 and in Romania in 1962. The reorganization had been completed earlier in Bulgaria and Czechoslovakia. In Eastern Germany, however, where 90 percent of the cultivated land is in principle socialized, most of the co-operative farms are of the type where only labor is collectivized, in many cases nominally. The authorities complain that peasants give too much time to private plots and livestock; and collective livestock rearing is now being encouraged.

The amalgamation of co-operative farms into larger units has gathered momentum. In Hungary, for instance, the average size rose in 1961 to 1,080 hectares, as against 450 hectares a year earlier. There were also mass mergers of farms in Czechoslovakia, the average size rising to 796 hectares in 1961, compared with 450 hectares in 1960 and 321 hectares in 1958.

In Poland, where only 13 percent of the cultivated land is in collective or state farms, there was a decline in the number of state farms, due partly to amalgamation and partly to sales of land to farmers. During the three and a half years since the Agricultural Bank began the sale of state land, a total of 120,000 hectares have been purchased by 46,000 farmers, of whom 11,000 have started independent

farms. The government is planning to check the recent trend towards the fragmentation of farms into uneconomic units. The specific Polish type of agricultural co-operation known as "agricultural circles" gained strength in 1961, and made a considerable amount of farm machinery available to private farmers on a rental basis. Cash incomes of individual farmers in Poland were estimated to increase by 11 percent in 1961, compared with an increase of only 3 percent in industrial wages. However, this gain has been offset by an increase of about 16 percent in the annual land tax as from the beginning of 1962.

Price policies in eastern Europe and the U.S.S.R.

Much greater incentives, however, are now being given to producers to expand their output in both eastern Europe and the U.S.S.R. In Bulgaria, for example, state purchase prices for meat, eggs, and tomatoes were raised 17 to 20 percent in 1961; for poultry, rice, and onions, 40 to 45 percent; for pepper, 57 percent; and for tobacco, 40 to 100 percent. State purchase was confined to staple products, leaving more than 80 products open for voluntary sales in official or free markets. To assist agriculture in mountainous regions, produce from hill farms was given a price premium of 20 to 30 percent, and important production requisites were sold them at a discount of 30 to 50 percent. In Hungary, also, purchase prices were raised in October 1961 for milk (by 17 percent), lard, and sunflower seed.

In spite of the attention given to livestock production since 1953, shortages of livestock products, especially meat, remain the most pressing agricultural problem of the U.S.S.R. To give greater incentives to producers the prices paid by the state to the *kolkhozes* for both cattle and pigs was raised by about 12 times from 1952 to 1959. This compares with increases of rather more than twice for crops as a whole, and an average of nearly six times for all livestock products. Even so, according to a recent official statement, prices paid to *kolkhozes* were below their production costs.

From 1 June 1962, therefore, prices paid for all types of livestock were raised by a further 35 percent and for butter by 10 percent. In general, the increased prices will be passed on to consumers. Retail prices of beef are to go up by about 30 percent, of pigmeat by nearly 20 percent and of butter by 25 percent. Nevertheless an element of subsidy still enters into retail prices, which are below the cost to the state of procurement and distribution. To offset the effect of these increases on the cost of living, retail prices of sugar have been reduced by 5 percent and prices of staple fibers by 20 percent. It appears that the increase in prices of meat and butter was also designed to limit the demand as, according to official statements, an alternative policy to leave retail prices of meat and butter unchanged and to recoup losses by an increase in prices of drink and tobacco was rejected because present scarcities of meat and butter compel consumers to pay higher prices to speculators.

Australia and New Zealand

Australia

Although Australia had a good trading year in 1961/62, with exports at a record level, attention continued to be focused on the long-term export prospects for the rural industries. The year's good results were mainly due to large sales of grain to Mainland China and the temporary allocation of a sugar quota in the high priced United States market. Uncertainties concerning the European Common Market, and especially the possibility of the United Kingdom's entry, clouded future prospects for Australian grains and meat in their traditional market. These uncertainties encouraged Australia's active search for opportunities to sell its agricultural products outside the United Kingdom.

Two committees of inquiry set up by the Federal Government to report on various aspects of primary industries presented their reports in 1961. The committee on the sugar and manufactured fruit industries recommended some changes in the formula for determining the domestic sugar price, but after considering the report the Government extended on much the same basis as in the past the Australian Commonwealth-Queensland Sugar Agreement governing the domestic marketing of sugar.

The Wool Marketing Committee of Enquiry found no occasion to recommend any major change in the free auction system, such as a reserve price scheme, although some possible improvements were indicated. The committee proposed the creation of an Australian Wool Commission to integrate wool research, promotion and market studies. Wool growers agreed to an increase in the wool promotion levy from 5 shillings to 10 shillings per bale.

The current wheat stabilization scheme is due to expire in September 1963. In recent years the wheat stabilization fund has been almost exhausted in view of the continuous increase in the officially calculated national average cost of production and the resulting annual increases in guaranteed producer prices. For the first time since the fund was established in 1948, wheat exports had to be subsidized in 1959/60 and the two subsequent years. The wheat growers have suggested a new stabilization plan to the Federal Government, against the expiry of the present scheme. It is rather similar to the current plan.

The Federal Government announced that it would propose a further five-year stabilization plan for the dairy industry when the current scheme expired on 30 June 1962. It is likely that the new scheme will be fairly similar to the old one, involving the continuance of a subsidy, with possible increases if necessary to compensate for any consequences of the United Kingdom's entry into the European Common Market.

Government assistance to import-saving rural industries, including cotton and tobacco growing, has been continued or strengthened. Rice production is increasing, with the greater availability of irrigation water from the Snowy Mountains Scheme. Federal funds are being used for the construction of so-called "beef roads," which will permit a better exploitation of the distant cattle-grazing lands.

New Zealand

The serious consequences for New Zealand which seem likely if Britain joins the EEC have been in the forefront of discussions on agricultural and general economic development. The greatest concern is for dairy exports. Although wool would not be adversely affected, there is anxiety for the future of the jointly-produced mutton and lamb meat which is exported predominantly to the United Kingdom.

The only policies which have appeared feasible to New Zealand have been to press strongly for special treatment in the United Kingdom import market and, at the same time, to promote export sales to other markets. To boost exports in general, an Export Promotion Council has been set up with co-ordinating and advisory functions. A campaign to expand the sale of meat and dairy produce is taking place in 1962, both in the United Kingdom and elsewhere, especially in the Far East. A new trade agreement with Japan, signed in March 1962, provides for full GATT relations between the two countries.

In 1961 a plan was announced to establish milk companies in the less developed countries for the production of "reconstituted" milk using imported New Zealand milk powder. Such plants are now operating in Singapore and Mauritius; another was scheduled to start operating in Hong Kong in July 1962 and other milk plants are planned for the Federation of Malaya and the Philippines. As in Australia, the levy on wool to finance expanded operations of the International Wool Secretariat has been increased.

The new Dairy Products Price Authority made no change in the basic price for butter for 1962/63, but the basic price for cheese was reduced slightly. The criteria for determining these prices was altered in 1961 – the Authority is no longer required to take into consideration production and marketing costs or price levels ruling for other farm products but must take account of market prospects, current realizations, and the state of the dairy industry's finances. The prices may not be varied more than 5 percent above or below those fixed for the preceding season.

LATIN AMERICA

The Alliance for Progress, announced in the spring of 1961, started to gain momentum during 1961/62. Under this important ten-year program the United States has agreed to "provide resources of a scope and magnitude" adequate to achieve a breakthrough in self-sustaining growth for the Latin American countries. In order to match and to make full use of external aid, the Latin American countries on their side have agreed to formulate plans for economic development, to mobilize their internal resources, and to make basic social reforms in the land tenure and tax systems. Progress in instituting these reforms will not be easy as they cut deeply into established social and economic patterns. Although all sectors of the Latin American economies will receive assistance, a few, such as housing, education, and land use, have been singled out as especially important.

Nearly $1,030 million in loans and grants were made available in the first year, although much

is still unspent as many projects were just starting to take shape. Deep-rooted problems, such as land and tax reforms, and several legal and organizational difficulties prevented the program from moving as quickly as had been hoped during the initial period. The United States Administration has asked Congress for an authorization of $3,000 million for this program for the next four years.

The largest beneficiaries in the first year were Brazil with $357 million (together with $305 million for the refinancing of old debts), Argentina with $159 million, Chile with $135 million, Mexico with $106 million, Venezuela with $99 million, Colombia with $69 million and Peru with $66 million. Of the total allocated, $132 million were grants and $898 million loans, of which $360 million came from the Export-Import Bank, $401 million from the Association for International Development, and $268 million from other sources, including the Inter-American Development Bank, administering the Social Progress Trust Fund, Food for Peace, the Peace Corps and the Inter-American Highway. However, actual expenditures of these commitments are conditional on the soundness of the proposed projects and on whether the individual country fulfills its obligations under the Charter. The Alliance could already point to progress in some fields. Every country now has a planning board, aid funds are being used to stabilize financial crises, food aid is being provided to relieve natural disasters and shortages, while land reform legislation is being formulated in several countries.

Economic integration

The Montevideo Treaty of February 1960 establishing the Latin American Free Trade Association, was ratified in May 1961 by Argentina, Brazil, Chile, Mexico, Peru, and Uruguay, and thus became effective and operational in June 1961. The seventh original member, Paraguay, ratified the Treaty in the same month. Later in 1961 Colombia and Ecuador joined the Association, and in April 1962 Bolivia announced its decision to adhere. All South American countries except Venezuela would then be within the Association, and in Venezuela official studies are being carried out on the implications of membership. After the first negotiations, agreement was reached on a total of 2,735 items that will enjoy customs rebates; of these over 1,000 were agricultural. Member countries seem in favor of eliminating trade barriers in a shorter period than the 12 years stipulated in the treaty.

The other main trade arrangement in the Latin American region is the Central American Integration Program (CAIS). The General Treaty of Economic Integration of 1960 (signed and ratified by El Salvador, Guatemala, Honduras and Nicaragua) led to the immediate establishment of a free trade system, under which over 90 percent of commodities produced within the participating countries will move without customs tariffs. Progress has continued in negotiating a uniform list of commodities and a common import tariff. A number of studies by a standing trade subcommittee of CAIS are to be placed for approval before the next CAIS meeting, scheduled for mid-1962. In addition to its trade activities, CAIS has established the Central American Bank for Economic Integration, which made its first loan to a member country in December 1961.

Development plans

During 1961/62 many countries announced new development plans. Some of these are over-all plans, while others relate to particular regions or are designed to ease particular problems. Bolivia approved a ten-year national plan for economic and social development. Ecuador moved ahead with the implementation of oil palm and sheep development programs, and was seeking foreign loans for other projects, including the development of the Amazon region. A four-year development plan (1962-65) was being implemented in Honduras: the government also announced an area development project in the east, to include the construction of roads, schools, clinics, banking facilities for the purchase of agricultural equipment, seeds, and livestock, and the provision of agricultural extension services. The Economic Planning Council of Guatemala put forward projects estimated to cost $82 million for the development of Indian communities and for land resettlement schemes. Nicaragua started a five-year road development program to link potentially productive agricultural areas with urban centers and with a seaport on the Pacific coast, and initiated preliminary studies for an area development plan on the Atlantic side.

Panama announced a $200 million four-year development plan including provisions for increased agricultural credit and extension services. A

Paraguay-United States co-operative enterprise was establishing a pilot project to aid in developing the meat industry. Peru has allotted 112 million soles ($4 million) from its 1960 budget surplus for agricultural development projects, including irrigation and rural schools. A 300 million soles ($11 million) loan from the Development Loan Fund is to be used for developing jungle highlands and for building access roads.

The National Planning Board of Colombia is incorporating the present four-year plan in a new ten-year general development plan. Total investment over the decade 1961-70 is estimated to reach $10,000 million of which just over 12 percent is for agriculture and livestock development. The gross national product is expected to increase by 5.6 percent per annum, and substantial increases in agricultural production and exports are planned.

Agricultural price policies

Concern over declining export earnings from agricultural commodities was a main reason for changes in price policies in Latin-American countries. In Argentina the government increased the price of wheat substantially, while in both Argentina and Uruguay most of the export taxes on animals, meat, and meat products were removed in an effort to stimulate production for export. Export taxes on coffee were slightly reduced in Mexico, and land is to be diverted from coffee to other crops. Colombia also moved to stimulate exports by reducing temporarily the retention on coffee exports from 15 percent to 4 percent at the end of 1961, and by formulating legislation for a permanent reduction in export taxes. Other countries were reviewing their policies for coffee with the aim of bringing production more in line with demand. Brazil announced a program to uproot 2,000 million coffee trees and to replant only 100 to 150 million high-yielding trees.

In a few countries domestic problems of inflation and food shortages led to policy revisions. In Brazil support prices were no longer attractive after devaluation and were raised for wheat, dry beans, peanuts, soybeans, and cotton. In Venezuela, the support price of sesame was increased, and milk production was encouraged by requiring merchants to purchase two units of domestic dry whole milk for each unit imported. (Previously they purchased only one unit of domestic for each five imported.)

Agrarian reform

In many countries the system of land tenure is recognized as a major obstacle to agricultural development and, as already noted, increased progress in agrarian reform has been made recently under the stimulus of the Alliance for Progress, despite inevitable opposition. In the past year the Colombian Congress reaffirmed the principle that land ownership is justified only if the land is used, and has established an institute of land reform to implement the legislation passed in 1961. El Salvador announced the beginning of a pilot scheme of land reform. Mexico intensified its land redistribution program and is to complete the allocation of 700,000 hectares of newly expropriated land on easy terms to small farmers and settlers. Land reform legislation was at the drafting stage or before Congress in Brazil, the Dominican Republic, Ecuador, Nicaragua, and Peru.

In Cuba the state now controls directly 3.8 million hectares, or roughly 40 percent of the total agricultural area. Of the state-controlled land, 2.6 million hectares are people's farms, that is, state farms managed by the government with paid labor; these are given first priority for investment. About 1.2 million hectares, once owned mostly by sugar mills, were turned over to sugar cane co-operatives whose members receive a daily wage and a periodic bonus from profits. A considerable area of land has been distributed as individual farms to some 31,000 peasants; this forms part of the 60 percent of the total farmland which remains in the private sector. Efforts have been made for a greater diversification of agriculture, but although many formerly imported food products are now being domestically produced, the goverment has had to ration meat, milk, poultry, rice, and fats and oils.

Farm credit

Government help in the financing of agricultural credit appears to be gaining momentum in Latin America. Argentina, Brazil, and Honduras eased credit conditions for purchases of farm machinery. The Bank of Paraguay was replaced by the new Development Bank of Paraguay which will be a new source of credit for agriculture. In Chile a further issue of mortgage bonds of four million escudos was authorized to finance agricultural loans. A record amount of 200 million bolivares ($60 mil-

lions) was loaned to farmers in Venezuela by the Agricultural Bank. The Institute for Economic Development, Panama, will provide credit facilities and technical assistance to medium and small farmers to enable them to carry out farming and livestock development programs.

Far East

Economic development plans, including plans for the agricultural sector, have for long played an important role in efforts toward improving levels of living in Asia and the Far East. Almost all countries have formulated at least their first development plan, and some have already implemented more than one plan over the last decade or so. More interest is becoming apparent in the implications for national planning of the plans of other countries. The formation in early 1961 of the Association of Southeast Asian States, comprising the Federation of Malaya, the Philippines and Thailand, was the first concrete step towards closer economic co-operation in the Far East. The Federation of Malaya, Singapore, Brunei, North Borneo, and Sarawak arenow exploring possibilities of a political union, to be known as Greater Malaysia, to further their economic and social progress. The two last named established in January 1962 a Borneo Free Trade area to ease the way for eventual participation in the proposed union.

Agricultural development plans

During 1961/62 Burma, South Korea, Thailand and Bhutan began the implementation of new economic development plans. Generally the agricultural sector will receive somewhat more attention than in previous plans, but in some cases the proportion of investment funds allocated still seems relatively low.

Under Burma's second four-year plan (1961-64), which aims at increasing the annual rate of growth of the economy to 6 percent, agriculture is allotted 12 percent of planned investment in the public sector of 2,629 million kyats ($550 million). The plan calls for diversifying the predominantly rice economy, for achieving self-sufficiency in sugar, oilseeds, cotton and wheat, and for expanding exports of pulses and tobacco. Rice production is to be increased by about 20 percent to provide an exportable surplus of 2.8 million tons by 1965/66, compared with exports of 1.5 to 2 million tons in recent years. A great strengthening of the co-operative movement is proposed, and after an initial educational period a rapid transition to co-operative farming is envisaged. More agricultural credit will be provided at lower rates of interest and multipurpose co-operatives established in association with existing village banks. As an incentive measure the government will raise the price of rice and will attempt to maintain equitable prices for other agricultural products. The Pydawtha scheme will also be strengthened to give local authorities greater freedom of action in implementing development projects.

South Korea's new five-year development plan (1962-66) aims at building an industrial base to compensate for the loss of the industrial north, with major emphasis on electric power, coal, transportation, and such key industries as cement, fertilizer, iron, and steel. Increased agricultural production and improved balance of payments are also important goals. Agriculture, forestry, and fisheries receive about 17 percent of the total planned investment, and efforts are to be made to raise the annual growth of farm production from 2 percent to 6 percent. Crop output is to be increased by 34 percent, and grain production by 30 percent by 1966, while the output of livestock products is to go up by 59 percent. To this end an additional 91,000 hectares will be brought under cultivation, another 99,000 hectares will be irrigated, and encouragement given to double-cropping and other improved practices. To provide incentives, prices will be stabilized by timely purchases by the government through the agricultural co-operatives and through the Rice Lieu Program which is already in operation, while credit facilities will be expanded.

In October 1961 Thailand initiated a six-year development plan (1961-66) to raise the gross national product by 5 percent annually and per caput incomes by 3 percent. These rates are only slightly above what has been achieved before the plan was introduced. About a third of the planned expenditures, equivalent to $662 millions, will be on communications and roads, while agriculture and irrigation receive just under a third. To diversify agriculture, the output of rubber, maize, lac, cassava, livestock, and fish products are to be stepped up. Rice production is expected to increase at the rate of only 1.3 percent annually, which seems to imply a gradual reduction of exportable supplies since population is now growing at about 3 percent. Regional plans

have been prepared within the framework of the six-year plan to develop transportation, irrigation, and electric power in the less developed northeast section of the country, where one third of the population lives, and also in the southern provinces.

South Viet-Nam, Nepal, and the Philippines have new over-all development plans under consideration. So far as the agricultural aspects are concerned, the South Viet-Nam plan calls for a 20 percent increase in rice production and regrouping the population of the flood-stricken delta of the Mekong River into new villages. The Nepal draft three-year plan emphasizes transportation, communications and electric power; goals for agriculture include a 75,000 ton increase in grain production, and a higher output of jute and sugar. The five-year program for the Philippines is wide in scope, but on the side of agriculture lays stress on achieving self-sufficiency in food production, especially foi rice and maize.

A comprehensive ten-year master plan has been prepared in West Pakistan to combat salinity and water logging, which have forced millions of acres out of cultivation and adversely affected production on a larger area. This plan, outside the framework of the second five-year plan, is estimated to involve a total expenditure of Rs. 5,900 million (over $1,200 million) for drainage and tubewells, as well as for the generation of electric power; it will benefit about 20 million acres. The second five-year plan itself is being revised to include Pakistan's contribution to the Indus Basin Development Fund and also to take into account the rising costs of other development measures.

The establishment of two agricultural development corporations in Pakistan, one in the East and one in the West, was reported last year. About one third of the government expenditures in the agricultural sector are now channeled through them. The West Pakistan corporation has been entrusted with the development of the Ghulam Mohammed barrage area. A co-ordination board has been established to assist the two corporations in co-ordinating their activities. The government of the Philippines is establishing a similar development organization, the Mindanao Development Authority, with an appropriation of 30 million pesos (about $8 million) a year for 10 years, to promote the development of the southern islands of Mindanao, Sulu and Palawan. These comprise 40 percent of the Philippines' total land area, but have only 20 percent of the population.

Agricultural price policies

Several countries made substantial changes in price policies during the year, usually to bring production more closely into line with plan objectives, and to give added production incentives to farmers.

India, the Philippines and South Korea took steps to stabilize grain prices. For the first time since 1955, India established a floor price for wheat of Rs. 13 per maund ($7.31 per quintal), to be implemented by purchases by state governments from farmers when necessary. To stabilize the consumer price of rice and to encourage production, the Philippines Government is buying rice from farmers and co-operatives, but not from merchants, for sale in areas where consumer prices are high. The Agricultural Price Support Act of South Korea authorizes the fixing of floor prices for specified agricultural commodities before the sowing season; the government being prepared to buy all produce offered at these prices. So far, floor prices for rice, barley, sweet potatoes, peppermint, linen flax, vegetable oils, castorbeans, and cocoons have been announced. To protect consumers, maximum prices were also specified for rice and barley, for which official farm prices had been considerably increased.

Both Ceylon and Japan are making efforts to reduce the high cost to government of subsidies on rice. Ceylon in effect has withdrawn the subsidy on rationed rice from the higher income groups. In Japan, where all sales of rice by farmers are made only to the government, a proposal has been put forward so that farmers could dispose of their rice to any buyer, though the government support price would still remain in force.

In Japan, where agricultural price policies are highly developed, an Animal Products Price Stabilization Law was enacted in October 1961. The law provides for minimum and maximum prices to be fixed by government for dairy products, meat, and eggs, to control price fluctuations and to encourage production to meet the continuing growth of demand expected over the next decade. A special foundation will administer the policy through buffer stock operations, and will also be the sole importer of livestock products. In March 1962 the Japanese Government adopted a comprehensive policy to stabilize consumer prices which had been rising rapidly. It included stringent financial measures, a flexible system to regulate the imports of commodities which significantly influence the cost of living, and

measures to adjust production to a changing pattern of demand.

A number of new price policies are concerned with sugar. In Taiwan the guaranteed price of sugar to farmers has been raised to stimulate production. On the other hand, the difficulty of exporting excess supplies of fairly high cost sugar has led to the regulation of centrifugal sugar production in India. A mandatory cut of 10 percent has been made in the output of each mill in 1961/62, but cane prices to producers were unchanged. Thailand too has enacted legislation to regulate sugar supplies. Controls are to include the maximum output of each mill, minimum price of sugar cane, maximum price of sugar and dates of the milling season. A sugar industry fund will be set up to assist planters, and to promote exports which, like India's, have to be subsidized.

To adjust production to demand, the Public Warehouse Corporation of Thailand reduced its purchase price for maize by 10 percent and increased the price for jute by one third. Maize exports were placed under government control in order to standardize quality, while minimum export prices were established as a stabilization measure. Actual prices, however, remained well above the minimum in 1961. Steps were also taken to regulate rice exports from Thailand to safeguard domestic supplies and prices.

There were developments in fiber price policies in India during 1961/62. The floor price for cotton was increased by Rs. 30 ($6.30) per quintal in order to encourage production, although also in this case ruling prices remained well above the new support level. On the other hand, fears of depressed prices following the large jute crop harvested in 1961/62 led the Jute Mills Association to set up a buffer stock agency to stabilize the market.

To conclude, there were several instances where incentive prices were given for minor commodities in order to stimulate production. For example, the support price for coffee was raised in the Philippines to encourage production because of the fast growth of imports. In Pakistan, on the other hand, the price of high quality *basmati* rice was raised to stimulate production for export.

Fertilizers

In most countries of the Far East the main increases in production since the war have come from an increase in the crop area. Several countries are now seeking to increase yields by encouraging the consumption of fertilizers. India reduced fertilizer prices in 1961/62 by about 10 percent. In the Philippines, fertilizer is being distributed at about one half of the commercial price under the government's maize and rice program. Ceylon withdrew in 1961/62 the restriction that only co-operative members who cultivated less than five acres could receive subsidized fertilizers. In South Korea maximum prices were fixed for fertilizer imported by commercial interests. The first fertilizer factory in East Pakistan went into operation during the past year.

Farmers' indebtedness

Several countries have recently taken important steps to lighten the load of farmers' indebtedness. South Korea put into effect the Usurious Loan Liquidation Act to reduce high interest debt. Both lender and borrower were to report outstanding loans which carried interest rates higher than 20 percent, and on which the principal was less than 150,000 hwan ($115). Upon certification, the Agricultural Bank assumed the debt from the creditor, who was issued five-year bonds in payment. Debtors are to repay the loan to the bank over a period of seven years at 12 percent interest. To increase institutional loans to farmers the former Agricultural Bank and the agricultural co-operatives were amalgamated to form the National Agricultural Co-operatives Federation. The new organization will use government loaned funds to channel low interest production credits to farmers. The Government of Burma canceled all agricultural loans outstanding on 30 September 1961, except loans advanced by the Agricultural Bank, and also wrote off unpaid land revenue assessments against cultivators.

Co-operative farming

Co-operative methods in farming have received attention in many countries during the last year. As already mentioned, Burma is looking into some type of co-operative farming to rationalize production methods. Co-operative farms are being promoted in Japan, as one approach to the problem of creating economically viable farming units. India has set up a National Co-operative Farming Advisory Board, and a start was made with 3,200 pilot co-operative farms.

Co-operative farming will also be encouraged in Pakistan to increase agricultural production through the regrouping of small holders and encouraging the use of agricultural machinery. A system of incentives, including subsidized services, supplies and machinery, and preferential treatment for co-operatives will be developed to help implement this policy. Another scheme has been announced for the co-operative settlement of landless tenants and small holders in newly irrigated areas of West Pakistan. In the Multan region of Pakistan, 125 existing co-operatives are to receive 250 tractors over the next three years to help their 10,000 farmer members till 140,000 acres.

Mainland China

In view of its acute food shortages, Mainland China continued to give priority to agriculture, while industry was set the task of aiding agriculture with supplies of tools and fertilizers. Within agriculture the order of priorities as set out by the National Peoples Congress in 1962 was grains, cotton and oilseeds. The commune system has been readjusted further as part of the efforts to increase production, and still more authority vested in the production team (village level), which in 1962 was made the accounting unit instead of the brigade (co-operative level) as before. Regional advisory centers have been set up to formulate production plans which take fully into consideration local conditions. The production teams and squads (groups of 10 workers) are to make their own decisions on production rather than to follow detailed directions from the commune headquarters or from the brigade as in recent years.

Unofficial reports indicate that new incentives were introduced during the year. For example, rural trade fairs have been revived in most parts of the country. Originally designed to be held from time to time to provide an outlet for produce raised by the better cultivators, the fairs have become established on a permanent basis and manufactured goods are also being sold. There are indications that in some areas compulsory deliveries to the state have suffered as produce finds its way into the "free" markets at substantially higher prices, as also happened before 1958 when free markets were for a period abolished only to be revived later. It has apparently been found impracticable to concentrate distribution in the hands of the state.

Further support was given to the agricultural sector in an effort to raise production. No workers are to be recruited from the countryside for industrial work for the next three years. On the contrary, the shift of urban workers and officials to rural areas for farm work has been mounting steadily since the first half of 1961 and is to be continued.

NEAR EAST

Comprehensive plans of development, covering both the public and private sector, are increasingly being adopted by countries in the Near East. In addition to the comprehensive plans already being implemented in Syria and the United Arab Republic, such plans have recently gone into operation in Afghanistan and Iraq, while in Iran, Jordan, Sudan, and Turkey they are due to commence in the near future. New plans of more limited scope are also being executed or are in an advanced stage of preparation in several other countries. In a number of countries the planning machinery has been strengthened.

Agrarian reform is again receiving much attention in the region. Earlier measures have been modified in Syria and in the United Arab Republic, and new programs are under way or in preparation in Iran and Turkey.

There have been further developments towards regional economic co-operation. A draft agreement on Arab economic unity was signed at the June 1962 meeting of the Arab League's Economic Council by Jordan, Kuwait, Morocco, Syria, and the United Arab Republic. A fund for Arab economic development has been established by the Government of Kuwait with an initial capital of £50 million ($140 million) to provide loans for public development projects in the Arab countries.

Development plans

The main features of the new development plans are briefly summarized below. In Iraq, the five-year economic plan (1961/62-1965/66), which incorporates the four-year interim program, envisages an investment of Iraqi dinars 556 million ($1,557 million). An increasing proportion of the oil revenues will be used to finance over half the plan. Agriculture and irrigation have been allocated 20 percent of the total development expenditures; the Dibis land reclamation scheme on the Lesser Zab

will be started to provide perennial irrigation for 330,000 hectares.

The second five-year plan of Afghanistan (March 1962 - March 1967) proposes the expenditure, largely by the public sector, of 44,500 million afghanis (about $1,000 million), of which about two thirds represent fixed investment. This is substantially in excess of the realized investment of the first five-year plan. More than one fourth of fixed investment has been allocated to agriculture and irrigation, which in monetary terms is seven times that of the first plan. The general objective of the plan is an increase of 8 percent per annum in national income, while the principal agricultural objectives are to expand food production and agricultural exports, especially of cotton.

In several countries comprehensive plans will soon come into operation. The five-year plan of Iran, starting in September 1962, aims at an increase in gross national product of 6 percent per annum, fuller use of labor, particularly in rural areas, and a more equitable distribution of income. It is planned to raise agricultural production by 4.5 percent and food production by 4 percent annually. Development expenditures over the plan period will amount to 348,000 million rials ($4,594 million), of which rather over one half will be in the public sector. Of the 36,000 million rials assigned to agriculture (19 percent of public sector investment), more than two thirds is in the basic or "core" program. Small irrigation works are included in the core program because of their rapid impact on production, while major irrigation schemes (a carry-over from the previous plan) are placed in the noncore category, and are allocated only 55 percent of the total investment in irrigation, compared with 90 percent under the previous plan. The irrigated area is to be extended by 140,000 hectares, and the water supply improved on an additional 260,000 hectares. Another major change is the increased emphasis on such sectors as credit (including a system of supervised credit), land reform, co-operatives and fertilizer and seed distribution schemes; such projects will receive 64 percent of public sector agricultural development expenditures, compared with 27 percent in the earlier plan. The resources of the Agricultural Bank are to be doubled.

In Sudan the main objectives of the comprehensive seven-year plan of economic and social development (1962/63-1968/69) are to expand and diversify the modern sector of the economy. The emphasis is on major irrigation and land settlement schemes such as the Roseires dam, the Kasm El Girba scheme and the Managil extension, which absorb 63 percent of the planned investment in agriculture. It is hoped to raise gross domestic product by 44 percent and per caput income by 16 percent over the 1960/61 level, and to reduce regional income disparities. Gross fixed investment over the period is expected to reach £380 million, two thirds of which is in the public sector. Agriculture is to receive 36 percent of the total public sector investment. Attention will be given to securing a proper balance between food and forage crops, and also on import substituting crops such as rice, wheat, sugar and coffee. For example, it is planned to meet the domestic demand of 5,000 to 6,000 tons of rice through local production and to bring a large area of rain-fed land under mechanized wheat cultivation.

The comprehensive five-year program of economic development in Jordan (1962/63-1966/67) has the main objectives of an 8 percent annual increase in gross domestic product, a 20 percent increase in employment, and a reduction in the country's dependence on foreign aid. The program envisages an investment of 127 million Jordanian dinars ($356 million), 53 percent in the public sector. Agriculture has been allocated one third of total investment and 43 percent of the public sector program. Water resources development is to receive about 90 percent of public-sector development expenditure in agriculture.

In Turkey a comprehensive five-year plan to begin in February 1963 is in preparation; it is understood that the aim is to raise per caput income by 4 percent per annum, for which the investment requirements have been estimated at $6,000 million.

New plans covering the public sector only include the five-year program of economic development in Cyprus. The program is based largely on the proposals of a United Nations survey mission and has set an investment target of £62 million ($174 million) for 1962-66, of which £20.9 million ($59 million) is for agriculture. This compares with a total realized investment for the five years 1957-61 of £12.4 million, including £4.7 million ($13 million) in agriculture. One half of the proposed development expenditure on agriculture is for the conservation and utilization of underground and rain water. An economic planning commission has been established.

In Saudi Arabia a two-year interim program (1962-63) is being implemented, consisting mainly of

preinvestment surveys of water and mineral resources, and of training and research projects in preparation for long-term planning. The Ministry of Planning of Lebanon has been reorganized and strengthened, and the preparation of a five-year public investment program is nearly complete. A five-year development program is also in preparation in Libya. In Yemen a development council has been established.

Land tenure

In the United Arab Republic a new law has lowered the maximum ownership of land per family from 200 feddans to 100 feddans (80 to 40 hectares), prohibiting the renting of more than 50 feddans (20 hectares) per person. It reduces by one half the installments on the principal and interest payable on land distributed under the earlier agrarian reform law. The distribution of Wakf land is also to be accelerated. Under the new charter, the government has ruled out the collectivization of land.

Under a new law promulgated in Iran in January 1962, each landowner is permitted to own only one village, the remainder being bought by the government. The owners will receive compensation assessed on the basis of taxes paid plus 10 times the annual gross income in 10 annual installments, while the farmers to whom the land will be sold will make their repayments in 15 annual installments. Membership of co-operatives is compulsory for the new holders. Thus in Maragheh, where the new law is now being applied, a co-operative has been established for every 10 villages of the 300 affected. It will provide seeds, fertilizers, tools, and tractors. The Agricultural Bank has been authorized to play an active role in the development of these co-operatives.

In Syria the agrarian reform law of 1958 has been revalidated, but with some amendments. Maximum ownership has been fixed at 80 hectares of irrigated land, and 300 hectares of unirrigated land, with the exception of the provinces of Hassetche, Dairaz-Dur and Al-Rashid, where the maximum is 450 hectares. Each member of the landowner's family can also receive 10 hectares in irrigated areas and 40 hectares in unirrigated areas. The new holders have to pay for their land in 10 annual installments if the purchase price is below £S 100,000 ($28,000) or in 15 years if the cost is higher.

A draft land reform bill prepared in Turkey proposes that the maximum ownership of land should be 506 hectares for dry land and 202 hectares for irrigated land, with certain regional variations. Land held above the limit would be purchased by the state and distributed. The bill stipulates that no farm family shall own less than 15 hectares, and includes measures to prevent the further fragmentation of holdings.

Price and marketing policies

Among the far-reaching economic measures designed to further socialization that have been introduced in the United Arab Republic, the Egyptian Cotton Commission has been set up to purchase cotton from growers at prices fixed by the government, and the Egyptian Cotton Organization to sell the cotton either for export or for sale to local textile producers. A public organization has been set up for the promotion of exports. Multiple exchange rates for exports and imports have been abolished, but all exports and inward transfers of currency now enjoy a 25 percent premium.

There have been rather few changes in agricultural price policies. In Lebanon, the government has fixed minimum prices for silk cocoons and fruit, and the Fruit Office will in future be responsible for purchasing directly from producers all fruit which is to be exported. In Turkey, the purchase price of wheat, which was raised in June 1961 because of drought, had to be increased again in September 1961 and then again in June 1962 because of higher prices on the free market of domestic wheat and of wheat imported under Public Law 480. The support prices for coarse grains were also raised, but those for sugar beet reduced. The government also started the support purchase, but not at uniform fixed prices, of animals sold by farmers. The producer price of cotton in Afghanistan has been raised by 20 percent. In Libya, the government has decided to fix guaranteed prices for wheat, barley, and olive oil.

AFRICA

Nearly all African countries are already operating, or are formulating, economic development plans. Some of these are comprehensive, including the private as well as the public sector, and a few are based on long-term perspective plans or economic appraisals. Others are more restricted in scope and

limited to the co-ordination of public development expenditures and investment. Important developments in respect of land tenure and settlement have taken place in a number of countries. Further progress has been made in the movement to build institutions for regional co-operation in the economic and other spheres.

Development plans

New long-term development plans have come into operation in Tunisia and Mali. The Tunisian ten year perspective plan (1962-71) aims at raising gross domestic product by 6 percent yearly, and agricultural production by 5.5 percent per annum, compared with the current rate of rather over 2 percent. Agriculture is to receive about one third of the total investment of 1,177 million dinars ($2,802 million). A principal objective is to achieve and maintain self-sufficiency in the main food requirements. Agricultural production is also to be diversified through a shift from cereals to higher-value crops. The co-operative system will be extended, and a comprehensive training scheme for agricultural technicians and extension workers started. Mechanization is to be widely introduced. A ceiling will be placed on individual ownership of irrigated land, and any area above this limit redistributed, though the large French estates which are being purchased by the government will be exploited directly by the state. A three-year operational program based on the perspective plan is being implemented.

The five-year development plan of Mali (1961-65) has as its general objective an annual increase in gross domestic product of 8 percent. Investment is estimated at CFA fr. 65,000 million ($263 million). Within agriculture, which is one of the priority sectors, the development of co-operatives is given special importance. Several of the light industries to be established will utilize agricultural raw materials, notably cotton, for which production is to be increased from 9,000 tons in 1959 to 55,000 tons in 1965, and groundnuts which are expected to be increased from 125,000 tons to 200,000 tons. It is also proposed to expand the production of paddy from 188,000 tons to 322,000 tons and to increase the sheep population from 800,000 in 1960 to 1,800,000 in 1965.

The three-year program of Niger (1961-63) proposed a government investment of CFA fr. 15,000 million ($61 million). Livestock and crop yields, particularly on the land under staple food crops, will be raised through encouraging improved methods of farming. Swampy lowlands and river valleys will be reclaimed and put under cash crops, largely for export. Improvements in the marketing of vegetables, tobacco, and hides and skins for example, are also emphasized.

The development program of Mauritius, originally due to end in 1962, has been extended to 1964/65 in order to take account of recent development proposals and to repair the 1960 cyclone damage.

The first national plan of Nigeria (1962-68), comprising the integrated capital expenditure programs of the federal government and the three regional governments, has been announced. The total government capital expenditure over the six-year period will amount to £ Nig 676.5 million ($1,894.2 million), of which the federal development program absorbs £ Nig 412.5 million ($1,155 million) and those of the three regional governments £ Nig 264 million ($739 million). Of these totals, primary production has been allocated £ Nig 20.5 million and £ Nig 25 million ($57.4 million and $70 million) respectively. The scope of the federal government program will no longer be confined largely to projects of exclusive federal concern, but will cover all new activities indispensable to rapid growth. The first stage of the Niger dam scheme at Kainji, the major project in the federal program, will be completed in this planning period at an estimated cost of £ Nig 68 million ($190.6 million). Although it is primarily a power project, agriculture too will benefit. The Niger Delta Development Board receives £ Nig 2.3 million ($6.5 million) to undertake a systematic survey of the development possibilities of the Delta.

The Western Nigeria Development Plan, the only regional plan so far available, aims at diversifying the economy, both within agriculture and away from agriculture, and at a large expansion in employment opportunities. Primary production is to absorb 20 percent of the total capital expenditure of £ Nig 90.3 million ($252.8 million). Of the agricultural allocation, investment in the development of tree crops, mainly for export, absorbs £ Nig 5.6 million ($15.7 million), including £ Nig 1 million ($2.8 million) for equity participation by the Government in plantation projects promoted by overseas interests, and £ Nig 2 million ($5.6 million) for the completion of the Development Corporation's existing agricultural schemes. The other major allocations are £ Nig 5 million ($14 million) for agricultural credit, and £ Nig 5.6 million ($15.7 million) for a scheme to establish young men trained

at Farm Institutes on co-operative farm settlements.

The Government of Uganda has raised the investment target of its public investment program from the £52 million ($145.6 million) suggested by the recent International Bank mission to £54.2 million ($151.8 million). The present plan, following the mission's report, regards agriculture as providing the main opportunities for economic growth in the next five years. About 13 percent of total public investment is allocated to agriculture, which substantially exceeds the present allocation. Of the two main export crops more emphasis will be laid on cotton than on coffee, but to reduce the dependence of the economy on these two products crop production will be diversified and livestock developed.

In Ethiopia a comprehensive second five-year plan will be launched in September 1962; it is understood to stress agriculture and small-scale industry. A Planning and Development Board with a permanent technical secretariat has been established in the office of the Prime Minister.

A draft four-year plan has been published by the Government of Northern Rhodesia setting out the development policy and the projected public-sector capital expenditure. Of total public investment of £30 million ($84 million), rural economic development and settlement on crown lands has been allocated nearly £11 million ($30.8 million) and African education and staff training £5 million ($14 million). In Nyasaland, a three-year development plan has been placed before the legislature; the biggest item in the program is education, and it is proposed to devote £1.5 million ($4 million), out of the total expenditure of £19 million ($53 million), to agriculture and fisheries.

In Sierra Leone a draft ten-year plan is awaiting approval, and the International Bank has been invited to send a mission to study the development needs and resources of the country. In Zanzibar, the government has placed before the legislature a report on the economic development of the protectorate, calling attention to the problems encountered in the crop diversification scheme, and recommending the establishment of a land bank to assist selected farmers.

A number of other countries are currently engaged in formulating development programs. In Dahomey, a twenty-year perspective plan which will be subdivided into medium-term plans of five-year periods is in preparation. Meanwhile, a four-year rural development program (1962-65), whose main objectives are to increase agricultural production and to impart a rural bias to education, is being carried out. In Upper Volta the general policy and over-all targets of the first five-year plan (1963-67) have been determined, and work is proceeding to fill out the general outline.

With the suspension of the five-year development program (1959-64) of Ghana, the recently established National Planning Commission has been entrusted with comprehensive planning functions including the preparation of a new over-all seven-year plan which is expected to be ready by 1963. Meanwhile, Ghana has started work on the Volta river project estimated to cost $324 million altogether.

In Somalia, a Planning and Co-ordination Committee for Social and Economic Development has been established in the Prime Minister's office.

Land tenure

Two new land settlement schemes have been started in Kenya which involve a radical change from the policy of reserving certain agricultural areas for Europeans. Under the first, 180,000 acres will be purchased from European owners for resale in units of 15 to 100 acres each to 8,000 African farmers having some capital, previous agricultural experience, and managerial capacity. This project is expected to cost £8.8 million ($24.6 million) of which over one half will be financed through loans and grants from the United Kingdom; the rest will come from an International Bank loan ($8.4 million) which will be used for developing the land prior to its sale to the new owners. Under the other scheme, financed entirely by the United Kingdom, 12,000 African small holders are to be settled within the next two years, mainly in the European farming areas of the Kenya Highlands.

In Southern Rhodesia, the 3,000 African farmers on the waiting list for the purchase of land are to be provided with suitable farms and a start has already been made on the work of subdivision on "unreserved land" where many of these farms will be located. Negotiations have begun for the purchase of 500,000 acres of privately owned land to be resold to African farmers.

The Government of Tanganyika has announced its intention to make a far-reaching change in land tenure relationships. Freehold title will be converted into some form of long-term leasehold at a nominal rent, both because freehold title is considered to be an alien concept and also because it is claimed

that a leasehold which incorporates development conditions will lead to the optimum development of the land.

In Ghana a policy of establishing large-scale co-operative farms is being pursued, as it is considered that the land will be farmed more efficiently in this way than under individual holdings, which are often uneconomically small and undercapitalized. In some areas farms are being merged to form single holdings of 200 hectares or more on which it is proposed to produce a wide variety of food and export crops, other than cocoa.

Price and marketing policies

There have been a number of changes in agricultural price and marketing policies. Because of the continuing fall in prices of coffee and cocoa, which has placed a strain on stabilization funds, producer prices of these commodities were reduced in a number of countries in 1961/62. As well as cocoa, producer prices of groundnuts and cotton were reduced in Nigeria. Producer prices of cocoa were maintained, however, in Ghana. Ghana is now selling cocoa only in Accra, and Nigeria in Lagos as well as in London. In Tunisia cotton prices were increased as well as those for oats and sorghum, while a producer price for olive oil has been fixed.

Under a five-year agreement with the Ivory Coast, France has undertaken to import 100,000 tons of coffee each year at a relatively high price, unrelated to prices on international markets. Tariff preferences will also be extended to wood and cocoa, and France has agreed, in addition, to buy bananas from the Ivory Coast.

To replace its quota under the Commonwealth Sugar Agreement, South Africa has negotiated with the United Kingdom a five-year bilateral agreement (1962-66) under which the United Kingdom will purchase 150,000 long tons of raw sugar each year at a fixed price of £ 35.15 ($98.42) per ton. South Africa has agreed that from 1964/65 onwards sales of Swaziland sugar in South Africa will not be restricted to the present limit of 80,000 short tons, but to 8.5 percent of the total sales of South African and Swaziland sugar. While the producer price of wheat in South Africa was increased slightly in 1961/62 to offset an increase in production costs, maize producers received a lower price, and the prices of dairy products were reduced substantially to stimulate consumption and reduce the accumulated surplus.

Regional economic co-ordination

Further efforts have been made to promote regional economic co-ordination in Africa and to create regional institutions. Meetings were held in Paris late in 1961 and in Brussels early in 1962 between the European Economic Community and the twelve African associated members to frame a new convention regulating their relations which should replace the present one due to expire in December 1962.

The twelve French-speaking countries which, at their meeting at Yaoundé in March 1961, established the African and Malagasy Organization for Economic Co-operation (OAMCE), signed at Tananarive in September 1961 the charter of the African and Malagasy Union (UAM) which is open to all independent African states. A general secretariat has been established as well as four technical committees on scientific and technical research, monetary problems, foreign trade, and economic and social development.

These 12 states, together with Ethiopia, Liberia, Libya, Nigeria, Sierra Leone, Somalia, Togo, and Tunisia, met in Monrovia in May 1961 to discuss African co-operation and appointed a committee of experts to work out a concrete program and the machinery for economic, technical, educational, and scientific co-operation among African countries. This committee in a series of recommendations affirmed that the creation of an African-Malagasy common market, whose essential organs would be a customs union, an investment fund, a payments union, and a regional price stabilization fund, would be the most concrete evidence of the solidarity of the members. The parent body, meeting at Lagos in January 1962, adopted, in principle, a resolution creating a new Inter-African and Malagasy States Organization. The proposed charter of this Organization lays down the principles and purposes of co-operation among the African states and also suggests the establishment of an assembly of Heads of State, a council of ministers, and a general secretariat. It was decided to set up a standing committee of finance ministers who will be responsible for the creation by stages of regional customs unions, the regulation of currency exchanges, price stabilization for primary products, and the pooling of statistics.

At the first session in Conakry of the economic committee of the Casablanca group, consisting of Ghana, Guinea, Libya, Mali, Morocco, the United

Arab Republic, and the Provisional Government of the Algerian Republic, it was resolved to establish a permanent economic planning council and, within five years, a free trade zone, provided that duties on certain commodities were reduced by members in a specified period. Resolutions on reciprocal preferences, on an African development bank and payments union, and the adoption of a common external economic policy were also approved by the committee.

The Equatorial Customs Union, namely the Central African Republic, Chad, Congo (Brazzaville), and Gabon, decided at a meeting in Bangui in June 1961 to adopt a common external tariff, to hold periodic consultations to harmonize fiscal structures, and regulate trade exchanges through a special convention.

Fishery policies

In many of the more developed countries (for example, in Denmark, France, Japan, and Sweden) government assistance for fisheries has been directed mainly toward improving the economic structure of the industry. Fishery credit policies in these countries have been designed primarily to make the industry more competitive through the modernization of facilities. At the same time, emphasis has been placed on experimental and exploration fishing aimed at locating resources which can be exploited more economically and at developing less costly methods of fishing.

Until technological improvements result in increased profitability of operations, however, the governments of some countries will have to continue, or even increase, direct financial support, because of special hardships experienced by some sectors of the industry. Thus, in the United Kingdom, fishery subsidies were for the first time made available also to the distant water fleet. Iceland and Norway, as a result of poor catches in certain branches of the industry, had to provide supplementary appropriations in 1961 to subsidize the sectors concerned. Iceland, in addition, appealed to the OECD to examine its difficulties in marketing fish products, especially frozen fillets, in member countries.

Exclusion from customary fishing grounds following the extension of fishing limits has contributed to a worsening of economic conditions in some fisheries. In this connection, the new subsidies in the United Kingdom include one for vessels of the near and middle water fleet which had traditionally fished for part of the year in the waters off the Faeroe Islands now closed to them. Extension of limits has created problems even for the fishing fleets of the countries which have closed adjacent waters to certain types of operations. Thus Iceland's trawler fleet, barred from rich grounds within the 12-mile limits, had a bad year and turned to the government for relief. The government saw itself faced with a choice of either making an exception for Icelandic trawlers by allowing them to enter the limits or providing new funds to assist the trawling industry.

In general, the question of fishing limits, after being for several years in the forefront of international attention, was somewhat in the background during 1961. This was partly because of the negotiations on the expansion of the membership of EEC, the outcome of which would affect competitive relationships in some of the leading markets for fish. While no further changes in fishing limits took place, a number of countries (for example, the United Kingdom, the U.S.S.R., the Federal Republic of Germany, and Poland), entered into negotiations with a view to obtaining temporary fishing rights in waters from which they had recently been excluded.

Negotiations were also carried out under various fishing conventions. The U.S.S.R. and Japan, for example, sought agreement on the management of the salmon and the king crab fisheries, two of the fisheries of major interest to them.

While governments in the more developed countries have continued to rely in their fishery programs preponderantly upon measures stimulating productivity, in the less developed countries development efforts have required more radical forms of assistance. Financial concessions and protective measures have consequently played a much more prominent part in these countries.

Recent measures have included new loan schemes (for example, in Sierra Leone); the lowering of duties on fishing equipment and requisites (duty-free import of certain types of vessels into Argentina, lower tariffs on the imports of nets into Ecuador); tax exemptions for new industrial enterprises (fishmeal plants in Chile and Mexico); exemption from export duties (for example, fishmeal exports from Angola); price reductions for fuel (diesel oil in Angola). Newly enacted protective measures (in Burma, Iran and Nigeria) have, in many instances, the double purpose of saving scarce foreign exchange and of strengthening developing industries.

Technological help to bring about improvements

in facilities and methods used in production, processing, and distribution, has not been neglected, however, nor has the need to establish a sound administrative organization. Libya, for instance, recognizing the importance of a suitable administrative structure for the formulation and implementation of development plans, established new offices responsible for fisheries matters in 1961.

The more developed countries have made increasing contributions to fisheries development in the less advanced regions. In many instances these contributions have taken the form of direct investment in the industry. Grants and loans have also been made for fisheries development, and joint ventures, providing for collaboration with less developed countries in the exploitation and utilization of fishery resources, have increased. All the important fishing countries have participated to some extent in these efforts, and almost all less developed countries with a seashore or with significant inland fisheries have been among the beneficiaries.

Forest policies

Countries continue to elaborate or revise their forest policies, or to establish forestry plans or programs at more or less long term, the trend being toward a closer integration with general plans for economic and social development. However, it does not seem that enough attention is paid to the implementation of these plans, either because governments give them less priority than they give to plans in other sectors, or because basic data, technicians and finance are lacking, and the economic and institutional conditions remain unfavorable for forestry development.

In the first of these cases, only a conscientious recognition of the importance of the economic and social role of the forest can bring the public authorities to give the necessary priority to the forestry sector. In this connection forestry services are trying to make a social evaluation of forest works in order to show the importance of the forestry and forest industry sectors in the over-all economy. In the second case, the forest services are trying, simultaneously with the elaboration of forestry programs integrated into economic and social development, to facilitate their implementation by improving data on forest through inventories, by developing educational and vocational training and by making available the necessary funds.

In Europe, in order to increase timber production, particular importance is given to the plantation of quick-growing species, afforestation, and the revision of the working plans of the forests-in-use. The main feature of these working plans is the flexibility of the regulations applicable to the forest, from the standpoint of production as well as silviculture. This flexibility is the result of new inventory processes which permit continuous research into the rotations giving the maximum utility. In France, the fourth plan of economic and social development (1962-65) gives more emphasis to the forest than did the preceding one; this plan not only sets out objectives, such as an increase in production by 1.25 million cubic meters, and a program for erosion control and soil conservation, mountain grassland improvement and national park development, but also specifies the various institutional measures and financial means for reaching these objectives. Detailed information is given on the revision of working plans, forest equipment, forest inventories, forest ownership, vocational training, and tax policy.

In Yugoslavia, within a long-term perspective plan, the five-year plan envisages an increase in the volume of fellings from 19.5 million cubic meters in 1960 to 22.5 million cubic meters in 1965, or a rise of 15 percent, with a simultaneous increase in the output of industrial timber from 6.4 to 9.2 million cubic meters, or 44 percent. Other objectives include the improvement of degraded forest and scrub on an area of 200,000 hectares; the planting of coniferous species in broadleaved forest on an area of 100,000 hectares; the clearing of degraded forests and their replacement with poplar and coniferous forests with the application of intensive methods, on an area of 25,000 hectares; the creation of 50-75,000 hectares of forest plantations, primarily with poplar. An over-all sum of 75,000 million dinars, or 15,000 million dinars a year, has been earmarked for the execution of these schemes, which is twice as much as was invested in previous years.

In Finland, the state Council has established a planning committee responsible for the elaboration of an over-all plan for the improvement of the forest and the increase of production. The report of this committee recommends that the present allowable cut of 45 million cubic meters should be raised to 47 million cubic meters for 1963-70, and to 48 million cubic meters for 1975-82, provided that artificial regeneration, drainage, thinning, and better logging techniques are undertaken.

In Poland, long-term development planning and

general outlines for annual plans, as well as forest inspection, are still the main task and responsibility of the Ministry of Forestry and Woodworking Industry. As the allowable cut has been exceeded in recent years, fellings in the next few years in the forests under the management of the ministry will be decreased step by step from the present 15.2 million cubic meters of industrial wood to 14 million cubic meters in 1965. The execution of these plans and the preparation of detailed working plans have, however, been decentralized both in the forestry and woodworking industries.

In the U.S.S.R. there is clear progress toward decentralization as compared with the period before 1955. The general outlines of development planning and inspection in forestry are the responsibility of the forestry sections of the Federal Council of National Economy and of the corresponding national council in each republic.

While some countries in the Near East have succeeded fairly well in elaborating forestry programs, most of them only have a forest policy which aims broadly at satisfying immediate needs through the plantation of quick-growing species, at protecting the forest against illegal cutting and settlement, and at developing educational and vocational training in order to make possible the recruitment of foresters and technicians, who are always needed. However, because of the lack of financial means and technical staff, these policies are not fully implemented, and the necessary institutional measures are not taken. In Sudan a seven-year forest development plan has been elaborated and will be integrated with the other sectoral plans; a provincial administration act facilitates the application of forest policies and programs drawn up by the central government by delegating certain responsibilities to provincial authorities. In Lebanon a ten-year plan for the physical and social improvement of the mountain areas, mainly through afforestation and soil conservation, is under way. In Syria a working plan has been prepared for the Lattakia forest which, together with the poplar plantations, is the main source of timber for all the country.

In order to meet the requirements for wood products, wood-using industries have developed rapidly in the Far East, especially in pulp and paper production. New pulp and paper mills are being set up in India and elsewhere, thus partially offsetting the unfavorable balance of supply and demand for pulp and paper in the region. Some of the pulp and paper mills under construction or planned will use rice straw or bamboo as raw material in addition to wood. However, in Japan the expected timber shortage has already manifested itself, and emergency steps have been taken for the cutting of more domestic timber, the import of additional foreign timber, and the production of more waste wood chips for pulping purposes. In other countries governments are promoting the creation of artificial plantations of quick-growing species, and showing interest in the development of mechanical logging and forest road construction. Policy has been changed in order to assure a continued supply of raw material for industries, formerly based on short-term contracts. But in some countries, namely Burma, Thailand, and the Philippines, teak forests continue to be overcut, owing to the lack of proper working plans, and a sharp decrease in production is expected in the near future.

Especially in the Lower Mekong basin area, some attempts at forest improvement have been made by regulating shifting cultivation. A new game law has been promulgated in Thailand in order to preserve wildlife species which are on the verge of extinction parallel with the rapid disappearance of forests and due to the lack of legal control for the protection of nature.

Forest policy has been increasingly integrated with land-use policy in the Far East, within the framework of general economic development. Watershed management is receiving more and more attention in most countries in the region, owing to growing pressure and competition in land use, especially in the countries where the decrease in land productivity is combined with soil erosion. In some countries strong emphasis is being placed on the establishment of farm woodlands to supply fuelwood as well as wood for other uses on the farm.

Latin American countries are becoming more conscious of the need for a stronger program of afforestation and industrial development, and new credit plans are being prepared for more coniferous plantations or forest renovations. In Argentina the states now apply the national tax exemption for plantations and related investments. In Paraguay a forest economic section has been proposed in the Industrial Development Bank for extending credit facilities for sawmills, the lumber trade and forest development. In Venezuela, Argentina, Paraguay, and Bolivia, steps are being taken to set up through the forest services a federation of lumber associations in Latin America, which will serve as a clearing

house for information and arrange marketing agreements between countries in order to develop intra-regional trade.

In federal countries, especially Argentina, there is an increasing tendency to return the administration of public land to the states themselves. As these states do not yet have forest services in operation, training facilities are being given the highest priority. Forestry schools and research institutes were opened this year in Brazil, Argentina, and Chile, while others are in preparation.

Following the operation of recent colonization projects in the Andean region of Ecuador and Peru, the participation of the forest services has been assured in the national planning of the resettlement of upland populations, where the lumber and fuelwood shortage is very serious.

Some recent developments in North America deserve consideration. In Canada, the Forest Act has been revised, and the Department of Forestry, headed by the Minister of Forestry, has been established. The minister is now responsible not only for research leading to the protection, management, and utilization of the forest resources of the country, and the better utilization of forest products, for forestry surveys, and for the wise use of the forest resources, but he also may enter into agreements with the government of any province for forest protection and management or forest utilization. Under such agreements the minister can make contributions to the provinces equal to half the amounts spent by them in establishing forest access roads and trails for the attainment of adequate fire protection, as well as other aspects of forest management, and in this way he can influence the forest exploitation policy of the provinces. In the United States, wildlife, national parks, and recreation are more and more the order of the day, and a First World Conference on National Parks was being organized in Seattle in June/July of this year. A Wilderness Bill, the purpose of which is to establish a wilderness preservation system, is now under consideration.

In Africa the main problems facing the new independent governments are the delimitation of a forest state domain in a period of economic and social growth, and the education and vocational training of young people to staff the forest services. In Liberia, which is in the closed rain forest belt, the national forest has been delineated (1.6 million hectares, 17 percent of the total land area) through the interpretation of aerial photographs. It is estimated that another 1.6 million hectares of primary and secondary forest are located outside the national forest. Under the new forest land use policy an inventory of this area has to be made by the concessionaires, to whom a permit for forest survey is issued. On completion of the inventory the concessionaire may negotiate a contract for forest product utilization for selected tracts within the area of option. In Gabon, which is practically the only producer of okoumé, the main objective of forest development is focused on sustained output of this product. For the proper exploitation of the forest the government has initiated the division of the forest into two zones: a zone of 2 million hectares of easy accessibility to be utilized by Gabon nationals, and a zone further in the hinterland requiring heavy investment for construction, open to large foreign enterprises.

Considerable efforts are being made in Africa to develop forestry education and training at three levels: for forest guards, rangers, and professional foresters. For the time being it is planned to establish forest faculties within the framework of the existing universities, and to raise the level of forest guards' schools to that of rangers' schools through international aid. Wildlife management continues to retain the attention of various African governments. In east Africa wildlife management, game cropping and game farming are already being widely undertaken. In west Africa, hunting regulations continue to be the basis for wildlife management, though in parts of Mali an attempt is being made at proper wildlife management planning.

Short-term outlook

The economic outlook for the remainder of 1962 and for 1963 in the leading industrialized countries, which account for the bulk of world import demand for agricultural products, is somewhat unclear at the time of writing. In general, however, the rate of growth of economic activity in these countries seems likely to be slower than had been expected earlier. Supplies of most agricultural products are

expected to remain ample, and there seems no reason to expect any great increase in demand that would halt the decline in prices on world markets.

Agricultural production outlook for 1962/63

The limited data available so far suggest that in 1962/63 the rising trend of world agricultural production will probably be resumed with a further sizable increase. Climatic conditions seem generally to have been more favorable than in 1961/62, when bad weather was widespread.

Production in western Europe should surpass the high level of 1960/61. Large grain harvests are expected in most parts of the region, but beet sugar production is not likely to show much change from that of 1961/62. Livestock numbers have continued to rise in most countries; while there may be some slowing down in the rate of expansion of the region's production of beef and veal, poultry meat, and also milk, considerable increases are likely for pigmeat.

Conditions have been less favorable in eastern Europe, and bad weather, especially the cold spring and summer drought in the Danube basin, are reported to have greatly reduced the production of grains and sugar beet. In the U.S.S.R. grain production is expected to exceed the 1961 level. The grain area, especially of maize and pulses, has been considerably expanded, and the area under grasses correspondingly reduced. However, difficulties are again reported in Kazakhstan and some other areas as a result of insufficient maintenance of agricultural machinery.

In the United States a further fall of 14 percent is forecast in wheat production in 1962/63, with the reduction in acreage under the Wheat Stabilization Plan. The production of coarse grains is also expected to decline further, with the extension to barley of the measures that were successful in limiting maize and sorghum output in 1961/62. United States cotton production is likely to be close to the level of the last two years. A further large expansion is expected in pigmeat production, but beef and veal production will probably increase only slightly, and poultry meat production may be adjusted downward following recent price declines. In Canada, while grain production will recover substantially over the drought-stricken 1961/62 level, a below-average wheat harvest seems possible in view of the depletion of soil moisture reserves in the prairie provinces.

Little information is yet available on probable levels of production in 1962/63 in the other regions of the world. In the countries of northwest Africa rainfall has been good, and grain production appears to have recovered sharply, while this should also coincide with the upswing in the two-year production cycle for olive oil. In the Near East, as a result of abundant and well-distributed rainfall, large grain crops are finally expected in Iraq, Lebanon, and Syria, three of the countries that have been hit by continuous droughts over the past four years, though in Jordan conditions have subsequently become less favorable after abundant rains early in the season. Turkish wheat production is expected to be larger than the poor crop of 1961/62. Because of favorable weather and a low degree of pest infestation, a further record cotton crop is expected in Sudan, and the harvest in the United Arab Republic is almost certain to be a great deal larger than last year.

In the Far East, assuming normal weather for the rest of the season, the gradual increase in the production of foodgrains should continue in 1962/63 outside Mainland China, where, however, adverse weather is reported to have seriously affected spring-sown grains and other food crops for the fourth successive year. The jute acreage in India and Pakistan is less than in 1961/62, when the large crops resulted in declining prices.

In Latin America, a smaller coffee crop is expected in Brazil in 1962/63; to offset the lower production and higher costs, the Coffee Institute has increased purchase prices. In Argentina an appeal has been made to farmers to increase the area under wheat and maize by 1 million hectares each. The efforts being made to diversify agricultural production in Cuba, as well as a number of other factors, appear to be exerting a downward influence on sugar output, which is unlikely to regain the 1960/61 level in 1962/63.

Commodity prospects

The general tone of the world grain market appears likely to remain firm during 1962/63. However, the changed distribution of supplies may result in a decrease in the world wheat trade for the first time in four years. A larger crop in western Europe may lead to lower imports, and the import requirements of northwest Africa and the Near East will also be considerably reduced compared with recent years. Shipments of wheat to India and Pakistan should continue at about last year's level and there will again be substantial imports into Mainland

China, though the exact volume is uncertain. On balance, total wheat exports in 1962/63 may fall to 41 million tons, or even lower, as compared with an average of 43.2 million tons in 1960/61 and 1961/62. On the other hand, the volume of the world trade in coarse grains is expected to remain about the same as in 1961/62, for which the provisional estimate is 24.5 million tons. In both cases, the volume of trade should be sufficient to cause further reductions in end-of-season stocks in the North American exporting countries.

With the reduced 1961/62 harvests in some exporting countries and stocks generally low, exportable supplies of rice are smaller than last year and the volume of trade will probably show a further moderate decline. As import demand has been maintained, especially in Indonesia and elsewhere in Asia, " free " international prices showed a pronounced increase during the first half of 1962, rising to their highest level for eight years. Stocks carried over into 1962/63 are therefore likely to be small, and the outlook for the season will be determined by the size of the next harvest. There are no expectations that Mainland China will export rice on any appreciable scale and an early resumption of Viet-Nam's sales seems doubtful. International markets for rice should thus remain generally strong in 1962/63.

Few significant changes are anticipated in the world sugar situation in 1962/63. In view of the domestic harvest situation, western European demand should be maintained at roughly the same level as in 1961/62, and the Sino-Soviet area will doubtless continue to absorb the bulk of the Cuban surplus. As indicated above, this is likely to remain lower than in the past, mainly because of the program of crop diversification that is being pursued. Under the new United States Sugar Act, United States suppliers will have the opportunity of meeting a larger part of the domestic demand, but other countries will continue to benefit from the redistribution of the Cuban quota. Hence no undue pressure of supplies on world markets is anticipated.

Supplies of citrus fruit for marketing during the summer and autumn of 1962 can be expected to be substantially larger than last year. In South Africa prospects are for a crop about 10 percent above the 1960 record. Brazil is reported to have about 4.5 million boxes of oranges available for export this year compared with 3.3 million boxes shipped in 1961. Smaller supplies, on the other hand, must be expected from California, where the crop of summer oranges is the smallest in the last ten years. Supplies of lemons and grapefruit will not substantially vary from those of last year. Fruit crops in importing countries will also be larger this year, although the increase may not be as great as previously anticipated because of the cool weather in spring, which may also have affected the 1962/63 citrus crop in the Mediterranean area. In general, however, the greater availabilities of both imported and domestic fruit may be expected to result in some pressure on prices during the coming months.

World supplies of oils and fats were large in early 1962, reflecting mainly the large harvests in autumn 1961 of groundnuts in Africa, sunflowerseed in the U.S.S.R. and soybeans in the United States, as well as a record output of butter, tallow and fish oils. Barring unusual weather conditions, this favorable supply situation is likely to continue in 1962/63. The production of slaughter fats will probably continue to increase, since livestock numbers are rising in response to heavy consumer demand for meat. Hence it is likely that the general level of international prices will continue low in 1962. However, the weakness of European import demand may be of a short-term character.

The world meat trade in 1962 is unlikely to be larger than in 1961. Exporting countries have been making strong efforts to find new outlets, but for the time being the volume of trade will continue to be determined by the situation in the main import markets of western Europe and the United States. The volume of beef entering world trade may increase slightly. Exportable supplies in Oceania and in some western European countries, including France and Denmark, have risen, while the United States and eastern Europe absorbed much larger quantities in the first half of the year. Imports into the United Kingdom will be influenced to a considerable extent by the supply situation in Latin America and prices of manufacturing beef in the United States, but these are not expected to be below those of 1961. The substantial increases in pigmeat production in the major importing countries of western Europe will reduce their import requirements. Pigmeat prices may therefore be lower, but meat prices generally are expected to remain similar to those of 1961.

Unfavorable weather conditions in Europe and New Zealand have temporarily slowed down the rising trend in milk production. Nevertheless, the increase in effective demand will not be sufficient to provide outlets for the expected increases in supply, particularly as the introduction of an import licensing system in the United Kingdom has accentuated the

difficulties in marketing surplus milk in the form of butter. These import restrictions have led, however, to a considerable strengthening of butter prices on the London market, which can be expected to continue in the immediate future. The outlook for international trade in eggs is not encouraging. In view of expanding production, import demand in the Federal Republic of Germany is unlikely to be much greater than in 1961, while in the United Kingdom it may be reduced. Import demand in western Europe as a whole, which accounts for nearly four fifths of world imports, is not expected to exceed that of 1961, but exportable supplies will be larger and prices are therefore likely to continue at relatively low levels.

Although the world coffee harvest in 1962/63 is expected to be lower than in the previous year, supplies will remain abundant because of the heavy stock accumulations in Latin America, and no significant strengthening of prices is anticipated, particularly if production increases in countries producing robustas and secondary milds. In the remainder of the 1961/62 season, the one-year International Coffee Agreement will continue to exert a stabilizing influence on the market, and prospects for 1962/63 will be enhanced if the longer-term, and more widely based, agreement now under discussion is successfully negotiated. Although an International Cocoa Agreement may also be negotiated early in 1963, this could not materially influence the situation until the marketing of the 1963/64 harvest. Meanwhile, cocoa supplies and demand are approximately in balance, and if consumption continues to expand at the recent rate the market should be better situated to absorb another crop in 1962/63 of the same size as those of the previous two years. Tea supplies also remain closely in line with the demand, with prices of high quality leaf showing the better prospects.

With little change in the United States crop and recovery in the United Arab Republic and Uganda, world cotton production in 1962/63 is expected to reach a new peak. The upward trend in cotton consumption, on the other hand, is likely to flatten out under the impact of the European stock cycle, the Japanese restrictions on textile output, and more intensive competition from rayon. The greater stability of wool prices apparent since the beginning of 1962 may continue into the new season. Jute production is likely to recede from the high level reached in 1961/62, and export availabilities may be reduced, thus checking the present fall in prices. A further increase in the output of hard fibers in 1962 is expected to be matched by a sizable expansion in demand. The production of natural rubber is again likely to show a slight increase, and with continued expansion in the consumption of synthetic rubber in western Europe, Japan and the U.S.S.R., prices may remain under pressure during 1962.

The future of markets for fishery products for human consumption in Europe and North America depends to a large extent on successful quality improvement and, especially in some European markets, on more vigorous promotion of frozen products. In less developed countries market expansion is still contingent on improved technology and the strengthening of the infrastructure. In the market for industrial fish, both the present situation and the outlook for fish meal are substantially better than in the last two years. Present efforts are in the direction of increasing utilization in markets where fish meal has not yet been used as extensively in animal rations as in North America and western Europe. The increased production of fish meal, however, has affected the less elastic markets for complementary products such as fish and whale oils.

The expansion of production and trade in forest products is expected to be more moderate in 1962 than in 1960 and 1961. In North America a recovery from the low level of sawnwood production in 1961 appears likely, and the consumption of pulp and pulp products is expected to grow steadily. European production and imports of sawn softwood should remain at a high level, but the consumption of sawn hardwood is likely to show little or no increase and the former rapid growth of imports of tropical hardwood may temporarily level off.

Chapter III. THE ROLE OF FOREST INDUSTRIES IN THE ATTACK ON ECONOMIC UNDERDEVELOPMENT

Forest industries present many special features. They furnish a very wide range of products, both consumption goods and intermediate goods flowing into many sectors of the economy; the demand for these rises sharply with economic growth. The industries vary considerably in their raw material and other factor requirements. In most of them alternative technologies can be successfully employed. They are based on a renewable resource. This resource is intimately linked with agriculture.

These features suggest that potentially forest industries can play a significant part in promoting economic growth in presently low income countries. This chapter represents a preliminary attempt to assess their potential role. The analysis is far from complete, and many important aspects are treated cursorily or not at all. The purpose of the chapter will have been served, however, if it succeeds in drawing the attention of policy makers to certain major considerations which are sometimes overlooked, and if it encourages economists and foresters to undertake a more profound and detailed study of some of the problems raised.

Some aspects of development policy

The postwar period has seen a growing awareness of the need for economic development in those areas of the world which the industrial revolution had left untouched. Development problems have acquired first place not only in the attention of governments and international organizations but also in the social sciences, where they have provided the common denominator for the integration of different branches of analysis and of different disciplines. This impact is also being felt in the specialized fields of study devoted to the economic and technical problems of single sectors or industries. Specialists and technicians can no longer disregard the wider context in which industries and sectors operate; that context is not a constant but a variable – perhaps the most important variable. Today sector problems and targets are at once subordinate to, and integral instruments of, general problems and aims of development.

In the following pages an attempt will be made to look at the forest industry sector in the light of the growth problems of economies at the beginning of their development processes. Forests are a most important asset of a country's wealth – an asset that even very poor countries possess or could possess – for they provide a renewable raw material for a whole range of industries which have acquired great importance in many industrially advanced countries. This asset is very often neglected in less developed economies, or exploited only as a raw material for export. This raises a number of obvious questions. What are the propulsive possibilities of the forest industries sector for the less developed areas? What can the role of this sector be in a development program aimed at attaining self-sustained growth?

To answer these questions vague and general considerations on what *prima facie* appear to be the merits of forest industries will not suffice. Economic theory and techniques of development programing have progressed considerably in the past few years. Although the field is certainly not clear of controversy and many unsolved points yet remain, substantial agreement has been reached as to the criteria which should orient choices and as to the data which are necessary to apply the criteria in practice. Thus sector analysis should follow

the main lines set by general economic analysis, if the necessary integration between the two for the purposes of development is to be reached.

We shall therefore start by reviewing in general terms some of the considerations relevant in sector analysis, and by defining the data and the elements of knowledge needed to appraise the economic possibilities of the forest industries sector.

Development aims - a political choice

Underdevelopment is a relative and to some extent a subjective notion. Some economies are defined as underdeveloped insofar as there are others which are more developed; and the former "are those which are dissatisfied with their present economic condition and want to develop." [1] For such countries economic growth has become or is becoming a matter of ideology, since it is bound up with the achievement of a truer independence – economic as well as political – and of higher standards of human dignity as well as of material well-being for the population. An understanding of the fact that development in its aims and motivations is not solely a matter of economics is essential in order to avoid false controversies on a number of points, and to apply economic tools with more accuracy and to better purpose.

First among these points is the need for public intervention. This follows almost by definition from the decision to change the existing situation of backwardness and from the fact that the existing situation is frequently the outcome of nonintervention or intervention of the wrong kind. If that decision is accepted, there can be no argument as to whether a power external to the market, for example, the state, should interfere with the "free play of market forces." In underdeveloped economies the object of intervention must be defined in very broad terms; since it is a question not of a single sector or of a single area, but of the whole economy lagging behind, intervention should, directly or indirectly, in milder or more energetic form, embrace the whole system. This, of course, amounts to saying that planning is necessary, meaning by planning the over-all co-ordination of public intervention in various fields, aimed at attaining clearly defined and mutually consistent targets of policy. Over-all planning does not necessarily mean direct public intervention in all fields. It is compatible with the predominance of private enterprise (provided it is guided by an adequate system of incentives and sanctions). It means essentially awareness of the ends to be reached in the first place, and then systematic programing of the use of all the available policy instruments with these ends in view.

From this approach to development policy it follows that, once the plan frame is defined, a number of excessively debated issues, such as the demarcation of public and private sectors, or the contraposition of agricultural development to industrialization, take on a truer significance. The solution of these and other similar problems cannot be reached in the abstract, but must be instrumental to the final aims, and even more important, the actual administration of the plan. This also applies to a large extent to the controversy of light versus heavy industry or more generally of immediate welfare versus long-term growth. In all cases, while the solution will depend on the structural conditions and the physical endowments (that is, the data) of the economy concerned, the main element of choice is political, since the definition of the general ends of the plan is mostly the result of a political decision.

Financial appraisal and social evaluation

A second and equally important consequence following from the principles stated above concerns the evaluation of benefits and costs of investment policies and projects. Benefits and costs should be estimated with reference to the aims set in the plan, and policies and projects be classified accordingly. Since the aims of the plan or more generally of development policy concern the entire community and not single producing agencies, it is not surprising that this kind of evaluation may diverge, and indeed will often diverge, from the private criteria of evaluation.

The principle of distinguishing between private evaluation and social evaluation – between financial appraisal (in terms of monetary returns in the short run or to special groups) and economic appraisal (in terms of both short and long-term returns to all people affected) – has already full acceptance in the advanced economies for all the so-called public utilities, that is for sectors of general interest in which it is admitted that financial benefits and costs to particular firms may not coincide with the

[1] Robinson J., Notes on the theory of economic development. In *Collected economic papers*. V. 2. Oxford. Blackwell. 1960. p. 96-97.

benefits and costs for the community. The good reason why the same principle has a much broader application in less developed economies is that in such conditions, at least for a time, nearly all economic activities must be considered as public utilities since the historic trend has shown a general divergence between private and social interest.

Private and social evaluations may diverge for reasons which have their origin in micro- as well as macro-economic, in static as well as dynamic, considerations. First of all the price system in an underdeveloped economy is often not "significant," that is, is not such as to insure either a technical or an economic optimum, since it does not reflect the relative scarcity of goods and factors; nor, *a fortiori*, does it reflect the scale of priority established in a development policy. Secondly, a given investment project may have a number of "secondary" benefits which do not appear in the form of money returns to the firms most directly involved, but which should be included in an economic appraisal; these consist essentially in "the increase in net incomes in activities stemming from, or induced by, the project." [2] Finally, account should be taken of secondary effects from a dynamic point of view. These can be grouped under the heading of external economies of production and consumption: investment in a propulsive sector will on the one hand create favorable conditions on the supply side for investment in other sectors; on the other hand, through its demand for inputs and through the new demand arising from the higher incomes of the newly employed, it will enlarge the market for other industries, thus providing the incentives for new investment on the demand side. This last consideration reflects the fact that, with lack of capital, lack of demand is also a most important obstacle to development.

The data needed for investment decisions

Whichever investment criterion is adopted certain types of data are needed to evaluate the economic impact of investment in a given sector. These can be grouped as follows:

Technological data

Such data regard the shape and the range of the production function. Independently of whether the choice is oriented toward higher or lower capital intensity, it can be said that the wider the range of the production function (that is, the higher the number of techniques available), the more suitable, *ceteris paribus*, a sector is for investment in a less developed country, because the possibility of adaptation to the general aims of policy and to the structural conditions of the country is greater. The study of the production functions requires:

(*a*) a knowledge of the internal structure of the sector (the wider and the more integrated this is, the greater the flexibility in decisions, owing to the possibility of combining different techniques at different levels of production);

(*b*) a knowledge of labor productivity, value added, capital output ratio and surplus per unit of output and capital for each technique available; in this connection it should be noted that the production function relevant for an underdeveloped economy does not necessarily coincide with that of a more advanced country; technical progress has undoubtedly been biased by factor availability and prices of advanced countries, and there are possibilities, to which not enough thought has yet been devoted, of devising techniques more suitable to different conditions.

Investment and cost data

These data are needed not so much for estimating actual production costs, which vary with input prices, as for checking the consistency of projects against the availability of funds and the size of the market. Technological indivisibilities may prevent the adoption of a given technique at less than a certain minimum scale, which might turn out to be too large relatively to the size of the market and to the amount of funds available. This group of data can also include the physical characteristics of inputs and outputs, the relative weight of which plays an important role in deciding to what extent a sector has, in a given country, a relative advantage *vis-à-vis* the rest of the world and where the industry should be located.

[2] This is the definition given in: United States Interagency Committee on Water Resources. Subcommittee on Evaluation Standards. *Report to Interagency Committee on Water Resources; proposed practices for economic analysis of river basin projects.* Washington, D.C., 1958.

Demand data

These data, on the other hand, give an idea of the importance of the sector and condition the choice of techniques and sizes. Demand projections also make it possible to estimate the gross import saving effect of investment in a given sector.

Secondary and indirect effects

Some of these effects belong to the general category of external economies. Others are more precisely connected with the creation of a new supply of some goods or service which will stimulate the development of other activities outside the sector. Still others stem from the creation of new demand which widens investment opportunities in other sectors: this happens through increased consumption expenditure by the newly employed, and through the input requirements of the new producing activity. The degree of backward and forward linkage of a sector with other sectors is considered a very important index of priority in sectoral allocation, since it measures the cumulative expansionary effect that a given investment may have on the whole economy.

In the following sections an attempt will be made to provide some of the data and elements of knowledge listed above for forest industries. We shall start with an assessment of present and future demand conditions for forest industries products, since these constitute an essential frame for the problems we are considering.

The products of forest industries in the economy – present and future

In this section we shall: (*a*) examine the structural characteristics of the demand for forest products, their role in the world economy, and the interdependence between forest industry and other sectors; (*b*) illustrate the present situation of production, consumption and trade of forest products in the two great blocks [3] into which the world can today be divided - the developed areas such as western Europe, North America, the U.S.S.R., Oceania and Japan, and the less developed areas in Africa, Latin America and the rest of Asia; (*c*) analyze the dynamic characteristics of demand for forest products in order to estimate its prospects in the less developed areas; (*d*) draw some conclusions regarding the extent to which future requirements should be satisfied by local production in the less developed areas.

Structural characteristics of demand

Even if one decided to overlook the variety of products, techniques and economic organizations of the sector under examination, some major distinctions must nevertheless be traced inside it. Wood removed from forests can be used either as fuelwood or for industrial purposes; here we shall only be concerned with industrial wood, since it is evident that fuelwood is secondary [4] from the point of view of economic growth. Industrial wood can be employed either in uses where, though undergoing several transformations, it maintains intact its chemical and physical structure, or as a raw material in chemical processes where it loses, so to speak, its individuality. Thus we have on the one hand sawlogs transformed into sawnwood, which is in turn used for construction, shipping and manufactured products; veneer logs, transformed into veneers, plywood and blockboard, also used for construction and manufacture; logs transformed into sleepers; pitprops, piling and poles. And we have, on the other hand, pulpwood transformed into pulp by mechanical and/or chemical action, and then manufactured into paper and paperboard. An intermediate position between these two groups is occupied by two more recent products – fibreboard

[3] The main justification for this crude dichotomy (with debatable components in either block) is statistical convenience.

[4] Secondary, but by no means negligible. Examples of a situation where fuelwood can contribute to economic growth are: (*a*) in heterogeneous hardwood forests, if alternative fuels are expensive or unavailable, species of negligible commercial value can be used to power wood transformation industries; (*b*) several successful iron smelting operations make use of wood charcoal, thereby reducing the need for good coking coal; (*c*) in fuel-hungry south Asia, where most dung is burned instead of being returned to the soil, village fuelwood plantations may be the key to a rise in agricultural productivity.

and particle board; from the manufacturing point of view they are nearer to the second group, but from the point of view of demand characteristics they should be considered in the first group, since they are employed in much the same uses as sawnwood and plywood.

In physical terms sawlogs account for a much greater volume than pulpwood. By far the most important use of sawnwood is construction, followed by packaging and manufacturing; the latter, however, covers an enormous number of products – from furniture to railroad cars, parts of motor vehicles, handles, toys, ladders, and pencils. In residential building wood is essentially used for framing, sheathing, millwork and flooring. The major pulpwood product is paper, followed by paperboard; and the most important types of paper are newsprint, printing paper, paper for wrapping, and bags.

It is unnecessary to give further details to show that wood products, directly or indirectly, must have a large share of final demand, and a share which is spread over a very large number of items. [5]

Both these facts are confirmed by quantitative observations. In 1953 the sector of forest and forest products (including both wood products and furniture and paper and paper products) accounted for 7.2 percent of the total value added and for 9.25 percent of total world employment of mining and manufacturing industries in the world, thus ranking fifth among industries in terms of value added and fourth in terms of employment. [6] The breakdown for the two main branches is the following: 4.2 and 3.1 percent of value added and 7.9 and 2.2 percent of employment respectively for wood products and furniture and for pulp, paper and paper products. This shows a remarkable difference between the two main branches in labor productivity, which is higher than the average in paper and paper products and much lower than the average in the other branch.

The "spread" of uses of forest products, or rather the extent to which they enter into other products (the degree of indirectness of the sector), is evidenced, with some limitations, in the available studies of interindustry interdependence by means of input/output tables. Two coefficients are relevant in this connection: the ratio of the value of purchased inputs to that of total production of a sector, which indicates how far production in a sector "involves the indirect use as compared to the direct use of capital and labor;" [7] and the ratio of the value of intermediate demand to that of total demand for the products of a sector, which shows the extent to which the sector "sells its output for further use in production." [8] These ratios for a given sector should be compared with the average or mean values of the ratios for the whole economy. This comparison is provided in Table III-1 for four countries – Japan, Italy, the United States of America, and Norway – which shows the average ratios for the economies as a whole and the ratios for wood and wood products and paper and paper products taken separately.

TABLE III-1. - INDICES OF INTERDEPENDENCE OF FOREST INDUSTRIES

	Ratio of value of purchased inputs to value of total production			Ratio of value of intermediate demand to value of total demand		
	Average all industries	Wood and wood products	Paper and paper products	Average all industries	Wood and wood products	Paper and paper products
Japan	48.7	68.2	62.8	46.1	29.6	80.2
Italy.....	43.8	71.6	53.8	41.1	43.1	75.3
United States ..	42.6	42.1	56.6	41.9	40.4	79.2
Norway	36.4	51.5	55.7	30.4	29.1	42.5

SOURCE: Based on CHENERY H.B. and CLARK P.G., *Interindustry economics*. New York, Wiley, 1959, p. 230.

It appears from these figures that in both subsectors and in all countries (with the exception of the United States for wood and wood products) the ratio of the value of purchased inputs to the value of total production is considerably higher than the average; it should be noted, however, that the purchase of inputs is concentrated, as is to be expected, in agriculture and forestry, from where the raw material is taken. More significant, as an indication of the linkages of the sectors considered with the rest of the economy, are the ratios of intermediate demand to total demand. Here there is a divergence between paper and paper products, where the value of the ratio is very much higher than the average, and wood and wood products, where it is lower (though not very much lower) than the average.

[5] The major wood transformation industries, and the uses to which their products are put, are shown graphically in Figure 1 on page 000.

[6] UNITED NATIONS STATISTICAL OFFICE, *Patterns of industrial growth 1938-1958*. New York, 1960.

[7] CHENERY H.B. and CLARK. P.G., *Interindustry economics*. New York, Wiley, 1959, p. 205.

[8] *Op. cit.* p. 201.

This is essentially due to the fact that in input/output tables, construction is included in final demand; as a consequence the share of wood and wood products used in construction, which would normally be considered as intermediate products (for example, wood for framing and sheathing or for concrete forms), appears only in final demand. Thus the values of the second set of ratios tend to be undervalued for wood and wood products relative to other sectors. When this is taken into account, and considering the high values of the ratio for paper and paper products, we reach the conclusion that the sector of forest products as a whole has a high degree of indirectness and of interdependence with other sectors.

Consumption, production and trade

Table III-2 gives, for the two groups of areas, developed and less developed, the production, total consumption and consumption per head of the main categories of forest products. Several striking facts emerge from this table.

The production of forest products is very heavily concentrated in the developed world. Consumption is even more highly concentrated, the less developed areas relying on the advanced regions for a substantial proportion of their supplies of certain categories. At the same time the population of the less developed areas is over twice that of the developed areas. Thus consumption per head of forest products in the less developed areas is extremely low: one seventeenth of that in the developed areas for sawnwood; one twenty-third for paper and board.

The position of less developed areas *vis-à-vis* the rest of the world is further illustrated in Table III-3. Also in the case of forest products the less developed countries are exporters of raw material and importers of manufactures; they export sawlogs; are more or less in balance, in quantities, for sawnwood (considering that their deficit is to a large extent due to the lack of coniferous forests, so that in aggregate they are exporters of broadleaved sawnwood but importers of coniferous sawnwood); and they are net importers of fibreboard and especially of pulp, paper and board. (The table does not include wood manufactures, such as furniture.) As a result, in spite of their very low level of consumption, the less developed countries show a net deficit in value terms. Not only is the unit value of products much higher than the unit value of materials (though not by so much as in the case of products of other industries, since raw material accounts for a very large part of inputs, especially in wood products), but also the value of imports is increased, relatively to the value of exports, by the whole amount of freight, which, for the largest

Table III-2. - Production and consumption of forest products, 1957-59 average

	Unit	A Developed areas	B Less developed areas	Ratio A:B
Population (1958)	Million	923	1 956	Just under half
Production				
Industrial wood	Million cubic meters (r)	842.9	103.2	8
Sawnwood (including sleepers)	Million cubic meters (s)	288.3	[1] 33.7	8
Wood-based panel products	Million cubic meters (r equiv.)	38.01	[2] 3.04	13
Paper and board	Million metric tons	60.0	3.4	18
Apparent consumption: total				
Sawnwood	Million cubic meters (s)	286.7	[1] 35.0	8
Wood-based panel products	Million cubic meters (r equiv.)	38.3	[2] 3.0	13
Paper and board	Million metric tons	58.1	5.3	11
Apparent consumption: per 1,000 capita				
Sawnwood	Cubic meters	310.0	18.0	17
Wood-based panel products	Cubic meters (r equiv.)	41.7	1.5	28
Paper and board	Metric tons	63.0	2.7	23

[1] Including an estimate of 9.4 for unrecorded production. – [2] Including an estimate of 0.61 for unrecorded production.
Note: (r) = roundwood; (s) = sawnwood.

TABLE III-3. - TRADE OF LESS DEVELOPED AREAS, 1957-59 AVERAGE

	Unit	Quantity			Value		
		Exports	Imports	Net trade [1]	Exports	Imports	Net trade [1]
		Million stated units			*Million* $		
SAWLOGS	Cubic meters (r)	7.6	1.2	+ 6.4	152.3	40.0	+ 112.3
SAWNWOOD							
Coniferous	Cubic meters (s)	1.5	3.6	— 2.1	68.8	155.3	— 86.5
Broadleaved	Cubic meters (s)	1.6	0.8	+ 0.8	83.5	46.7	+ 36.8
Sleepers	Cubic meters (s)	0.2	0.2	—	5.7	29.3	— 23.6
Veneers	Cubic meters (s)	0.07	0.02	+ 0.05	4.6	3.9	+ 0.7
Plywood	Cubic meters (s)	0.18	0.25	— 0.07	21.5	24.7	— 3.2
Fibreboard	Metric tons	0.04	0.08	— 0.04	3.3	10.2	— 6.9
Particle board	Metric tons	0.02	0.02	—	1.1	2.1	+ 1.1
Pulp	Metric tons	0.06	0.57	— 0.51	9.9	83.4	— 73.5
Newsprint	Metric tons	0.03	0.91	— 0.88	3.6	152.3	— 148.7
Other paper and board	Metric tons	0.05	1.05	— 1.00	13.1	258.6	— 245.5
TOTAL VALUE [2]					406.0	873.0	— 467.0

[1] + = export surplus; — = import surplus. - [2] Including some manufactured products (SITC 24, 25, 63, 64).
NOTE: (r) = roundwood; (s) = sawnwood.

part, accrues to developed regions who own the largest share of merchant fleets.

The final figures in Table III-3 show a net overall deficit in value terms (for SITC Divisions 24, 25, 63 and 64) of U.S.$467 million. Besides the items listed in the table, this figure includes certain manufactures of wood and paper. It excludes, however, many finished goods of wood and paper, such as furniture, prefabricated houses, books, newspapers and other printed matter, and so on. Were these included the deficit would be considerably greater.

This situation is all the more striking considering that many of the less developed areas have their raw material ready at hand, and that not all the deficit sectors necessarily require, as will be seen later, exceptionally complex techniques.

DYNAMIC CHARACTERISTICS OF DEMAND

In estimating demand trends for forest products the main variable to be taken into account, as in the case of all other products, is income. However, a rather precise relationship between income and consumption holds only for pulp products. In the case of other forest products this relationship is complicated by the interaction of other factors, and especially by an interdependence, which becomes relevant particularly in low income areas, between demand and supply.

Very high correlations have been obtained between consumption per head of paper and board and national income (normally gross national product) per head. These relationships hold both for paper and board in total, and for the several broad categories of paper and board. They hold whether the parameters are studied in space, through cross-sectional analysis, comparing many countries at a given time, or in time, comparing the evolution of consumption and income in a given country or region over a period of years.

The relationship is not a linear one; in fact, income elasticity declines as income rises. Thus at income levels of around $100 per head, elasticity is as high as 2.5 to 3; at levels of around $200 to $400 per head, it ranges from about 1.5 to 2.5. At European income levels, roughly $500 to $1,000, it is well over unity. For the United States of America, with an income per head of well over $2,000 it is below unity for most categories. [9]

This decline in elasticity as income rises applies to each of the major categories of paper and board as well as to paper and board as a whole. But the decline is not uniform. Thus at low income levels of $50 to $150 per head the elasticity for

[9] FAO. *World demand for paper to 1975*, Rome. 1960.

cultural papers (newsprint, printing and writing paper) is somewhat higher than that for industrial papers (other papers and paperboard). At $200 to $250 per head the elasticity is about the same – something under 2. At higher income levels, from $800 and up, the elasticity for industrial paper is much higher than that for cultural papers. These data lead to the conclusion that a remarkable expansion in the demand for paper and paper products is to be expected in the less developed countries – an expansion much more rapid, for equal rates of income growth, than in more advanced countries.

There has, in fact, been a marked increase in consumption per caput of paper and board in the less developed world over the last decade, as the figures in Table III-4 show:

TABLE III-4. - CHANGES IN PER CAPUT CONSUMPTION OF PAPER AND BOARD, 1946-48 TO 1957-59

	1946-48	1957-59	Percentage increase
	Kilograms per caput		
Developed areas.....	38.6	62.9	63
Less developed areas	1.49	2.85	91

In the light of the earlier quoted demand elasticities, it may seem surprising that relative progress in the less developed world has not been more marked. It should be recalled, however, that during the 1950s the rate of per caput income growth in the less developed areas lagged considerably behind that in the more advanced areas.

When we turn to the other principal forest products, however, it is much more difficult to pronounce with certainty on demand trends. Factors other than income heavily influence the demand for sawnwood and for wood-based sheet materials. Demand for all these products consists overwhelmingly of derived demand. In many of the end-uses in which they are employed, these products can substitute each other to a high degree. Thus for many purposes plywood, fibreboard and particle board are all technically feasible solutions, and the material adopted will depend on relative prices. Moreover, all three can take – and have taken to a considerable extent over the last decade or two – the place of sawnwood over a broad range of end-uses. Finally, there is a high elasticity of substitution in many avenues of utilization between all the products of the forest industries sector and the products of other sectors of the economy such as bricks, cement, steel in construction, metals and plastics in furniture and packaging. These considerations tend to deprive the concept of income elasticity of demand of much of its empirical relevance, since the coefficients which can be estimated on the basis of time-series or of cross-sectional analysis conceal the effects on demand of the other factors which have been mentioned.

From what has been said it is clear that the trend in demand for these products will depend largely on their price relative to each other and to the products of other sectors. Simple price relatives furnish no clear guide, however, since technical progress – which always tends to be material-saving, both for wood and for its competitors – can considerably modify the impact of relative price movements.

An assessment of the available data [10] leads to the conclusion that, taking sawnwood and wood-based panel products together, demand does increase with income, and, at low levels of income, increases at a rate equal to or greater than the rate of increase in income.

Thus for sawnwood and wood-based sheet materials as well as for paper and board economic growth will bring rapidly increasing requirements in countries at present with low incomes.

FUTURE REQUIREMENTS AND ALTERNATIVE SUPPLY POSSIBILITIES

There have recently been prepared estimates of forest products requirements in the underdeveloped regions of the world by 1970. These estimates are based largely on regional studies of timber resources and requirements presently under way, or recently completed, by FAO in collaboration with the regional Economic Commissions of the United Nations.

A substantial rise in industrial wood requirements by 1970 is foreseen in all the less developed regions (Table III-5). This increase ranges from 56 percent for Latin America to 83 percent for Asia. For the less developed areas as a whole the increase is 72 percent.

For these regions, the current decade will thus

[10] Notably detailed surveys carried out recently in Uganda, Kenya, Tanganyika and Ghana by Pringle, Arnold, de Backer and von Maydell.

TABLE III-5. - FOREST PRODUCTS: RECENT CONSUMPTION AND ESTIMATED 1970 REQUIREMENTS IN THE LESS DEVELOPED REGIONS IN ROUNDWOOD EQUIVALENT

	Sawnwood		Wood-based sheet material		Paper and paperboard		Wood used in the round [1]		Total, industrial wood	
	1957-59	1970	1957-59	1970	1957-59	1970	1957-59	1970	1957-59	1970
	Million cubic meters (r)									
Latin America	28.0	42.0	1.5	3.4	5.8	12.0	7.5	9.6	42.8	67.0
Asia (excluding Japan)	41.1	85.7	0.9	6.4	6.1	15.8	34.7	43.4	82.8	151.3
Africa	6.3	9.0	0.6	1.2	1.9	3.5	6.2	10.0	15.0	23.7
TOTAL	75.4	136.7	3.0	11.0	13.8	32.3	48.4	63.0	140.6	242.0

[1] Includes in addition to wood used in the round some miscellaneous products not included under other categories (e.g., wood for turning, cooperage and shingle bolts etc.).

bring need for an additional 32 million cubic meters (sawn) of sawnwood, 8.6 million tons of paper and board, and 8 million cubic meters (in roundwood equivalent) of plywood, fibreboard and particle board.

These estimates are relevant to the problem of investment in the sector of forestry and forest products, since they show the demand on which an expanded productive capacity could rely, or, alternatively, the cost, in terms of foreign exchange of not expanding productive capacity at a rate sufficient to meet additional demand.

Table III-6 provides a tentative estimate of these costs, under various hypotheses. Hypotheses *A* and *B* represent two extremes: under *A* it is assumed that productive capacity will not be expanded at all so that all additional consumption will be satisfied by imports, and under *B* that production will be expanded so as to meet entirely the increase in consumption (that is, leaving net imports unchanged). Both hypotheses are rather unreal, but are interesting insofar as they show that the capital cost of expanding productive capacity (hypothesis *B*) and hence of ensuring a constant flow of output, is not much greater than that of importing the required additional quantity of product in one year.

TABLE III-6. - ALTERNATIVE SUPPLY PROSPECTS FOR ADDITIONAL FOREST PRODUCTS REQUIREMENTS

	Unit: millions of	1957/59 Average annual consumption	Estimated annual consumption by 1970	Additional annual requirements	A	B		Cumulative capital requirements to 1970
					Annual cost of additional imports by 1970	Additional annual production needed by 1970	Additional annual wood requirements	
					Million $	Stated unit	Million m³ (r)	Million $
Sawlogs and veneer logs	Cubic meters (r)	51				70	70	
Sawnwood	Cubic meters (s)	35	67	32	1 600	32	(64)	800
Wood-based sheet material	Cubic meters (r equiv.)	3	11	8	314	8	(8)	277
Pulpwood	Cubic meters (r)	...				18	18	
Pulp [1]	Metric tons	1.7				5.7	(18)	1 710
Paper and board	Metric tons	5.3	13.9	8.6	1 956	8.6	(18)	2 220
TOTAL					3 968		88	5 007

NOTE: A = If all additional requirements are imported; B = If volume of net trade remains constant – e.g., all additional requirements are produced at home. (r) = roundwood; (s) = sawnwood

[1] Does not include nonwood pulp.

SUMMARY

It is now possible to draw some conclusions regarding the " demand side " of forest products with reference to less developed areas.

(*a*) Forest products account, in the world total, for a substantial share of industrial production and industrial employment.

(*b*) Consumption, however, is very unevenly distributed between the developed and the less developed regions – per caput consumption in the latter being extremely low.

(*c*) The expansion of the forest products sector is strictly connected with general industrial expansion and with the growth of income both through technological interindustry relations and through income/demand relations. The former are shown by input/output tables in the form of a high degree of indirectness of the sector; the latter find expression in high coefficients of income elasticities of demand. These relations show that, if the expansion of demand for forest products can be considered as an effect of income growth, the expansion of supply of forest products, on the other hand, owing to its forward linkages, can be a stimulus to the expansion of other sectors.

(*d*) The share of less developed areas in total production is even lower than their share in total consumption. In other words, their productive capacity is not even up to their very modest requirements. As a consequence they are heavy importers of manufactured products, although net exporters of raw material (sawlogs and veneer logs).

(*e*) The net trade situation in value terms is even more unfavorable. Transportation costs are very high for the exported raw material and are fairly high on the imported products, but transportation profits seldom accrue to the less developed areas, since they do not own important merchant fleets. On the other hand, the f.o.b. price of imported products is much higher than that of exported raw material, since the former embodies all the value added in manufacturing.

(*f*) Future prospects for the less developed areas are no brighter as far as their net trade position is concerned. Income elasticity of demand is very high, not only for paper and paper products but also to a lesser extent for wood products. Even if the rate of expansion of productive capacity continued at the rate of recent years, the net deficit would increase substantially by 1970, with a considerable addition to the already heavy burden in terms of foreign exchange. Only if something more is done can this burden be reduced. The economic problem is to see which cost is higher relative to benefits - that of investing in the sector or that of paying for increasing imports.

This problem will be considered in subsequent sections, but two things should be said immediately. First, the problem of comparing costs and benefits is economic and not financial; all benefits, direct and indirect, short- as well as long-term, should be considered and weighed against costs for the community, that is, social costs.

Secondly, the problem cannot be given a ready-made solution on the basis of the traditional doctrine of international trade and specialization. A static theory cannot account for dynamic phenomena, nor can it justify the result of past trends, such as the concentration of forest industries (or of any other industries for that matter) in more advanced areas. Traditional international trade theory takes for granted that industries are where they are, but cannot explain why they are there. Such a theory is founded on a given distribution of external economics and is valid within its limits, but it cannot be used to infer that such distribution is the optimal one or that it cannot or should not be altered. Very few advantages are really natural, in the sense that they cannot to some extent be created in the long run. In the case of forest products the natural element underlying the existing forest industry pattern might be the distribution of conifers. This in turn depends, however, on the favored position of conifers, which technical progress, especially if consciously oriented, could undermine, not to speak of the fact that it might also be possible to alter the existing distribution of conifers. In any case, all arguments in favor of maintaining the *status quo* which are based on the theory of international specialization are only valid when long-term advantages in terms of accumulation and reinvestment, and social advantages in terms of external economics, are neglected – that is, only when applied to a static context, but cease to have any relevance when the question is exactly that of creating those advantages in order to change the *status quo*.

Characteristics of forest industries

THE GLOBAL PATTERN

The simplified forest products flow chart shown in Figure III-1 demonstrates schematically the place of primary forest industries in relation to the forest on the one hand and to other branches of the economy (including final consumption) on the other. It also brings out some important interrelations between the forest industries, whose demands on raw materials are largely complementary but in part competitive, and whose products, too, are to some extent substitutive and hence competitive, but also complement each other in many respects in satisfying the needs of other sectors and of final consumers.

A general idea of the relative importance of the major primary forest industries can be obtained from Table III-7.

The contrasts between the four main groups emerge clearly from a comparison of some of the ratios involved (Table III-8).

The pulp and paper industry, followed by board products, is a good deal more capital-intensive than either plywood manufacture or sawmilling. Moreover, it yields the highest gross product per unit of raw material. Since both pulp and paper and board products operate mainly on small-dimensioned woods, do not make use of high value timbers and are in fact utilizing to an increasing extent wood residues, both from other forest industries and from forest operations, their lead over plywood manufacture and sawmilling in terms of value added per unit of raw material is even more pronounced than is shown in the table.

These aggregates and averages, however, conceal great differences in the scale of operations (and factor requirements) within each main group, as we shall see shortly when we discuss some of the principal features of each industry group in turn. First, however, we should note that there are a number of minor primary forest industries omitted from these tables: other industries concerned with wood transformation, such as charcoal, wood-wool manufacture and wood distillation; and industries concerned with the extraction and refining of tanning materials, resins, lacs, oils, and the like. Thus, total employment in the primary wood-transforming forest industries reaches close on 6 millions, while about the same number are engaged in the secondary forest industries - furniture, container, box, match and other wood-working, and various paper converting industries.

TABLE III-8. - SELECTED RATIOS: WORLD'S PRIMARY FOREST INDUSTRIES (1960)

Forest industry	Gross value of output per unit of raw material	Investment per person employed	Investment per unit of raw material	Employment per unit of raw material
	$ per m³ (r)	1,000 $	$ per m³ (r)	No. per 1,000 m³ (r)
Sawmilling	27	2.6	15	5.7
Pulp and paper	57	23.8	151	6.4
Plywood	40	4.2	45	10.5
Board products	57	9.3	74	8.0

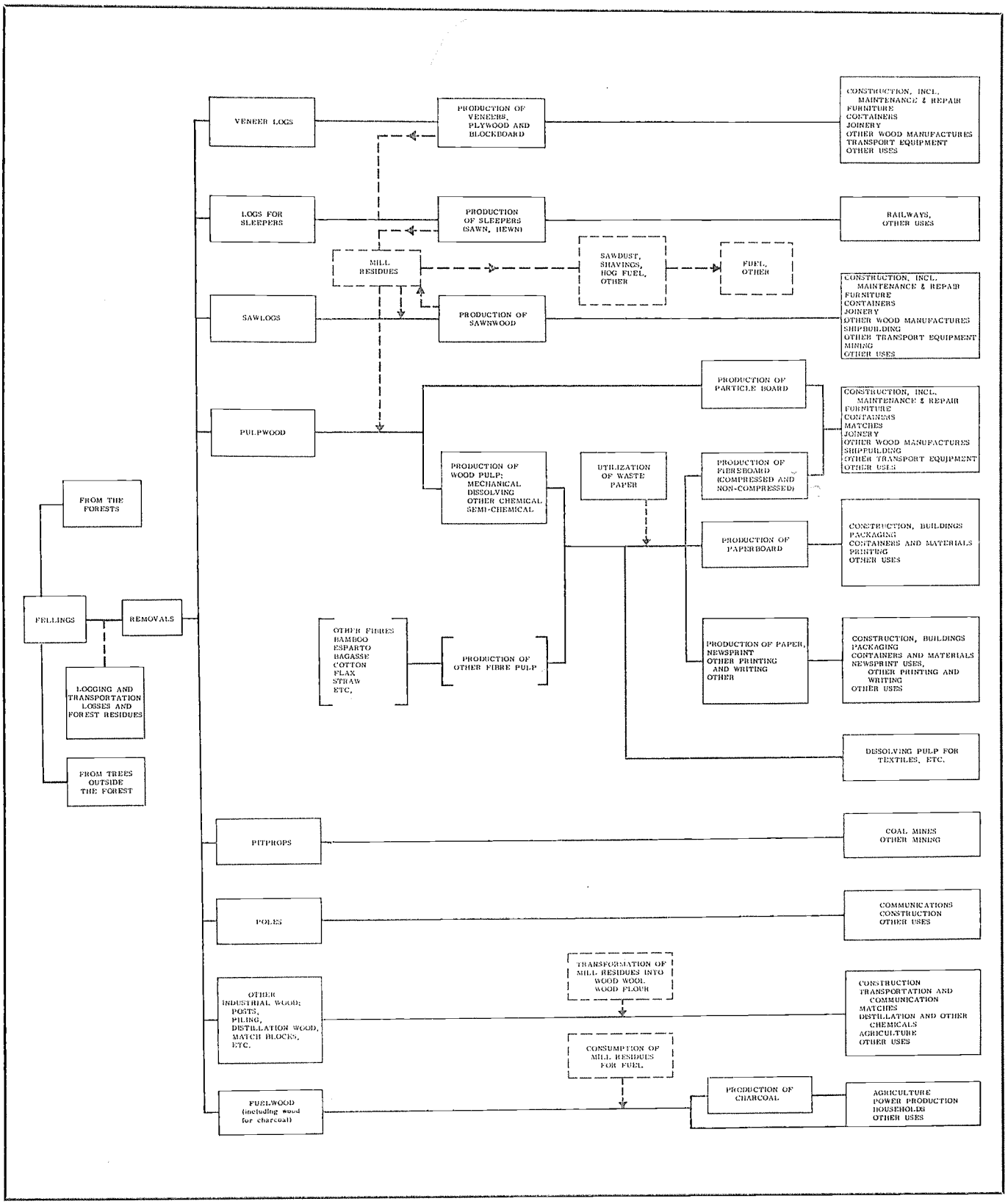
THE SAWMILLING INDUSTRY

In the sawmilling industry, the size of establishment varies from small mills (often mobile) in the forest, producing a few cubic meters a day for local needs, to highly mechanized mills with an annual capacity of several hundred thousand cubic meters, producing for export or serving large consumption centers. All have their place; optimum

TABLE III-7. - WORLD'S PRIMARY FOREST INDUSTRIES COMPARED (1960)

Forest industries	Roundwood equivalent of output		Gross value of output		Investments		Labor force	
	Million m³	%	Million $	%	Million $	%	Millions	%
Sawmilling	561	65.2	15 400	48.4	8 400	17.2	3.2	60.3
Pulp and paper ..	252	29.3	14 300	45.1	38 000	77.8	1.6	30.2
Plywood	38	4.4	1 500	4.7	1 700	3.5	0.4	7.6
Board products..	10	1.1	573	1.8	740	1.5	0.08	1.9
TOTAL	861	100.0	31 773	100.0	48 840	100.0	5.3	100.0

FIGURE III-1. - FOREST PRODUCTS FLOW CHART



size and location can be determined only in the context of raw material supply, markets served, and communications between the two. Communications bulk largely in determining location, given the high incidence of transport costs on the raw material delivered mill and the finished product delivered to the market. Value added in processing is small, and economies of scale in the mill installation not of decisive importance. Typically the cost of logs delivered mill represents 50 to 70 percent of mill production costs. Because of this, and because of the need to carry an adequate stock of logs to assure continuous operation and of processed sawnwood to meet customers' requirements, working capital needs are heavy, often amounting to as much as fixed investment.

Labor needs vary within very wide limits, depending on the type of material sawn, the degree of mechanization and, of course, on the efficiency of operations. To produce 1 cubic meter of sawn softwood in a mill of 10-15,000 cubic meters of annual capacity in a less developed European country requires 10 to 14 man-hours; in a larger mill of 20-35,000 cubic meters of annual capacity, only 7 to 10 man-hours are needed. The more homogeneous the log intake, the greater the possibilities of mechanization and labor-saving. Hence, labor productivity (as measured by output per man-hour or man-year) is normally much higher in sawn softwood mills than in mills sawing hardwood. In predominently coniferous forest areas – North America, the U.S.S.R. and northern Europe – softwoods comprise 85 to 95 percent of the raw material for sawmilling as compared with 10 to 40 percent in Asia, South America and Africa.

International trade in coniferous sawlogs is only about one third that in hardwood sawlogs; moreover, a much smaller proportion of the trade is intercontinental. The interregional hardwood sawlog trade consists mainly of tropical timbers. It is obvious that advantage would accrue to the developing countries if a greater proportion of their tropical timbers could be processed before export. Indeed, several countries have successfully adopted measures to favor exports of sawnwood instead of logs. There are limits, however, to what can be achieved in this direction since technical factors, perhaps no less than political factors, have determined the way in which this trade has developed historically.

International trade in tropical hardwoods includes a variety of stock, constructional timbers, but consists mainly of higher value woods for use in furniture, etc. In the past there have been many developing countries, for example in west Africa and central America, which have achieved a considerable export of hardwood logs, and sometimes also of sawn hardwood, while the domestic market has absorbed little or no sawnwood. Today, domestic markets for sawnwood are beginning to grow. If efforts are made to find local markets for secondary species (perhaps after treatment) and subexport grades of the better-known species, the cost of forest operations can be reduced, exporting power strengthened and perhaps, in some cases, the way opened for more processing before export. With greater emphasis in the developing countries on centrally-inspired programs for housing, school building and so on, there are new opportunities for positive action in this direction.

A large proportion of the raw material entering the sawmill, a proportion ranging from 25 to 50 percent – perhaps averaging 40 percent for the world as a whole – emerges from the process in the form of slabs, edgings and sawdust. This material, at one time wasted, today can be almost all turned to industrial account if there are appropriate forest industries in the vicinity to use it. The slabs and edgings can be chipped for pulp or board manufacture and even the sawdust and shavings from planing mills can be utilized in other wood-processing industries. The possibility of utilizing sawmill residues has already considerably modified the economics of sawmilling in the developed areas of the world and has in many cases encouraged the integration of forest industries.

As yet, these potentialities have scarcely been realized in the developing countries. But if in most of these countries the time is not yet ripe for creating giant integrated forest industry complexes, there are few where it is not already possible to introduce successfully one or more small industries operating wholly or partly on mill residues, manufacturing particle board, or wood composition boards or blocks for constructional purposes. Alternatively, when a new sawmill is planned, the possibility of associating with it from the outset such a related enterprise may enhance both its prospective financial return and its social evaluation.

Sawmilling is usually the first forest industry to be established. It does not require a high degree of technical skill on the part of its labor force, but only on the part of a few key technicians. It is much more flexible in location, in size of plant, and in finished product than any of the other primary forest industries. If export demand is good, the industry

TABLE III-9. - RELATIVE IMPORTANCE OF VARIOUS COST ITEMS IN THE PRODUCTION OF PULP AND PAPER

Cost item	Mechanical pulp, integrated	Chemi-groundwood integrated	NSSC - pulp [1] (broadleaved wood) integrated		Sulphate pulp [1] non-integrated				Newsprint, integrated mechanical pulp	NSSC - [1] corrugating board integrated
			Unbleached	Bleached	Unbleached conifers	Bleached				
						Conifers	Broadleaved wood	Straw		
	Percentage of the total production cost at the mill									
Fibrous raw material	40	29	36	32	50	43	35	32	39	31
Chemicals	—	12	3	18	4	12	14	15	—	3
Other materials	3	3	4	3	3	3	3	3	4	5
Power, steam, water ...	21	18	12	10	2	4	5	5	15	13
Labor, incl. repair	7	7	9	7	7	6	8	8	9	9
Supervision overhead ...	5	5	5	4	6	5	6	7	5	5
Capital costs	24	26	31	28	28	27	29	30	28	34

[1] With recovery of chemicals: NSSC - neutral sulphite semi-chemical process. Production capacities: about 100 tons per day.

can concentrate on high-quality production of lumber to dimensions required by the overseas market, using substandard production resawn for the local market. Should export demand cease or require different specifications, the industry can quickly adapt itself to the changed requirements.

THE PULP AND PAPER INDUSTRY

Second of the primary industries in terms of raw material requirements and value of output, but far and away the largest in terms of capital invested, the pulp and paper industry has grown rapidly in recent years. During the decade 1950 to 1960 world production of pulp rose from 34 million tons to 59 million tons, and of paper from 43 million tons to 74 million tons.

This industry is much more heavily localized than the sawmilling industry, mainly because, although wood costs represent the main item in total production costs and a cheap wood supply is essential, other process materials and production factors assume considerable importance. [11] The pattern of production costs varies considerably with the process used, the size of plant, the location, and according to whether the process is integrated (pulp and paper) or not. Some of the main characteristics are deducible from Table III-9.

While wood costs still represent one third to one half of total production costs, it will be observed that first, capital charges are high; secondly, process chemicals assume a considerable importance, especially for bleached grades; thirdly, power, steam and water represent a very important element; and fourthly, labor costs are relatively small.

Obviously wood costs have an important, though not, as in sawmilling, a dominant influence on total costs. The wood costs shown in Table III-9 are for wood delivered mill; labor represents the major element in this cost. Thus, while the mill operation itself is not labor-intensive, the associated forest extraction operations are so. Investment needs for this industry are certainly heavy. Typical requirements (fixed investment in the mill only, excluding working capital and any necessary infrastructural investment) for medium-sized mills of 100 tons per day capacity (or 30 thousand tons per year) in a less developed country range from $12 million to over $20 million, depending on location, process and production program.

More than one half of this investment consists of equipment, engineering fees, etc., normally requiring foreign exchange outlay in a less developed country. On the other hand, pay-out time (total investment divided by annual gross output) is not high – ranging from eighteen months to three years.

However, there are a number of indivisibilities in the technological process which make for sizable economies of scale. These are particularly pronounced for newsprint and for kraft pulp and paper. A general indication of the variation of capital costs with size of mill for some typical mills is afforded by Table III-10.

Clearly, given the high impact of capital charges on production costs, a small mill must enjoy com-

[11] Nonintegrated paper production operating on purchased pulp, and production using a substantial furnish of waste paper or non-wood fibres, are not, of course, tied to the wood supply.

TABLE III-10. - INFLUENCE OF TYPE AND SIZE OF PULP AND PAPER MILLS ON FIXED INVESTMENT

Mill type	Daily capacity, metric tons			
	25	50	100	200
	Fixed investment in 1,000 $ per daily ton			
NONINTEGRATED				
Unbleached chemical pulp	235	175	135	105
Bleached chemical pulp	325	240	190	150
INTEGRATED				
Unbleached paper ..	300	230	180	140
Bleached paper	390	295	235	185

SOURCE: *Report of FAO/ECAFE conference on pulp and paper development prospects in Asia and the Far East. Tokyo. 1960.*

pensating advantages to compete successfully with a larger rival.

Power requirements are also high, normally ranging from 350 to 550 kilowatt-hours per ton of bleached sulphate pulp to 1,700 to 2,000 kilowatt-hours per ton of newsprint. Hence the importance of cheap power supplies, especially for mechanical pulp and newsprint. Conversely, this industry, as a major industrial consumer, can assure power developments a needed outlet, thus influencing the feasibility of projected hydro works.

The fresh-water requirements in pulp and paper manufacture are quite high, especially for bleached grades of chemical pulp and certain special papers. Typical needs (in cubic meters of water per ton of pulp or paper) are: groundwood, 50; unbleached sulphate pulp, 300; bleached sulphate pulp, 450; dissolving pulp, 600; newsprint (integrated with groundwood), 100; kraft paper (integrated with pulp), 400; paperboard (integrated with pulping of straw and waste paper), 400; and cigarette paper up to 1,000. An integrated paper mill with a daily output of 100 tons consumes about 40,000 cubic meters of water, which equals the needs of a city of some 150,000 inhabitants; in Finland forest products industries account for about 80 percent of the entire water consumption. [12]

For the production of chemical pulp considerable quantities of chemicals are required, both for cooking and bleaching. Thus, for every 1,000 tons of bleached pulp produced, 200 to 500 tons of chemicals are consumed. This shows the importance, so far as chemical pulp operations are concerned, of convenient access to the basic materials, salt and limestone.

The bringing of large quantities of raw materials to the mill, and the shipping of the finished product, entails a considerable transport problem. Thus, for a 100 ton per day mill, daily transport tonnage may average 500 to 1,000 tons, and considerably exceed these figures at peak periods. Thus, not only is good transport organization necessary: heavy expenditure may be required on transport facilities, such as roads, rail, harbors, and trucks. This point also serves to underline the intimate relationship between pulp and paper development and general infrastructural development.

Space precludes a detailed discussion of available pulping processes, and of the fibrous materials to which each is specially adapted. It is sufficient to mention here that, even though the major part of the world's pulp and paper is still made from traditional coniferous species, there are very few timbers, coniferous or broadleaved, which cannot today be pulped by one or other of the available processes, and that there are processes suited to a wide variety of nonwood materials, including bamboo, esparto and other grasses, cereal straw and bagasse (sugar cane waste). It should be added, too, that one of the cheapest sources of fiber for paper-making is waste paper, which can replace fresh fiber to a considerable extent in many grades, and wholly in some grades of paperboard. Thus, in western Europe, no less than 25 percent of paper consumed is recovered for remanufacture, and waste paper accounts for 36 percent of the fiber furnish of paper grades other than newsprint and kraft paper. The cost of waste paper is made up largely of collection and sorting costs; hence the higher and more concentrated the consumption of paper, the cheaper is waste paper as a raw material. With consumption rising rapidly in the developing countries the opportunities for utilizing waste paper are growing, and there are very many countries which could already support a small but economic paperboard production based on this material.

Though labor requirements for pulp and paper manufacture are modest, a fairly high proportion, ranging from 35 to 45 percent, needs to be skilled. Hence the need for schemes of intensive mill training when starting new projects in the developing countries.

The characteristics of the pulp and paper industry already described may have given the impression that

[12] TÖTTERMAN, HARALD, Die Wasserfragen der Finnischen Zellstoff- und Papierindustrie. *Paperi ja Puu.* 43(4)1961.

there is no scope for small-scale operations, for mills of 5 to 10 tons/day, for example. This is not so. Even in the industrialized countries, small mills often comprise 80 percent of the total number, though accounting only for some 10 to 25 percent of the total output of paper and board. These include mills making speciality papers, [13] such as cigarette, electrical and currency papers, which are almost universally produced in small units. But they include many more mills (usually nonintegrated mills) making strawboards, tissues and other grades of paper and board for local consumption. Small-scale operations have the following favorable aspects: utilization of local fibrous raw materials and reduced transport charges; local sale with low distribution costs and ready adjustment to local market requirements; adaptation to limited water supply; fewer technical personnel and skilled labor needs; relatively small capital requirements (though this will not necessarily apply to certain, high-value, speciality papers); use of locally made machinery; geographical dispersal of employment opportunities. Quality need not necessarily suffer in small-scale operations.

Thus, while it would clearly be mistaken policy to plan the long-term development of the pulp and paper industry mainly on the basis of small-scale mills, such mills can sometimes play an important part in the early stages of the industry.

PLYWOOD, FIBREBOARD AND PARTICLE BOARD

Plywood

World plywood production, around 3 million cubic meters in 1938, today stands at well over 15 million cubic meters, having more than doubled during the last decade. There has been a great expansion both in the use of hardwood plywood for decorative purposes (panels, doors, table tops and the like) and of utility softwood plywood for constructional purposes. This expansion has been largely bound up with technical developments (improved glues, surface treatments, new products), with the favorable price trend of plywood as compared with sawnwood, and with labor saving applications of plywood in the construction industry.

The most important factor in the location of plywood mills is the availability of large-diameter logs of good form, whether indigenous or imported, suitable for peeling or slicing. Much of the industry which has been built up in Europe and Japan has been based on imported tropical hardwoods. With veneer size logs becoming progressively scarcer, technical progress in the industry has concentrated on making use of smaller diameter logs and lower quality material, for example, by cutting out defects, patching and reducing core size. The transformation coefficient in plywood manufacture is fairly low, losses on conversion amounting to 50 to 70 percent (40 to 60 percent on veneer manufacture). Frequently all or part of these residues will be used as fuel for steam and power needed in the plant for hot presses, dryers, etc. But if a commercial outlet is available for them, this can have a decisive influence on the economics of operation. Blockboard manufacture is largely a branch of the plywood industry. There is also a notable trend to integrate the plywood and particle board industries, not only because the latter use the residues of the former, but also because much particle board is veneer-faced and because both industries serve the same consuming sectors, construction and furniture.

The cost of wood raw material represents 30 to 50 percent of total manufacturing costs, the other important process material being adhesives (resins, casein, blood albumen, soya bean, etc.) of which about 25 to 35 kilograms are required per cubic meter of plywood. With the growing importance of moisture-resistant and waterproof plywood, the consumption of urea and phenol resins has increased rapidly.

Investment costs, though higher than for sawmilling, are much lower than for pulp and paper manufacture - about $100-$200 per cubic meter of annual capacity. Scale economies are less pronounced than for pulp and paper; they relate mainly to power and presses, only mills operating on large quantities of homogeneous material (for example, Douglas fir plywood) and manufacturing standard grades can fruitfully introduce much mechanical handling and some automation control.

Labor needs per cubic meter of output vary substantially, depending upon the degree of mechanization, log sizes, average thickness of veneer, need for patching, and so on. In less developed countries more than 100 man-hours per cubic meter may be used if circumstances favor heavy reliance on manual handling. The proportion of skilled labor needed may range from 20 to 35 percent.

What has been said under sawmilling concerning the opportunities in developing countries for carry-

[13] For which demand is likely to be very small in countries in the early stages of industrialization.

ing out further processing before export applies also to plywood manufacture. Here it is perhaps useful to note a recent trend toward establishing non-integrated veneer plants, making green or drier veneer, to feed local or overseas plywood plants equipped simply with a press or drier and press. Such veneer mills require little investment, and can operate on a limited supply of veneer logs. Shipment of veneers saves weight and space compared with shipping logs.

Blockboard, laminated board, etc., are included in the broad category of plywood, and output of these products has increased parallel with the production of particle board. Blockboard can be manufactured almost manually, with but limited equipment. It is of considerable interest to many developing countries since it can not only replace imports, but also offers an outlet for thinnings and small-diameter logs from coniferous plantations as well as for sawmill residues.

Fibreboard

The fibreboard industry, with a world output (1960) of well over 4 million tons, has many affinities with the pulp and paper industry. The problems of wood supply are similar, as is the stage of pulp preparation, if the traditional wet processes are employed. Process chemicals are not normally required, and the sizing materials and additives which impart particular qualities to the finished product do not represent an important element in total costs. Wood costs may account for 20 to 40 percent of the total, depending on the size of mill (though they may fall to 10 percent if cheap residues are available), while fixed charges (mainly depreciation and interest on working capital) may account for 30 to 20 percent, again depending on size of mill. Thus, as with pulp and paper, scale economies are significant. Fixed investment per daily ton may range from $90,000 to $100,000 for a mill of 6,000 tons annual capacity, down to around $30,000 for a mill of 50,000 tons annual capacity. In fact, fibreboard production lends itself to small-scale operations less readily than several branches of the pulp and paper industry.

An adequate supply of fresh water is required; water needs are similar to those for newsprint production. Power requirements, at 300 to 800 kilowatt-hours per ton of product, are less than for newsprint but more than for chemical pulp. Labor needs (in the mill) are modest, ranging from 12 to 40 man-hours per ton. Fibreboard production can be based on a wide variety of coniferous and broadleaved species, including suitably blended mixtures, and is eminently suitable for utilizing residues (including even bark and sawdust) from other forest industries. There is a growing trend to the use of unbarked wood.

In recent years several dry processes for fibreboard manufacture have been developed. These processes may well come to have an interest for developing countries since investment is somewhat lower and there is no need for large supplies of fresh water. Resins are, however, needed for bonding purposes.

Particle board

The particle board industry is essentially a post-war development. Over the 1950-1960 decade world production grew from about 15,000 tons to nearly 2 million tons. Like fibreboard, particle board can make use of a very wide variety of species, coniferous and broadleaved, as well as flax, bagasse, and wood residues; indeed, this industry developed in the first instance to make use of wood residues. It is, in fact, this tolerance in raw material requirements that confers on both these board industries a special attraction for countries with tropical forests, wherein frequently only a small proportion of the available timber (species and sizes) are suitable for the other major forest industries.

Investment in a particle board mill of intermediate size represents roughly half that in a fibreboard mill of comparable tonnage. Though there are economies of scale, relatively small mills can be economic, particularly if operating on locally available residues or serving a captive market. The average capacity of mills in 1956 in Europe, North America and the world as a whole, was 4,200, 2,500, and 3,500 tons respectively. Investment cost ranges from about $12,000-$30,000 per daily ton, depending on the process used and hence on the type of board produced.

There are fewer restrictions on location than in the case of fibreboard. Water is not needed. Power requirements are modest, 100 to 300 kilowatts per hour per ton of board, as are mill labor requirements, 5 to 20 man-hours per ton. A key consideration, however, is the availability and cost of resin, normally urea, or phenol resin. This bonding material, which represents about 5 to 8 percent of the weight of the finished board, may account for 15

to 35 percent of production costs, depending on the process used and the cost of resin. Thus resin costs may frequently exceed wood costs. Obviously, if resin has to be imported, this sharply diminishes the import-saving value of the project.

Miscellaneous and secondary forest industries

In addition to the major forest industries just discussed there are very many other smaller industries based on raw materials of forest origin. These are so diverse that no simple grouping is wholly satisfactory for classification purposes.

Though some of these smaller industries are little more than extensions of the sawmilling and veneer industries, they may be separately established, particularly where the existence of a suitable resource or the needs of a consumption center make this advisable. In some instances the raw materials may even be imported. Wood turning, with handles for agricultural implements and sports goods, woodenware and spools as principal products, is one example. The manufacture of match blocks in the form of sawnwood or veneer is another. Small plants (or units within larger plants) are suitable for producing shingles, pencil slats and briarwood pipe blocks, often for export, where appropriate raw materials are available. The manufacture of cooperage and other wooden containers and of wood wool are complementary to certain food and drink exporting industries as well as to the shipping of many manufactured goods. The capital requirements per unit of wood consumed are of about the same order as those for smaller sawmills. Mills may, however, be quite small in size. A large proportion of the production costs are made up of charges for skilled and semiskilled labor but this varies considerably from industry to industry. Raw material costs tend to be quite important in the total.

The chemical distillation of wood yields a large variety of products, the more important of which are charcoal and methyl or wood alcohol. When coniferous woods are used various oils and tars are also produced. In addition to its common household and commercial uses for cooking and heating, charcoal has a number of important industrial uses, such as in steel manufacture, water purification, and tobacco curing. One of the developing countries has recently made a major use of charcoal in the manufacture of Portland cement. The capital requirements for wood distillation plants are not excessive. Charcoal alone may be produced in simple pit methods requiring no capital. The other products are, of course, lost in this case.

A number of extractives from wood and bark provide the raw material for several small but important industries. Some species of pine are suitable for the tapping of a resinous exudate used for the manufacture, by a distillation process, of turpentine and resin. A considerable amount of labor and little capital are required in the industry. The trees may also be used for their timber. Products of this industry are important in a variety of chemical industries.

The production of tannins, most important raw materials in the hide and leather industries, may be based on a great number of woody and herbaceous plants. The most important sources have been the wood of the quebracho, which is common in South America; bark of the chestnut, oaks and hemlock, which were the important materials in North America and Europe; mangrove bark, common to many tropical coasts; and the bark of wattle, which has become an important plantation tree for this purpose. A wide variety of species found in the developing countries are suitable for tannin production. Export markets have been poor in recent years but domestic production for local leather industries is logical for most developing countries.

The final group of industries to be briefly summarized here are the secondary wood and paper manufacturing industries, which use as their raw materials the products of sawmills, plywood and veneer plants, board mills and paper mills. They may be closely associated with mills producing their raw materials or may, by contrast, be widely decentralized near consuming centers. Their products are most varied, supplying consumers, literally, from cradle to grave. Among the more important of the secondary wood using industries are furniture manufacturing; joinery plants producing such things as doors, window sashes, moldings, and even prefabricated houses; boat-building; manufacturing of vehicle bodies — wagons, truck bodies, etc. Although they may frequently do their own initial processing, woodturning and container plants sometimes are simply secondary manufacturing units. Paper-using plants also produce a great variety of goods, including corrugated boxes, carbons, paper bags and sacks, waxed containers, envelopes, napkins and exercise books. These industries tend as a group to be labor-intensive — calling for a wide range of skills —

and to use relatively high cost raw materials. Capital requirements are generally modest to low. Plants can often be small and decentralized but there are some economies of scale for the more mechanized. These industries can often be developed as units in industrial estates. They are often well-suited to developing countries because they tend to be labor-intensive, and can usually vary in size. Even in countries with little or no forest resource they can be operated on imported materials saving appreciable foreign exchange on the value added. Many wood-deficient developing countries are now importing products of the secondary wood and paper industries to a value in excess of their imports of all other wood and paper products. By contrast some countries in this category, such as Israel and the United Arab Republic, have developed these secondary industries to a high degree.

Characteristics of the forest base

Many of the characteristics of the forest industries which we have just discussed are determined largely by the nature of the raw material on which they operate and the conditions under which that raw material is supplied. Our assessment of the potential role of forest industries in developing countries would therefore be incomplete without at least a cursory glance at the forestry sector.

Supplying wood, the raw material of the forest industries, is the major function of the forestry sector of the economy. There are two fundamental phases of the timber-supplying forestry operation: logging, the felling and transportation of logs to the market or to the wood-user; and forest management, which is concerned with the provision of standing trees ready for felling. These two phases are intimately interwoven and, in turn, they often have a distinct bearing on the other major function of forestry - assuring the flow of nontimber goods and services inherent in the forest environment. The nonwood production of the forest is considered in a later section. Here we are concerned with the forest as the " woodshed " of the forest industries.

Some characteristics of forestry

A most striking, although not always obvious, characteristic of forestry is the complexity and variability of the production function. The forest grows, not as the simple summation of trees growing as individuals, but in a competitive race for space and nutrients in which the development of each tree affects that of its neighbors. According to environment and to their historical development forests vary from simple groups of trees of the same age and of the same species to heterogeneous mixtures of trees of many ages and of a vast number of species. Fairly homogeneous forest stands of a few coniferous species and of fairly simple age structure, which are typical of the more northern temperate areas, lend themselves well to the techniques and economies of mass production logging. The tropical rain forest with its myriad diverse species, typical of many of the developing areas, demands, in its exploitation, either a search over sizable areas for individual trees, or logging and processing techniques capable of handling most heterogeneous raw materials. Trees grow at vastly different rates, according to their species, their physical environment and the competition from their fellows. The age of felling depends not only on the numerous combinations of these factors, but also on the kind of product being cropped. Thus there may be pulpwood cut from fast-growing plantation species after six or eight years of growth, or veneer logs harvested from 200- to 300-year-old trees from the natural forest.

As a tree grows it builds upon its former frame, making it larger and larger, accumulating annual growth from year to year. Over any appreciable area, however, individual trees at various stages of their life fail to withstand competition and die. The rate of mortality is high when many trees of similar sizes are competing or when numerous individuals reach " old age." In the natural forest, except in times of epidemic losses due to disease or insects, the mortality losses balance the accumulation of annual increments and the net result of the dynamic change within the forest is little or no change in total volume of standing trees.

Natural forests do, however, represent an accumulation of past annual growths which have, gen-

erally, built up heavy volumes of large, old and frequently valuable trees. Such forests have often been exploited as a cost-free timber mine or reservoir of forest capital without regard to problems of replacement. In the early stages of development in many countries, this exploitation without renewal has enabled the accumulation of other forms of capital. Such a "free loan" has often brought in its train the social costs of abrupt declines in local economic activity and of abandoned towns. Nevertheless, exploitation of the natural forest has played an important role in the development of these countries.

The use of natural forests without concern for replacement, that is, the liquidation of forest capital, can occasionally be justified – but only under very special conditions. Normally, where continuity of supply has to be assured, there must be provision for successive croppings from the same areas. Plans and schedules for this may take a variety of forms and involve different intensities of use.

These are largely conditioned by two inherent characteristics of the forest. The first characteristic is the identity of factory and product, a characteristic shared to some extent with meat production and fisheries. The act of cropping destroys a part of the forest capital (the wood factory) but in so doing harvests as a product an accumulation of annual "interest" or growth. It is thus possible to vary the actual volume and time of harvest within fairly wide limits – to delay the harvest, storing the crop as it stands, or to accelerate the cutting temporarily, borrowing from the capital. This flexibility of the harvesting period is a characteristic of forestry which offers distinct advantages. Of course, continuous harvesting in excess of growth potential will eventually destroy the forest. At the same time, the removal of trees does profoundly affect the growth of their neighbors or permits the establishment of new trees. Thus, within limits, harvesting can promote the net growth or rate of production of the forest.

The second characteristic concerns the very large areas upon which forestry is practiced. This makes close supervision difficult, and the progress of production equally difficult to observe.

In its least intensive form forest management may differ from capital liquidation only in that it ensures a future crop, either from trees not felled at the time of the initial cut or from new trees. The most elementary approach to supply continuity consists of a simple progression of harvesting throughout the forest, returning to the first area of cutting when the next crop matures.

Most natural forests have such a variation in tree size that a complete cropping of commercial species at the time of initial felling is inappropriate. In such cases, two or more crops may be taken from a given area during the span of years that corresponds to a rotation.

Intensive management is characterized by more frequent returns to the same area. Not only are final crop trees removed; thinning, the removal of small and intermediate-sized trees, is also undertaken. This reduces potential losses through mortality and favors the growth of the remaining trees, permitting the annual growth to accumulate on fewer and larger individuals.

With increasing intensity of use come other measures, including protection from fire, insects and disease. Harvestable growth has been doubled or trebled in many well-managed natural forests by means of a wide range of techniques including thinning, weeding, pruning, enrichment planting, seed source selection, and drainage.

Planting forest trees in unforested areas or within cutover areas in the natural forest has, of course, long been a recognized technique. But plantation forestry has made spectacular advances in recent decades. Forestry genetics can assure high quality breeding material. With the use of selected seedlings, by tilling and fertilizing the soil, plantations can produce as much as ten times the growth of the natural forest.

The shift to what are essentially agrotechnical methods presents many advantages; convenient selection of species and rotation period; a more homogeneous crop, lending itself to mass production removal and processing techniques; co-use of the land with agricultural crops in the first few years after establishment; reduction of supervision and transport costs by concentration; and freedom to plan the sequence of age groups for orderly harvesting (as distinct from accepting the age patterns in the natural forest). Another distinct advantage is the possibility of complementing production from the natural forest.

Prospects for further development in plantation forestry are most promising. Incredible growth rates, particularly in tropical regions, have been obtained, sometimes with species which have done poorly in their native habitat. A promising area of investigation, as yet scarcely explored, is the application of fertilizers, trace elements and hormone

compounds. Along with more widespread and better organized research and experimentation, facilities for the exchange of information have expanded. It is the improved organization, no less than the increasing scale of research effort which guarantees new breakthroughs.

An adaptation of plantation forestry – now commonly called linear forestry – has evolved in a number of countries, usually those with much land in agricultural use. Fast-growing species are planted in rows along motor roads, railroads, canals, rivers, terrace edges and field boundaries. They have often been established as boundary markers and for their shade, windbreak and erosion control functions. These plantations have often supplied much industrial wood as well as fuelwood. In some areas, they have proved so profitable that they have led to forest plantations of the normal type on land formerly under agriculture.

The logging phase

Logging methods, in addition to being greatly affected by the nature of the terrain and by the climate, are also much influenced by the nature of the product harvested, by the structure of the forest and by the form and intensity of forest management. Methods vary from the most elementary of hand methods to heavily mechanized operations. Generally, the more highly mechanized operations have developed under one of two conditions – where a uniform forest and easy terrain encourages mass production techniques, or where difficult terrain poses special problems. Although some measure of mechanization improves efficiency, there remain many instances where hand methods, or at least methods requiring little capital, are equally or even more effective.

Logging must often have a seasonal pattern because of rainfall and resultant ground conditions, because of snow or ice conditions, extreme fire hazards, or volume of stream flow. In many cases seasonal labor requirements for logging complement those for agriculture, some types of manufacturing, and building activity.

Some advantages inherent in forestry

The characteristics described above are those which are responsible for the flexible productive function in forestry (forest management plus logging), permitting ready adaptation to conditions which vary greatly in space and time.

On the one hand, output itself may readily be varied with little change in the nature or quantity of inputs. There is at any time a considerable choice of the form in which the output will be harvested. With new opportunities opened up by the technology of processing and changed economic conditions, a shift in the product can be readily accommodated. In this way, material originally planned or grown for veneer logs or sawlogs can be used, with few limitations, for pulpwood – even after being felled and transported to a mill. Wood considered originally only of fuelwood quality may, with technological improvements, be used as pulpwood or as raw material for particle board. Much pulpwood may even be used for sawlogs. The time of harvesting is flexible within considerable limits, permitting adaptation to short-term fluctuations in demand, without danger of spoilage or excessive problems of storage.

On the other hand, there exists marked flexibility and possibility of variation in the combination of inputs. Even in the exceptional case where forest capital is liquidated without planned replacement there are a variety of choices on land input (land here in the sense of land plus forest growing stock). One can harvest little from much land, or more from less; the choice determines the relation between direct and indirect costs of harvesting. The former choice means relinquishing timbers of marginal value; but it may serve an " opening up " function over and above forest exploitation.

If, as is normal, continuity of supply is the aim, then to the choice of variation in logging input is added numerous alternatives within forest management, as well as between the two major phases of forestry. Generally, the greater the input of land, the larger is the portion of wood cost made up by logging cost; the less the use of land, the larger is the portion composed of timber growing costs. More extensive forestry over large areas calls for less labor for timber growing but more for the creation of what may be temporary infrastructure, and more into logging labor and transportation capital because of the greater distances. Plantation forestry is the extreme case of limiting land input.

In the growing of timber, time itself is an important input, which varies with the type of forest, the product and management intensity. The cost of time is interest on engaged capital; this is why

the more intensive practices tend to be associated with a short rotation period.

Evidently the many choices available, both as regards combination of input and patterns of output, give rise to numerous problems of decision. What is relevant in our present context, however, is that they also offer a multitude of possibilities in the supplying of raw material for domestic industry or for export. This range means that there is virtually no country, whatever its stage of economic development, whatever its forest endowment, for which forestry is not an appropriate economic activity. Experience has shown that, even in countries with little natural forest of value, plantation and linear forestry can transform the situation speedily, opening up entirely new perspectives.

Features of forest industries relevant to development

A general appraisal of investment prospects in the forest industries sector can now be attempted. The question is: Given a decision to undertake industrial investment, to what extent can investment in the sector under review be recommended for its short- and long-term advantages?

The individual situations in the countries included in the group of less developed regions vary greatly. Therefore, arguments and conclusions will necessarily have to be stated in very broad and general terms. The general indication they provide will apply more to some countries and less to others: this indication, however, may provide an incentive to undertake more detailed country reviews to show how far the propositions of this chapter are relevant in individual cases.

Demand expansion and import-saving effect

A partial argument for investment in the forest industries of less developed countries arises from the present situation and future prospects of demand relative to present supply possibilities. As has already been seen, the group of less developed countries, in spite of their very low levels of income and per caput consumption, already now presents a substantial deficit in net trade of forest products, and this trade deficit is bound to increase very rapidly, at least in absolute terms, unless very large investment is undertaken.

Final and intermediate goods with an income elasticity of demand as high as that of forest products (and especially of paper and wood-based panel products) pose difficult problems to developing countries. One of the most important obstacles that these countries have to face in their growth process is their balance of payments situation, since they normally have a structural deficit on current account which is likely to become bigger and bigger as the growth process gets under way. The increasing deficit is normally due to imports of the capital goods necessary for industrialization, which may be compensated for by loans and grants restoring the equilibrium on capital account, and to imports of commodities the consumption of which increases in proportion or more than in proportion to income. In order to maintain the deficit within reasonable limits, without holding in check the growth process, imports of goods other than capital goods must be restricted with tariffs and quotas, and at the same time the domestic productive capacity of previously imported goods must be expanded, so as to deal with additional requirements.

The magnitude of the import-saving effects resulting from expanding domestic production of forest products, is not by itself, however, a decisive argument for investing in the sector, since an equally relevant import-saving effect might be obtained by expanding the production of other goods with a similarly high income elasticity of demand. The heart of the matter consists in choosing which commodities should be consumed at the expense of others. Since the given amount of capital will not suffice for expanding domestic production of all goods, there will be some goods the consumption of which must be restricted in order to prevent a growing trade deficit. Hence the case for investment in forest industries cannot rest simply on the import-saving effect that an expansion of such industries would have but should be supplemented by other arguments.

Of such arguments there are plenty, stemming from structural characteristics of supply and demand, in part already examined in earlier pages.

Characteristics of the raw material and locational factors

One set of arguments derives from the nature and properties of the raw material employed in forest industries.

First, wood is the only raw material that nearly all inhabited regions of the world have available and can reproduce from existing forests, or could possess by establishing plantations. It is a general principle of development policy that priority should be given to industries processing local raw materials, since the presence of the latter in part offsets the external diseconomies that have prevented industrialization in the past. Nevertheless, it is often forgotten in underdeveloped economies that their forests – which the very lack of development has in many cases helped to preserve – are as important a source of natural wealth as mineral deposits; if properly exploited, forests represent a most important incentive to the beginning of industrialization.

A second argument for expansion of forest industries, again connected with the characteristics of forest industries inputs, rests on location theory. Of all the major raw materials, wood is usually the most difficult to transport. Not only is forestry tied to extensive areas of land, so that transport can never start from a permanent position, as it does for instance in the case of coal; in addition, wood as cut in the forest is a bulky material varying in size and shape, and the extent to which these can be altered for the sake of easier transport is severely limited by the future use of wood and by other factors. Finally, forest industries, as was shown above are typically weight-losing, and the wood raw material accounts for a substantial proportion of total production costs.

Less developed regions, though already exporters of broadleaved sawnwood and plywood, still export a considerable quantity of sawlogs, which are then sawn or felled in importing countries. Here, evidently, there is a *prima facie* case for expanding sawmilling and plywood capacity by an amount sufficient to satisfy not only growing internal demand, but also to substitute exports of processed wood for exports of sawlogs. It is a case which, for once, could find support even in the traditional theory of international specialization, since this substitution of exports would result in a net decrease in costs owing to the saving in freight. This advantage has so far been insufficiently exploited, partly for certain technical reasons (which are not, however, insuperable), but mainly because of the lack of infrastructure which characterizes all less developed countries. This, however, should no longer be an obstacle if a consistent development policy is pursued: as has already been stressed, investment in forest industries is appraised in this chapter not in isolation but in the general context of an over-all development policy which presupposes, as a preliminary step, the building of social overhead capital and implies the installation of industries also in different sectors. In this case the cost of infrastructure can no longer be considered as a cost to be borne for the sake of a single investment project in a simple sector: what was true for the colonial exploitation of one or very few export goods (and made it financially convenient to export the raw material rather than process it locally) does not apply with reference to the over-all economic growth of a country. [14]

Location factors are similarly important for wood-based panel products and for pulp and paper. For the manufacture of many grades of paper, however, an admixture of long-fiber pulp is needed, and many developing countries at present lack indigenous sources of long fiber. In the long run, adequate forestry development can usually fill the gap; in the short run, long-fiber pulp has to be imported. In the meantime there are often excellent prospects for the local manufacture of short-fiber pulp to be combined with imported long-fiber pulp in the local manufacture of paper.

An even better utilization of local resources will, of course, be attained as technical progress leads to the substitution of the types of wood which are locally available for those which have to be imported – especially of broad-leaved sawnwood and wood-based panel products for coniferous sawnwood and of short-fiber for long-fiber pulp in paper manufacture.

Technological advantages of forest industries

Another set of arguments in favor of forest industries rests on the characteristics of the technologies in use in the industries themselves. It was pointed out earlier that the wider the range of the production function and the greater the flexibility

[14] The same reason suggests that in the long run, where possible, a policy of forestry development should be followed that aims at creating the supply of the types of wood (especially conifers) which are now lacking, in order to minimize the burden of necessary imports.

relative to scale, the more suitable a sector is for investment in the less developed countries. Forest industries, taken individually, present these advantages.

First, in the production of the raw material, expensive mechanization can often be postponed and unskilled labor used instead. Logging often takes place under conditions where expensive mechanization is not a pressing necessity, and is sometimes uneconomical owing to the heterogeneity of the environment and of the produce. Quite often and especially in regions where it tends to be plentiful, manual labor assisted by animals or relatively cheap machinery can hold its own in competition with expensive machines. Thus the owner of a small forest industry is normally in a position to do his own logging without incurring heavy initial expenses; and, as long as labor remains relatively cheap, larger operators will also be able to postpone far-reaching mechanization in the forest. The possibility of postponing the use of expensive machinery in the production of raw material is distinctly helpful in less developed areas, since it reduces capital requirements while at the same time providing considerable employment possibilities for labor possessing only the types of manual skill commonly found in agricultural areas.

Secondly, the physical properties of wood render it relatively easy to work mechanically, so that many products can be manufactured adequately with the use of fairly simple machinery. The difficulty of transporting the raw material on the one hand, and the ease with which it can be worked on the other, make it possible for small, or fairly small, units to be economical in the manufacture of such basic products as sawn timber, veneer, and mechanical pulp: the proximity of raw material supplies, and sometimes also the possibility of selling locally a large part of the product, go a long way toward compensating for the disabilities of size. Where conditions are favorable, the manufacturing unit can be increased step by step, as additional capital and qualified manpower become available. Even certain types of integration are possible on quite a small scale. This possibility of growth by degrees is very useful in developing economies.

Demand for forest products: indirect advantages and external economies

We have noted that a major problem of development policy consists in the sectoral allocation of a limited amount of capital and in deciding for which commodities production should be expanded and for which instead consumption must for some time be restricted in order to prevent a growing balance of payments deficit. Characteristics of supply, as examined so far, provide good indications for the choice; but, also independently of them, characteristics of the commodities and of the needs that they satisfy can be of help.

Many commodities with a high income elasticity of demand are consumption goods, introduced into advanced countries at relatively high income levels. These are also demanded in less developed countries in spite of lower average incomes, especially where, as is often the case, there are conspicuous inequalities in income distribution. Sometimes imitation or demonstration effects are at work. Such goods can, on all counts, be considered less essential since they satisfy less urgent needs. Admittedly this is a value judgment more than an economic evaluation; but hardly anybody would or should hesitate in the choice between better food, more clothes, and education on the one hand, and cars, radios and the like on the other. From this point of view there can be little doubt that the consumption of forest products in a country is as good an index as any of the standard of social, as well as material development of the population: in the less developed areas the products of forest industries can help the attainment of some of the essentials of material well-being and of human dignity – ranging from suitable housing and furniture to the possibilities of instruction and the diffusion of books and newspapers. There can therefore be little doubt that the sector ranks rather high in the scale of priorities that should be established in determining for which goods production should be expanded and demand completely satisfied, and of which instead consumption should be restricted.

This consideration is reinforced by the consideration of other indirect effects of investment in forest industries on the economy as a whole, mainly consisting in the creation of external economies in a broad sense.

The first group of economies to be noted are not external to the sector, but concern the mutual relations between the industries within the sector: the installation of some forest industries tends to pave the way for complementary production within the area concerned and make the sector as a whole to some extent self-propelling. Forest exploitation commonly yields wood of different kinds and

grades, and the mechanical conversion of wood usually leaves a substantial amount of residue that can be utilized by other branches of forest industry. With rising demand for wood products of different kinds on the one hand and increasing value of the raw material on the other, existing industries often provide the incentive to the establishment of new enterprises and complementary types of utilization tend to develop. In sum, the heterogeneous nature of the wood resource, together with the versatility of wood and its unwieldy character in the raw state, tend to stimulate new industrial activities within the area, often within the same enterprise.

External economies of a most important type arise from the fact that forest industries should normally be localized as near as possible to the forests, and hence are normally decentralized in the hinterland of the regions concerned. This " back-wood " character of forest industries creates a natural tie beteen them and various infrastructural undertakings. When a new road opens up forests to sawmilling and is used to transport sawn timber to the consuming centers, the economic benefits thus derived may contribute substantially toward amortizing the cost of the road; logging roads may help to extend the regional road system; the establishment of a hydro-electric plant may permit the building of a newsprint mill, which, once in operation, is bound to become a major customer of the electric plant; and so forth. This interrelation is an important feature of forest industries, notably in the early stages of development, and may be a very effective factor in preventing the occurrence of " dualism " in economic growth, that is, of a cumulative differentiation between two parts of the same region.

A further indirect advantage arises in forestry from the high flexibility of forestry work, and from the consequent possibility of utilizing labor that is temporarily idle. Due to the perennial nature of trees, neither intervention in their growth through silvicultural treatment nor the final harvest of the wood is tied to a strict time schedule; and although climatic factors associated with the seasons of the year affect different kinds of work in the forest, this influence is much less pronounced than in agriculture. Such flexibility is important in less developed areas. Since many kinds of forestry work are well suited to the employment of relatively unskilled labor, a labor potential which otherwise would be wasted can be utilized in current production or for the formation of savings in the shape of future yields of raw material.

But possibly the most important of the indirect effects of installing forest industries is of an eminently dynamic character. Forest industries can be considered a propulsive sector, that is, a sector the expansion of which is liable to induce spontaneous investment in other branches of production. This is due to the fact that the forest industries have a very strong forward linkage with other sectors. A high degree of linkage makes a sector a good starting point for industrial growth: investment there, by inducing demand and providing supplies for other sectors, widens investment opportunities in the economy as a whole and has a multiplier effect – not in the traditional sense of the word, which is based on final demand and on the consumption of income by the newly employed, but in the sense of increasing interindustry demand.

Summary

Few of the advantages of forest industries that have been listed so far can be translated into a financial evaluation, since they are not liable to find expression in terms of money. This makes it difficult to attempt a quantitative comparison of costs and benefits and a precise assessment of social profitability. All the said advantages, however, should be taken into account by planners when making decisions on the allocation of available investment resources – with particular care, since, in the case of forest industries, social benefits may sometimes be as important as the financial profit.

A tentative estimate has already been made of the financial cost of an increase in productive capacity sufficient to prevent the trade deficit from rising. The capital cost per unit of additional production is but little greater than the cost per unit of imports. But the former cost would be borne once and for all over a period of years; the latter would be a recurring cost. The total investment required over the decade – some $5,000 million – is a forbidding sum. But this must not be conceived as a sudden lump sum investment; it would be a gradual, progressively rising investment, spread over a number of years. Viewed in this light, there are no grounds for regarding such a target as unrealistic.

Analysis here has so far brought out many cogent reasons why countries in the early stages of economic development should give special attention to the establishment or expansion of forest industries. These stem, essentially, from the structural and dynamic characteristics of the demand for forest products, from the flexibility and range of the production functions of forest industries, and from the fact that nearly all the less developed countries possess unused or insufficiently utilized forest resources, or could possess them within a short space of time.

The first two points have been amply demonstrated. The third, commonly taken for granted, requires examination, since the naive assumption that unused forests spell industrial opportunity has in the past been the source and origin of much disillusionment and many disappointments.

Variety of forest reserves

It was pointed out earlier that in most developing countries the forest reserves differ considerably in composition and quality from those of the industrially advanced countries which have succeeded in building up important forest industries.

Natural conifers

Perhaps a score of these less developed countries possess significant areas of natural conifers. These consist mostly of pine species and, while some of these areas are readily accessible, others lie in remote places with difficult terrain. In general, given reasonable management, regeneration and growth rates are good – usually much higher than in the coniferous forests of North America, northern Europe and the U.S.S.R., but somewhat less than the rates achieved in the intensively managed artificial coniferous forests of, say, Denmark and the United Kingdom.

Planted forests

Quite a number of developing countries already possess substantial areas of planted forests – various types of pine, and such broadleaved species as poplar, willow and eucalypts. As has already been mentioned, phenomenal growth rates are frequently recorded in these plantations; more than five times the rate in the natural coniferous forests of the north temperate zone is quite common.

However, important as are these coniferous forests and plantations (important precisely because currently available technology is well adapted to their utilization), they are nevertheless exceptions in the less developed regions of the world. In fact, more than nine tenths of the forest reserves of Asia, Africa and Latin America consist of broadleaved forests, and these vary greatly in their nature, and consequently in the problems and prospects of their development. A brief summary of the major types will illustrate this point.

Tropical rain forests

Tropical rain forests represent perhaps the popular concept of undeveloped forest resources. These occur in greatest abundance in high rainfall areas near the equator, particularly in the basins of the Amazon and the Congo and in the peninsular and insular areas of southeast Asia, but they also range quite widely in smaller concentrations over other parts of the tropics. They cover some 1,000 million hectares and comprise 40 percent of the forests of the developing countries. The stands are dense and are composed of numerous species, only a few of which at present provide important commercial woods (such as the mahoganies, okoumé, wawa and greenheart). Of the total volume of growing stock, frequently no more than 5 to 10 percent consists of currently marketable species. The buttressed and fluted bases of the trees, and the abundant growth of climbing vines and creepers, add greatly to the exploitation problem caused by the heterogeneity of the stands.

Moist deciduous forests

Moist deciduous forests are found in tropical and near-tropical areas which have seasonal variation in temperature and rainfall, often on mountain slopes. The stands are also dense but are less heterogeneous than the rain forest. Conifers are sometimes found in admixtures. This forest type is one which has

been subjected to considerable population pressures (with consequent clearing for agriculture and shifting cultivation) as well as to the exploitation of a few desired species such as teak and podocarpus. This type accounts for about 200 million hectares – nearly 10 percent of the forests in the developing regions.

Dry deciduous forests

Dry deciduous forests are found in those tropical and subtropical areas which have limited rainfall. They are particularly abundant in eastern South America, south-central Africa and southern Asia. The density of the stands is greatly affected by the amount of precipitation, and in drier locations they become open and interspersed with thorn scrub thickets and frequent savannas. Many of these forests have been subjected to frequent burning and sometimes to overgrazing. Except in the moister locations where a few species have commercial value, the trees are very badly formed. These forests comprise about 800 million hectares or 35 percent of the forests under discussion.

Temperate hardwood forests

Temperate hardwood forests account for approximately 50 million hectares of the forest reserves of the developing countries. These forests, found largely in east Asia, parts of the Himalayas and southern Latin America, sometimes include conifers.

Mangrove and bamboo forests

Miscellaneous types of more restricted distribution include the mangrove forests of tropical coastlines and bamboo forests. Bamboos are an important component of wet evergreen, moist and dry deciduous forests; they also are found at high altitudes and temperate climates in Asia, and pine bamboo stands frequently follow in the wake of shifting cultivation.

Over the greater part of these forests there has, as yet, been no systematic exploitation, but only a scattered and sporadic use of the forest by local populations for fuel and rudimentary constructional material. Even so, there are vast areas which have been commercially exploited in the past or are being so today. To a large extent this exploitation has been geared to the production of unprocessed wood for export. Progress in establishing local forest industries has been disappointing. And the reason is not that available technology has but limited applicability to the kind of forest reserves which these countries possess. This much is clear if we recall that several of the less developed countries do possess "orthodox" coniferous forest reserves still undeveloped, reserves which differ little from, and are no whit inferior to, those resources which already sustain sizable forest industries in the industrially advanced countries. These reserves remain an unrealized potential, even though their composition would readily permit industrialization on the basis of existing technology. Evidently, technology is not all.

In any case, currently available technology is by no means as irrelevant to the circumstances of developing countries as is often supposed. At this stage it may be useful to take a quick look at some of the technological trends which have been at work in the industrially advanced countries over recent decades.

Recent technological trends

Two basic trends can be distinguished, and both have intensified in the postwar period: the broadening of the raw material base for the forest industries, and the fuller utilization of the forest crop.

Both these trends have their origin in the particular circumstances facing established foresti ndustries in the advanced countries. Thus limited availability, or rising costs, of the species preferred for mechanical pulping (spruce, fir, hemlock and pine) has led to the use for groundwood of poplar, aspen and eucalypts. Among the chemical processes, the earliest to be adopted on a large scale was the sulphite process, also suited mainly to the dominant species of the north temperate zone – spruce, firs, hemlock and some pines. Since the early 1930s, however, there has been a spectacular expansion in sulphate pulping capacity, an expansion due to the fact that this process, with greater flexibility and great tolerance to partially decayed wood and bark, can be used for pulping practically all kinds of fibrous raw materials. Finally, since the last war, there have been developed a number of pulping processes which combine mechanical and chemical action, offering higher yields than those obtained by pure chemical

processes, and capable of substituting both mechanical and chemical pulps over a wide range.

Thus, over the last 30 years, the relatively narrow raw material base of the paper industry in the advanced countries has been expanded to include all the resinous pines (especially in the United States), birch (formerly a "weed" tree in Scandinavia), most temperate hardwoods (alone or in mixtures) and various agricultural residues (notably cereal straw and sugar cane waste). For example, hardwoods accounted for 15 percent of pulping raw materials in Europe in 1961, as against a negligible percentage in 1945. At the same time, much greater use has been made of wood residues from sawmills and plywood plants for pulping. The volume of residues so pulped in Europe rose from 4.5 million cubic meters in 1956 to over 11 million in 1961.

Though the technological progress which has brought about a broadening of the raw material base of the pulp industry has had its main impulse in the raw material supply situation in the advanced areas of the world, it has incidentally made possible the establishment or expansion of the pulp industry in the less developed areas which, by and large, are lacking in the coniferous species which constituted the industry's traditional material. The impact has come not only through the devising of new pulping techniques, but also from a modification of the traditional pulp furnish for the manufacture of different types of paper. It has become increasingly possible to substitute short-fiber pulp for the coniferous long-fiber fraction, without major sacrifice of quality and strength properties. Today there are very few developing countries that do not possess fiberous resources from which it is technically possible to make most grades of paper.

Similar considerations (supply and price) have prompted the remarkable expansion in the advanced countries since the war of the fibreboard and plywood industries, and have brought into existence a completely new industry – particle board – which has grown spectacularly over the last decade. Technical improvements have enabled plywood to replace sawnwood, the real cost of which has risen, in many end-uses. Fibreboard has made similar gains, thanks to improved properties, a broadened raw material base and an improved relative price. The case of particle board is even more striking. Initiated in wood-deficit Germany and making use mainly of mill residues, the industry was favored by improved and cheaper synthetic resins and captured a large part of the market (for example, as furniture core) previously held by sawnwood. However, the product proved so competitive that it soon spread to the wood-surplus countries of northern Europe, to the United States and to many other parts of the world. Today, particle board plants exist in nearly 50 countries.

Even the sawmilling industry, which has seen no radical technical advance for half a century, has been affected to some extent by the trends just discussed: there is greater emphasis on precision sawing and high yield. Thanks to important advances in wood preservation techniques, less durable species hitherto despised can be given a reasonable life in service and hence find new markets.

These technical advances have been realized by means of research directed toward the solution of those problems which confront forest industries in the industrially advanced countries. The volume of research directed to the specific problems of the less advanced countries is still negligible. But an important incidental effect of these advances is that they have created immensely greater technical possibilities for successfully establishing forest industries in the less developed countries. If these possibilities have so far scarcely been realized, the reason is that as yet efforts to adapt and transfer existing technology to the circumstances of the developing countries have been sporadic, unco-ordinated and often halfhearted. This, in turn, is due to the fact that the socio-economic context necessary for the adaptation and application of technology has only recently matured in many of the less developed countries and has still to mature in others.

Where research is lagging

The main need is for the adaptation of available technology, and for applied research rather than for basic research. This is not to deny the need for fundamental research, both for the discipline and training it provides and for the possibility it always offers of radical new discoveries. But, in terms of simple cost/benefits, efforts on a less exalted plane are likely to be more fruitful.

In research, as in technology, emulation of the organization and methods of the more advanced countries is seldom appropriate. There is usually much more to be learned from those countries which have themselves still to contend with serious problems of regional backwardness and are vigorously trying to face up to them. The special contribution which

such countries can make is still insufficiently appreciated.

Because the forest resources of the developing countries differ considerably in location, composition and distribution from those of the more advanced countries, one of the most important areas for applied research and experimentation is into the economic and technical factors which bear on the cost of extracting the raw material supply for industry and hence on the raw material input cost per unit on processed output. For the most part these studies should be conducted on the spot, although there is great scope for the co-ordination of parallel studies on a regional basis. Some of the subjects requiring urgent attention are: minimum input techniques for attaining certain types of forest following exploitation of the original stand; inexpensive methods of protecting from fire, grazing, etc., in ways that allow for the interests and traditional habits of the local inhabitants; plantation forestry as related to all species of possible interest (here time is important, and the need is for small-scale experiments to be started as soon as possible to gain time, without waiting for the funds needed for a comprehensive program); suitable logging tools, and suitable combinations of different types of logging equipment with manual work and the use of animals, adapted to the local environment and labor supply conditions; and methods of low-cost forest road construction and maintenance.

Another desirable area of research concerns problems of storage and shipment, both before and after conversion. So far inadequate attention has been paid to checking or controlling decay, warping, discoloration, etc., under varying climatic conditions. Specially important are the problems involved in shipping processed wood overseas under different conditions.

Much work has already been done on the physical and chemical characteristics of secondary species, but this work has all too often been carried out in metropolitan countries and aimed at testing candidate export species. More helpful would be engineering studies of the usefulness of these species, with or without preservation, for local housing and nonresidential construction, harnessing prefabrication techniques. More work is needed on the properties of plantation species and secondary hardwoods in relation to different pulping processes and for various board products. Cheaper and better glues and resins, where possible manufactured from locally available materials, are needed to improve the properties of plywood and particle board under severe climatic conditions. As regards research on pulp and paper processing, the great need is for scaling down the economic production of pulp within the known processes (notably the semi-chemical and the soda and sulphate processes), and for adapting plant design to semiskilled labor. In sawmilling there is little need for new machines, but great need for improved plant layout as well as considerable scope for the introduction of modern methods of stock control.

These are but a few of the promising avenues for research and experimentation. All require essentially an objective review of what is already known, and an intelligent adaptation of that knowledge to the specific conditions of developing countries – particularly as regards the local raw materials, the possible scale of operations, and locally available labor and skills.

A large part of the problem is an informational one. The volume of new and relevant information increases annually, and international and national arrangements for pooling, analyzing, transmitting and receiving the relevant information are failing to keep pace. Awareness of what has been done elsewhere is a prerequisite for the successful exercise of the imaginative approach and flexibility which alone can ensure the effective adaptation of existing technology to the special circumstances of the developing countries.

Making capital go further

We have seen that several of the principal forest industries are capital-intensive, so far as the processing plant is concerned. It is a common characteristic of countries in the early stages of the growth process — at any rate as soon as they have committed themselves to a conscious development program — that capital is scarce and expensive. On the other hand, most, though by no means all, the developing countries do possess a reserve of unemployed or underemployed rural labor, sometimes amounting to the equivalent of 30 percent of the active rural population. There is, therefore, a clear need for economizing in capital provided this is consonant with efficient and economic operation. It does not by any means follow that labor-intensive techniques are invariably to be preferred to capital-intensive ones.

While the choice of techniques must take into account the alternative impact on operating costs, other considerations will frequently bear on the

final decision. Labor-intensive methods may be preferred because for political and social reasons it is necessary to create employment opportunities. What should not be overlooked is that factor availability can change rather quickly as the process of industrialization proceeds. Labor which is plentiful and cheap today will certainly, as it acquires skills, organization and an increased sense of dignity, become scarcer and dearer tomorrow. This is not a regrettable contingency; it is the very purpose of development. The corollary is that, in selecting techniques and designing mill layouts, labor-intensive methods should be limited to those stages of the process which lend themselves to ready mechanization at a later stage when it becomes economic. This applies above all to materials handling operations at either end of the production process.

Forestry and forest industries provide many opportunities of absorbing under- and unemployed labor. Even in the developed countries almost all operations in the forest are carried out by manual labor. Afforestation, thinning, pruning, nursery work and some aspects of insect and fire control, for instance, do not lend themselves readily to mechanization: these operations are mechanized but rarely, and only in those countries where labor is extremely scarce and expensive. The same is true for many aspects of forest exploitation — save in those few instances where large log sizes compel mechanization. What should be emphasized here, however, is that limited or negligible mechanization should not imply primitive methods of work. In all these phases there is ample scope for spectacular increases in productivity by the provision of suitable transport and simple well-adapted tools. These tools should be designed to meet local conditions, and in many cases it will be possible to organize their manufacture locally in small workshops.

So far as the wood-processing plants themselves are concerned, it is to be feared that in the past many opportunities of capital-saving have been neglected. This may be due in part to the fact that it is frequently easier for an entrepreneur, contractor or consulting engineer to operate from established designs and layouts rather than think through every aspect with a view to capital-saving under local conditions. In mill construction, for example, manual labor can often be used in substitution of expensive construction machinery for excavating foundations and road-making. Buildings can make use of cheap, local building materials and, if the climate allows, outside construction may be adequate for certain phases of the operations. Thorough advance planning by key personnel can do much to cut down actual construction time and hence capital costs. For example, a pulp and paper mill which might take 18 months to construct in an industrially advanced country commonly takes three years or more in a less developed country; this alone adds 5 to 10 percent to the investment cost. Seldom can the margin be cut down to zero, but effective preplanning can reduce the margin and effect considerable savings.

Multipurpose machines offering flexibility in the production program often have advantages over single-purpose machines where production series are small; this is relevant not only in paper-making, but in such industries as furniture and joinery manufacture. Shonfield [15] attaches much importance to good obsolescent machines, claiming that much of the equipment required during the early stages of industrialization can readily be provided secondhand. Certainly this is a source not to be scorned, for it should be recognized that the relative factor, availability that made these machines obsolescent elsewhere, is very different from that in the developing countries. In fact, some of the important forest industries existing today have made their start with secondhand equipment. It would be a mistake, however, to exaggerate the part which secondhand equipment can play: (*a*) it is not always well adapted to local raw materials; (*b*) spares and replacements often pose major problems; (*c*) it tends to make excessive demands on skilled labor. It may be observed in passing that the recent trend toward automation in process control in the industrialized countries is very relevant to industrialization in the developing countries. There is nothing either bizarre or contradictory in installing electronic equipment inside the mill, where it can replace special skills that take many years of training and experience to acquire, and making lavish use of manual labor in the woodyard.

It is common knowledge that operating ratios (the relation between actual output and nominal or all-out capacity) are much lower in developing countries than in industrialized countries. This is one of the main sources of capital wastage. The most frequent causes of stoppages and high breakdown time are low standards of maintenance and delays in obtaining replacements and spares. Sustained effort can reduce these losses, for example, by

[15] SHONFIELD, ANDREW, *The attack on world poverty*. London, Chatto and Windus, 1960, p. 163 *et seq.*

special emphasis on planned preventive maintenance or by standardizing auxiliary equipment such as electric motors and pumps. There are, in fact, many types of auxiliary equipment common to forest industries and other sectors of industry. Careful study of joint requirements may well establish a case for domestic production of these items. This is not only a useful way of effecting import substitution; the fact of their being locally available can do much to employ fixed investment more effectively in all the industries served, by reducing shutdown time. Central repair shops, serving several industries, can also contribute.

Many of the forest industries — plywood, veneer, blockboard, joiners, furniture, paper conversion, to name a few — are suitable for operations on a modest scale and can be accommodated on industrial estates where all types of common services can reduce the capital needs for each individual venture and also assure efficient deployment of managerial and other skills.

Forest industries in developing countries often require relatively much more working capital than their counterparts in industrially advanced countries for lack of effective co-ordination between production programs at the mill and sales trends. Special attention to these problems, and the adoption of various simple systems of stock control which have now been developed can help to reduce working capital needs.

The difficulties imposed on developing countries by the limited size of the domestic market have already been sufficiently stressed. At the same time it has been made clear that, so far as forest products are concerned, markets are in continuous, and often very rapid, expansion. All new ventures, therefore, should be planned from the outset with a view to subsequent expansion. This concerns not only the raw material catchment area, but also land, buildings, plant layout, etc., as well as, in some cases, the selection of process plant. This may require slightly higher investment per unit of output in the first instance, but will lead to very substantial capital savings later — perhaps within two or three years. In the pulp and paper industry, for example, the new investment needed to add a given capacity expansion to an existing mill is generally only 50 to 70 percent of that required to establish a separate mill of equivalent capacity.

This brief discussion of capital-saving possibilities is not, of course, comprehensive, but merely indicative. It serves to show, however, that many possibilities exist, not all of which have been realized in the past. One reason, of course, is that hitherto the total market for forest industry equipment in the developing countries has been rather small in relation to the annual requirements in the industrially advanced countries. The consequence has been that but few manufacturers have devoted much attention to the special needs of the developing countries. Over the next decade these equipment needs will represent a very considerable market in their own right. It was seen earlier that total investment needs in primary forest industries in the less developed countries could amount to $5,000 million up to 1970 if industrial development should take place to the extent needed to prevent imports of processed wood goods from rising. Two thirds or more of this sum would represent expenditure on forest industry equipment. It is clear that those equipment manufacturers who concentrate on designing and making what is needed, rather than on selling what they are accustomed to making, will be in the best position to take advantage of the opportunities this expanding market affords. It is clear, also, that the scale of expansion in many of the larger developing countries offers opportunities for the domestic manufacture of some, if not all, of the necessary equipment.

Determining the role of forestry

The intimate interrelation between the forestry and forest industry sectors means that a coherent forestry plan is a prerequisite for the sound long-term development of forest industries. Planning forestry with due regard to the other economic sectors involves:

(*a*) estimating the future demand for wood and for the noncrop utilities that the forests can provide: this refers both to the forests already in existence and to those that may have to be created;

(*b*) estimating the size and the nature of the forest resource, and appraising the extent to which essential production factors might be available for forestry;

(*c*) determining the plan within the context of the economic needs of the country as also the measures for the execution of the plan.

Planners, especially in countries where the economy is in the early stages of development, will often find inadequate the data on which decisions are to be based. Such lack of data ought not to delay planning unduly. Plans, however provisional, should be formulated and applied; they can be revised as additional knowledge becomes available. This is particularly important where tendencies hostile to forests are at work that may cause considerable damage in a brief span of time.

Estimating the demand for wood

Consideration must be given to the future internal demand for wood in all forms, ranging from fuelwood and saw timber to the wood-component of elaborate products such as paper and board, and to plans for export, if any.

Projections of demand as conditioned by internal consumption and export possibilities must be made for the next 15 or 20 years, indicating the size and composition of the demand at convenient intervals, for example, of five years. These demand projections (which specify roundwood needs from the forest) are derivations of the more detailed demand projections required to specify forest industry plans — both for the next industry planning period, be it three, five, or seven years, and for the perspective plan of 15, 20 or 25 years which, in this sector, should provide the frame for the shorter term plan. Since many undertakings in forestry require considerably more time than 15 or 20 years to reach fulfillment, changes in demand in the more distant future should also be considered. It is true that the possibility of relevant action within the period of the short-term plan may be limited, but this is no reason for disregarding likely long-term changes. The long-term prospects are particularly relevant to decisions concerning, and provisional measures directed to, integrated land-use policies, including questions of forest reservation.

Internal consumption and export are interdependent. They are complementary when leading to economies of scale, or when, by creating a more varied market, they permit a fuller utilization of the resource: as is well known, intensive forest exploitation commonly yields wood of different species, or of the same species but appropriate to different uses, or both, while the industrialization of the wood yields produce of different grades, and sometimes several joint products. On the other hand, there are also situations where export and internal needs cannot be reconciled, and planners must weigh the advantages of export earnings against future difficulties in supplying those needs.

In considering future demand, the possibilities of deliberately planned substitution should be appraised. Many products based on wood can be substituted by others that are not, and *vice versa*; in addition, there are important and steadily expanding possibilities for substitution within the field of wood proper. Kinds and qualities of wood that are relatively abundant or can be quickly grown in plantations may serve as substitutes for scarcer materials. Imaginative substitution can be of great importance to a growing economy as an import-saving or export-earning device. In certain cases it may be found worthwhile to use temporary substitutes that are to some extent inferior. Substitution may involve technical study and, in addition, inertia and bias may have to be overcome.

Estimating the demand for the noncrop utilities of forests

These utilities, nowadays often termed forest influences, may be grouped as follows, using a recent classification: [16]

(*a*) Direct influences, roughly corresponding to mechanical effects, or rather to influences in which mechanical action appears to play a preponderant part. This category includes the protective action of the forest against fall of stone from rocks or screen areas lying above the forest, or against avalanches, and especially the manner in which it acts as a windscreen.

(*b*) Indirect influences, comprising those in which the physicochemical influences play the principal though not the only, role. These are the influences which, by modifying the environment, let the forest affect soil retention and the water cycle.

(*c*) Psychophysiological influences — a category that apparently has to be differentiated — although, as for the other categories, the influences that

[16] FAO. *Forest influences*. FAO Forestry and Forest Products Studies No. 15. Rome. 1962, p. 248-249.

may be grouped in this category are derived largely from mechanical or physicochemical effects. But they have now become so great, particularly in heavily industrialized countries where there is a marked population increase, that they cannot be ignored. These are the influences which directly interest man, since they provide him with a better environment: purified air, rest and recreation areas (green belts), tourism, sports, and so on.

Forest influences form part of the socio-economic infrastructure of a country; as might be expected, the general public is not aware of their usefulness to the same extent as in the case of infrastructural elements that enter the everyday life of most citizens, such as roads, schools, or medical services. Also, scientific knowledge on some of the more complex influences of forests is relatively little advanced. Yet there can be no doubt that their over-all importance to a community is enormous.

From the point of view of planning, forest influences must be appraised in relation to the economic and other sectors of life that these influences serve: the protective effects of a shelterbelt have no significance except in relation to the crops that are shielded from winds; the hygienic and recreational values of a green belt only acquire meaning when considered in relation to a town. In this sense, forest influences are the concern of the agricultural planner, the urban planner, etc., and it is their function to decide whether the aims that they have in view should be attained with the aid of forestry or through other means, whenever there is a choice of means.

However, since forests rarely serve only noncrop functions – they nearly always also produce, or can be made to produce, wood at the same time – and since, on the other hand, every forest can acquire some of the noncrop functions under certain circumstances, these functions, or influences, of forests are inseparable from forestry planning. It is necessary, therefore, to estimate future requirements in relation to likely developments in farming, colonization, urban expansions, and so on. These appraisals are indispensable elements of the plan for the forestry sector, but they can be derived only from the other economic sectors and the over-all needs of the region.

In planning the treatment of a forest, it is often difficult to decide whether a certain area deserves special consideration on account of the noncrop functions that it may be exercising or may come to exercise in the near future; common sense suggests that uncertainty in this respect justifies cautious treatment.

Estimating the size and the nature of the forest resource

This involves the perusal of the available data and the collection of new data by means of forest surveys and related studies. In regions possessing major forest resources, such surveys may require many years of work, yet some of the data may be urgently needed for planning. Often situations arise that call for no small measure of judgment in deciding on geographic priority and the degree of precision to be aimed at in surveys. It is convenient to distinguish three types of survey, of different intensity, each appropriate to different phases of planning.

Reconnaissance surveys are designed to furnish at low cost preliminary information concerning the location and extent of large areas of forest.

At the next stage, more detailed classification of forest areas is required, together with estimates of volumes of standing timber and some information about species and dimensions. Nation-wide coverage at this intensity will eventually be required; in developing countries areas so inventoried can be considered as the first contributions to the national forest inventory. Though obviously more expensive than reconnaissance surveys, costs per unit area need not be high, and already provisional decisions, positive or negative, can be taken – so far as the timber supply is concerned – about potential projects.

For a final decision, and in particular for the working plan which will embody management decisions in relation to the timber supply area, more intensive working plans inventories are required. Detailed forest maps will be essential, as will volume estimates, by species and diameter classes, and preferably also by quality classes. Costs per unit area will be a good deal higher than for national forest inventories and, *a fortiori*, for reconnaissance surveys.

Until recently, one of the most serious obstacles to forest industry development in the less advanced countries was the high cost of obtaining essential data concerning the forest resource. This state of affairs has now been radically altered. The tremendous advances made in aerial photography and photo-interpretation techniques: new high precision cameras, wide-angled lenses, infrared photography,

improved films and electronic printers have all played their part in producing better quality aerial photographs from which more information can be extracted. Again, the application of modern statistical sampling techniques to forest surveys has made possible greater precision at lower cost. Finally, modern methods of data processing have facilitated the compilation and analysis of inventory data.

Information will be required not only on the physical nature of the forests – their area, location, composition, wood volume, growth, and so on – but also on their distribution according to ownership and the size of individual properties; these latter considerations may have a decisive influence on the pattern of subsequent development. The extent and methods of treatment and utilization, industrial and other, as also the noncrop functions of the various forest areas, must be checked.

Appraising the availability of production factors

The availability of land, manpower, and capital must now be appraised.

Land

Afforestation will involve occupying land at present not under forest. Conversely, some of the existing forests may have to give way to arable farming, pasture, and townships. In either case, sound decisions on the most appropriate use of a given area of land cannot be made except within the framework of an integrated land-utilization program.

The transfer of land from forestry to other uses ought not to be undertaken without sound reasons; such transfer has led to regrets in countless instances. The relinquishment of land from forestry may involve several losses. In the first place, the area concerned obviously ceases to produce wood. Secondly, total wood production in the locality may be lowered to the detriment of future supplies to the population or forest-industrial development. Thirdly, and in spite of good intentions to the contrary, important noncrop functions of the forest are liable to be impaired. In addition to all this, clearing very often involves appreciable waste of wood that is difficult or even impossible to avoid. Probable losses must be weighed against the benefits of transfer and, if the latter is decided upon, losses must be minimized as much as possible.

Needless to say, the withdrawal of land from forestry hardly makes sense unless it is permanently suited to the new use. Many of the colonization schemes of the past did not pay sufficient regard to the capacities of the soil and, now that the need for a more equitable distribution of farmland has become a pressing issue in many countries in Latin America and elsewhere, there is a danger that haste, expedience, or both may lead to a repetition of past errors. Under certain circumstances, properly conducted colonization can help to ease agrarian problems. But, unless the land is right for the purpose, an extension of cultivation will not bring relief to rural misery but will only extend its bounds.

It is also worth bearing in mind that forestry can often assist colonization in a very direct manner: work in forests can help to equalize the distribution of the work of settlers throughout the seasons of the year, and can provide them with much-needed cash income; in certain cases, controlled grazing in the forest can benefit cattle while reducing the fire hazard to the forest; and so on. These aspects of forestry are sometimes overlooked in the clamor for more agricultural land.

Manpower

The treatment and exploitation of the existing forests and the establishment of plantations in new areas demand the application of manpower of various levels of skill. In underdeveloped economies, managerial and professional skills tend to be scarce, and so does skilled labor, while unskilled or semiskilled labor tends to be abundant, although scarcities may occur locally or at certain seasons of the year. Often the availability of capable management is decisive. Where this can be found, a large proportion of the administrative and manual tasks in forestry can be broken up and distributed in a manner that permits economy of scarce or relatively scarce skills, while also facilitating training at different levels. Such training should avoid wasteful "spreading out"; it should be confined to essentials, so as to build up rapidly the required manpower.

Although continuity of operations is very important in forestry, much of the manual work is not tied to a strict time schedule, so that it is possible to use seasonal surplus labor from agriculture, unemployed labor, etc. These important possibilities must be taken into account.

Capital

The characteristic scarcities of capital in underdeveloped economies affect forestry in common with all other activities. Forestry needs depend relatively little on foreign-exchange availabilities provided it is possible to substitute expensive equipment, which would have to be imported, by the use of labor, rendered more productive with the aid of suitable tools or of inexpensive small machinery.

Since public ownership occupies a very important place in forestry throughout the world, a large part of all forestry activity is in the hands of government departments, either central or local. Their finance usually follows the general budgeting procedures of the country or locality concerned; occasionally special funds or block grants are provided to cover departmental expenses over a period of years. Forest departments in most countries have come to be regarded as entities of a quasi-commercial nature; they are expected to show the highest possible financial return that is compatible with sound operation. However, it is unusual for a department to show surpluses in the early stages of work, even when it controls valuable forest resources, since considerable inputs are needed to bring the forests under proper management. Moreover, sales of produce have to be carried out in a manner more conducive to forest-industrial development than to departmental revenue.

With the development of international finance designed to benefit the less developed countries, some governments have been able to obtain finance from international and bilateral funds, either in convenient loans or as grants. In this way, they have obtained infrastructural investments that have facilitated, or will eventually facilitate in a fairly immediate manner, the development of their forests. Such investments include the building of roads and of power plants within, or in the vicinity of, forest regions. There seems to be no palpable reason why similar finance should be impossible for certain investments in forestry proper, such as afforestation that may be required in order to supplement a local forest resource, where for example the latter provides a good basis for initiating a forest industry but planting by government is needed to assure long-term supplies. In a case like this, payment of interest and amortization of the principal may, in fact, be easier to perform than in the more conventional infrastructural loan, since the assurance of funds for afforestation will create the possibility of selling wood to industry from the existing public forests.

Credit capital plays an important part in the forestry of commercial companies; such finance is normally obtained for the sum total of their activities, of which forestry is one. In a number of countries, the government has made available special long-term credits to forest owners, communities and co-operative societies for such purposes as afforestation and the drainage of forests. Usually this type of credit is linked to certain measures of government control, and it can be a useful policy instrument for assisting, subsidizing and controlling non-state forestry.

Determining the plan and the measures to be adopted

In many of the less developed countries, forestry programs will have to be judged to a very great extent by their over-all effect on the balance of payments and the increase of national wealth as related to certain objectives. For instance, a forestry program might be appraised by the extent to which, in providing the raw material basis for forest industries, it will contribute to the amount of capital available for such annual investment in the economy as is considered necessary in order to maintain a certain rate of economic growth. Whatever the criteria adopted, the quality of the decisions in determining the forestry plan will depend to a great extent on the knowledge and planning available for all the sectors of the economy, including the foreign trade related to each.

No matter what the total input assigned to the forestry of the region, the distribution of this input will vary according to the technical condition and the economic significance of forest stands; and intensity of treatment may range all the way from minimum protection against destructive agencies, notably fire, in remote areas, to the most intensive management and silvicultural treatment in the neighborhood of wood-using industries. Normally working plans will be drawn up, laying down the objectives and working procedure for each major area and its subdivisions.

In some cases, exploitation may be carried into virgin forest areas. In principle, the working of these areas is desirable, since it means mobilizing new resources and, where a fire hazard exists, it will facilitate control, by rendering these areas more accessible, creating settlements of forest workers that can be called upon in an emergency, and so

on. However, there is also some danger involved. The opening-up of these areas may distract attention from the need for better utilization practices in those already being worked; it may mean the extension of undesirable practices of exploitation. Not infrequently it may be wiser to leave alone new areas of virgin forest until organization of forestry has progressed to a stage when they can be handled with relative ease.

Technically, afforestation work need not differ from the replanting of felled areas. Financially, there is often an important difference, since the latter type of planting is undertaken within a going forestry concern, whereas the former very often is not. In regions very poor in forest, afforestation is unlikely to alter the position radically within the normal span of the forestry plan. Yet a great deal can often be accomplished with relatively modest input, for instance where wood from fast-growing plantations can supplement wood-waste from different sources to an extent permitting the establishment of a local industry.

Forestry occupies a somewhat peculiar position in the political thought of most developed countries, including those with liberal economies, in that public ownership or at least a large measure of direct or indirect intervention in private and other non-state enterprise has long been regarded as a necessity. In the course of time, a vast body of experience has been gained, under the most varied conditions, on methods of administration, organization management, and exploitation best suited to public forests, the techniques of selling their produce, the role of the state in forestry education and research, and so forth, as also on the scope and the limitations of numerous techniques of state intervention through assistance and legislative control. In many cases, assistance by the state has proved more effective, and control less irksome, when exercised through the intermediary of co-operative and other associations of forest owners.

Those concerned with forestry in the less developed countries will be able to draw on this vast experience when considering methods of handling public forests and of ensuring over-all co-ordination through public intervention. One word of caution is perhaps necessary: planning that overreaches itself, that fails to take account of local limitations, especially those imposed by the size and training of the professional and administrative staff of forest departments, is a travesty of planning. In the past there have been too many instances of forest laws enacted whose provisions have proved inapplicable in practice because of lack of means of enforcement and for want of popular acceptance. There have been concessions granted, containing admirable provisions for silvicultural measures to accompany exploitation, which provisions have been ignored in practice for lack of professional control. Ambitious planting programs have been announced in a blaze of publicity only to die a silent death as earmarked funds are quietly diverted to other uses.

The lesson is not that those responsible for the establishment and execution of forestry plans ought to lower their aims or stifle their sense of urgency. The lesson is rather that, unless provision is made within the framework of the plan for the creation of trained cadres and for the guaranteed career prospects that will ensure the forest service against wastage, the plan is incomplete.

Planning for forest industrial development

In their general aspects, the problems of planning the development of forest industries have much in common with the problems of planning any industrial sector. With these general aspects of industrial development planning and programing we shall not concern ourselves here since they are already reasonably well documented. [17]

We shall, instead, content ourselves with drawing attention to certain special aspects of planning for forest industry development which stem from the particular characteristics of these industries and their relationship with other sectors of the economy.

[17] For example, in the publications of the United Nations Division of Industrial Development and those of the regional economic commissions of the United Nations. There is, however, no satisfactory compendium as yet of specific information – technical requirements, operating data, etc. – regarding the forest industries sector. FAO has at present under preparation a bibliography for forest industry development and hopes to publish later on a manual for forest industry planning.

Time horizons for planning

The forester and the industrial development planner inevitably differ in the emphasis they lay on the different time horizons for planning. We have already drawn attention to the long-term nature of many forest operations, and the consequent need for long-term projections of requirements, however approximate, to provide an order of magnitude of future demands on the forest in its capacity as a "woodshed" for forest industries. Few other sectors of the economy have the same need to look so far ahead, since very long-term considerations, for example, to the end of the century, weigh less heavily on current decisions. The industrial planner, certainly, is concerned mainly with the current or imminent general economic planning period, whether it be three, five or seven years. In recent years there has been a trend to the use of perspective planning – setting out broad outlines and provisional targets for up to 15 or 20 years ahead, as a background for current planning. The current plan, in these cases, is seen as the first instalment of the perspective plan. The perspective plan itself (as well as its second instalment, the next short-term plan) is progressively modified and adapted in accordance with new data on needs and possibilities – and in particular in the light of achievements of past plan periods.

Perspective planning has everything to recommend it, and it is significant that it is finding increasing favor in both centrally planned economies and in economies which rest mainly on free enterprise. However, the point that needs to be made in the present context is that, for forest industry development, perspective planning is mandatory. This much is evident from the characteristics of forestry as we earlier described them. To establish a pulp and paper mill in a given location in 10 or 15 years' time, it may be necessary to intervene in the forest now, to supplement the resource, or arrange for its eventual gradual replacement by plantations, or simply to ensure that the resource is still there when it is needed. But there is another consideration which argues for perspective planning. Some major projects in the forest industries sector may take from five to seven years to realize if, as is frequently the case, feasibility studies have to start with a detailed inventory of the forest resource. Such projects inevitably spill over from one plan period to the next. What is needed, therefore, is a forward planning group that can look ahead beyond the immediate plan period; this group can ensure that resources are not misallocated in the short-term plan. To meet the general targets which have been adopted, a series of specific projects should be under study. Some, as investigatory work is completed, can be immediately implemented; others will be discarded; others will be taken up as resources permit and the need arises. In other words, the short-term plan should not only include certain specific projects to be realized within the plan period; it should also include provision for data collection, pilot investigations and project planning needed for succeeding plan periods.

Getting and using resource data

It is clear that data pertaining to the forest resource, the forest inventory, represent an important category of information required in planning forest industry development. No prospectus for investment in forest industries can be prepared without this information. Some of the technical aspects of obtaining these data were touched on in the preceding section. The point to be stressed here is that this is the kind of information governments must possess themselves. The cost of acquiring it, though very much cheaper than even a decade ago, is still considerable, and there may be an inclination to leave data collection to entrepreneurs and potential investors. This is a mistake. Unless governments have their own data they are in no position to weigh the pros and cons of various projects and pronounce on the validity of projects submitted to them. If concessions or contracts are eventually involved, they are unlikely to be able to negotiate these concessions or contracts on equitable terms. Moreover, even if privately-obtained data are turned over to the government, the likelihood is that the inventory will have been tailored to the expected requirements (areas, species, dimensions) of the private party, and will therefore be unsuited or inadequate for use in assessing the prospects for alternative projects, perhaps in other branches of forest industry. This point is particularly important at the present time when technology is making rapid strides; the possibility always exists that species and dimensions presently unconsidered may be effectively utilized in the not distant future.

In the past a common feature of forest exploitation in the developing countries has been single-commodity exploitation. This has meant that much

useful timber has been left in the forest, since it was not adapted to the purpose of the operator or, sometimes, that timber extracted has been put to uses lower than its intrinsic qualities merited. Instances of integrated forest industry development, with integral utilization of the forest crop, have been rare. But governments have a profound interest in the fullest utilization of the forest crop, for technical as well as economic reasons, and will seek to influence operators in this direction when negotiating concessions. This they can hardly do without adequate knowledge of the forest resource.

Planning demand

The broad indications of demand trends for forest products which suffice for establishing forest production goals will not, of course, be adequate for planning forest industry projects. Much more detailed investigations of present and potential markets for particular products and grades are necessary. In many developing countries the starting point for an assessment of current consumption will be an examination of the import statistics [18] since imports are the only present source for many processed forest products. Demand projections, based on such parameters as per caput income and demographic growth, can be helpful. But for considering specific industrial projects it is necessary to get down to further detail by investigating, for instance, the specific requirements of other sectoral developments, and particularly of major potential consumers such as of bags for cement, of boxes and crates for fruit exports, of sawnwood and wood-based sheet materials for housing programs, and so forth.

It was noted earlier that most of the demand for forest products consists of intersectoral demand rather than final consumption. In many developing countries a substantial proportion of the total demand may well arise either in the public sector itself or as a direct consequence of government programs, such as railways and other utilities, housing, school buildings, works departments. Governments are thus well placed not only to encourage or promote the establishment of appropriate forest industries but also to influence production standards.

The significance of this role will be appreciated if it is borne in mind that, in developing countries, construction, as distinct from equipment, may account for 50 to 70 percent of total fixed investment. Thus housing and urban facilities have a large share wherever there is a substantial transfer of population from agriculture to industry, while the importance of public works and public utilities (roads, docks, transport, water, electricity, schools, hospitals, and government buildings) is always great in the first decades of development, declining thereafter. The great importance of construction has not always been fully considered in development programs, and the scarcity of building capacity has often been the principal obstacle to stepping up the rate of capital formation. A common error is failure to provide for the necessary output of building materials and components. [19]

Not only can the government, as major consumer, decisively influence the demand for sawnwood, wood-based panels and other construction timber; by properly planning its demand it can help industries to specialize in making parts and components, such as panels, windows, doors, staircases, and bearing elements.

Skilled labor is often a bottleneck in expanding construction. For this reason special attention should be paid to labor-saving construction materials such as plywood, particle board, fibreboard and woodwool board. In the developed countries, shortage of construction labor has been a major factor in increasing the demand for wood-based panels.

It is not necessary to discuss here the standard measures which a country may take to encourage industrial development; tax exemptions, tariffs, subsidies and the like. These are common to all industries, and here we are concerned only with aspects special to the forest industries. There is, however, one further point arising from the demand characteristics for forest products which is perhaps worth mentioning. It has already been noted that many of the forest products are broadly substitutive over a wide range of end-uses. This applies, for example, to the three major wood-based sheet material in-

[18] Here it should be observed that the forest products trade statistics of most developing countries are still lacking in the detail and accuracy that could render them useful for industrial development investigations.

[19] It is interesting to note that, in the U.S.S.R., one of the main principles in planning the material and technical basis of construction is that its development should keep ahead of the increase in the volume of construction envisaged in the plan. To this end, a higher rate of growth is planned for the gross output of the building materials industry than for the total volume of construction. *See* Repenko, A. T. *The material and technical implementation of housing programmes. Report on the seminar on housing surveys and programmes with particular reference to problems in the developing countries.* Geneva, United Nations, 1962.

dustries. If none of these industries exists at present, and if there are sound technical and economic grounds for preferring to develop one rather than the others, judicious import regulations can be helpful in both testing and priming the market.

The importance of infrastructure

The location of forests in relation to population concentrations, the transport volumes and distances involved in both raw material procurement and product distribution, and the technical requirements of forest industries, all combine to make the development of this industrial sector – perhaps more than that of any other – heavily dependent on progress in creating certain basic infrastructural facilities: power, water, road and rail communications, and port facilities. At first sight, this fact might seem a discouraging one for developments in this sector. There can be no doubt that in the past it has had an inhibiting effect. Governments and private entrepreneurs, attracted by the idea of valorizing a particular forest resource by establishing a major forest industry unit, have often renounced the undertaking once it was realized that it would be necessary to create those forms of social overhead capital which already exist in the industrially advanced countries. The cost of providing these facilities, when shouldered entirely by an individual project, would add perhaps 50 percent to the cost of investment.

Today the situation has radically changed. Not only has the concept of industrialization as a conscious and organized process won full acceptance in the developing countries; it is understood that successful industrial development can take place only if governments deliberately set about creating the necessary infrastructure. The important thing from the planning standpoint is that infrastructural investment plans should take full account of the forest industry development possibilities they can provide. This applies when mapping out new roads and railways, siting power stations and power lines, or developing new or improved port and harbor facilities. Not only can judicious planning help to bring new forest industries into existence; the industries they generate will often represent the first major financial return on the infrastructural investment undertaken. In some cases, they may provide the decisive element in determining whether to undertake a particular infrastructural investment or not.

Planning for specific areas within a country

Next, a word on the area aspects of planning. The emphasis given to area planning, and the degree of initiative accorded to areas in both plan formulation and plan implementation, will vary from country to country. The central problem will always be how to harness most effectively local energies and enthusiasms without falling into inconsistency in aims and errors in phasing, both as between the several areas and as regards the relation between central and local targets. In large countries, of course, a considerable measure of decentralization is inevitable if planning is to be effective.

Planning by area assumes particular importance for forestry and forest industries. It is at this level that the noncrop functions of the forest can best be appreciated and the social implications of customary rights in the forest fully understood. Moreover, from the industrial aspect, while there are certain forest industries that must clearly have a national range in order to prosper, there are other branches which can successfully operate on a smaller scale. From the standpoint of economic development (including industrialization), there is much to be said for studying the forestry and forest industry development possibilities of a country not simply in terms of the country as a whole, but also in terms of defined forest-economic areas within it. These areas should be defined not simply on the basis of existing or potential forest resources, but also by taking into account population concentrations, other physical endowments, current and future claims on the land, and so forth. This approach can be helpful in assuring a clear orientation of the aims of forest policy in each area. Thus certain areas will be clearly marked to become principal wood reservoirs for major forest industries serving the whole country. In others, an ordered transfer of forest land to agricultural use, while retaining sufficient land under forest to supply industries serving local needs and to assure maintenance of noncrop utilities, can be permitted. Finally, there will be areas where the main emphasis will have to be placed on protective forestry, with forest industries playing a subordinate and perhaps negligible role.

Autarchy or economic integration

Some developing countries, oppressed by the prospect of a steeply rising import bill for forest prod-

ucts, have already resolutely undertaken programs of forestry and forest industry development, and a careful examination of these programs suggests that, in one or two cases, national self-sufficiency in forest products is the implicit, though seldom explicit, ultimate goal. The programs already established do not overlook the fact that, in some instances, certain commodities produced from the indigenous forest resource will find difficulty in competing on even terms with the products of the industrially advanced countries. Justification is found in the pressing need to save foreign exchange, in the fact that industrialization in any sector is unlikely to succeed without a measure of protection, and perhaps even in the fact that a vigorous forestry program is required in any case to assure the flow of noncrop utilities of the forest. Sound as these arguments may be, it would be a serious mistake to suppose that they can be held to justify the goal of self-sufficiency in forest products in all instances.

Mention has been made earlier of the fact that current moves toward economic integration among the less industrialized countries can favor the development of certain industries by extending the market and thus overcoming the obstacle presented by small national markets in branches of the industry where scale economies are pronounced (such as newsprint and chemical pulp). This in itself is a very strong argument in favor of the confrontation, and if necessary adjustment, of national plans for forest industry development on the part of countries participating in economic integration schemes. Indeed, without such confrontation and adjustment, there is danger that mutually inconsistent plans may be pursued and the avowed aims of economic integration frustrated.

But small national markets and economies of scale are not the only reasons for giving special attention to the forest industries within areas of economic integration. In the less developed countries, where economic integration schemes are already moving forward or are at present being discussed, there is often a wide disparity in the natural forest endowment and in the suitability for growing different types of timber. Moreover, there is often a large measure of complementarism in the nature of the forest resource held by different countries within the area, for instance, as regards short-fibered and long-fibered material for paper making. It is only commonsense that these disparities, and this complementarism where it exists, should be taken into account in any mutual agreement on these national development plans which will make for optimum regional economic development. The advantages lie partly in the programed international division of labor, partly in securing the optimum utilization of the region's forest resources. In many cases the adoption of national self-sufficiency in forest products as the goal to be achieved will mean deliberately foregoing these advantages.

An organizational need

Whatever the role that may be accorded to public and private enterprise respectively in developing forest industries, there is, and must always be, an indissoluble link between the development of this sector and the forest resource on which it is to be based. This argues the need for a specially close and intimate relationship between those authorities responsible for the forests (usually the forest service, a department of the Ministry of Agriculture) and those responsible for planning and encouraging industrial development. Unless there is the closest co-ordination, the danger is always present that, on the one hand, the forester may forget that his function is to serve people, not to serve trees, while on the other the industrial developer may ignore, to the cost of the community and perhaps to his own, both the dynamics of the forest and its important functions other than as a wood-provider.

It is a regrettable fact in most developing countries (and for that matter in several more advanced countries) that as yet no effective link exists. That this has led in many cases to reckless and wasteful use of the forest resource is widely recognized; its legacy is felt in the significant proportion of total forestry effort which has now to be devoted to what are essentially rehabilitation measures. What is perhaps less widely understood is that this lack of effective collaboration has been largely responsible for the failure to recognize, plan and realize hundreds of perfectly sound and feasible forest industry projects.

It is idle to imagine that this situation can be remedied merely by establishing formal links. If foresters, forest utilization officers, industrial economists and development planners are to reach a mutual understanding of each other's problems and to explore creatively the development opportunities that lie in the forests, working contacts must be multiplied at all levels. These are the considerations which have led some countries, in which forest industries already play or are clearly destined to play a key role, to concentrate responsibility for forestry

and forest industries in the same department or ministry. This solution is not likely to be universally valid; but the problem of achieving an organic and creative working relation between the two sectors has to be solved if a vigorous program of industrial development based on the forest is to be realized.

THE CHOICE

In the foregoing paragraphs we have referred to some of the problems of planning for forest industry development which arise from the peculiarity of the forestry and forest industry sectors and their relation with each other. The list is intended to be illustrative, not exhaustive. Each example quoted, however, implies a particular responsibility on the part of governments if these sectors are to be effectively developed. This could hardly be true whatever the political philosophy inspiring government action, whatever the type and degree of planning undertaken by governments to promote the welfare of their peoples.

It has been shown that the forests have a great potential as a source of human welfare, and that industrialization based on the forest can both contribute to and promote the general economic development process. Yet it must be acknowledged that the mobilization of the forest resource through the establishment of forest industries is not a prospect that brings unmixed joy to the hearts of many professional foresters. They know only too well that, if the forest is to fulfil its role, there must be exact knowledge of the resource, the forest must be brought under proper management, working plans must be devised, and extraction schemes worked out. Only thus can the resource base of industry be made secure. But these tasks require strong and effective forest services, and today forest services in many developing countries are still extremely weak. It is awareness of the danger this situation represents, not any mistaken attachment to the idea of conservation as an end in itself, which impels many foresters to don the mantle of Cassandra.

But it would be a mistake to cherish illusions on this point. And it is an illusion to suppose that there exists a choice between mobilizing the forests now, and leaving them intact until forest services have been built up to the point where it is safe to open the forest gate. The technical and economic conditions for establishing new forest industries in the developing countries are maturing fast. In the course of the coming years many new areas of forest are inevitably going to be brought into use. The choice is between mobilization in the public interest based on sound planning and with adequate safeguards and with the forest services taking an active part and being built up in the process, and mobilization taking place in an uncontrolled and haphazard way, while weak forest services stand by helpless. This is the real choice.

It is in making this choice that the responsibility of government is engaged. For this is not a question which concerns a forest department alone; it concerns ministers of agriculture, economy, industry and trade; it concerns planning departments and development agencies; it concerns finance ministries and budget bureaus. Only concerted action on the part of all departments can ensure that forest industries play their part in the attack on economic underdevelopment, and that the immense contribution which forests, rightly used, can make to the development process is fully realized.

Chapter IV. THE LIVESTOCK INDUSTRY IN LESS DEVELOPED COUNTRIES

Introduction

THE ANATOMY OF HUNGER

The greater proportion of the world's population, both human and animal, never gets sufficient food. The prevalence of hunger and malnutrition in the less developed countries of the world, and the imperative need to expand food production in these regions in the face of an accelerating growth of population, is gradually forcing itself into the world's consciousness. In the progress of mankind in the less developed countries hunger is always too closely at his heels. In particular, the consumption of protective foods, notably livestock products, is extremely low in the less developed countries, and their scarcity, as is shown later, results in large measure from the inadequate feeding of the flocks and herds which provide them.

It is for livestock products that the disparities between the diets of the less developed countries and the more adequate diets of the more developed regions are most marked. For example, recent estimates suggest that, whereas total food consumption as measured in calories in the less developed regions as a whole averages some 70 percent of the average for more developed regions, the corresponding figure for total protein is about 65 percent and for animal protein only 20 percent. Of the main sources of animal protein, the consumption of meat is estimated at about 20 percent of the average in the more developed regions, of milk about 14 percent, and of eggs about 12 percent. For fish at 70 percent the disparity appears to be much smaller, but the consumption of fish tends to be concentrated in coastal and riverine areas.

Such broad averages can clearly be no more than indicative; they are shown in somewhat greater detail in Table IV-1. Nevertheless they bring out the salient facts that consumption levels in less developed countries are not only low quantitatively, but (as they are based overwhelmingly on cereals and starchy roots) are strikingly lacking in many essential nutrients. Even the above averages understate the disparities, for the distribution of the limited supplies in less developed countries is very uneven, and hundreds of millions of people consume only tiny quantities of livestock products.

POVERTY INHIBITS PRODUCTION

Poverty is undoubtedly the main explanation for the low average consumption of livestock products and in turn for the limited production in most of the less developed countries; it explains also the uneven distribution of supplies within these countries. At low income levels almost the whole sum available for food is spent on the cheaper varieties, such as cereals and potatoes or other starchy roots, to satisfy hunger. It is only when there is a surplus above what is required to buy these basic needs that appreciable expenditures on livestock products

TABLE IV-1. - PER CAPUT CONSUMPTION OF LIVESTOCK PRODUCTS BY REGIONS

	Milk [1]	Meat	Eggs	Fish	Protein	
					Animal	Total
	..... *Grams per head per day*					
North America	850	248	55	26	66	93
Oceania	574	312	31	22	62	94
River Plate countries.	460	318	22	10	63	101
Europe	494	111	23	38	36	88
ALL ABOVE REGIONS	573	152	30	34	44	90
Latin America (excluding River Plate area)	204	67	9	20	19	61
Far East	51	24	3	27	8	56
Near East	214	35	5	12	14	76
Africa	96	40	4	16	11	61
ALL ABOVE REGIONS	79	30	4	24	9	58

SOURCE: P. V. SUKHATME. *Food supplies and human nutrition.* Stanford University Press, California, U.S.A. (In the press).

[1] Including the liquid milk equivalent of milk products other than butter.

and other more expensive foods become possible. The market for such foods is thus very limited in low income countries, and a high level of production is hardly feasible.

This basic situation may be modified in areas climatically favorable for livestock production and where there is not too great a pressure of population on the land. In these circumstances the cost of livestock production is low and livestock products enter more largely into the diet than is usual at the income level of the country. This accounts, for example, for the high level of meat consumption in some Latin-American countries, and of milk products among some pastoral peoples such as the Fulani of west Africa. The natural advantages enjoyed by Argentina and Uruguay have not only enabled them to build up a large export trade, but also permit a level of meat consumption which is among the highest in the world.

Population and economic development

Although the level of livestock consumption in the great majority of less developed countries is unlikely to approach those normal in wealthier countries for many years to come, two recent developments have led to a considerably more rapid growth of effective demand. The first is the accelerating growth of population, mainly as a result of the better control of disease and the consequent reduction in the human death rate. In country after country new census returns show an appreciably more rapid growth of population than had been previously assumed. Thus the 1961 census of population in India showed an average annual increase in the past decade of about 2 percent compared with the earlier estimate of 1.2 percent made in the second five-year plan. In Ghana, the population census of 1960 returned a population of 6.69 millions compared with the previous estimate of 5 millions.

The second factor is the intensified effort now being made in nearly all the less developed countries to accelerate their economic development and raise per caput incomes. At low income levels the elasticity of demand for livestock products is extremely high, sometimes exceeding unity. As incomes rise the demand for livestock products is thus likely to rise in about the same proportion. Japan provides a particularly striking and well-documented example of the influence of higher incomes on the demand for livestock products. From 1955 to 1960 the average expenditure of urban households rose by 35 percent and expenditures on food by 19 percent. During the same period, however, expenditures on meat, milk and eggs rose by no less than 68 percent. The volume of increased consumption was somewhat smaller as production and imports could not keep pace with the increase in demand and prices tended to rise. Nevertheless, from 1955 to 1960 the consumption of beef and veal rose by 19 percent, of pork by 41 percent, of eggs by 45 percent, milk products by 80 percent and fluid milk by over 100 percent. Rapid rates of increase, however, are also evident in many other countries; for example Greece, Taiwan and Venezuela, to mention countries widely distributed geographically.

For the world as a whole the currently expected growth of population is about 2 percent annually, but the rate is likely to be much faster in the less developed than in the higher income countries and to be of the order of 2.5 percent, although in some countries reaching rather over 3 percent. At the same time current United Nations objectives for the "development decade" envisage that real national incomes in the less developed countries are raised by some 5 percent annually, corresponding to an average increase in per caput incomes of about 2 per cent. This is a low rate of increase taking present living standards into account, though more than most countries have achieved in recent years. If both these projections prove correct, then the total effective demand for livestock products in less developed countries could be expected to increase by something like 5 percent annually, since in the less developed countries an increase of 1 percent in per caput incomes usually leads to a somewhat higher percentage increase on livestock products. At that rate the effective demand for livestock products would increase by nearly 50 percent by 1970 and by well over 100 percent by 1980. Even so, consumption per head in the less developed regions would have risen by little more than 25 percent by 1980. This would still leave them with very much less than is considered an essential and normal diet by millions of people in the more developed economies.

A further point of some significance here is that not only income elasticities for livestock products but also price elasticities are high in the less developed countries. This means that, if the cost of livestock products to consumers could be reduced by improvements in production and marketing, a larger increase in the volume of consumption would be possible

for a given rise in income. At present neither production nor marketing is as a rule very efficient, and livestock products in these countries therefore tend to be expensive. The rather high price elasticity means also that, if for any reason production temporarily ran ahead of effective demand, the excess supplies could be absorbed by the market with a considerably smaller fall in prices than if the same situation arose, for instance, with cereals. This situation might occur if the livestock production target were exceeded, or if over-all economic growth and incomes fell short of the rate mentioned.

To sum up, quite apart from the great nutritional need for larger supplies of livestock products in most of the less developed countries, there appears to be justification on economic grounds for special efforts to raise the output of livestock products roughly in proportion to the expected combined rise in population and per caput income; that is to say, by some 5 percent annually. Failure to approach such a target would not only mean a continuation or even a worsening of the present unsatisfactory levels of nutrition, it might also lead to a rise in the prices of livestock products, and to greater foreign exchange difficulties if imports were increased to counteract any such price rise.

Increased production should be aimed primarily at the home market where the need is greatest. Export prospects for livestock products are not in general favorable, and markets must be very carefully explored before production for export is initiated. Surpluses of milk products have been depressing world markets for some years, and prospects for international trade in meat have recently become less promising. This does not, of course, rule out the possibility of exporting livestock products from less developed countries as a means of earning foreign exchange should favorable opportunities occur.

Livestock production potential

The rate of growth of some 5 percent annually in livestock production suggested above is considerably greater than the rate of growth during the past decade. Statistics of livestock production are less reliable than statistics of basic crops, especially in the less developed countries, but current FAO estimates (Table IV-2) suggest that world production rose by about 2.5 percent annually during the 1950s. The most rapid growth, however, tends to occur in some of the more developed regions, notably western Europe and Oceania. Although more rapid progress has been reported recently, for example in the Near East, it is probable that during the 1950s livestock production in many of the less developed countries did not keep pace with the growth of population, and still less of effective demand. This is borne out by the frequent tendency for prices of meat and other livestock products to rise faster than prices as a whole.

Table IV-2. - Estimated average annual rate of growth of livestock production by regions 1948/49 - 1959/60

	Percent
North America	1.7
Western Europe	3.8
Oceania	2.9
Latin America	2.5
Far East (excluding Mainland China)	2.3
Near East	3.1
Africa	1.5
All above regions	2.6

Livestock in relation to general agricultural development

While the main role of livestock husbandry in the less developed countries lies in the provision of food, notably high quality protein, as well as draft power and such raw materials as wool, hides, and skins, it can also contribute to the attainment of a higher and sustained level of agricultural production. Thus improved livestock production can be of material assistance to the maintenance and progress of crop production by means of increased soil fertility. The need for full integration of crops and livestock and the fallacy of reliance upon monoculture have been demonstrated on many occasions where systems of monoculture have led to serious loss of soil fertility and a decline in agricultural resources.

Livestock husbandry also makes possible the utilization of resources which might otherwise go to waste. Much of the earth's surface can only be utilized for the production of food for human consumption by grazing it with livestock. Range lands which are unsuitable for cereal and other crops can be efficiently utilized by livestock. Furthermore, it is only through their utilization by livestock that crop residues, and various waste products and

by-products, can be converted into human food (Shaw, 1962).[1]

As incomes rise in the course of economic development a frequent problem, especially in densely populated countries, is to find intensified methods of farming which can raise the cash incomes of small and medium-sized holdings and so prevent too great a disparity of incomes developing between town and country. Certain systems of livestock husbandry or of mixed farming are well adapted for this purpose, based in some cases on the use of imported feedstuffs. This was the pattern which developed over much of western Europe, and it now appears to be gradually developing in other parts of the world, for example, in Japan. Even on farms which depend on grains as the main source of income, the development of an efficient supplementary livestock enterprise may be essential for economic survival when crops are poor.

Animal population pressure

Man is not alone in suffering the vicious circle of poverty referred to by Wright (1961), where low food intake leads to reduced body weight and low levels of activity: low levels of activity lead to decreased productivity, and thence to still greater poverty. The other cycle, common to both man and his animals, is that of the malnutrition which lowers the resistance to disease, and results in infections and infestations which inhibit the proper utilization by the body of the food intake.

Overstocking is all too common in the less developed territories. For example, in India the cow is a sacred animal which may not be slaughtered. In consequence, the human population of India derives only fractional nutritional benefit from its immense cattle and buffalo population which is estimated at some 200 millions. Uncontrolled expansion of domestic animal populations become a menace, as in parts of Africa where cattle are currency, or in India. A reduction in numbers of the unproductive and underfed cattle populations would, with better management, lead to greater supplies of milk for a human population lacking animal protein and also seriously underfed.

There has been a notable failure in many countries to correlate the numbers of livestock with the carrying capacities of land areas. Under the present systems of management this has resulted in the destruction of much soil and vegetation due to overstocking. It is also true that in many parts of the world, double the present stock could be carried on existing grazing land with better management. Such wastage of natural resources may be complicated by social and religious practices entailing, for example, restrictions on slaughter, by lack of suitable marketing facilities, and by communal tenure of grazing lands. Quantity rather than quality of livestock is still the prime motive in many areas, stock numbers frequently indicating prestige, in other words a primitive status symbol. In such circumstances no attempt is made to cull the unproductive. The vicious sequence of uncontrolled breeding of low quality stock, overstocking, and starvation must be broken if the deterioration of livestock is to be checked. Stimulus for improved husbandry practice and for the breeding of better animals may sometimes require only the provision of adequate markets for the livestock product.

Disparities in animal productivity

The text which follows is mainly concerned with the problems of expanding and improving livestock production in less developed countries, in particular with the technical problems. Not all the problems which arise are of a technical nature. For example, in most less developed countries inefficient methods of marketing result in heavy losses of livestock and livestock products, and also unnecessarily inflate prices to consumers, thereby acting as a brake on consumption and hence, indirectly, on production. In addition, institutional and economic obstacles such as obsolete methods of land tenure, lack of production credit at reasonable rates of interest, and price instability retard the development of livestock production as they do all other branches of agriculture. These matters have been discussed at some length in recent issues of *The state of food and agriculture.* [2]

A first point to be made is that the problem of raising livestock production in most of the less developed countries is much more a question of raising

[1] See list of references on page 160.

[2] See, for example: Some general problems of agricultural development in less developed countries in the light of postwar experience, *The state of food and agriculture. 1959:* Programing for agricultural development, *The state of food and agriculture, 1960:* Land reform and institutional change, *The state of food and agriculture. 1961.*

TABLE IV-3. - APPROXIMATE NUMBERS OF LIVESTOCK PER THOUSAND HUMAN INHABITANTS 1959-60

	Cattle	Sheep	Goats	Pigs
	..... *Numbers*			
Western Europe	270	320	40	200
Eastern Europe and U.S.S.R.	320	530	35	200
Oceania	1 450	13 000	10	150
North America	540	170	20	330
Latin America	940	620	190	370
Far East (excluding Mainland China ..	230	50	80	40
Mainland China	60	80	70	250
Near East	240	810	470	1
Africa	500	600	400	20
WORLD	300	325	110	170

the productivity of flocks and herds and of individual animals than it is of increasing the number of livestock. As is evident in Table IV-3, the numbers of livestock in relation to the human populations is not greatly out of line with those in many of the more developed countries. And while no great accuracy is to be attached to the figures in general, they are more likely to be under than overstated. The very uneven regional distribution of the different types of livestock, also evident in Table IV-3, is discussed in a later section on the problems of each of the main regions.

There is, however, a wide divergence between levels of efficiency in animal productivity in the different regions of the world. In many parts of the tropics, for example, the yield of twenty milk cows is barely equal to that of one cow in such countries as Belgium, the Netherlands, New Zealand, Switzerland, and the United Kingdom. Bad livestock and pasture management are among the main reasons for the very low milk and meat production of the less developed countries. Vast areas of the Far East, the Near East, Africa and Latin America are considerably overstocked with livestock of very poor quality. The output of livestock products per head of the cattle population in Europe is about ten times greater than it is in the Far East, seven times greater than in Africa, and four times greater than in the Near East and Latin America. Moreover efficiency in livestock production, even in Europe and North America, is still far below what would be possible if feeding, management and breeding were improved, and if disease were brought under control. In terms of the meat and milk " harvested " per animal, these differences are illustrated in Table IV-4.

TABLE IV-4. - AMOUNT "HARVESTED" PER ANIMAL IN THE CATTLE POPULATION

	Beef and veal	Milk
	..... *Pounds*	
United States	166.7	1 335
Canada	140.8	1 693
Europe (excluding U.S.S.R.)	121.5	2 419
Australia and New Zealand	104.3	1 107
South America	71.5	210
Mexico, Central American and Caribbean countries	57.5	265
Africa	37.4	192
Asia	26.2	140
WORLD (excluding U.S.S.R.) ..	70.1	655

SOURCE: PHILLIPS, R.W. Man and his cattle, *The cattleman*, XLVI, 12, 1960.

The difference between the " harvests " in the first four areas listed above and those in other regions is due primarily to bad management (which incorporates poor feeding and failure to utilize natural resources properly), primitive or haphazard breeding practices, and failure to prevent, treat, or control the range of diseases which obstruct production. All these play their part in the diminished potential of the world's herds and flocks.

Increasing the world's supply of animal protein

The main methods of promoting livestock production lie in the control of disease, in better feeding and in improved breeds. These three facets of efficient husbandry are indivisible. It is illogical to devote time and energy to the production of improved supplies of feedstuffs if the stock to which they are fed are unthrifty through disease or parasitism. Similarly, genetic improvement will be fruitless without the ready availability of satisfactory feed in sufficient quantity. Full production therefore depends initially on disease control, but related to this is the need for a great improvement in animal

management, nutrition, genetics and breeding, reproductive and environmental physiology, and the processing and handling of meat and other animal products.

In the light of the vast and largely preventable losses caused by disease, and the economic necessity of replacing substandard health by full health, increased world attention both to research into animal health questions and to the international application of disease control measures is necessary for progress in animal production. In the same way, further emphasis should also be placed on research into the other aspects of livestock management, and on the best means of strengthening educational and extension services so that improved methods of husbandry may be widely disseminated among producers, especially in the less developed regions.

Finally, to enable farmers to make use of this knowledge, an economic and social climate favorable to agricultural development has to be created. Such basic needs for better farming as adequate credit facilities and, in many countries, improved conditions of land tenure will be required. In order to provide the link with the growing urban demand, more organized marketing and distribution services are necessary for livestock and livestock products. These can reduce the present heavy losses in distribution with a saving in costs to consumers, and at the same time increase the incentive to producers to raise their output.

The shadow of overstocking, underfeeding, the prevalence of disease, primitive or haphazard breeding practices, poor husbandry, detrimental food customs, and poverty of achievement in livestock production, can be alleviated by the interrelated factors of disease control, betterment of animal nutrition and genetic upgrading. These combined factors constitute improved management. Together with improved educational and marketing services, they are discussed more fully below.

Animal nutrition

Inadequate nutrition is one of the most important reasons for the slow growth of animal production in developing countries in recent years. Improvement and expansion of work in the field of animal nutrition is essential, with emphasis on the need for integration of livestock production with crops and grassland management. There is general agreement that the development of animal production is based to a large extent on increased production of grass and forage and/or cereal grains and legumes, combined with the proper management of livestock and the best utilization of these feeds. There is need for extended research into the establishment of new varieties of pasture legumes which can survive in the tropics and subtropics, including the arid areas.

It appears that accepted standards of animal feeding may not be fully applicable to the special metabolism of animals on pasture, and that grazing increases the nutrient requirements. Much more information is required on the feed intake and nutritional requirements of grazing animals particularly in relation to a wide variety of environmental conditions.

In the arid tropics, including dry forest areas, steppes, savannas and scrub forests, lack of water is the greatest limiting factor for plant growth and, unless proper stocking and animal management are maintained, the land may become waste. The control of bush by indiscriminate burning, for example, common in most of the savanna areas of Africa, may harm the grazing lands and endanger forest areas. Ultimately, if not subjected to rational control, it tends to encourage bush at the expense of grass and may lead to soil erosion. Late burning carried out at long intervals (up to four years) has been found to give adequate control of bush in, for example, Mali and Southern Rhodesia when proper safeguards are applied. Again, more studies are needed on drought-resistant grasses, the forage of which would be suitable for ruminants. Information is also required on nitrogen metabolism in the ruminant in order to predict the effectiveness of nonprotein nitrogen supplements under a variety of conditions.

In the humid tropics and in temporarily flooded lowlands, great possibilities exist for developing animal production. This is largely due to the high year-round yield of tropical grasses and legumes. Permanent pastures ensure an even and high production of forage, and also cover and protect the soil. However, organic matter has to be added to support a high crop production, and the most direct method of producing this is by raising animals.

While the desirable integration of animal husbandry and agriculture may be achieved relatively easily in the humid tropics, the principal impediment to good quality animal nutrition is the poor nutritive value of the forage. In order to obtain the highest possible productivity rate, further investigation is still required into the changes in chemical

composition of forage during the growth period, and also into supplementing animal rations with salt, trace elements and even concentrates.

In areas where cereal grains are used largely for human consumption their application as feedstuffs will be limited. With improved standards of living, however, there will be an increased demand for a greater variety in human diet and more cereal grains will become available to improve animal production. In other areas, climatic conditions may be such that pastures can support milk and meat industries, the by-products of which can be used to support pig and poultry production. Certain foods which are suitable for human consumption may with justification be fed to animals when they so balance a ration as to enhance greatly the efficacy of utilization of other nutrient substances suitable only for animal consumption.

Much can be done in developing countries to elaborate rations for pigs and poultry by estimating the values for local feeds on the basis of values established for similar feeds in the more highly developed countries; in view of the paucity of data on local feeds this procedure is in many cases the only feasible alternative. Refinements can follow as data on local feeds become available (Shaw, 1962).

The complex problem of mineral deficiencies and imbalances is an important aspect of livestock nutrition which requires attention in many of the developing countries. The clinical symptoms, and the subhealth and lack of productivity which frequently result, may be associated with a variety of pathological conditions such as parasitism. Much of the current research involves the trace mineral elements, but deficiencies of such major minerals as calcium, phosphorus and magnesium continue to inhibit animal production in many areas, and the resulting syndromes require close examination both as deficiency entities and in their association with other clinical factors. In this field, as in so many others, the problems could be solved, at least in part, if the knowledge currently available were fully applied.

Experimentation in livestock development has to be planned over a long period of time. Genetic studies must be based upon accurate assessment of an animal's ability to produce. Consideration must be given to such matters as milk and fat production; efficiency of feed utilization; work potential; adaptability to environment; quality and yield of wool; relative amounts of meat, fat and bone; reproductive efficiency and resistance to disease and other stresses.

Livestock/plant interrelationship

It is apparent that plant production and animal production must be brought into closer relationship. The assessment of production potential solely on the basis of the individual animal is no longer considered rational, and there is a need for research into the total production per unit of land area in terms both of animals and crops. In the arid irrigated regions of the world, leguminous fodder crops for livestock feeding are being raised as part of the rotation, thus returning some of the needed nutrients to the soil. The system of fallow is gradually being superseded by the raising of crops after chemical fertilization of the land, and the use of the subsequent growth as fodder or pasture. The beneficial pasturing of winter wheat and other winter grains for limited periods of the year during the autumn and early winter growth is more in vogue today than ever before. In Australia and New Zealand, great gains have been made in the close association of grain and fodder cropping with the production of beef, mutton and wool. The heavy losses caused by periodic droughts in areas of low rainfall can be eliminated or alleviated by abandoning the complete reliance of the livestock raiser upon pasture in favor of a combination of stock raising and feed production. The trend in Australia toward this combination is illustrated by the following figures compiled from the most recent available information for the country as a whole (Australia, 1962):

	Wheat farms with sheep	*Percentage of wheat farms with sheep to total wheat farms*
31 March 1948	42,458	78.6
31 March 1956	41,119	82.85
31 March 1960	45,217	85.35

The increase in sheep numbers to record levels in New Zealand since 1950 has been due in varying degrees to the rapid extension of pasture improvement, the rising carrying capacity of hill country farms brought about by aerial top-dressing, better farm management practices and the buoyant market conditions for wool and meat.

In some Latin-American countries such as Uruguay, sheep and wool production generally exists in conjunction with dairy farming or stock breeding for slaughter or both. The greatest concentration of sheep per unit of area is found in farms of 100 to

2,500 hectares, that is, in those with the highest wool-bearing sheep/cattle ratio. In Argentina and Uruguay the total numbers of sheep are declining in relation to alternative livestock production. Certain diseases, such as epididymitis, and deficiency conditions are also having an adverse effect.

Fodder conservation and grazing management

One of the features of natural grasslands in dry tropical countries and semiarid areas, or in tropical areas with a dry season when little or no grazing is available, is the irregularity of their production. During the rainy season, which may last for less than four months, pastures grow quickly and produce heavily, but during most of the dry season only dry grasses and shrubs can be eaten by grazing animals, which approach a state of starvation as the season advances. The rainfall variation from one year to another can be very great and neither warrants reliance on average production figures nor permits a reasonably accurate estimate of the carrying capacity of the ranges.

In such conditions, there is an acute need not only for increasing fodder and forage supplies but also for the conservation of fodder to avoid periods of starvation. Even in the more temperate climates of the economically more developed countries (where seasonal shortages of grazing and fodder are usually less acute) hay, silage and other methods of conservation have made an important contribution to the high level of livestock production.

Lack of feed conservation leads to marked seasonal fluctuations in the numbers and quality of livestock offered at markets. The efficiency of the marketing system is thereby reduced, and the cost of marketing increased. One of the means of attaining improved livestock production in the arid areas of the world is to ensure a more even distribution of animal feed throughout the year. This can only be done by adapting animal numbers to forage resources and complementing the rations during periods of shortage with concentrates or conserved fodder.

Greater integration of crops and livestock is necessary for the development of livestock production both in semiarid and arid nonarable areas. The increased supply of organic matter and nitrogen from animal residues leads to higher crop yields, which in turn makes possible an increased production of fodder crops. There is thus a complementary effect which raises the productivity of both crops and livestock.

Range management (including deferred grazing), the cultivation of fodder crops, the manufacture of silage, development of ley farming systems, the utilization of grain cereal crops, and the use of crop by-products and concentrates all have their parts to play in the increase of forage supply. Fencing, which makes rotational grazing possible and which facilitates the balance of animal numbers and carrying capacity of the grazing land, can greatly improve grazing management where it is practicable. Its feasibility depends upon costs of installation and upkeep in relation to the productivity of the land.

Although shortage of water is a notable limiting factor to livestock production in dry areas, an increase in the number of watering points without attention to the carrying capacity of the surrounding land can spread the worst evils of bad grazing management to areas which are now protected by their isolation. Legislative control of communally-owned grazing grounds and water supplies may be necessary.

Importation of exotic breeds of livestock

As one means of increasing livestock productivity, governments in many of the less developed countries turn almost automatically to the importation of exotic breeds. The stimulus for this comes from the remarkable progress which many of these breeds have made in their native territories. There are, however, limitations to this procedure; the introduction of exotic breeds of livestock does not always result in the spectacular progress which is anticipated. The managerial skills required to maintain such developed livestock are often lacking in the importing country, and results can be disappointing or even disastrous.

The impact of few imported animals — all that may be possible with limited financial provision — on the national stock is meager. Under the conditions which prevail in the tropics, little information may be available to guide the breeder in the feeding and management of imported stock, which may have been developed under the vastly different conditions of a temperate zone. Exotic stock sometimes succumb to local diseases against which they have no immunity or resistance. Nevertheless, it is undeniable that the introduction of carefully selected blood lines can be outstandingly successful where

all the necessary precautions are taken, as for example in the recent spread of Friesian cattle in the United Arab Republic.

Where large-scale irrigation projects are in hand, and the full utilization of land and water calls for diversified agriculture, or where feed for animals can be grown in satisfactory quantity and quality, the introduction of exotic breeds of superior productivity may be useful. This applies particularly where the income level of the population is rising and there is a growing demand for food of high biological value, such as milk, eggs and meat.

A very real danger in the importation of foreign breeding stock lies in the possible introduction of exotic disease. Quarantine practices, both in the country of export and in the importing country, are not invariably such that stock can be guaranteed free from infectious disease, the introduction and spread of which may disrupt the livestock industry for long periods and have an enduring detrimental effect on production. In these days of increased ease of transport for livestock, the intercontinental transference of virulent exotic diseases is a hazard which must be recognized. The possibilities for the transfer of major epizootics into free areas are very real, and every possible means must be utilized to avert such catastrophes.

Artificial insemination, one of the most useful instruments for the improvement of livestock quality, can ensure that much greater use is made of imported livestock. However, unless properly applied, this too can become a medium for the widespread dissemination of both undesirable genetic factors and of disease.

Use of indigenous breeds of livestock

It is accepted that, when any proposals are under consideration for the development of the livestock of small producers, it is unrealistic to fail to utilize indigenous livestock. Governments are well advised always to give early consideration to the improvement of indigenous stock. Through generations of neglect and failure to cull the unproductive animal, some strains have become extremely inefficient producers. Nevertheless they have retained the ability to thrive within the available feed and management resources and, unlike exotic stock, they have a notable resistance to the diseases common in the area. The less developed countries in general have not been able to maintain indigenous stock under conditions of management and feeding which would ensure the fullest utilization of their genetic potential. Plans aiming at livestock improvement must, therefore, incorporate improvement in feed resources through proper utilization and conservation of foods available.

Through the application of modern technology the production of feed for livestock must be increased. Extension services can perform invaluable functions in such matters.

Selective breeding within indigenous strains is practicable but, for financial and physical reasons, much of the necessary testing for weak inheritable factors of economic importance is beyond the capacity of the small breeder. Stock improvement can be achieved more satisfactorily by large organizations such as co-operatives or government agencies. There is much less risk in such a program of gradual evolution, which is based upon the adoption of those methods of breeding most effective in increasing production within the framework of economically feasible animal husbandry practices.

Crossbreeding

In the evaluation of hybrids the phenomenon of hybrid vigor or heterosis is utilized. By crossbreeding it is possible to introduce into the gene complement of a breed new hereditary factors which were not there before and which may be important in increasing the efficiency of animal production. In this way, a new character, beneficial to its economy, may be introduced. However, the introduction of exotic breeds, either with a view to grading up to high levels of production or with the aim of evolving adaptable animals of high productivity, would require both sufficient feeds and a well-developed management level brought about through local research and extension.

Crossbreeding may have specific objectives in animal production. The expense involved, and the difficulty of ensuring continuity have largely inhibited the spectacular achievements which were possible with the brief generation interval of plants. Crossbreeding has, however, been widely used by commercial livestock producers. In view of the high heritability, found in some beef breeds, of characters such as high birth weights, high weight-gain, carcass yield and meat quality, beef bulls have been used on commercial dairy cattle which are not

required to produce their replacements. The progeny have been a commercial success and, in some countries, a very high proportion of dairy cows are currently being inseminated with semen from beef bulls to produce such commercial cattle for slaughter.

Crossbreeding is also of great value in achieving a combination of environmentally desirable characteristics. For example, culled Merino ewes from eastern parts of Australia are brought to the wheat belts and crossed with Border Leicester, Romney Marsh and Dorset Horn rams and their female progeny are subsequently crossed with Southdown rams for fat lamb production.

The genesis of new breeds has been achieved through selective crossbreeding, resulting in animals of high productivity and adaptability to extreme climatic environment. A notable example of this has been the evolution of the Santa Gertrudis breed of cattle in Texas.

Disease survey, control and eradication

The losses caused by disease in livestock all over the world are immense. In some of the technically advanced countries systematic survey work has been initiated in recent years and it is clear that the full toll of livestock disease, in terms of loss of production and wasted labor and feed, runs into billions of dollars annually. At the present time, in the less developed countries it is only possible to estimate roughly the relative economic importance of specific diseases, but it may be assumed that the total losses are staggering. In the light of modern veterinary skills, many of these losses are preventable. Sufficient progress has been achieved during the last fifteen years in many of the less developed countries to indicate the great possibilities in the field of disease control, for example the manner in which rinderpest has been controlled in Thailand and is being controlled in India. Increasing numbers of laboratories and better veterinary services have controlled epizootics such as that of African horse sickness in the Near East which could barely have been challenged as recently as a decade ago.

Improved methods of husbandry and better means of disease control must go hand-in-hand in a balanced agricultural economy. The concept of the veterinarian as one who is concerned exclusively with the treatment of sick or injured animals has changed very radically within the last two decades. His primary functions are the promotion and maintenance of animal health. The emphasis is now on prophylaxis rather than on cure.

Of all the publicity which livestock diseases from time to time receive through the press, the most dramatic is that which accrues to foot-and-mouth disease. Nor is this surprising, since it is not only the most infectious disease known, but is probably the most important from the economic standpoint. The Western Hemisphere produces 45 percent of the world's meat supplies, but vast areas of South America, for example, are chronically affected by foot-and-mouth disease. In affected countries, the drop in milk production and the losses due to abortion lowered meat production and wool yield have been estimated to cause a total annual reduction of 25 percent of livestock production (Eichhorn, 1953). At the present time, there are indications of improved vaccines which, by conferring a stronger and more enduring degree of immunity, will, it is anticipated, bring about a great improvement in the prevention of foot-and-mouth disease, and may eventually reduce the incidence to a level where complete eradication will become economically possible.

In many of the great plagues of livestock — foot-and-mouth disease, rinderpest, haemorrhagic septicemia, and contagious bovine pleuropneumonia, to mention only a few — early and efficient diagnosis can lead to the application of adequate prophylactic measures, but in most developing areas of the world today the veterinary services are inadequate, and preventable diseases often reach epizootic proportions before control measures can be initiated. The shortage of veterinarians is causing concern everywhere and steps are being taken in many parts of the world to establish new veterinary faculties in universities. At the present time, the United Kingdom has one veterinarian to 30 square miles; the United States of America, one to 270 square miles; east Africa, one to 5,000 square miles (FAO, 1960).

This shortage is reflected throughout the developing countries of the world and, with increasing livestock populations, it is also seen in the technically advanced countries. In 1960, there were 22,000 veterinarians in the United States: by 1957, it is estimated that the requirement will be 35,000.

The universal deficit in numbers of veterinarians is part of the larger picture of the need for facilities for a great increase in technical training in all aspects of agriculture. The modern veterinarian, however,

is equally concerned with medical matters because of the necessity of controlling the zoonoses, diseases such as tuberculosis, brucellosis and rabies which are communicable between animal and man. The zoonoses are a public health concern and many of them, such as brucellosis, are economically highly important. Their control in man is completely dependent upon their being efficiently controlled in the first instance in animals. Numbers of new schools, in such vital areas of livestock production as Guatemala, Peru and Chile, have adopted curricula designed to meet the challenge of these present-day requirements. The emphasis on basic education is a healthy indication of long-term planning for progress, and, coupled with the great extension of research subject-matter in animal health and the increasing numbers of veterinarians who are adopting research as a career, holds much promise for the future.

There has been a marked growth both in the number and size of veterinary services in the governments of many of the developing countries during the last 10 years. This expansion of activities in the field of animal health has required the establishment of new offices or the strengthening of existing ones, in order to deal efficiently with veterinary administration, field disease control, and research.

Examples are the establishment of a livestock disease research laboratory in Bechuanaland; the great extension of the research and other activities of the veterinary services in India; the successful operation of two laboratories in Thailand, one for foot-and-mouth disease and one for other animal diseases; and the remarkable expansion of the veterinary services in the Sudan.

Assistance in disease control given by the technically advanced countries to the developing areas of the world, whether multilaterally through the work of the United Nations specialized agencies, the World Health Organization and the Food and Agriculture Organization, or on a direct country-to-country basis, has increased greatly in recent years, but is still insufficient for the needs of these countries. It is also inadequate to ensure that "clean" areas of the world are not threatened by the extension of exotic diseases, which are spreading far beyond their traditional boundaries. Such assistance requires, on an increasing scale, the establishment of research and vaccine production laboratories, the provision of material and equipment, the means to train greater numbers of technical personnel and the services of skilled and experienced bacteriologists, virologists and parasitologists. Research problems can be tackled most effectively in the countries where they exist. Similarly, the conduct of disease surveys, based upon the critical techniques of biostatistical methodology, is being seen increasingly as an urgent necessity in the developed as in the developing countries, in order to ascertain the existence, the incidence and the relative economic importance of individual infections and infestations of livestock. It is being recognized in many quarters that the emphasis placed in past years on fundamental research may have detracted from essential ecological and epizootiological studies.

Modern feeding practices, essential though they are, bring with them new problems of animal health. Veterinarians working with physiologists and biochemists are giving greater attention to the study of nutritional disorders. Improved irrigation and better pastures may not only create suitable environmental conditions for intestinal and other parasites, but also be associated with such deficiency ailments as hypomagnesia. Deficiencies and imbalances of both major and trace elements are being investigated on a wider scale in regions where they appear to impede stock raising, and the complications which ensue from their co-existence with disease processes such as those caused by internal parasitism are receiving attention.

Disease in livestock is not necessarily a spectacular matter with thousands of cattle exhibiting obvious symptoms and lesions as in foot-and-mouth disease, or with a high death rate as in rinderpest and African horse sickness. It may be so subtle and insidious as to become accepted as a normality, examples being some of the infectious infertilities and certain of the mineral deficiencies. Internal parasitism in livestock, for example, is insidious and costly to such an extent that it is now generally recognized as a factor of major economic importance in livestock production everywhere. In many areas it may be of even greater importance than the epizootic diseases. Parasitism accounts for a vast amount of subhealth which is largely preventable by modern methods of diagnosis, prophylaxis, treatment and control. Research work is urgently required into the life-cycles of many parasites, and an intensification is necessary of the great work in the production of new therapeutics and improved parasiticides which has been a feature of recent years. Studies of the life-cycles of protozoan and metazoan parasites of animals are aimed at the discovery of vulnerable stages in the life-cycles. There is a notable trend

in investigation of biological preparations which will induce increased resistance to infestation.

Mastitis is a universally serious problem which causes a heavy annual loss in areas of dairy production — estimated at £10 million (U.S. $28 million) in the United Kingdom alone. It is probable that, on any one day, up to 5 percent of the milking cows in any dairy shed will have clinically apparent mastitis. Even with the widespread use of antibiotics — not always an unmixed blessing — losses in milk, "quarters" and even lives are still serious.

Control of insect vectors of disease, and especially improved means of preventing their transport from country to country, and continent to continent, by such media as the ubiquitous and highly suspect aircraft, is a factor of increasing importance in the international approach to disease control. In many cases, for example, African horse sickness, the full extent of vector involvement is not yet known, nor is the life-cycle always understood. Until research on such matters is initiated, the control of vectors will continue to be inadequate. In such extremes as the tsetse areas of Africa, millions of hectares of territory will remain virtually closed to livestock production until cheap and effective insecticides can be produced and applied in quantity; or until other methods, such as biological control, can be utilized for the eradication of vectors, and hence for the control of livestock disease.

Animal reproduction, including the application of artificial insemination for the improvement of livestock and the control of disease, poses many new problems. In the application of new techniques in this field, health of the donor male is of vital importance, and extended research into those obscure and insidious diseases which may be transmitted by artificial insemination is essential if these techniques are to be applied with safety. The mechanism of such transmission, and the therapeutic and biological treatment of infected animals, call for continuing investigation. Improved control over the transmission of disease through the medium of semen will lead to a further lessening of embryonic mortality. The deep freezing of semen has created possibilities for the improvement of livestock in certain parts of the world, and it has become a factor of considerable commercial value. It is most important that emphasis should be placed on the absolute freedom of semen from infective agents, and that the selection of bulls should depend both on genetic principles and perhaps to the resistance of their semen to the adverse effects of deep freezing and storage. Continued research on the care and handling of semen and on the sexual health control of breeding animals will be required as artificial insemination inevitably extends still further.

Education

Education is at least as important in solving the problem of increased supplies of animal protein as in any other field of progress in the less developed countries. Ignorance and illiteracy — not necessarily synonymous — are invisible barriers to progress in all fields. More specifically, better education is needed among producers to improve their methods and productivity, and among consumers to familiarize them with the essential need for an adequate level of protein in the diet.

In all fields the lack of educated and trained personnel is a major obstacle to economic and social progress in the less developed countries. Economic development in these means primarily agricultural development, which underlines the importance of agricultural training and education. The term "agricultural" is used here in its widest sense, to include both crops and livestock, and also forestry and fisheries.

Education should be closely related to the needs of the country and to the conditions under which the trainee will work. In all branches of animal production and health, for example, FAO fellowships have been closely related to specific projects. They have thus helped to ensure continuity and to provide the countries concerned with the technical means of following programs to their planned conclusion, and of integrating them into the agricultural economy. Training centers in technical subjects are held wherever possible in countries which are making good progress in that particular field and which can therefore provide the requisite facilities and enable trainees to derive the maximum benefit from the demonstrations.

The FAO/WHO Expert Panel on Veterinary Education, established in accordance with recommendations made at an international meeting on the subject held in London in 1960, has begun a study of all details of veterinary education in the various regions of the world. The panel will produce reports reviewing veterinary education in all countries, including countries in which the establishment of veterinary schools is being considered (FAO, 1960). In providing a stimulus for higher education in a

specialized field, and by making available the best advice and guidance on the subject, this panel provides a model which may with advantage be followed in other technical fields. For example, the FAO Expert Panel on Animal Husbandry Education, now being formed, is to study and advise on education on the feeding, breeding and management of animals; and the functions of the FAO Expert Panel on Animal Nutrition include consideration of education and training in that field.

It is no small part of the functions of such panels, which include in their membership some of the foremost authorities from all regions of the world, that advice and guidance can be given to governments, universities, foundations, trusts and other bodies with a practical interest in the subject on all aspects of the specialized education under consideration, including the establishment of new schools or the reorganization of old ones.

The establishment in less developed countries of such an essential service as a veterinary department is dependent upon the provision of adequate and appropriate education of the personnel who will comprise the professional staff. An efficient veterinary service is essential if animal diseases are to be controlled or eradicated, and if animals are to be kept in good health so that livestock production may develop economically. Veterinarians, too, should play a full part in the encouragement of good livestock husbandry because the management, housing and feeding of animals are an important aspect of preventive medicine. This can be practiced effectively only by veterinarians with a full appreciation of the impact of these factors on the health and well-being of livestock (FAO, 1962). In all countries at whatever stage of economic development, the cost of animal disease control is high: it is, however, only a small fraction of the cost of uncontrolled disease.

For the satisfactory growth of livestock production in Latin America, for example, educational facilities need to be rapidly expanded both in animal husbandry and in animal health. Several excellent schools already exist in these fields, but their numbers and the number of trained veterinarians are small in relation to the vast livestock populations. Brazil, with more than 71 million cattle, 45 million pigs, and 19 million sheep, has only 2,890 veterinarians, many of whom have to serve as advisers on animal production as well as on animal health.

A major obstacle to the expansion of education is the critical shortage of teachers. It is necessary to provide the means for "teaching the teachers to teach." Some veterinary schools, for example, encourage young graduates to become teachers for some years at their own school, in order to gain the necessary experience. The FAO/WHO Expert Panel on Veterinary Education has proposed that formal courses in methods of teaching should be inaugurated for young veterinary graduates who intend to follow a career in teaching. This is of especial importance in veterinary schools in the less developed countries.

In modern times it is being increasingly realized that teaching and research form an ideal partnership, and that educational institutes are suitable locations for the conduct of research programs. The combination of such activities under one roof depends for its success upon a sufficiency of staff, a farsighted attitude on the part of the college authorities, and a departure from archaic educational methods. It has a particular application in the fields of animal production and health, and the trend in many faculties today is for a closer integration between departments of research and those of teaching.

In order to keep them up to date with recent technical advances which may have special application to their country or region, the provision of refresher courses for practitioners in all fields of animal production is another important aspect of education.

In all less developed countries where qualified and experienced professional staff is scarce, it is important to make full use of auxiliary personnel working under suitable supervision. This principle, which has been recognized by the FAO/WHO panel, is applicable to numerous disciplines in many countries. Lay or auxiliary personnel, for example, can be trained for work on some aspects of disease control, artificial insemination, food inspection, animal husbandry and management, as laboratory assistants and for certain types of regulatory work. Extension work in these and related fields can also be undertaken by such auxiliary personnel, always under appropriate supervision by qualified professional staff. The system is not without its dangers, and it should not be forgotten that auxiliaries are intended to augment and facilitate the work of the professional, and not to substitute for him. It is important, however, that for both professional and auxiliary staff there should be the opportunity of suitable permanent employment in a career offering prospects of promotion and advancement in accordance with capability and seniority.

These are some of the varied facets of education. In animal production, future progress depends upon

an acceleration of the twin processes of education and re-education. There is notable scope for both bilateral and multilateral aid. Almost all forms of technical assistance to the underdeveloped countries have their roots in education.

Marketing

Facilities for satisfactory marketing must always be taken into consideration where plans for livestock development are being formulated. In many of the less developed countries the main factor retarding the growth of a productive and profitable livestock industry is the difficulty and cost of getting livestock and meat to the consumers who want it. Both output and consumption are low because of the wide margins between the price to the producer in the country and that to the consumer in the city. If production is to be increased in order to meet the growing demand for animal protein, the need for adequate marketing services will increase still more, because a large share of any additional consumption will be located in towns where incomes are higher and where the growth of population is faster than in the country as a whole. More hygiene, improved packaging, and more modern shops are also demanded. There is also a need for much greater investment in transport and processing facilities, and for the adoption of improved sales methods, if livestock raisers are to have sufficient incentives to expand the volume and improve the quality of their output.

Efficient marketing of livestock and livestock products begins with the planning of livestock production programs with marketing and processing requirements in mind. One of the factors deterring investment in marketing facilities in many parts of Africa, for example, is the short and fluctuating period during which stock are offered for sale. The provision of water supplies and some supplementary feeding could do much both to extend the season of sale and to turn out a better quality animal. On the other hand, some of the traditional producing areas are facing a consumer reaction against fat in meat.

A thorough re-examination of accepted quality standards is called for to reflect these new buying preferences. Corresponding changes in production practices will be needed if they are to produce the kind of meat consumers will most readily buy.

Since livestock can usually be fed most cheaply at some distance from consumer centers, transport of livestock products to these centers is a major marketing problem, particularly in view of the perishability of meat and dairy products. In west Africa about 1,5 million cattle, goats and sheep are trekked annually over 1,000 kilometers, through areas infested with the tsetse fly, from the savanna to the coastal cities. The establishment of better watering and feeding facilities en route would help considerably to reduce the loss of meat and quality that is incurred.

The construction of roads and railways cannot as a rule be justified on the basis of livestock and livestock product marketing requirements alone. However, easier access to the vehicles needed can make a great difference. In western Europe and parts of Latin America the greater availability of refrigerated transport is having an important influence on the marketing channel and the location of processing facilities. Livestock may then be slaughtered in the production area. By avoiding damage, loss of weight and quality in the live animals, by saving feeding and labor costs en route, and by carrying only the more valuable parts of the carcass, transport costs can be greatly reduced.

In Chile, for example, a convenient rail service from the main producing area to the largest consuming center permitted the development of a refrigerated meat marketing channel. Losses during transport were reduced, some long-established monopolies disappeared and meat consumption increased because of lower prices to consumers. The scope for adopting this system, however, is still limited in many less developed countries, as the lack of a return pay load and other factors raise the overhead cost. There is also a greater risk of losses from a breakdown in the refrigerating equipment, from the lack of skilled technicians to undertake maintenance and repairs, and from difficult road and rail conditions.

Movement of livestock by boat (as in northern Australia, parts of east Africa and to Hong Kong) is a cheap means of transport, where feasible. Where other means of transport are lacking and the markets are able to pay high prices, fresh meat is sometimes brought in by air.

An efficient means of bridging the distance between producer and consumer is even more essential in the marketing of milk. In India, for example, until recently, milking herds were kept in the towns instead of in the surrounding areas where fodder was cheaper, largely because of difficulties in organizing regular marketing channels over distances of more than a few kilometers. The rapid increase

which can be achieved in milk output by establishing suitable collection and transport facilities has been demonstrated recently in a project organized by FAO and the United Nations Children's Fund (UNICEF) in northeast Africa. Milk collecting stations were established, and within a short period the quantity received at one collecting station set up about 50 kilometers from a big consumer center had increased to 2,000 liters daily, whereas previously practically no milk from this area reached the city.

In some areas, access to a profitable market is only feasible for livestock products if they can be processed into a form less susceptible to deterioration in hot or humid climates during the long time needed to reach the consumer. For example, the drying, smoking or salting of meat has been common practice in many parts of Africa and in northeast Brazil. Canning meat not only makes it much easier to handle, but is in line with consumption trends toward foods convenient to handle in the kitchen. It also reduces the risk of transmitting animal diseases. The establishment of improved slaughtering establishments, including methods of handling by-products, generally brings increased returns in better quality hides and skins and ingredients for livestock feeds, as well as more hygienic meat.

Schemes for marketing unadulterated milk and for the economic conversion of seasonal surpluses of milk into butter, ghee, or cheese, are often most easily put into effect by means of the establishment of wholesaling and processing facilities and distribution through a limited number of organized channels which can be adequately supervised. This system also makes possible the introduction of "toned," "filled," and "reconstituted" milk to make milk protein available at low prices. Such schemes are especially important in tropical countries where milk production is limited and expensive. Toning the high fat content of local cow and buffalo milk to 3 percent or less by adding water and imported skim milk powder has permitted its sale in Bombay at retail prices less than half that of whole milk, and has proved an effective means of raising consumption in low income groups. So-called filled milk, made by reconstituting skim milk with edible vegetable fats and oils and added vitamins, has achieved rapid acceptance in the Philippines.

In many of the less developed areas, existing sales methods for livestock products afford insufficient incentives to increase output or improve quality. Large numbers of livestock are still sold in units without sufficient regard to weight, yield of meat or quality. The organization of systematic markets where livestock can be sold on a weight and grade basis can make an important contribution.

Open sale by public auction – provided there are enough competing buyers – assures that farmers obtain the current market price and are paid in cash immediately after the animal is sold. It also contributes indirectly through the dissemination of market information. In the case of milk, it is important that the producer be paid on the basis of cleanliness and purity. Since protein content is more important in tropical areas than fat content, payment on solids-not-fat should be introduced when feasible.

Perhaps the main weakness in the marketing of eggs in less developed countries is uncertainty as to quality at retail. It restricts consumption because buyers are diverted to more dependable foods, and it discourages production both because total sales opportunities are limited, and because the high wastage risk in marketing cuts down the price payable to the producer. If refrigeration throughout marketing is not economically feasible, then eggs should be collected and distributed very rapidly with effective price premiums for performance at each stage.

Livestock and livestock products

CATTLE

According to official estimates, there are about 1,000 million cattle and buffaloes in the world, and their numbers during the past decade have increased by some 1.5 percent annually. In many countries the figures are very uncertain. What is certain, however, is that a very large proportion of them is completely unproductive, or has at best only a very low level of productivity. The more productive are, as would be expected, located in the more developed regions of North America, Europe and Oceania where the demand for both beef and milk is high.

Asia on the other hand is essentially a meat deficient area in spite of an estimated population of cattle and buffaloes approaching 400 millions. Cattle

numbers have been increasing rapidly in recent years in many countries of the region, notably those with a rising standard of living such as Japan and Taiwan. In many countries of this region there are religious objections to the consumption of beef, and the main development is likely to be in the increased production and consumption of milk and milk products.

The cattle of Africa, with the notable exceptions of those in a small number of localized areas, are of poor quality, and stocks are severely restricted by such widespread diseases as trypanosomiasis. The estimated cattle population is 115 million. Extensive control of disease, parasites and vectors, and improved husbandry, nutrition and breeding, would bring about an immense increase in meat production throughout the continent, where the human population at present is sadly deficient in animal proteins.

The consumption of beef is high in Brazil, Argentina and Uruguay, but in the rest of the continent of South America the consumption is low, notwithstanding the over-all population of 165 million cattle. Cattle numbers have increased over the past 10 years in some countries, including Brazil and Venezuela, and have declined in others, such as Argentina and Uruguay.

In general, throughout the world, much more beef and veal are produced from dairy cattle and from working oxen and buffaloes than from the beef breeds. The average of quality, conversion rates and meat yield is, therefore, low and could be greatly improved by the use of beef types for crossbreeding.

In most of the less developed countries the wastage involved in the production of meat is very considerable, and there is partial or complete failure to utilize a wide range of useful and valuable by-products such as blood, bones and offal, and to convert carcasses unfit for human consumption into meat and bone meal or carcass meal for animal feeding; these are valuable sources of protein, minerals and vitamins.

The per caput consumption of milk and milk products in less developed countries is extremely low, as was shown earlier in Table IV-1. The high price of milk in relation to incomes is a major obstacle. If in 1957 an average Danish citizen had spent all of one day's disposable income on liquid milk he would have received nearly 25 liters, while a United States citizen could have purchased 22 liters. In Paraguay, however, the amount would be only 2.7 liters, in India and Ceylon only 1 liter, and in the Philippines, Burma and the Congo, 0.8, 0.5 and 0.4 liter respectively.

Milk production in the developing countries has been increasing but it does not appear to have kept pace with population growth. In 14 countries of the Far East (not including Japan) milk production is estimated to have increased by 17 percent from prewar (1934-38) to 1955-59, but because of population growth the per caput supply declined from 42 to 36 kilograms. In Africa (not including South Africa) total production also increased by about 17 percent, while production per caput declined from 40 to 33 kilograms. In Latin America, milk production rose by 62 percent, but the output per caput only rose from 60 to 97 kilograms. With the exception of countries such as Argentina and Uruguay with favorable livestock conditions the level of consumption still remains low in the majority of countries.

The establishment of urban milk plants usually provides the incentive for an improvement of milk quality and hence of livestock conditions in the dairy belts surrounding the cities. The marketing system is improved through more efficient handling and distribution, attention to hygienic control and the reduction and gradual disappearance of the practice of selling adulterated raw milk. In developing countries, however, cities are still only islands in a vast rural area in which appreciable changes in traditional livestock practices are slow to mature.

The most important of FAO's work in the field of dairying is that connected with the development of the UNICEF Milk Conservation Program (MCP). In this connection the functions of the two specialized agencies are complementary. The extent and consequences of malnutrition, which may affect more than half of the human population of less developed countries, bear particularly heavily on children and pregnant and nursing mothers. Malnutrition is a major cause of infant and child mortality, it retards mental and physical growth and ability, and predisposes to disease.

The joint FAO/UNICEF milk conservation program is aimed directly and specifically at the improvement of nutrition; it achieves this aim through the provision of processing plants which serve as demonstration and training units to stimulate efficient dairy development in areas where the need is greatest. Special attention is given to improving the production of milk and milk products, and to methods of reducing the price of milk to consumers in countries with a low level of income, while still maintaining a reasonable return to producers. It is a necessary constituent of this program that there is adequate provision for technical experts, fellowships, and training for plant managers and other essential personnel to ensure the efficient operation of plants on a financially sound basis after foreign aid is withdrawn.

Sheep

There are approximately 900 million breeding sheep in the world, and at least one third of these are estimated to be of native types, uneconomical, poorly fed and badly managed. Such low-productivity animals are found precisely in the regions where the population depends most upon sheep for the production of meat and milk. In many of these countries the only meat consumed may be from sheep or goats. Often the flocks are maintained under desert conditions with long dry periods of semi-starvation separated by short spells of pasturing.

Sheep are kept exclusively for meat and wool production in the Americas, Australia, New Zealand and most of northern Europe. On the other hand, in north Africa, the Near East, southern Europe and southern Asiatic U.S.S.R., almost 75 million ewes are maintained primarily for milk production. In these regions ewes' milk accounts for over one third of the total milk production. In Turkey, Iraq, and Cyprus, over 50 percent of all milk produced is sheep milk. There has been little systematic attempt at increasing the output of sheep milk. Until such time as pastures capable of sustaining productive dairy cattle are brought into being, and the necessarily slow alterations are made to the living customs of agricultural peoples, the ewe will continue to be utilized for its milk production.

There is evidence of increasing consumption of mutton and lamb in the Mediterranean countries, excluding Italy. In Afghanistan, Iraq, Iran, Jordan, Pakistan, and Saudi Arabia, where sheep supply 75 percent of the meat consumed by the population, the demand is constant but is conditioned at a modest level by the low economic status of the population which severely restricts the consumption of this and other animal proteins. In these countries, carpet and coarse wool is produced but the output shows little expansion, although the demand for this commodity is firm. Low availability of feed, arising from deficient management practices, prevents rapid increases in sheep production, while the use of marginal lands for cropping rather than sheep grazing is also a limiting factor.

Australia, New Zealand, the United States of America and other leading sheep countries possess flocks which produce annually an average of 8 to 12 pounds (3.5 to 5.5 kilograms) of wool per sheep. The sheep of Asia, north Africa, the Near East and Andean South America produce less than 3 pounds (1.4 kilograms) of wool yearly. Because of poor animal husbandry practices and ineffective disease control, these regions produce only 20 percent as much meat per breeding ewe as the sheep used for meat production in the advanced countries.

The division of wide pastoral areas into smallholdings is reducing the possibilities for the large-scale grazing of sheep flocks. Another limiting factor is the increasing shortage of experienced shepherds which, together with a lack of winter grazing, is reducing the efficient use of summer pastures. Improvement of the sheep industry in the less developed countries for the foreseeable future must be based upon a policy of painstaking education in management, husbandry and disease control, allied to improvements in systems of land tenure. In these countries progress will be slow and must fundamentally be related to small modifications and improvements to existing methods.

Goats

The view has often been expressed by animal production experts that the goat is a destructive grazer, and sometimes the extreme view is submitted that goats should be exterminated as a serious brake on agricultural progress in underdeveloped countries. The problem, however, is one which can be solved by proper management methods. There are many areas of the world, such as certain regions of Africa, Asia and South America, where the goat is a valuable source of meat and milk. Improved management should include controlled grazing or tethering, selection, supplemental feeding and disease control. In countries where goat production is considered to be useful and necessary, education in improved husbandry methods is essential.

Poultry

World production of poultry meat for 1961 (excluding Mainland China) is estimated at about 8.1 million tons, exceeding the previous year's by about 10 percent. In some instances, production has increased so rapidly that it has outstripped demand, and several more developed countries have discovered an excess of poultry meat and eggs to be an economic embarrassment.

The poultry industry is one of the most promising and progressive of livestock industries, and in many countries it has been evolving in a highly satisfactory manner in recent years. Only a small capital investment and easily acquired skills are

required to raise chickens under village conditions, as they adapt better than any other stock to variations of climate and geographical conditions. Eggs and poultry meat provide valuable protein and other nutrients for growing human populations, and offer an important source of income for producers even when these are operating on a small scale.

In many of the less developed countries and notably those of the Far East great progress has been achieved in poultry nutrition and management, and the vitally important question of prevention and control of disease. Improved strains of laying and meat-producing birds have been selected and propagated widely. This is discussed more fully in a later section. Although there has been an increasing tendency toward bigger poultry units, the importance of the small flock has not been overlooked. This has a particular relevance for less developed countries.

Where nutrition, management and disease control are satisfactory, an annual production of up to 300 eggs per hen can be achieved. Poultry meat nowadays can be produced with less than 2 kilograms of feed per kilogram of live weight if fast-growing strains and properly balanced feedstuffs are available. Feed conversion rates around 2.5 are now common in broiler plants. Ten years ago, 3 to 4 kilograms of feed was required to produce 1 kilogram of live-weight chicken. Provided that feed is available – and in many cases the bulk of it can be produced locally at an economic price – and that the decimating diseases of poultry are controlled by extensive vaccination programs and applied hygiene, there are no significant obstacles anywhere to the establishment of a sound and progressive poultry industry. The world's poultry industry, however, is constantly threatened by many contagious diseases, and developing countries require assistance to enable them to produce vaccines and to conduct extensive vaccination campaigns.

Pigs

Since 1952, there has been an increase in the world's pig population, from 294 million to approximately 500 million at the present time. The most conspicuous increases have occurred in Latin America, the Far East and Europe, while small increases have been recorded in Oceania. In North America, there has been a cyclical movement in pig numbers, while in Africa and the Near East numbers have remained virtually stationary.

In Latin America, the Far East, and other areas where religious objections against the consumption of pork apply to only a minority of the population, the pig is nearly as promising as the chicken as a potential source of acceptable protein for human consumption. Pork can be an inexpensive meat of dietetic importance. Improving the quality and quantity of pork year after year by even a small fraction would significantly enrich the diet and raise the standard of living of many peoples (United States Department of Agriculture, 1962).

Pigs may also be especially useful to the small farmer in the developing countries for the production of meat and lard, on a subsistence scale, for family use and for modest marketing, much along the lines of village poultry raising. This does not preclude pig farming on a large scale where feed is available and suitable management and disease control exist.

In the more advanced countries pigs have a very satisfactory efficiency in the conversion of concentrates for each kilogram of live-weight gain, the average figure being rather over 3 kilograms: this, however, is under conditions where selected pigs, high grade feed and means for disease control are available. In the developing countries, the ratio of conversions is less satisfactory, being in the region of the equivalent of 6 to 8 kilograms of concentrates per kilogram of live-weight gain. This is essentially due to the traditional custom of feeding pigs almost exclusively on by-products and waste materials.

The best type of pig for the developing countries depends to a great extent upon the needs of the population. The extremely heavy " lard " types are to be avoided as they are wasteful; moreover the market for cooking lard has declined in most areas and consumers discriminate against very fat meat. Such countries as the Philippines, Thailand, Viet-Nam, and the South American countries are showing definite trends in the selection of smaller, leaner pigs for higher meat production and lower fat. The same trends are to be seen in North America and in Europe.

Buffaloes

From Egypt to the Philippines the buffalo is the main support of many thousands of small farmers who depend upon it primarily as a draft animal. In this wide area there is an estimated buffalo population of 80 million. The health and efficiency

of the buffalo is a vital factor to the well-being of the human populations of these localities, notably in the countries of southeast Asia. Because this animal is found principally in the less developed countries there are notable gaps in the technical information relating to it, and there is scope for investigation and research to increase its productivity.

The buffalo is remarkable in that it frequently thrives on pastures where other grazing animals become emaciated. The need for the preservation and improvement of buffalo stocks is emphasized by its importance as an integral part of the life and welfare of families in small agricultural communities. Anything which will improve the quality of buffaloes, anything which will increase their work potential or their production of meat and milk, will make a material contribution to the progress and prosperity of many countries.

The value of the buffalo as a producer of high quality milk has long been recognized, notably in India at the Aarey dairy colony in Bombay. Buffalo milk is an excellent product either whole or as a constituent of " toned milk, " when it is combined with dried skim milk. Increased production of buffalo milk could assist in raising the living standards of agricultural peoples throughout the vast area involved, but practical steps must be taken to improve health and husbandry practices, to reduce the enormous losses from infectious disease and parasitism, and to increase the capacity for work and reproduction through improved management.

Other types of livestock

Auchenidae

There are some 5 million *auchenidae* in South America living in the Andean regions ranging from southern Colombia to northern Chile, with the greatest concentration in Peru. The species comprise llama, alpaca, vicuña and guanaco. Llamas are widely used as beasts of burden, and both llamas and vicuñas provide hair, hides, meat and milk, and constitute a significant aspect of agricultural production and an important source of income for the indigenous mountain people. Some attempts have been made to improve the quality of these animals but, in general, these have so far been on a small and unco-ordinated scale. Research into means of improving their productivity and fertility and of controlling disease is related to the wider question of animal production at high altitudes, a subject of considerable importance which is now beginning to attract attention as a matter both of economic urgency and in relation to applied physiology in both human and veterinary medicine.

Elephants

The elephant which, in Burma, is worth U.S. $300 per foot (approximately $900 per meter) measured at the shoulder — a mature elephant may measure 8 feet (2.5 meters) — is a valuable animal species which until recently has also received little or no serious veterinary attention and which, regarded solely as a working animal, is of considerable economic importance.

Wild life and game

The adaptation of animals and plants to their environment needs to be fully understood before rational land-use methods can be put into operation. Different species of grazing animals exhibit variations in efficiency in utilizing vegetation to produce animal protein. Under circumstances now prevailing in east Africa, zebu cattle, for example, are generally in much better condition than European breeds. From the research which has so far been conducted it appears that, through this form of metabolic adaptation, many wild animals maintain themselves and even grow and improve in condition on diets which will not support zebu cattle.

Game animals in Africa almost invariably appear better nourished than European cattle in Africa, and far eclipse the thin nomadic stocks. The magnificent condition of zebra and some species of antelope is in marked contrast even to the state of zebu cattle which, under identical conditions of pasture, may be emaciated and dying.

Game would appear to offer great possibilities as a source of protein for human consumption, if a system of game farming could be initiated. The development of wild-life policies and the conduct of detailed biological investigation will, it is anticipated, tap a promising source of animal protein for human consumption. Before systematic game cropping can however, be introduced on a large scale, much more information is needed concerning the numbers of wild game in the area under consideration, their grazing habits, reproduction rate, annual increase, losses from disease and other causes, and their migratory movements.

Ecological considerations involving wild game, nomadic herds and settled farming systems raise questions to which no satisfactory answers have yet been found. Just as the large herds of the Masai tribe, by overgrazing the land and increasing erosion, constitute a serious and growing threat to the wild life of the area, so the vast herds of game live in uneasy apposition to settled farmers, many of whom regard them as a considerable menace.

Hides and skins

Hides and skins, mostly as by-products from abattoirs, frigorificos and meat-canning plants, are the raw materials of the tanning industry and are important commodities in world trade. In rural areas, and especially in the less developed countries, there is often a lack of proper slaughtering facilities and of capital and skilled labor, which contributes to the failure fully to utilize the potential for the production of good quality hides and skins. These products can make a significant contribution to economic and social development and much wastage can be prevented through the application of improved modern techniques which are both simple and inexpensive.

The supply and demand for hides and skins depends on world factors outside the control of the country of origin. These products are not a foreseeable harvest which can be increased or reduced according to demand. Increase in supply follows increased demand for meat, but may also be a result of emergency slaughter or the effect of prolonged droughts. Quantities available for export will be reduced as a result of the development of a local tanning industry which utilizes large quantities of raw material and obviates the wasteful procedure of exporting raw hides and skins and reimporting them as finished leather.

Damage of various kinds has a severely adverse effect on the value of hides and skins which are peculiarly susceptible to the evidences of the wide range of parasitic, bacterial and viral diseases that affect the skin of animals in tropical and subtropical zones. Diseases and intermittent droughts annually cause the deaths of vast numbers of animals in the less developed countries, and the hides are usually the only part of the carcass which can then be salvaged. Such "fallen" hides are produced in large numbers in countries such as India where the slaughter of cows is prohibited and all cattle die from natural causes. Fallen hides are of inferior quality, are difficult to process and, where the animal has died from anthrax, may be dangerous to handle since this acute septicemic disease can be transmitted to man even years after the death of the animal.

Branding, wire cuts, pressure sores, knife wounds, bruising, inefficient bleeding, various forms of adulteration and other evidences of bad handling are all causes of reduced value and output which can be readily remedied.

Hide improvement services should be regarded as an essential part of agricultural administration, utilizing the services of the agriculturist and the veterinarian to demonstrate that, with little additional effort, hides and skins of good quality can be produced for which a remunerative market exists. Success depends upon the treatment of parasitic skin conditions and the control of other dieases, improved management and handling of livestock, and better methods of removing, flaying and preparing the hides. Much progress will follow the introduction of any of these factors and a growing and valuable industry will follow the adoption of all of them to the fullest extent possible in the prevailing circumstances, provided that proper legislation for control and the organization of marketing facilities are also vigorously pursued.

Regional trends in animal production and health

Africa

The African region presents special problems which have been increased by the rapidity with which independence has been gained in certain countries, and the difficulties resulting from the loss of the services of many expatriate specialists. The need for protein of high biological value is as marked in parts of Africa as anywhere else in the world. The requirements, however, are very great, and lack of purchasing power in the new and developing countries prevents the importation of milk products,

for example, in the quantities needed. Apart from small areas, the milk potential is not great and there are many major handicaps to the development of dairying in Africa.

In Africa, the hazards of livestock farming are perhaps greater than in any other region. Some 4 million square miles (10 million square kilometers) of Africa are dominated by the tsetse fly which, as a vector of protozoan parasites, effectively inhibits the successful raising of cattle and other livestock. The problems of disease control are extremely complicated, and are rendered even more difficult by such factors as the huge distances, lack of communications, droughts, floods, areas of poor land, plethora of vectors, uncontrolled wild fauna, management malpractices, unsettled civil conditions and illiteracy. Nevertheless, much work is being done in controlling the major epizootics of the region, and significant advances are being made in the control of contagious bovine pleuropneumonia, tick-borne diseases and parasitism. A notable rinderpest control program has been conducted in west Africa under the auspices of the Commission for Technical Co-operation in Africa South of the Sahara (CCTA), and the disease now exists only in north Kenya and Ethiopia. The latter country presents particular difficulties but even there a steady reduction of incidence is noted.

There is a growing interest in meat production, both of domestic animal origin and from systematic game cropping, and positive action has been taken, for example in the Sudan and Cameroun, to improve the hygiene and handling of meat and meat products for human consumption.

In large areas of Africa sheep provide the principal source of meat, while goats are also of importance. In north Africa some progress has been made in pasture improvement and improved sheep raising, but in the rest of the continent — with the exception of South Africa — the industry is primitive, management methods are inefficient and feed supplies are deficient. Little hope can be entertained for a rapid improvement in the husbandry of sheep and goats in Africa. Any programs must be planned both on a wide scale and on a long-term basis.

The poultry industry is highly developed in South Africa and is capable of rapid expansion in a number of other African countries. Poultry can make a substantial contribution in relieving the protein insufficiency of Africa. As in other regions, success in poultry production depends on the control of disease and the provision of feedingstuffs from local sources. The average production per hen per year in African villages is at present about 40 undersized eggs, compared with 280 to 300 good quality eggs in the top-producing flocks of developed countries.

Near East

Sheep are the main form of livestock in this region, for meat and wool and also for milk. In the area between Libya and Pakistan 75 percent of the milk is produced by sheep and goats. Cow pastures are very poor and cattle are selected for draft rather than for milking purposes. There are over 100 million sheep in the region, mostly of the fat-tail type. In view of the dangers of overstocking, production increases will not be attained by increasing this population, but rather by improving the quality of stock. Some steps have been taken to improve the output of meat, wool and milk. The governments of Afghanistan, Cyprus, Iran, Iraq, Lebanon, Libya, Pakistan, Syria and Turkey consider that sheep numbers must be held constant and the quality improved in order to satisfy the needs of their peoples. The present trend of numbers is difficult to assess due to the four years of drought in the Near East which destroyed at least 40 percent of the breeding stock. Before the drought period, a tendency toward stability was noted. The region continues to be deficient in meat and milk, but progress — slow but steady — can be anticipated with the improved methods of management and nutrition now being applied.

The dairy industry, based upon the consumption of cows' milk and its products, has developed satisfactorily in Israel and, to a lesser extent, in Lebanon. Throughout the region, bilateral and multilateral programs are assisting governments in the development of modern dairies for the major markets. These dairies serve as stimulants for the development of a local industry. This has been particularly noticeable in the case of the Teheran dairy project. Encouraging progress has also been noted in Iraq, Israel, Lebanon, Syria, and the United Arab Republic. One of the difficulties in the region is that much of the liquid milk sold is produced under unhygienic conditions and is heavily adulterated before it reaches the consumer. Milk is a traditional food, particularly in the form of yoghurt and cheese, but per caput production and consumption of milk and milk products is, in general, very low.

There is an urgent need for protein of high biological value throughout the region, but extreme climatic conditions and the lack of animal feed render dairy development particularly difficult. The importation of high-yield dairy stock, particularly for the irrigated areas, is being actively promoted by governments, and steps are being taken to improve educational facilities for modern animal husbandry practices. There is a new awareness of the importance of dairying.

Poultry production is of particular importance in Moslem countries where pig products are not eaten, and it can make a significant contribution to the available protein. Remarkable progress in egg and broiler production has been made in Iran, Israel, Jordan, Lebanon, Syria, Pakistan and the United Arab Republic. The expansion has been due in no small measure to the widespread production and use of vaccines against such conditions as Newcastle disease, which can wipe out a vulnerable poultry population. The most urgent requirements now are for improvement and development in the feed industry and in marketing systems.

Of disease problems, the control of epizootics has been given first priority. Modern techniques for the production of vaccines against rinderpest, and the application and extension of methods of field control, have received increasing attention in Afghanistan, in Pakistan and in the United Arab Republic. Progress in the control of foot-and-mouth disease has been slower, but a number of countries, notably Iran, Turkey, and the United Arab Republic, are producing their own vaccines and applying field control methods, primarily to protect the growing dairy industries. A severe setback has been encountered with the appearance and rapid spread of a type of foot-and-mouth virus, SAT-1, never before encountered in the region, which appears to have a predilection for sheep but is also affecting large numbers of cattle, especially in Israel.

The wave of African horsesickness, which swept across the Near East from 1959 to 1961, necessitated the establishment of four vaccine-producing laboratories and the provision of expert guidance in the complicated techniques involved. The disease is now on the wane, although this may be only a temporary recession; it appears, however, that the vaccination campaigns, which were prosecuted so vigorously by the governments concerned, have been successful in bringing the disease under control. The losses of horses, asses and mules were exceptionally heavy in some areas and the impact has been severe on agricultural activity, in countries where these animals provide the main means of draft and transport.

Much attention has been given to the control of diseases of reproduction, which are of grave economic importance especially in such countries as Pakistan, Syria and the United Arab Republic. Artificial insemination programs have been introduced and are successful where they are operated under adequate veterinary supervision and hygienic control.

The growing appreciation of the enormous economic losses caused by disease in livestock, and of the necessity to establish control measures as part of any long-term agricultural development program, has led to the establishment, under the United Nations Special Fund, of the Near East Animal Health Institute, with units in Iran, Iraq, Lebanon, Sudan and the United Arab Republic. This will be responsible for research, training, diagnostic work and vaccine production in a wide range of important livestock diseases, including equine encephalomyelitis, contagious bovine pleuropneumonia, foot-and-mouth disease, African horsesickness, parasitism, diseases of reproduction and diseases of poultry.

Nomadism

A note may be inserted here on nomadism, a way of life which today persists mainly in Africa and the Near East. Nomadic practices have their roots in the need to find means of exploiting unfavorable habitats which are not conducive to any system of arable cultivation. If animals in such arid areas were maintained in any one place for a long period, they would consume the limited available pasture and would then die of hunger. There is no possibility for the harvest and storage of fodder, and thus no alternative to the constant movement to new areas in search of pasture.

The pattern of nomadism closely resembles the spontaneous migration of wild animals which follow the rains and the growing vegetation, but the nomadic pastorialism seen, for example, over large areas of Africa, can be responsible for much land deterioration, and for the reduction of the game population with which it is in constant competition. Many areas are suffering severely from overgrazing, since almost invariably the number of domestic animals which can be maintained under such conditions is grossly overestimated, and widespread deterioration of habitat is the inevitable result. Stocks are not only a source of protein but are a symbol of status the im-

portance of which outweighs economic considerations.

Nomadism is a traditional form of social organization based upon a collective occupation of pasture lands. Even where this traditional nomadism is inimical to the habitat and to rational land-use practices, it is difficult to introduce any measures which will lead to its abandonment or even curtailment, although many areas are now suffering from severe overgrazing.

In east Africa, pastoral peoples are completely dependent upon their cattle and live on a diet of blood and milk. Such a liquid diet has notable advantages in an arid country. The use of milk and blood in this manner obviates the killing of the animals for food and greatly reduces the large conversion losses. The nomadic peoples, and the animals which they herd, have become adapted to their severe environment to a truly remarkable degree (Kay, 1961).

In the world's largest desert, the Sahara, a human population estimated at over one million lives wholly or mainly on livestock production, which provides milk, butter, and cheese as well as such materials as leather, wool and hair. Meat is seldom eaten, and the barter or sale of livestock provides the vegetable portion of the diet. Cattle are not usually kept by desert nomads since they have special pasture and water requirements which cannot be met. Sheep and goats, formerly maintained essentially for wool hair, and hides, are now kept mainly for meat and milk. In recent years the demand for camel meat has risen with increasing incomes (Eichhorn and Cockrill, 1962).

In general, it appears that nomadism is on the decline, and settling is very slowly increasing with the exception of a few areas. Gradually a process of evolution and a change in human ecology is bringing the nomads nearer to modern society. Further progress in this direction depends largely upon an extension of drilling water holes, and the establishment of permanent irrigation areas. The complete disappearance of nomadism, however, would leave great land areas totally unused since, with present means, they cannot be utilized in any other way (UNESCO, 1962).

Far East

One of the outstanding features of present trends in animal production in the region is the great increase of pigs and poultry. While poultry are acceptable nearly everywhere, this is not always the case with pigs. In the Far East, however, very large sectors of the population have no religious or other objections against pigs and, with the use of improved biologics, notably hog cholera vaccine, pig keeping is developing very satisfactorily in most countries. With further encouragement, it could be greatly extended: education in nutrition and management would render it more efficient and, in most areas, a considerable reduction in the time required to reach the optimum slaughter condition could be attained with relative ease.

Newcastle disease is enzootic throughout the region and, in the past, frequent epizootics have been the limiting factor in the development of the poultry industry. Spectacular control has been achieved in many countries following the use of attenuated virus-vaccines which can be produced in quantity at low cost. Large poultry farms are now being established in areas where poultry farming was previously limited to small farmer ownership of up to 50 birds. In Singapore between 1948, when large-scale vaccination was started, and the present time, the poultry population has increased from 500,000 to nearly 6 million; the price of eggs has fallen and a notable contribution has been made to the level of nutrition of the human population. Such remarkable increases in poultry production follow the widespread use of improved vaccines and control measures directed not only against Newcastle disease, but also against such diseases as fowl pox and pullorum. In many areas, the prevalence of these conditions had reduced poultry keeping to a backyard minimum. Now that decimation of poultry flocks is rare, it has been possible to build up a large-scale industry. This has been greatly aided by the introduction of new management and feeding methods. Successful efforts have been made in many areas to reduce or eliminate the necessity for importing feeding materials from abroad, and frequently it has been found that the poultry industry of a country can be self-sufficient in locally-produced feeds. Increased supplies of poultry meat and eggs and an assured market have brought about a reduction in retail prices, and these commodities are now making a highly important contribution to protein requirements.

Duck production, based upon traditional husbandry methods, is common in countries where there is demand for table ducks and duck eggs. It may operate on a large scale, especially in paddy areas where the ducklings feed largely on small fish and

parasitic crustaceans. Duck hepatitis, a virus disease which causes heavy losses, requires research and the application of field control methods. Salmonellosis is also a periodic cause of much economic loss.

A combination of pig, together with poultry and duck, rearing, and the production of such pond fish as carp and tilapia, is practiced in a number of countries, usually on a relatively small scale.

India and China are the only countries in this region in which sheep are of importance in the agricultural economy. The sheep population of India is estimated at nearly 40 millions. During the past five years much interest has been shown in improving the industry, and it is confidently anticipated that the next decade will be one of continuing development. Archaic systems of land tenure and lack of marketing facilities are among the major difficulties to be overcome. Total wool requirements will, it is considered, be met without difficulty, but for many years it will not be possible to meet the need for mutton.

In most parts of the world, low quality roughage constitutes an important source of energy for ruminants. In India this may be in excess of 90 percent. The processing of cellulose materials with chemicals, and especially treating straw with alkali, can produce a feed which is of considerable nutritive value. Due to the large quantities of water required, however, this has been impracticable in most cases.

Recent research indicates that the energy values of feeds may be altered through processing or by the use of certain additives which, by controlling microbial activity, control the relative production of organic acids in the rumen. The possibilities are sufficiently interesting to warrant further research with particular reference to the improvement of the feeding value of straws and similar poor quality roughages so important in the Far East and other regions (Shaw, 1962).

The development of dairying in Asia and the Far East varies greatly both within the countries and from country to country. In the region, the whole range is covered from the small-scale peddling of milk of doubtful quality, to highly industrialized and economically efficient dairy operations. In some countries considerable quantities of milk are produced, while others depend largely on imports. Throughout the region the average per caput consumption of milk and milk products is extremely low, sometimes even decreasing due to the inability of dairy production to keep up with the population increase.

Inefficient dairy farming, leading to low yields per animal, has resulted in price levels far above the means of the average consumer, even in areas where collection and distribution are organized and modern processing facilities exist. Imported, low-priced skim milk powder has been used as a price-reducing remedy by several enterprises manufacturing reconstituted or toned milk. This has brought about an increased consumption of milk in a limited number of large municipalities.

A number of dairy projects in various countries of the region have received technical and financial assistance from national and international sources, and increasing emphasis is being placed on the training of technical personnel for the dairy industry. Japan and India have taken the lead in the dairy field. However, a considerable number of projects have been initiated in other countries, for example, Ceylon, Nepal, Pakistan, and the Philippines. An interesting bilateral project has recently been started in Thailand, entailing the establishment of a dairy herd of Red Danish cattle which, together with the provision of expert services, has been provided by the Danish Government.

Animal health problems in the region are far-reaching in their effects on production. In recent years there have been encouraging gains in the various campaigns against disease. Particular mention is made of the manner in which rinderpest has been brought under control in such countries as Thailand, of the great rinderpest campaign which is making such satisfactory progress in India, and of the active measures which are being taken in Cambodia. The maintenance of constant vigilance and the occasional carrying-out of frontier vaccination are playing an important part in preventing reinfection in Thailand, Viet-Nam and other key countries. Notable advances have been made in controlling diseases of pigs and poultry with a resultant boost in production. Improved vaccines are bringing about reductions in losses from hemorrhagic septicemia, a seasonal disease of cattle and buffaloes, which can cause a very high death rate and which ranks high on the list of diseases of economic importance. Much work remains to be done, and there are signs that governments are emphasizing animal health matters in conjunction with projects aimed at increasing productivity. Foot-and-mouth disease, probably the disease of greatest economic importance in the region, is receiving growing attention, especially in Thailand where new vaccines are undergoing field trials at the present time.

Parasitic infestations, which cause incalculable losses in cattle, buffaloes, sheep, pigs and poultry – losses which are largely preventable by modern techniques and methods – require much more attention throughout the entire region. They cause a high death rate, especially in young animals, and a great deal of subhealth; their control should be a necessary aspect of animal husbandry projects. The excellent irrigation schemes at present in progress in many of the underdeveloped tropical countries, and which are important in raising the living standards and improving the well-being of the people, are also creating ideal conditions for the spread of parasitism both in man and his animals, and should be accompanied by the necessary precautions and prophylactic measures. Experts have expressed the view that, if this is not done, the diseases which result may cancel out the benefits which irrigation schemes can bring.

Many of the zoonoses, such as tuberculosis, rabies and brucellosis, which are intercommunicable between man and animals, are common in the region. Much work is urgently needed to control these diseases which, in affecting public health, are also of economic importance to expanding agricultural programs.

Latin America

Over most of Latin America, dairying can be described as an infant industry. The average milk production and consumption is far below desirable levels. Outside some of the major markets milk is frequently heavily adulterated and handled under unhygienic conditions. In many cities it is possible to buy milk of good quality, but the price puts it out of the reach of the lower income groups who need it most. As might be expected, the development of dairying has taken place principally around the major markets, and much therefore remains to be done to make dairy development national in scope. Many of the Latin-American countries have found it necessary to protect their industries by placing tariff barriers on imported products.

Considerable progress in the poultry industry has been seen in many countries, particularly Brazil, Chile, Colombia, Mexico and Venezuela, but such limiting factors as lack of specialized personnel, shortage of suitable feedstuffs, and the prevalence of decimating poultry diseases, prevent really satisfactory development in many areas where an expansion is most needed.

As regards sheep production, there are great possibilities in Bolivia, Colombia, Ecuador, and Peru, although beef and poultry may more suitably meet the requirements of the population. In general, within the region beef is preferred to mutton. The flourishing sheep industries of Argentina, Chile, Paraguay and Uruguay still have ample scope for improvement in wool and meat production, and Mexico is gradually making progress.

In the past 15 years there has been a marked expansion of livestock production in Latin America. Shortly after the second world war, during which several countries had seriously depleted their livestock resources, conservation policies were adopted which restricted the export of livestock and their products. These policies have resulted in substantial increases in the total livestock populations of most countries and, in the past five years, the meat export trade has shown rapid growth. This growth in exports has been further encouraged by improved economic conditions in Europe and by a demand for certain types of meat products. Not only have the better-known exporting countries, such as Argentina and Brazil, been involved in these developments but also several much smaller countries such as Costa Rica and Nicaragua, which have developed valuable export markets. The Central American republics, which are recognized as being free from foot-and-mouth disease, can find a ready sale for their meat and meat products in the United States, a market which bans the importation of frozen or chilled meat from the rest of Latin America.

A new and more rapid phase of growth in livestock production is now being initiated. With the improvement of communications, vast areas of land hitherto unexploited are being opened up. At the same time more efficient production and marketing procedures are coming into operation.

Animal health has steadily assumed greater importance and will continue to do so as livestock production is expanded and intensified in Latin America. Rapid transport and the more frequent interchange of livestock on the hoof facilitate the spread of disease, while intensive production methods increase the risk of exposure to infection, and may reduce the resistance of the individual animal.

One of the gravest problems is foot-and-mouth disease. This disease has been enzootic in most of South America since the turn of the century.

The countries of the Andean chain, such as Bolivia, Chile and Peru, have been the less seriously affected but have suffered from frequent sporadic outbreaks. The countries lying to the north of the Amazon basin, from Ecuador to the Guianas, remained free until the beginning of the last decade when the disease invaded Venezuela, spread to Colombia and made its appearance in the coastal region of Ecuador. Foot-and-mouth disease appeared in Mexico in the late 1940s; it was successfully eradicated after a long and costly campaign. The whole of the Central American and Caribbean area is now free from the disease. This fortunate situation requires constant vigilance on the part of the disease-free countries, in order to preclude the entry of animals or products which might introduce the disease. With special reference both to the protection of the countries which are free and to the control of the disease in the countries which are affected, the Pan-American Foot-and-Mouth Disease Center was established at Rio de Janeiro in 1951. This center provides advice and active assistance to all the countries in the Hemisphere. Recently, the leading countries of South America have reached the conclusion that, in order to ensure the satisfactory development of their livestock industries and to permit their products to reach the best possible markets, they must work toward the eradication of foot-and-mouth disease. Groups of countries have met together to plan control programs.

Other diseases, although not so widely discussed, are of equal significance to the development of livestock production. Both internal and external parasites take tremendous toll among farm animals. In general, modern control methods are not widely applied, though their economic potential is very great. Such diseases as brucellosis and tuberculosis, which have been eradicated or are coming under control in North America and many countries of Europe, are only now receiving the necessary investigation in Latin America, and very little has been done about their control. The losses which occur in animals in the months after birth have received next to no attention. In fact, the field of animal health, apart altogether from certain major epizootic diseases, offers a new and promising means of attaining great production increases. Enormous losses occur as a result of disease, and a very large proportion of these is preventable. There is a growing awareness of the importance and urgency of this question, exemplified by the gradual improvement of veterinary services and the increasing numbers of veterinary schools and laboratories over the last decade.

Livestock production and animal health services must be strengthened, and educational facilities must be further expanded. The best possible use must be made of the relatively few graduates currently available and, as new ones are trained, they must be brought into the government services. The judicious employment of auxiliary personnel, for example in laboratories and clinics to assist veterinarians, enables the fullest use to be made of the latter's services. The adequate utilization of extension workers in preparing farmers for effective operations in animal health will also play a significant part in realizing the tremendous potential for livestock production which still remains untapped in Latin America.

To complete this section, brief notes are added on developments in the economically more developed regions.

North America

Much work has been done over many years by the range-cattle industry of the United States of America in breeding beef cattle for the unfavorable environment, and this has had a great influence in many parts of the world in increasing calf crops, reducing losses from disease and drought, and accelerating the rate of growth of young stock. Drought, cyclical downturn, and fluctuating local shortages of cattle for slaughter bring about annual meat production variations in the United States and Canada, but output continues to show an over-all rise. The bulk of the high-grade beef comes from steers and heifers. Grading, which provides reliable meat standards, is based upon conformation, finish and quality. In spite of the high production, the United States does not by any means fulfill its own needs, and there is a considerable import trade with Canada, Mexico and New Zealand. As noted earlier, in view of the prevalence of foot-and-mouth disease in South America, no meat or meat products are permitted entry into the United States unless these have been properly sterilized and canned. Large numbers of cattle are imported from Canada and Mexico.

The dairy industry of North America is highly efficient and extremely well organized. Although the number of dairy farms has declined over the last

10 years, and the total national dairy herd has been reduced by 10 percent, there has been approximately a 9 percent increase in milk production because of higher yields per cow. The effective demand for milk and milk products, however, has not kept pace with this production increase for a number of reasons including the increasing use of margarine, which has cut per caput butter consumption by one half over the last 20 years; the high prices of milk products, due to sanitary requirements; relatively high marketing margins for fluid milk and, to some extent, government price support policies; the extended use of high-yielding dairy cows producing milk with a lower butter-fat content; and the recent publicity accorded to the possible association of heart disease and the consumption of animal fat.

Indications are that the surplus problem is becoming of even greater importance than in the past. North American efforts to dispose of surpluses have a notable effect on world market conditions, and are sometimes the subject of considerable discussion. Enormous quantities of nonfat milk solids have been donated by the United States Government for use in various international aid schemes, including UNICEF programs.

In both the United States of America and in Canada there is a strong trend toward larger poultry farms and vertical integration. In the United States, about 25 percent of egg production and over 90 percent of broiler production have been integrated in 1961. Production of eggs, broilers, and turkeys has frequently been higher than the local consumers' demand. Broiler prices in Georgia, for example, went down to 9.5 cents per pound (21 cents per kilogram) of live weight in autumn 1961, whereas the cost of production was about 14 to 15 cents per pound (31 to 33 cents per kilogram) in well-managed broiler plants. A mandatory Federal government inspection program has recently been introduced in the United States as a guard against the sale or export of diseased poultry. This program is an extension of the meat inspection service which has now been in effect for some 50 years.

Oceania

Australia and New Zealand have highly developed dairy industries which form an important part of the agricultural economy. The exports of dairy products, particularly in the form of butter and cheese, make a substantial contribution to the foreign exchange earnings of these two countries. In the past 10 years, milk production has increased by approximately 8 percent in Australia, and by 14 percent in New Zealand. The weakness of international markets for dairy products and the fall in prices are thus a cause of much concern for the industry in these countries. Even with the ideal farming conditions of New Zealand, and an efficiently run industry, the butter price on the London market has been unprofitable.

The poultry industry is one of the six main primary industries in Australia. New Zealand and other areas have small but well-organized poultry industries. Newcastle disease has not, so far, created a problem but the avian leucosis complex sometimes causes considerable losses and is becoming a major problem.

Australia and New Zealand enjoy a unique position in regard to freedom from most of the major epizootics. With the spread of many of the emerging diseases, however, that freedom is increasingly challenged. Quarantine and other measures designed to guard against the importation of exotic diseases of livestock are exceedingly strict but, even so, hog cholera, for example has recently occurred with some spread in Australia. The increasing ease and speed of transport has drawn attention to the fact that the livestock themselves are by no means the sole possible carriers of disease, and that reliance upon total prohibition of entry of certain species may be inadvisable as well as being unduly restrictive in instances where adequate tests and quarantine precautions can be applied.

Western Europe

Milk production has increased by some 28 percent in the past 10 years, due to increased efficiency of production and also to a 9 percent increase in the number of dairy cows. In contrast to the less developed countries the dairy industry in western Europe is faced with a growing problem of surplus production, particularly in butter. Per caput consumption of milk products at present prices has not kept pace with increased milk production, and export markets of the necessary magnitude have not been developed. In general, milk and milk products of good and improving quality are available in abundance at prices within the reach of the average consumer.

Marketing of milk products has, in most cases, been subject to government control for so long

that it is difficult to judge the effect which a free market might have on the production and sale of milk products. Further increases in production are forecast, and it is doubtful if increasing consumption will absorb more than a small part of the growing surplus: additional consumption may be achieved by lowering retail prices. It is hoped that greater quantities of milk products will be made available in the areas where the need is greatest. In the years ahead, western European countries may be expected to undertake vigorous campaigns, both in Europe and in other regions, to increase the effective demand for milk and milk products.

The poultry industry has been making rapid progress in all European countries. Meat production, too, has shown the expected increases which follow the better treatment and control of livestock disease, and improved feeding.

Disease in livestock can cause severe reduction or limitation in output and it is encouraging to note, for example, the steady over-all decline in foot-and-mouth disease, with diminishing seasonal peaks of incidence, which has occurred during the past eight years. This has been due in large part to better sanitary control, and the production and use of a quantity of vaccines of improved efficiency. Many countries are now approaching the stage when, if the present decline continues, the adoption of the slaughter policy as practiced, for example, in the United Kingdom and recognized as the ultimate step in control and eradication of this disease, may at last become economically feasible.

A number of salient advances in disease control have been noted, for example, the successful campaigns for the eradication of bovine tuberculosis in the Netherlands, Switzerland and, more recently, in the United Kingdom. With the exception of sporadic reinfections the disease is now considered to be completely under control in these countries. Denmark, Norway and Sweden have successfully controlled brucellosis in cattle. Such advances, however, are somewhat offset by the serious challenges of the virus epizootics. African swine fever, for which there is at present no prophylaxis, no cure and no defense other than strict quarantine and slaughter, appeared in Portugal and Spain in 1960, and the results have been little short of devastating. A slaughter buffer zone was promptly established by France in the frontier area where immediate slaughter of affected pig herds is carried out, no attempt being made to differentiate African swine fever from the more common hog cholera. This measure may well have assisted in preventing African swine fever from spreading beyond the environs of the Iberian peninsula.

Disease prevention is an international responsibility, a fact which has been recognized by the European Economic Community. The increase of trade and travel between Africa and countries east, north and west of the continent is leading to an extension of African diseases beyond the geographical frontiers which have been their traditional boundaries. Temperate and tropical regions alike must be alert to possible invasion by such disrupting conditions as African horse sickness, African swine fever, lumpy skin disease, Rift Valley fever, and the South African and Asian types of foot-and-mouth disease.

The next decade

Dynamics of development

The broad field of animal production, with all the disciplines which it incorporates, holds an immense potential for development. Progress, however, will not be achieved by the universal application of the standard methods of the technically advanced countries, nor will their trends necessarily arise in developing countries or their research be automatically applied there.

Progress already made in management, nutrition, breeding and husbandry cannot be regarded with hopeful complacency. The vast increase in output, vital for human well-being, which could be obtained from the application of modern technology to the world's animal resources, can only be achieved if the machinery of progress is adequately serviced. One of the greatest needs is for more trained personnel. More extension services are needed to bring the findings of research to the producer. When financial provision has been made, trained personnel available and extension services being built up, it is important that adequate transport should be provided. In all the less developed countries means of

communication are lacking to a degree which incapacitates technical assistance, the essence of which is mobility. Basic requirements for almost all projects are mobile laboratories, observatories or dispensaries: many could use light aircraft and helicopters. The financial outlay is small in relation to the return which results from the full and proper use of skilled manpower. It is strange that so many assignments are crippled by sheer lack of the means of taking expert knowledge to the precise location where it is needed.

It is not only more economic aid which is needed from the more developed countries, but also more skilled manpower. In planning their education and training policies, the more developed countries should consider both their own expanding requirements and also those of the developing areas of the world. They will have to think in terms of their existing scientific force, expanded to meet their expected national needs, and expanded again (it has been estimated perhaps by as much as 10 percent of the total force) to enable a corps of specialists to be at the disposal of the nations in need of them, and to lead their development with all the urgency possible.

Education, then, is one of the basic requirements of progress: education in the advanced countries on a scale sufficient to provide a surplus of scientists over national needs; even more important, education, in the less developed countries, which will incorporate training at all levels and which will necessarily entail heavy demands for some years to come on the expatriate teacher. The fruits of technical assistance begin to appear only with the increase in numbers of trained local personnel, and their assumption of responsibility in their fields. The success of technical assignments is based on the ability of foreign experts to " work themselves out of a job. "

Training at lower levels in technical subjects should be greatly increased in the less developed countries, to ensure that the best possible use is made of highly trained local experts, as well as the temporary services of experienced foreign experts. Such experts should not have to devote their time, for example, to minor details of administrative procedure which can well be handled by a competent local junior. The use of auxiliary staff has been a feature of animal health work in a number of countries for many years and this type of operation, in which lay assistants who have received the necessary training conduct such routine duties as mass vaccinations, always under supervision by a qualified professional veterinarian, might well be extended to other fields. It ensures that there is no misemployment of experts on work which can be done by personnel with limited training. Such training can be largely in-service.

The establishment of administrative and executive units specially adapted to the needs of individual developing countries is seen as an essential factor in agricultural progress. There is much to be said for having all agricultural disciplines under one ministry. Such departments need not necessarily model their operations on those of the advanced regions. Their aim must be to ensure the effectiveness of all specific technical measures of improvement, from the co-ordination of policy matters at the top to the extremely important extension approach at the field level. The services of high-level specialists should be properly used to guide policies rather than to conduct the details of field programs.

The importance of securing the participation of people in plans for their own improvement is manifest, and such support is perhaps more readily forthcoming in animal production than in many other sectors. Results can be achieved relatively quickly, and pilot and demonstration projects can be established which carry conviction; for example, the improved condition and early maturing of animals in which parasites have been controlled or which received balanced rations. Social and human factors must receive adequate attention when planning and implementing development programs. A framework should be established which will provide for sound administration; for investigation, survey and experimental work; for the functions of regulation; and for comprehensive education at all levels. On this can be built the regulatory services and the direct services to the farmer.

Much more is required to bring about development and to stimulate progress in the field of animal production than the provision of educational facilities and the establishment of an administrative and executive organization. Basically, we are dealing with the stock owner, a universal figure with the frugality and prejudices bred of generations of unremitting toil, and the individualism of independence, though that independence may not extend to the ownership of land or complete freedom from debt.

Incentives are required to increase livestock production as they are to stimulate any kind of production. Disincentives may be necessary to check undesirable practices.

Outlets

The sales process, as the link between the producer and the consumer, has a powerful influence on the efforts of the producer, and the provision of satisfactory local marketing facilities is essential to progress. Extended marketing channels become necessary when a livestock area can produce more meat than can be absorbed for local consumption. This may lead to the production of meat for cities within the country or export to foreign markets. An incentive is thus provided for the development of a livestock industry designed to produce what the public wants in an appropriate form and quality.

Within a single marketing channel there are often a number of different enterprises and these may be expected to compete against each other. Where a single market, transport, and slaughter service exists, informal price fixing agreements may operate to the mutual disadvantage of producers and consumers. Such systems may be overcome by the establishment of co-operative production units and co-operative markets. The adoption of better methods, the formation of efficient marketing procedures, and stability of prices are of direct interest to all livestock producers, on whatever scale they may be operating, where economic development is being accelerated.

An important aspect of increased meat production lies in its handling and inspection. Much wastage occurs in the transport of animals for slaughter due to bruising and other injuries which may later entail the condemnation of as much as 35 percent of the carcass. Wastage occurs also in failure to utilize all the valuable by-products of slaughter, for example, blood, hides and skins, bones, etc. Thorough veterinary inspection for disease and other abnormalities is a necessity for all meat intended for human consumption.

Meat is the end-product of a complicated and highly technical industry, and factors which increase the productivity of the industry are of vital concern. The use of food additives, such as antibiotics, aimed at quicker weight gain of livestock will undoubtedly increase in the coming years. Allied to this is the use of hormones, of tranquillizers, the low-level feeding of parasiticides and other medicaments and even preslaughter feeding or the injection of tenderizers. The whole question of additives, and of other means of increasing meat production through an increase of the yield of the individual animal, will come very much to the fore in the next decade, initially in the more advanced countries which are in a position to test their value and safety, and to utilize such techniques.

The prevention of meat spoilage through poor handling will also receive attention. Improvements in freezing techniques, in packaging and transporting are all needed, and there can be little doubt that eventually there will be a greatly increased use of agents such as antibiotics in all stages of production, intended to improve good hygienic practice (but not to replace it) and to prolong the life of the product. The treatment of meat and other foods by ionizing radiations, which suffered a serious setback a year or so ago, is again receiving attention and much research work is in progress.

Improved animal health

Livestock disease is one of the greatest single impediments to improved production. There is a continued wastage of food and labor in husbanding animals which may never reach maximum productivity, whose output is limited by reason of a heavy parasite load, which have a high morbidity rate and which, by virtue of their lack of output, are themselves parasitic on their owners.

Modern technology and improved biological and pharmaceutical products mean that disease can be more accurately and quickly diagnosed, and methods of prophylaxis, treatment and control can be applied, so that a substantial reduction can be made in the enormous losses sustained at present in the less developed countries. Disease impedes all the many farsighted schemes for improved feeding and breeding, and better pastures and management, and may well completely nullify them. The discouragement to the small farmer when he loses a valuable animal, or when his breeding stock proves infertile, or his children become infected with brucellosis or tuberculosis of bovine origin, or his draft animals are incapacitated by foot-and-mouth disease just when their efforts are most needed, cannot be measured in terms of money alone. The cumulative effect of such incidents, multiplied many hundreds of times, has an adverse effect on a nation's whole economy.

Reduction of disease losses, eradication or control of the major epizootics and improvement of livestock health by reduced parasitism are all feasible given the necessary skill and the appropriate materials. Once these factors are realized – and very

satisfactory and obvious advances can be achieved within a short space of time – an incentive to increased livestock production is provided.

Improved nutrition and breeding

Better feeding practices and improved genetic stocks are aspects of sound animal husbandry which call for urgent attention in all the developing countries. They go hand in hand with disease control in improving standards of livestock. If the unproductive animal cannot be made productive it should be culled. Animals of low physiological fertility or having transmissible defects of any nature cannot be allowed to propagate and thus perpetuate unproductivity. Improvements in pastures and advances in nutrition are of no avail if they are to be utilized for the benefit of the parasite animal and the commensals which it harbors.

The means now available for preventing losses and for improving nutrition are pointers to increased numbers of livestock, but the developing countries also require greatly improved quality of animals. This can be achieved through breeding and selection with the aim of increased production. Genetic experimentation is necessarily slow, but a regional approach to these problems is both logical and economical.

Improved integration of livestock and crops, ensuring better crop rotations which result in increased soil fertility and hence more cereal and other food crops as well as cash crops, is coming increasingly to the fore as a necessary aspect of greater production, especially in those areas with a shortage of artificial fertilizers. Improvement in pasture management practices, rotating pastures with crops where appropriate, and efficient stocking rates in range lands, with such aids as the establishment of water points, are related factors of great importance.

Use of food surpluses

Constructive use is now being made of surpluses, in expanding consumption and aiding development in the economically less developed countries. Rational surplus disposal helps to satisfy the increasing demand resulting from development, and additional proposals are being formulated for the employment of such stocks without prejudice to normal trade. Surplus stocks are made available both as a transitional measure against hunger and as an incentive to economic development.

Individual recipient governments, whose development is being promoted by this means, have to take the responsibility for determining the precise uses to which surplus foods will be put.

The use of such food aid lies principally in countries where large sections of the population consume the food grains which are in significant surplus. At the present time these are wheat, barley, maize, and millets. However, cereals fed to livestock are an investment in the production of human food in the form of meat, eggs and dairy products.

There are many countries, especially in Asia and Africa, where cattle populations are large but of negligible productivity because of poor feeding. The addition of small quantities of feed grains to their diet could increase their output, especially if more nitrogenous local by-products such as oil cakes were included. The establishment of "milk colonies" – concentrations of milking stock in one or more units usually consisting of 2,000 or more animals – in a number of countries, or of feed mixing plants, could provide controlled channels for the distribution of the surplus feed grains. Grain supplies can act as the initial capital in establishing co-operative feed mixing plants.

The poultry industry which, as has already been indicated, can provide the means for a very rapid increase of protein for human consumption, can similarly be stimulated. The establishment of poultry feed mixing units could channel distribution of feed surpluses, and continue to function later with purchases of feedstuffs, made possible by the profits from increased production.

In some countries, such as those of the Near East and north Africa, the increasing demand for cereals for human consumption and livestock feeding has led to the extension of grain production on lands submarginal for cropping, which formerly were used for grazing purposes. Crop yields are very low and the lands are declining in fertility as a result of erosion and poor cultivation. It is difficult for the farmer to change his practices, as he is dependent on the cereal crop, sparse though it may be. Pilot projects have indicated that it would be possible to build up some areas of this type as bases for sound livestock production if outside supplies of grains could be guaranteed to enable the farmer to return submarginal lands to grass for a long enough period. After rehabilitation it might be possible to resume cereal cultivation in some areas

under a grassland rotation, and with higher yields. There may also be important instances in these and other regions where feed grains supplied as aid could be used to hasten the implementation of national plans for better range management and grazing control combined with fodder production. Such grains could be used to help maintain the livestock off the range until the recovery of the vegetation, after which sometimes even twice the number of animals might eventually be carried under controlled grazing. Measures of this kind might also contribute in many ways to improved watershed management and soil conservation (FAO, 1961).

Over large regions the supply of livestock products is not sufficient to meet, even at present low levels of demand, the additional requirements due to the growth of population. Human diets in the less developed countries are seriously deficient in proteins of high biological value. The proper use of food surpluses is thus not restricted to stop-gap or emergency conditions, where there are great disasters and national calamities, but should be seen rather as a stimulus to long-term production programs.

DEMAND

Probably the greatest of all incentives for the livestock producer is the assurance of a growing demand for his produce. The need for animal protein is evident and, with the accelerating growth of human population, unbalanced diets are often accepted with a despairing apathy. Demand is quite another thing. It is a positive indication of awakening consciousness that there need not be a dull acceptance of life at the bare subsistence level, of malnutrition or of downright starvation. This upsurge of expression is closely linked with increases in income, which lead directly to the desire for and ability to afford better standards of living. As development gains momentum, however gradually, the demand for more protein becomes imperative. Even a slow rise in income can make this trend perceptible within the relatively short period of one decade.

The world's livestock industry is facing a decade in which enormous developments are possible. The means by which they can be attained are feasible and practicable. The contribution which can be made to the well-being of mankind is incalculable.

References

AUSTRALIA. BUREAU OF AGRICULTURAL ECONOMICS. 1962 *Statistical handbook of the sheep and wool industry, 1962.* Canberra.

EICHHORN, E. A. To protect our meat supply. 1953 *Américas*, Pan American Union, Washington, D. C., 5(5): 3-5, 42-43.

EICHHORN, E. A. & COCKRILL, W. R. Progress in 1962 veterinary science. *Span*, 5(2). Shell International Chemical Co. Ltd., London.

FOOD AND AGRICULTURE ORGANIZATION OF THE 1960 UNITED NATIONS. *Report of the FAO international meeting on veterinary education.* Rome. Meeting Report AN 1960/4.

FOOD AND AGRICULTURE ORGANIZATION OF THE 1961 UNITED NATIONS. *Development through food: a strategy for surplus utilization.* Rome.

FOOD AND AGRICULTURE ORGANIZATION OF THE 1962 UNITED NATIONS. *Report of the first meeting of the FAO/WHO Expert Panel on Veterinary Education.* Rome.

KAY, H. D. What limits food production? *In* Rus- 1961 sell, E.J. & Wright, N.C., eds. *Hunger: can it be averted?* London, British Association for the Advancement of Science, p. 49-59.

SHAW, J. C.: Problems of increasing animal produc- 1962 tion. *Proceedings of the Nutrition Society*, 21: 99-106.

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CUL- 1962 TURAL ORGANIZATION. *The problems of the arid zone: Proceedings of the Paris symposium.* Paris. Arid Zone Research 18.

UNITED STATES DEPARTMENT OF AGRICULTURE. 1962 AGRICULTURAL RESEARCH SERVICE. *Breeding better swine through performance testing.* Washington, D. C. ARS 22-77.

WRIGHT, N. C. The current food supply and present 1961 trends. *In* Russell, E.J. & Wright, N.C., eds. *Hunger: can it be averted?* London, British Association for the Advancement of Science, p. 1-14.

ANNEX TABLES

ANNEX TABLE 1A. - INDICES OF TOTAL FOOD PRODUCTION, BY COUNTRIES AND REGIONS

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
WESTERN EUROPE	93	101	100	102	103	107	110	113	120
Northwestern Europe	95	100	102	101	103	106	107	109	121
Austria	91	102	96	103	108	112	116	110	122
Belgium-Luxembourg	94	96	104	107	100	107	111	105	117
Denmark	100	101	101	97	101	111	110	107	118
Finland	98	105	100	97	100	109	110	112	124
France	91	99	104	104	101	105	105	111	125
Germany, Federal Republic	95	101	101	100	103	105	111	107	124
Ireland	95	97	105	99	105	115	104	97	111
Netherlands	99	99	101	103	98	106	117	118	130
Norway	97	99	99	96	108	101	101	102	108
Sweden	104	103	101	91	101	99	95	97	100
Switzerland	101	100	103	99	97	99	108	106	112
United Kingdom	96	98	99	99	108	106	102	111	117
Southern Europe	90	103	98	105	104	111	115	123	118
Greece	81	105	100	104	110	125	120	116	115
Italy	92	104	96	105	104	102	117	117	111
Portugal	87	106	104	102	102	105	99	101	103
Spain	101	95	102	98	103	108	110	116	117
Yugoslavia	70	115	90	119	105	147	120	165	152
EASTERN EUROPE AND U.S.S.R.	90	95	96	104	116	119	130	133	134
NORTH AMERICA	99	98	97	101	104	101	109	109	111
Canada	112	105	78	99	107	91	95	101	105
United States	98	97	99	102	104	102	110	110	111
OCEANIA	99	99	98	103	100	98	116	114	119
Australia	98	100	99	104	99	95	120	114	120
New Zealand	98	96	100	103	103	109	112	114	115
LATIN AMERICA	94	96	101	101	108	111	117	117	118
Central America	92	94	100	102	112	122	128	131	133
Cuba	100	98	94	98	111	114	116	115	127
Guatemala	98	97	99	99	107	107	110	114	116
Honduras	101	104	93	96	106	107	107	110	112
Mexico	86	91	104	105	114	129	139	143	140
Panama	90	101	98	105	105	114	119	119	115
South America	95	96	101	101	107	109	114	113	114
Argentina	99	95	100	98	107	107	112	102	95
Brazil	89	96	101	103	111	115	122	127	130
Chile	101	95	102	104	99	108	103	104	107
Colombia	97	99	97	104	103	103	107	109	112
Peru	100	101	102	102	96	99	105	112	112
Uruguay	94	109	101	99	97	90	83	80	90
Venezuela	93	97	101	103	106	111	112	112	119

ANNEX TABLE 1A. - INDICES OF TOTAL FOOD PRODUCTION, BY COUNTRIES AND REGIONS (*concluded*)

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
FAR EAST [1]	92	99	100	103	107	106	111	116	120
Burma	102	98	96	97	108	92	109	112	111
Ceylon	97	90	101	113	99	101	107	113	110
China: Taiwan	95	97	99	100	108	114	119	114	120
Federation of Malaya	90	89	101	104	116	114	111	123	134
India	90	101	101	102	107	106	111	115	119
Indonesia	89	102	105	101	103	104	108	109	114
Japan	97	85	94	114	110	115	119	126	127
Korea, Republic of	86	107	104	106	98	110	113	118	119
Pakistan	97	101	103	96	104	102	102	109	113
Philippines	94	98	99	101	107	110	115	115	119
Thailand	89	108	84	105	114	91	104	109	116
NEAR EAST	93	101	97	101	108	113	117	119	119
Iran	92	98	98	103	109	115	114	117	114
Iraq	85	106	119	87	103	123	105	98	100
Israel	81	92	100	104	123	127	149	164	155
Syria	93	106	117	68	117	133	84	89	84
Turkey	100	110	85	99	107	105	122	122	124
United Arab Republic	86	93	103	106	112	116	113	117	118
AFRICA	94	98	101	100	106	103	107	107	111
Northwest Africa	91	101	107	94	108	92	105	102	107
Algeria	91	99	106	96	109	99	95	100	104
Morocco	[2] 90	[2] 100	[2] 109	[2] 97	[2] 104	[2] 80	[2] 107	100	103
Tunisia	95	110	103	80	113	99	135	111	128
South of Sahara [3]	95	98	100	102	105	105	107	108	112
Ethiopia [4]	99	100	100	100	100	99	99	103	102
South Africa	89	98	100	102	110	106	110	113	122
WORLD [1]	94	98	99	102	107	108	114	116	119

NOTE: Country indices are calculated by FAO on a uniform basis. They may differ from national indices produced by the countries themselves because of differences in concepts of production, coverage, weights, and methods of calculation. They are not yet available for 1961/62.

[1] Excluding Mainland China. - [2] Former French zone only. - [3] Derived by substraction of subtotal for northwest Africa from regional total. - [4] Excluding Eritrea.

ANNEX TABLE 1B. - INDICES OF PER CAPUT FOOD PRODUCTION, BY COUNTRIES AND REGIONS

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
WESTERN EUROPE	95	102	101	101	101	105	106	109	115
Northwestern Europe	96	101	102	100	101	103	104	105	115
Austria	91	103	96	103	108	112	115	109	121
Belgium-Luxembourg	95	97	104	106	99	105	109	102	113
Denmark	101	102	101	96	100	109	108	104	113
Finland	100	106	100	96	98	106	106	107	117
France	92	100	104	103	100	102	101	106	118
Germany, Federal Republic	97	102	101	99	100	101	106	101	115
Ireland	94	96	104	99	106	117	107	100	115
Netherlands	102	101	101	102	95	102	111	110	120
Norway	99	100	99	96	106	98	98	98	102
Sweden	105	104	101	90	100	97	93	94	97
Switzerland	102	102	103	98	95	95	103	99	102
United Kingdom	97	98	99	99	107	104	101	109	114
Southern Europe	92	104	98	104	103	109	112	118	113
Greece	83	106	100	103	108	122	116	121	109
Italy	93	104	96	104	103	100	115	114	107
Portugal	88	107	104	101	101	103	97	98	99
Spain	102	96	102	97	102	106	106	112	112
Yugoslavia	73	117	91	118	102	142	114	156	142
EASTERN EUROPE AND U.S.S.R.	92	96	96	103	112	114	123	124	123
NORTH AMERICA	103	100	97	99	101	96	101	100	99
Canada	118	107	78	96	101	84	85	88	90
United States	101	99	100	100	100	97	103	101	101
OCEANIA	104	102	98	101	96	92	106	101	104
Australia	102	103	99	102	94	89	109	102	106
New Zealand	103	98	100	101	98	102	102	103	102
LATIN AMERICA	98	98	101	99	103	104	106	104	102
Central America	97	97	100	100	107	112	115	114	112
Cuba	104	100	94	96	107	107	106	103	112
Guatemala	104	100	99	96	101	98	98	98	97
Honduras	107	107	93	93	100	99	97	97	95
Mexico	91	94	104	103	108	119	124	124	116
Panama	95	104	98	103	100	105	107	104	98
South America	99	98	101	99	103	102	104	101	99
Argentina	102	97	100	97	104	102	106	95	88
Brazil	93	98	102	101	106	107	112	113	113
Chile	105	97	102	101	95	102	95	94	95
Colombia	101	101	97	102	99	97	98	98	98
Peru	104	104	102	100	91	92	95	97	95
Uruguay	98	111	101	97	93	85	78	74	82
Venezuela	100	101	101	99	98	99	97	93	95

ANNEX TABLE 1B. - INDICES OF PER CAPUT FOOD PRODUCTION, BY COUNTRIES AND REGIONS (*concluded*)

	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61 (Preliminary)
	Indices, average 1952/53-1956/57 = 100								
FAR EAST [1]	95	101	100	101	103	100	102	105	106
Burma	104	98	96	96	106	90	105	107	105
Ceylon	102	92	101	110	95	94	97	100	95
China: Taiwan	102	101	99	97	101	103	104	95	97
Federation of Malaya	96	92	101	101	110	105	99	106	112
India	93	103	101	100	103	100	103	105	106
Indonesia	92	104	106	100	99	97	99	97	99
Japan	99	86	94	113	108	111	114	119	119
Korea, Republic of	88	107	104	105	95	103	103	105	103
Pakistan	100	102	103	94	100	97	95	99	101
Philippines	98	101	99	99	102	102	103	101	102
Thailand	93	110	84	103	110	86	97	99	104
NEAR EAST	97	104	98	99	103	106	107	106	103
Iran	96	101	98	101	104	107	105	106	101
Iraq	91	109	119	84	96	114	94	85	84
Israel	87	96	102	101	114	113	128	137	126
Syria	99	110	116	65	110	123	75	75	69
Turkey	106	113	85	96	101	97	109	107	106
United Arab Republic	90	96	103	103	107	109	103	105	103
AFRICA	98	100	101	98	101	97	98	96	98
Northwest Africa	95	103	107	92	103	87	97	84	86
Algeria	95	101	107	94	104	93	86	88	89
Tunisia	98	111	103	78	110	94	127	104	118
Morocco	[2] 93	[2] 103	[2] 110	[2] 95	[2] 100	[2] 76	[2] 99	74	74
South of Sahara [3]	99	100	100	99	101	99	99	99	100
South Africa	94	100	100	101	105	99	100	100	106
WORLD [1]	97	100	99	101	103	102	106	106	107

NOTE: See explanatory note to Annex Table 1A.

[1] Excluding Mainland China. - [2] Former French zone only. - [3] Derived by subtraction of subtotal for northwest Africa from regional total.

ANNEX TABLE 2A. - WORLD [1] PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
	Million metric tons									
Wheat	144.7	153.9	171.4	183.5	201.3	197.5	227.4	217.9	218.7	209.0
Barley	44.1	46.7	57.1	61.9	70.1	63.9	69.6	67.7	76.6	71.0
Oats	64.0	60.6	57.8	62.8	62.0	58.7	61.8	56.0	58.1	53.1
Maize	106.4	131.9	136.0	155.4	157.1	158.0	174.7	189.2	202.4	197.1
Rice (milled equivalent) [2]	65.7	70.7	77.8	83.0	87.5	81.5	90.1	95.6	100.4	99.6
Sugar (centrifugal)	24.9	32.0	37.5	38.9	40.9	44.3	48.8	48.6	55.5	51.4
Citrus fruit	11.1	15.1	17.7	18.2	17.9	18.1	19.7	20.1	20.1	20.6
Apples	11.5	13.5	15.0	13.8	16.3	9.9	21.3	13.8	21.2	15.4
Bananas	8.1	12.8	14.0	14.4	14.8	15.9	16.6	17.7	18.3	18.1
Vegetable oils and oilseeds (oil equivalent)	10.4	12.9	14.7	15.4	16.9	16.5	17.4	16.7	18.1	18.8
Coffee	2.41	2.28	2.44	2.86	2.52	3.18	3.51	4.64	4 05	4.28
Cocoa	0.74	0.76	0.82	0.83	0.90	0.77	0.92	1.00	1.23	1.15
Tea	0.47	0.56	0.68	0.61	0.71	0.73	0.77	0.78	0.79	0.79
Wine	20.3	18.9	22.4	23.0	22.0	18.4	23.9	24.6	24.2	21.5
Tobacco	2.29	2.74	3.09	3.27	3.28	3.21	3.12	3 24	3.28	3.31
Cotton (lint)	5.99	6.81	8.04	8.18	8.06	7.66	7.90	8.49	8 80	8.80
Jute	2.15	2.08	1.73	2.38	2.36	2.22	2.50	3.16	2.26	3.05
Wool (greasy)	1.61	1.79	2.04	2.12	2.22	2.20	2.34	2.47	2.45	2.48
Rubber (natural)	1.00	1.74	1.85	1.95	1.92	1.98	1.97	2.07	2.03	2.14
Milk (total)	221.0	259.5	289.7	298.0	308.9	320.6	328.6	335.2	340.7	344.9
Meat [3]	29.4	36.3	42.9	44.8	47.1	48.0	48.7	50.2	50.6	52.2
Eggs	6.32	8.76	10.3	10.6	10.9	11.4	11.7	12.2	12.4	12.7
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	77	88	98	102	107	107	113	116	119	119

	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million cubic meters								
FOREST PRODUCTS									
Roundwood	1 471	1 553	1 637	1 670	1 673	1 663	1 733	1 732	1 750
Sawnwood	270.6	278.2	302.0	299.6	294.0	305.8	306.0	330.9	329.9
Plywood	8.3	9.0	10.9	11.4	11.9	13.1	14.9	15.4	15.9
	Million metric tons								
Wood pulp	39.1	42.4	46.5	49.6	50.1	50.0	55.0	58.9	62.2
Newsprint	9.8	10.4	11.2	12.0	12.3	12.1	13.1	14.0	14.4
Other paper and board	38.5	40.8	45.6	48.2	49.3	50.7	56.0	59.9	63.8

[1] Excluding Mainland China, except for forest products. - [2] Paddy converted at 65 percent. - [3] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 2B. - WORLD EXPORTS[1] OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million metric tons									
Wheat and wheat flour (wheat equivalent)	15.29	24.83	22.49	24.52	31.43	29.25	27.32	29.06	32.92	41.39
Barley	1.76	3.23	5.47	5.16	7.04	6.35	6.50	6.18	4.93	6.12
Oats	0.72	1.23	1.48	0.91	1.32	1.58	1.46	1.40	1.29	2.70
Maize	9.33	4.35	5.41	4.68	5.86	7.10	8.82	10.00	11.13	12.47
Rice (milled equivalent)	9.67	4.40	4.28	4.85	5.46	5.54	4.95	4.80	5.53	5.43
Sugar (raw equivalent)[2]	9.63	10.75	11.91	13.32	13.53	14.69	14.34	13.33	15.99	16.87
Citrus fruit[3]	1.86	1.88	2.60	2.84	2.39	2.69	2.78	3.11	3.36	2.99
Apples	0.69	0.57	0.71	0.98	0.87	1.14	0.85	1.29	1.22	1.34
Bananas	2.48	2.35	2.95	3.10	3.09	3.40	3.56	3.72	3.93	3.88
Vegetable oils and oilseeds (oil equivalent)[4]	4.20	3.60	4.55	4.67	5.09	5.25	4.95	5.25	5.59	5.35
Coffee	1.64	1.93	1.78	2.07	2.34	2.23	2.19	2.55	2.59	2.65
Cocoa beans	0.68	0.67	0.69	0.70	0.75	0.78	0.64	0.75	0.88	0.97
Tea	0.36	0.41	0.50	0.43	0.50	0.48	0.52	0.50	0.49	0.51
Wine	1.93	1.61	2.25	2.58	2.46	2.74	2.75	2.38	2.60	2.38
Tobacco	0.49	0.54	0.59	0.64	0.64	0.68	0.66	0.64	0.68	0.72
Cotton (lint)	2.88	2.37	2.63	2.38	2.84	3.07	2.65	2.79	3.49	3.24
Jute	0.79	0.85	0.90	0.99	0.88	0.81	0.95	0.89	0.83	0.80
Wool (actual weight)	0.96	1.05	1.01	1.14	1.18	1.20	1.15	1.38	1.32	1.42
Rubber (natural)[5]	0.98	1.67	1.86	2.02	1.94	1.96	1.97	2.27	2.00	2.18
Meat (fresh, chilled, and frozen)[6]	1.15	0.95	1.11	1.18	1.32	1.43	1.48	1.57	1.56	1.61
Eggs (in the shell)	0.25	0.24	0.34	0.35	0.36	0.38	0.39	0.43	0.42	0.39
FOREST PRODUCTS	*Million cubic meters*									
Roundwood[7]	...	[8] 18.4	21.3	26.2	26.3	27.1	26.0	28.8	33.5	36.8
Sawnwood	...	[8] 28.7	32.1	35.7	31.7	33.9	33.3	36.2	40.8	41.2
Plywood	...	[8] 0.5	0.8	1.0	0.9	1.1	1.2	1.6	1.5	1.5
	Million metric tons									
Wood pulp	...	[8] 6.0	6.9	7.6	7.8	7.8	7.7	8.5	9.7	9.7
Newsprint	...	[8] 6.0	6.2	6.6	7.0	6.9	6.8	7.0	7.5	7.7
Other paper and board	...	[8] 2.3	2.8	3.1	3.2	3.5	3.4	3.9	4.6	4.9

[1] Including exports from the rest of the world to the U.S.S.R., eastern Europe, and Mainland China, but excluding exports from these countries, except for forest products. - [2] Excluding United States trade with its territories. - [3] Oranges and lemons only. - [4] Excluding re-exports of copra from the Federation of Malaya and Singapore, but including unrecorded shipments of copra from Indonesia and the Philippines to the Federation of Malaya, Singapore and North Borneo. [5] Excluding imports into the Federation of Malaya and Singapore for re-export and exports from Hong Kong, but including unrecorded shipments from Indonesia to the Federation of Malaya and Singapore. - [6] Beef and veal, mutton and lamb, pork. - [7] Logs, pulpwood, pitprops, fuelwood, poles, pilings and posts. - [8] 1953.

ANNEX TABLE 3A. - WESTERN EUROPE: PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
	Million metric tons									
Wheat	31.07	30.32	35.70	37.80	32.01	40.55	39.07	42.66	39.63	37.31
Rye	7.49	6.65	7.64	6.69	7.14	7.21	6.99	7.17	7.04	5.42
Barley	9.08	10.93	13.72	14.74	19.04	17.51	17.73	20.35	22.14	22.59
Oats	16.44	14.84	14.58	14.78	15.98	13.23	12.89	12.60	13.31	12.83
Maize	9.73	7.17	8.58	9.74	10.14	12.18	11.04	14.27	14.79	13.09
Sugar (centrifugal)	4.02	5.14	6.56	6.89	6.50	7.07	8.19	7.32	9.90	7.79
Potatoes	69.87	76.33	80.99	73.11	84.33	79.02	72.35	72.69	79.27	72.15
Citrus fruit	1.99	2.10	2.63	2.54	1.84	2.76	2.91	3.28	3.20	3.58
Apples	7.42	8.72	9.50	8.70	10.30	4.26	13.71	7.24	14.04	8.10
Olive oil	0.81	0.86	0.84	0.69	0.90	1.06	0.83	1.10	1.13	1.04
Wine	14.13	13.09	15.33	16.08	15.58	11.53	16.02	16.66	16.63	13.75
Tobacco	0.19	0.25	0.29	0.34	0.30	0.36	0.30	0.32	0.27	0.25
Milk (total)	77.02	76.64	91.02	89.95	91.23	95.47	95.94	96.91	101.49	102.21
Meat [1]	8.56	7.39	10.20	10.48	10.68	11.07	11.16	11.57	12 26	12.85
Eggs	1.95	2.13	2.65	2.72	2.81	2.94	3.11	3.27	3.34	3.45
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	82	86	100	102	103	107	109	113	120	118
	1938	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million standards									
FOREST PRODUCTS [2]										
Sawn softwood	10.24	10.04	11.16	11.65	11.25	11.18	11.15	10.89	11.79	11.80
	Million cubic meters									
Sawn hardwood	9.07	9.30	10.00	10.76	11.00	11.63	11.75	11.90	12.66	13.28
Plywood	1.09	1.25	1.88	1.98	1.94	2.14	2.18	2.36	2.68	2.74
	Million metric tons									
Fibreboard (hard and insulating)	0.17	0.65	1.05	1.19	1.27	1.38	1.46	1.52	1.74	1.84
Wood pulp (chemical) [3]	6.67	5.96	7.66	8.40	8.72	9.26	9.18	9.90	11.12	12.00
Wood pulp (mechanical) [3]	3.95	3.46	4.40	4.70	4.98	5.12	5.12	5.46	6.02	6.30
Newsprint	2.80	2.33	2.86	3.11	3.43	3.52	3.52	3.81	4.22	4.40
Other paper and board	8.29	8.85	12.11	13.18	13.67	14.72	15.18	16.29	18.26	19.20

[1] Beef and veal, mutton and lamb, pork. - [2] Including eastern Europe. - [3] Only partial coverage of production of exploded and defibrated pulp.

ANNEX TABLE 3B. - WESTERN EUROPE: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
GROSS EXPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)	1.44	0.75	2.27	3.36	2.26	3.05	3.81	3.70	3.27	3.00
Sugar (raw equivalent)	0.86	1.37	1.68	1.83	1.56	1.84	1.37	1.34	1.57	1.50
Citrus fruit [1]	0.97	0.91	1.26	1.40	0.86	0.97	1.20	1.35	1.48	1.42
Apples	0.19	0.31	0.41	0.66	0.53	0.74	0.38	0.79	0.71	0.82
Wine	0.50	0.48	0.77	0.76	0.93	0.86	1.15	0.73	0.88	1.19
Bacon, ham, and salted pork	0.26	0.14	0.27	0.29	0.28	0.30	0.30	0.31	0.37	0.35
Eggs (in the shell)	0.20	0.17	0.26	0.27	0.28	0.31	0.31	0.34	0.32	0.30
Wool (actual weight)	0.12	0.05	0.06	0.08	0.08	0.09	0.08	0.11	0.11	0.11
	Million cubic meters									
Coniferous logs [2]	2.39	1.71	0.88	0.84	0.61	0.69	0.92	0.96	1.29	1.32
Broadleaved logs [2]	0.50	0.42	0.56	0.77	0.68	0.68	0.59	0.80	1.04	0.99
Pulpwood [2]	3.03	3.53	4.11	5.74	5.22	5.15	4.13	4.70	5.96	7.35
Pitprops [2]	3.16	3.00	2.44	3.00	3.03	3.12	2.62	2.10	1.85	1.87
Sawn softwood [2]	13.86	12.66	14.88	15.26	13.94	14.66	13.53	15.10	17.25	15.35
Plywood [2]	0.36	0.30	0.45	0.50	0.39	0.44	0.41	0.52	0.62	0.59
	Million metric tons									
Wood pulp [2]	4.55	3.51	4.39	4.70	4.97	4.90	4.83	5.34	5.90	5.62
Newsprint [2]	0.92	0.87	1.02	1.12	1.30	1.29	1.34	1.36	1.56	1.64
Other paper and board [2]	1.20	1.49	2.21	2.41	2.44	2.67	2.59	2.94	3.44	3.63
GROSS IMPORTS										
Wheat and wheat flour (wheat equivalent)	11.99	14.47	12.99	13.29	15.87	14.13	12.31	12.84	11.12	14.55
Barley	2.41	2.53	3.95	3.58	5.06	4.62	4.69	4.75	4.27	14.15
Maize	8.46	4.03	4.27	4.51	5.02	4.78	6.32	7.65	8.93	9.31
Rice (milled equivalent)	1.17	0.33	0.41	0.57	0.58	0.43	0.51	0.61	0.64	0.57
Sugar (raw equivalent)	3.47	4.26	3.79	4.07	4.41	5.38	4.87	4.61	4.61	4.06
Vegetable oils and oilseeds (oil equivalent)	3.00	2.50	3.02	3.12	3.46	3.57	3.30	3.42	3.76	3.42
Oranges	1.28	1.32	1.92	2.06	1.73	1.95	2.10	2.24	2.47	2.30
Coffee	0.69	0.48	0.61	0.68	0.75	0.76	0.80	0.88	0.94	0.99
Cocoa beans	0.36	0.33	0.40	0.40	0.39	0.45	0.39	0.43	0.47	0.52
Tea	0.26	0.23	0.28	0.26	0.27	0.31	0.30	0.27	0.28	0.29
Wine	1.68	1.39	2.00	2.40	2.13	2.53	2.67	2.23	2.51	2.32
Tobacco	0.37	0.34	0.39	0.41	0.40	0.41	0.41	0.40	0.47	0.48
Cotton (lint)	1.76	1.40	1.58	1.42	1.51	1.72	1.43	1.44	1.70	1.57
Rubber (natural)	0.36	0.59	0.69	0.78	0.73	0.76	0.74	0.65	0.68	0.73
Meat (fresh, chilled, frozen) [3]	1.12	0.82	0.77	0.93	1.14	1.18	1.12	1.08	1.18	1.01
Canned meat	0.08	0.18	0.20	0.20	0.19	0.23	0.24	0.24	0.23	0.24
Bacon, ham, and salted pork	0.39	0.21	0.31	0.31	0.32	0.34	0.35	0.36	0.41	0.40
Butter	0.57	0.39	0.32	0.40	0.44	0.45	0.46	0.47	0.48	0.47
Cheese	0.23	0.27	0.28	0.28	0.30	0.31	0.33	0.34	0.34	0.36
Eggs (in the shell)	0.31	0.21	0.29	0.31	0.32	0.34	0.36	0.41	0.43	0.42

[1] Oranges and lemons only. - [2] Including eastern Europe. Prewar figures refer to 1938. - [3] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 4A. - EASTERN EUROPE AND U.S.S.R.: PRODUCTION OF MAJOR COMMODITIES

	Average 1949-53	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million metric tons								
EASTERN EUROPE [1]									
Wheat	11.8	9.6	11.9	10.7	13.2	11.8	13.8	12.9	13.7
Rye	10.9	9.8	11.2	10.7	11.4	11.2	11.9	11.4	11.8
Barley	4.4	4.3	5.2	4.6	5.3	4.8	5.6	6.3	5.9
Oats	5.2	4.7	5.3	5.1	5.3	5.3	5.2	5.5	5.5
Maize	5.8	8.9	10.7	7.4	11.5	7.9	11.3	11.1	10.5
Potatoes	56.0	64.2	51.6	66.2	64.5	58.5	60.2	63.9	66.0
Tomatoes	0.9	0.9	1.0	1.0	1.2	1.2	1.3	1.5	...
Onions	0.6	0.7	0.6	0.5	0.6	0.6	0.8	0.8	...
Apples	0.9	1.2	1.0	1.6	0.8	2.2	1.1	2.1	...
Plums	0.6	0.6	0.8	0.6	0.6	1.1	1.3	1.2	...
Grapes	1.7	1.5	2.3	1.4	2.1	3.0	2.3	2.0	...
Sugar beet	20.8	23.5	24.0	19.4	25.9	27.0	23.2	33.9	30.0
Sunflowerseed	0.6	0.7	0.7	0.6	0.6	0.6	0.9	0.9	0.8
Tobacco	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	...
Milk	20.6	22.5	23.6	24.0	25.6	27.2	27.7	28.1	28.4
Eggs [2]	9.6	10.6	11.5	12.7	13.6	14.3	15.4	17.0	18.0
U. S. S. R.									
Total grain	80.9	85.6	106.8	127.6	105.0	141.2	125.9	134.4	137.3
Wheat	34.5	42.4	47.3	67.4	58.1	76.6	69.1	64.3	66.3
Rye	[3] 15.5	15.6	16.5	14.1	14.5	15.7	16.9	16.3	16.6
Barley	[3] 7.8	7.8	10.3	12.9	8.5	13.0	10.1	16.0	13.3
Oats	[3] 10.1	10.8	11.8	13.2	12.7	13.4	13.5	12.0	8.8
Maize	5.3	3.4	14.7	12.5	7.0	16.7	12.0	18.7	24.1
Millet	[3] 2.7	3.0	3.0	4.6	1.6	2.9	1.3	3.2	2.9
Rice	[3] 0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Potatoes	75.7	75.0	71.8	96.0	87.8	86.5	86.6	84.4	84.0
Other vegetables	10.0	11.9	14.1	14.3	14.8	14.9	14.8	16.6	15.6
Fruit [4]	[3] 2.2	...	2.6	...	...	3.1	3.2	3.0	...
Grapes	[3] 1.0	...	...	1.2	1.4	1.7	1.7	1.9	...
Sugar beet	21.1	19.8	31.0	32.5	39.7	54.4	43.9	57.7	50.6
Oilseeds	2.5	...	...	4.4	3.2	5.1	3.4	4.3	5.2
Sunflowerseed	2.0	1.9	3.8	3.9	2.8	4.6	3.1	4.0	4.7
Tobacco	[3] 0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	...
Milk	35.7	38.2	43.0	49.1	54.7	58.7	61.7	61.7	62.5
Butter	[3] 0.5	0.5	0.6	0.7	0.8	0.8	0.8	0.8	0.9
Meat	4.9	6.3	6.3	6.6	7.4	7.7	8.9	8.7	8.8
Eggs [2]	12.9	17.2	18.5	19.5	22.3	23.0	25.6	27.4	28.9
Flax	0.2	0.2	0.4	0.5	0.4	0.4	0.4	0.4	0.4
Cotton (lint)	3.5	4.2	3.9	4.3	4.2	4.3	4.6	4.3	4.5
Wool	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4

[1] Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, Romania. - [2] Million units. - [3] 1953. - [4] Excluding citrus fruit.

ANNEX TABLE 4B. - EASTERN EUROPE AND U.S.S.R.: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	U.S.S.R.						Eastern Europe [1]					
	1955	1956	1957	1958	1959	1960	1955	1956	1957	1958	1959	1960
	Thousand metric tons											
GROSS EXPORTS												
Wheat	2 035.8	1 452.4	5 450.8	3 878.7	6 052.0	5 638.9	460.6	209.6	68.2	125.1	159.8	126.6
Rye	698.9	519.4	440.6	461.0	548.9	689.5	74.4	151.8	8.6	5.3	3.1	24.0
Barley	565.0	785.4	1 214.0	278.3	121.6	325.0	57.3	110.1	111.7	99.7	64.8	88.2
Oats	75.6	164.3	223.5	261.1	131.4	41.5	—	0.1	—	0.1	1.5	—
Maize	307.4	293.7	84.6	220.5	154.9	123.1	706.5	541.4	174.4	508.7	112.8	465.3
Fresh meat	10.8	30.9	74.4	33.4	173.6	68.0	...	70.2	65.4	94.0	86.5	110.6
Butter	5.1	26.3	49.1	24.7	80.3	37.2	7.8	5.3	5.1	32.5	31.4	37.9
Cheese	0.1	0.8	7.9	0.4	1.0	2.6	3.4	5.1	6.8	8.6	17.4	19.2
Eggs [2]	—	—	—	—	—	—	796	869	789	1 022	1 284	1 748
Cattle [3]	—	—	—	—	—	—	34.2	91.1	86.5	94.5	104.7	186.3
Pigs [3]	—	—	25.0	58.0	54.7	54.5	203.7	408.3	195.8	641.5	660.0	562.1
Tobacco	4.4	7.5	6.0	6.2	7.1	1.6	36.1	53.6	61.2	51.2	73.6	89.8
Cotton (lint)	336.9	309.5	318.7	310.9	344.5	390.9	4.3	8.3	4.3	5.3	1.6	1.7
Wool (clean basis)	14.6	12.7	13.8	17.0	16.9	17.8	0.8	1.0	0.2	0.9	2.3	3.1
Flax	9.5	37.5	44.7	43.3	77.5	65.2	2.4	3.1	6.3	7.8	11.1	8.7
Oilseeds	66.5	59.9	49.8	47.1	83.3	110.4	58.1	60.4	49.5	5.1	7.9	20.1
Vegetable oils	24.0	55.6	47.8	52.2	82.5	91.8	28.2	35.0	34.6	27.4	23.8	77.3
Sugar (raw equivalent)	227.9	189.6	207.1	217.8	214.4	264.0	901.8	336.8	409.1	878.2	1 138.9	986.2
GROSS IMPORTS												
Wheat	29.1	443.3	122.1	323.3	246.9	98.0	2 625.5	2 227.0	5 216.7	3 296.8	4 793.0	5 382.8
Rye	—	—	—	—	—	—	765.3	872.2	403.2	485.1	405.0	536.2
Barley	—	—	—	176.4	1.0	21.8	796.9	671.5	1 087.6	436.3	488.1	411.9
Oats	—	—	—	31.0	8.5	3.2	40.0	110.7	178.4	143.2	64.5	60.0
Maize	275.8	50.2	30.3	261.5	—	117.2	433.5	476.4	449.6	425.6	386.9	508.9
Rice	487.1	637.6	370.5	500.5	689.1	501.1	169.0	171.7	206.3	263.2	414.8	422.3
Meat (fresh)	231.8	189.0	94.3	116.9	83.0	47.4	...	137.8	179.8	156.4	349.9	265.6
Butter	5.6	5.8	8.2	25.2	—	4.0	33.0	41.5	60.1	30.8	84.3	60.8
Cheese	0.4	0.3	0.3	—	3.1	—	12.4	10.7	17.8	12.4	15.4	23.5
Eggs [2]	231	225	224	373	110	113	285	264	335	57	81	87
Cattle [3]	146.3	187.0	136.2	121.1	142.3	158.0	25.1	7.4	9.1	18.5	16.7	9.5
Pigs [3]	51.3	62.4	—	58.0	54.7	54.5	45.1	90.6	64.8	172.7	120.1	85.0
Citrus fruit	87.7	87.8	108.5	132.6	103.9	120.3	72.8	61.7	94.1	117.8	158.4	107.3
Coffee	1.5	3.3	5.1	4.1	13.3	19.1	14.0	18.1	21.1	24.3	43.9	39.2
Tea	10.2	16.0	21.0	25.7	29.8	22.6	4.9	4.5	7.4	6.7	9.4	6.6
Cocoa beans	14.1	16.4	44.1	10.4	39.8	58.1	21.0	22.3	23.9	31.3	40.4	43.4
Cotton (lint)	19.9	51.4	108.8	142.1	190.3	193.0	350.5	352.0	392.1	402.6	431.8	473.8
Wool (clean basis)	46.5	48.5	57.3	55.2	57.8	61.5	43.1	43.2	52.3	54.4	60.8	65.5
Flax	—	—	—	—	—	—	13.5	17.1	19.8	21.6	26.3	24.4
Jute	20.0	20.0	16.4	23.0	22.0	16.6	42.0	42.1	45.9	53.1	48.4	46.4
Oilseeds	759.9	801.5	716.0	551.7	715.2	418.5	244.3	209.7	387.4	287.5	306.2	341.5
Vegetable oils	195.3	96.5	45.6	73.3	71.6	59.3	58.8	55.1	93.8	102.2	142.8	69.8
Rubber (natural)	35.3	140.7	145.5	258.7	242.1	190.9	67.6	84.0	107.6	110.1	146.3	112.4
Sugar (raw equivalent)	996.6	347.0	671.0	394.6	334.8	1 717.3	230.2	79.1	89.0	94.9	122.6	313.1
Tobacco	55.2	73.3	91.1	84.3	96.6	74.2	40.9	36.2	48.9	51.8	46.9	58.7

[1] Albania, Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, Romania. - [2] Million units. - [3] Thousand units.

ANNEX TABLE 4C. - U.S.S.R.: PRODUCTION AND EXPORTS OF FOREST PRODUCTS

	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
PRODUCTION					*Million standards*					
Sawn softwood	8.80	12.08	12.55	13.75	13.93	14.92	17.10	18.92	19.28	20.25
					Million cubic meters					
Sawn hardwood	7.24	9.96	10.35	11.34	11.49	12.30	14.10	15.60	15.90	16.30
Plywood	0.66	0.95	1.02	1.05	1.12	1.15	1.23	1.30	1.35	1.42
					Million metric tons					
Fibreboard	0.02	0.04	0.05	0.05	0.07	0.09	0.11	0.16	0.21	0.27
Wood pulp (chemical)	1.08	1.56	1.68	1.74	1.85	1.96	2.09	2.19	2.28	2.38
Wood pulp (mechanical)	0.43	0.61	0.66	0.72	0.77	0.79	0.81	0.83	0.85	0.87
Newsprint	0.24	0.29	0.32	0.36	0.36	0.38	0.39	0.40	0.42	0.44
Other paper and board	1.20	1.76	1.95	2.04	2.22	2.41	2.57	2.69	2.81	2.93
EXPORTS					*Million cubic meters*					
Pulpwood	0.06	—	—	0.55	0.53	0.59	0.82	1.18	1.59	1.61
Pitprops	0.29	0.44	0.78	0.84	0.64	0.82	0.99	0.88	1.11	1.10
Sawn softwood	0.82	1.30	1.74	2.32	2.21	3.44	3.61	4.34	4.94	5.37
Plywood	0.05	0.05	0.06	0.09	0.05	0.10	0.11	0.12	0.13	0.13

ANNEX TABLE 5A. - NORTH AMERICA: PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
FARM PRODUCTS	*Million metric tons*									
Wheat	26.65	44.54	35.81	39.63	42.96	36.50	49.78	41.77	50.27	40.73
Oats	18.99	25.30	25.19	28.00	24.80	24.59	26.53	21.72	23.73	19.85
Maize	53.20	82.36	78.24	82.58	88.22	87.11	95.38	107.41	110.55	102.64
Rice (milled equivalent) [1]	0.62	1.25	1.89	1.65	1.46	1.27	1.32	1.58	1.61	1.58
Potatoes	11.94	12.76	11.41	12.14	12.98	12.87	13.94	12.81	13.74	15.25
Citrus fruit	3.62	6.41	7.32	7.47	7.51	6.40	7.36	7.20	6.85	7.42
Vegetable oils and oilseeds (oil equivalent)	1.19	2.66	2.86	3.20	3.66	3.37	4.00	3.71	4.00	4.46
Tobacco	0.62	1.02	1.10	1.06	1.06	0.83	0.88	0.89	0.93	1.03
Cotton (lint)	2.81	3.11	2.98	3.21	2.90	2.39	2.51	3.17	3.11	3.11
Milk (total)	54.44	59.40	63.03	63.64	64.67	64.45	64.15	63.65	64.19	65.46
Meat [2]	8.09	10.91	12.40	13.21	13.76	13.28	12.77	13.56	13.91	14.05
Eggs	2.42	3.94	4.09	4.09	4.16	4.13	4.16	4.24	4.08	4.04
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	68	93	97	101	103	98	105	107	109	108
	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
FOREST PRODUCTS	*Million standards*									
Sawn softwood	11.86	18.14	18.43	19.99	19.04	17.20	17.28	19.14	18.15	17.46
	Million cubic meters									
Sawn hardwood	12.08	18.10	17.80	18.68	18.77	14.79	15.07	16.74	15.58	11.79
Plywood	0.82	3.49	4.99	6.52	6.71	6.74	7.62	8.82	8.91	9.10
	Million metric tons									
Fibreboard (hard and insulating)	0.64	1.21	1.50	1.67	1.72	1.63	1.71	1.96	1.81	1.87
Wood pulp (chemical)	5.20	13.68	17.02	19.16	20.62	20.25	20.27	21.54	23.66	25.00
Wood pulp (mechanical) [3]	3.44	7.23	8.32	8.87	9.20	8.98	8.70	9.36	9.55	9.55
Newsprint	3.38	5.74	6.51	6.92	7.32	7.40	7.04	7.51	7.89	8.00
Other paper and board	10.05	20.50	23.31	26.04	27.20	26.35	26.53	29.14	29.53	30.70

[1] Paddy converted at 65 percent. - [2] Beef and veal, mutton and lamb, pork. - [3] Includes exploded and defibrated pulp.

ANNEX TABLE 5B. - NORTH AMERICA: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
GROSS EXPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)	6.08	18.39	13.16	13.54	21.88	20.16	19.07	19.53	23.17	29.84
Barley	0.50	1.44	2.15	2.96	3.56	2.55	4.25	3.83	3.01	2.40
Maize	0.80	2.31	1.96	2.78	3.02	4.52	4.57	5.59	5.61	7.35
Rice (milled equivalent)	0.07	0.54	0.56	0.52	0.82	0.74	0.57	0.68	0.87	0.80
Oranges	0.15	0.23	0.33	0.30	0.41	0.33	0.16	0.26	0.21	0.20
Vegetable oils and oilseeds (oil equivalent)	0.02	0.41	0.85	0.83	1.17	1.32	1.09	1.44	1.58	1.23
Tobacco	0.20	0.22	0.22	0.27	0.25	0.24	0.23	0.23	0.24	0.24
Cotton (lint)	1.29	1.04	0.94	0.56	1.03	1.57	1.04	0.83	1.73	1.45
	Million cubic meters									
Coniferous logs	...	0.33	0.60	0.71	0.72	0.54	0.60	0.79	1.00	2.28
Broadleaved logs	...	0.23	0.25	0.22	0.26	0.24	0.27	0.24	0.34	0.31
Pulpwood	...	5.68	4.64	4.58	4.89	4.51	3.29	2.91	3.12	3.17
Sawn softwood	...	8.41	11.14	12.59	10.79	10.22	10.76	11.38	12.55	13.28
	Million metric tons									
Wood pulp	0.80	1.83	2.38	2.72	2.63	2.64	2.48	2.81	3.40	3.67
Newsprint	2.80	4.50	5.14	5.42	5.55	5.51	5.27	5.47	5.74	5.84
GROSS IMPORTS										
Sugar (raw equivalent) [1]	3.22	3.88	4.05	4.22	4.46	4.43	5.01	4.86	4.93	4.50
Citrus fruit [2]	0.11	0.19	0.22	0.21	0.21	0.21	0.20	0.24	0.22	0.17
Bananas	1.35	1.48	1.61	1.58	1.67	1.70	1.76	1.91	2.02	1.93
Vegetable oils and oilseeds (oil equivalent)	0.38	0.55	0.52	0.56	0.54	0.52	0.54	0.58	0.59	0.57
Coffee	0.81	1.27	1.07	1.23	1.33	1.30	1.26	1.45	1.38	1.41
Cocoa	0.26	0.29	0.25	0.24	0.27	0.25	0.21	0.23	0.27	0.36
Tea	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Jute	0.07	0.08	0.06	0.05	0.08	0.06	0.04	0.07	0.06	0.03
Sisal	0.14	0.18	0.17	0.18	0.16	0.16	0.15	0.16	0.12	0.13
Wool (actual weight)	0.10	0.29	0.15	0.17	0.17	0.13	0.12	0.19	0.15	0.16
Rubber (natural)	0.52	0.81	0.65	0.70	0.64	0.61	0.52	0.63	0.45	0.43

[1] Excluding United States trade with its territories. - [2] Oranges and lemons only.

ANNEX TABLE 6A. - OCEANIA: PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
FARM PRODUCTS	*Million metric tons*									
Wheat	4.38	5.30	4.70	5.39	3.74	2.76	6.02	5.64	7.67	6.91
Sugar (centrifugal)	0.94	1.04	1.48	1.36	1.36	1.51	1.64	1.60	1.56	1.55
Wool (greasy)	0.59	0.69	0.79	0.85	0.93	0.88	0.97	1.02	1.00	1.04
Milk (total)	10.18	10.25	10.56	11.33	11.85	11.54	11.39	11.85	11.95	11.64
Meat [1]	1.42	1.60	1.81	1.87	1.96	1.99	2.20	2.17	2.07	2.24
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	78	90	98	103	105	102	117	118	122	123
		Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million cubic meters									
FOREST PRODUCTS										
Sawnwood	...	4.19	4.73	4.84	4.60	4.51	4.70	4.98	5.18	5.28

[1] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 6B. - OCEANIA: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
GROSS EXPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)	2.80	3.09	1.96	2.51	3.54	2.53	1.40	2.65	3.57	6.38
Barley	0.07	0.26	0.63	0.36	0.63	0.64	0.32	0.88	0.38	0.95
Oats	0.01	0.19	0.03	0.11	0.20	0.22	0.07	0.38	0.22	0.47
Sugar (raw equivalent)	0.56	0.47	0.81	0.80	0.82	0.98	0.89	0.84	1.04	1.01
Copra and coconut oil (oil equivalent)	0.13	0.13	0.16	0.17	0.17	0.17	0.16	0.16	0.16	0.19
Beef	0.15	0.13	0.17	0.25	0.24	0.28	0.28	0.32	0.25	0.27
Mutton and lamb	0.27	0.30	0.34	0.33	0.31	0.30	0.34	0.39	0.42	0.40
Butter	0.24	0.21	0.18	0.24	0.25	0.21	0.24	0.28	0.22	0.25
Cheese	0.10	0.12	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.11
Wool (actual weight)	0.49	0.66	0.62	0.71	0.72	0.80	0.73	0.87	0.85	0.88
GROSS IMPORTS										
Wheat and wheat flour (wheat equivalent)	0.06	0.21	0.26	0.28	0.32	0.33	0.32	0.27	0.21	0.22
Sugar (raw equivalent)	0.09	0.11	0.12	0.12	0.11	0.12	0.13	0.11	0.13	0.15
Rubber (natural)	0.01	0.04	0.05	0.06	0.05	0.04	0.05	0.04	0.04	0.02

ANNEX TABLE 7A. - LATIN AMERICA: PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
FARM PRODUCTS					*Million metric tons*					
Wheat	8.62	7.97	11.69	9.50	11.03	10.15	10.58	9.41	7.79	9.26
Maize	18.00	15.01	17.26	18.82	18.41	20.32	21.82	21.95	23.12	23.85
Rice (milled equivalent) [1]	1.33	3.07	3.83	3.64	4.19	3.99	4.21	4.93	5.19	5.17
Sugar (centrifugal)	6.89	12.53	13.11	13.11	14.58	15.09	16.79	17.19	18.46	16.98
Citrus fruit	3.28	3.71	4.01	4.19	4.39	4.51	4.68	4.85	4.96	4.76
Bananas	4.20	7.81	9.13	9.38	9.80	10.59	11.14	12.04	12.34	12.21
Coffee	2.11	1.88	1.94	2.23	1.88	2.50	2.75	3.78	2.92	3.35
Cocoa	0.24	0.25	0.32	0.29	0.31	0.29	0.34	0.33	0.35	0.31
Tobacco	0.21	0.31	0.35	0.38	0.39	0.39	0.40	0.42	0.45	0.45
Cotton (lint)	0.59	0.86	1.13	1.27	1.16	1.29	1.27	1.20	1.42	1.52
Milk (total)	12.22	14.57	17.38	18.22	18.91	19.86	20.51	21.67	21.85	21.93
Meat [2]	5.03	6.02	6.15	6.44	7.11	7.25	7.56	6.94	6.79	7.19
Eggs	0.48	0.57	0.73	0.77	0.80	0.88	0.92	0.88	0.92	0.94
					Indices, average 1952/53-1956/57 = 100					
Index of all farm products	73	89	100	102	107	112	118	122	120	124

	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
					Million cubic meters				
FOREST PRODUCTS									
Sawnwood	10.48	12.06	12.34	12.12	10.86	11.20	10.89	11.00	11.10
					Million metric tons				
Wood pulp	0.22	0.31	0.29	0.34	0.38	0.43	0.50	0.54	0.58
All paper and board	0.72	0.93	1.19	1.28	1.33	1.50	1.62	1.71	1.83

[1] Paddy converted at 65 percent. - [2] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 7B. - LATIN AMERICA: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
GROSS EXPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)	3.44	2.00	3.37	4.22	3.03	2.83	2.45	2.48	2.49	1.94
Maize	6.61	1.20	2.27	0.53	1.11	0.84	1.74	2.74	3.11	1.85
Rice (milled equivalent)	0.10	0.25	0.16	0.13	0.25	0.13	0.17	0.13	0.13	0.13
Sugar (raw equivalent) [1]	4.05	7.07	6.56	7.71	7.91	8.66	8.85	8.17	9.89	10.52
Bananas	2.04	1.92	2.32	2.37	2.37	2.63	2.79	2.94	3.11	2.99
Linseed and linseed oil (oil equivalent)	0.55	0.19	0.29	0.18	0.08	0.17	0.18	0.23	0.21	0.22
Coffee	1.40	1.61	1.35	1.57	1.70	1.57	1.56	1.87	1.85	1.82
Cocoa beans	0.21	0.18	0.22	0.22	0.21	0.20	0.19	0.17	0.23	0.18
Cotton (lint)	0.34	0.39	0.73	0.69	0.76	0.52	0.59	0.73	0.62	0.68
Wool (actual weight)	0.19	0.18	0.16	0.17	0.19	0.13	0.18	0.20	0.19	0.24
Meat (fresh, chilled and frozen) [2]	0.59	0.34	0.25	0.28	0.49	0.50	0.52	0.47	0.42	0.43
Canned meat	0.12	0.12	0.10	0.10	0.10	0.14	0.13	0.11	0.08	0.10
	Million cubic meters									
Broadleaved logs	...	0.40	0.34	0.40	0.46	0.35	0.38	0.26	0.34	0.40
Sawn softwood	...	1.25	1.19	1.60	1.03	1.74	1.49	1.19	1.26	1.28
GROSS IMPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)	1.67	2.80	3.34	3.74	3.27	3.21	3.34	3.82	4.08	3.31
Rice (milled equivalent)	0.39	0.37	0.30	0.22	0.22	0.32	0.40	0.34	0.26	0.27
Sugar (raw equivalent)	0.25	0.36	0.43	0.47	0.28	0.49	0.37	0.39	0.25	0.23
Potatoes	0.18	0.24	0.21	0.19	0.20	0.21	0.16	0.15	0.18	0.18

[1] Excluding trade between the United States and its territories. - [2] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 8A. - FAR EAST (EXCLUDING MAINLAND CHINA): PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
	Million metric tons									
Wheat	12.13	11.48	13.45	13.95	13.79	14.66	13.11	15.51	16.02	16.78
Millet and sorghum	14.94	13.83	18.15	15.55	15.35	16.99	18.03	17.02	17.33	17.60
Rice (milled equivalent) [1]	60.61	62.42	67.53	73.19	77.23	71.30	79.97	84.22	88.73	88.10
Sugar (centrifugal)	4.18	3.15	4.69	5.07	5.22	5.59	5.71	6.27	6.81	6.57
Sugar (noncentrifugal)	3.67	4.04	4.48	4.47	5.08	5.13	5.82	5.41	5.18	5.57
Starchy roots	21.62	29.38	33.97	35.93	35.74	37.23	39.92	42.29	41.40	42.04
Pulses [2]	6.78	7.20	8.31	9.42	9.25	9.88	8.79	11.45	10.13	10.59
Vegetable oils and oilseeds (oil equivalent)	3.96	4.03	5.06	4.86	5.25	5.15	5.08	4.68	5.31	5.45
Tea	0.46	0.52	0.62	0.54	0.64	0.65	0.68	0.68	0.68	0.69
Tobacco	0.79	0.61	0.75	0.79	0.84	0.86	0.77	0.81	0.82	0.83
Cotton (lint)	1.22	0.89	1.30	1.21	1.25	1.30	1.23	1.07	1.35	1.19
Jute	1.94	2.00	1.64	2.28	2.26	2.11	2.40	2.12	2.15	2.94
Rubber (natural)	0.97	1.65	1.74	1.82	1.77	1.83	1.82	1.90	1.86	1.97
Meat [3]	1.65	1.84	2.03	2.24	2.39	2.51	2.56	2.63	2.58	2.59
Milk (total)	23.23	25.24	27.61	27.65	28.29	27.91	28.41	28.76	29.00	29.20
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	84	87	100	103	107	106	111	115	119	120

	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
FOREST PRODUCTS	*Million cubic meters*								
Sawnwood	17.34	21.51	25.24	29.50	31.70	30.28	31.17	34.50	34.80
Plywood	0.25	0.67	0.84	1.05	1.24	1.40	1.75	1.82	1.93
	Million metric tons								
Wood pulp	0.78	1.65	1.93	2.21	2.47	2.38	3.02	3.54	4.07
Newsprint	0.16	0.45	0.48	0.55	0.59	0.61	0.75	0.80	0.85
Other paper and board	0.90	1.77	2.08	2.53	2.84	2.90	3.70	4.42	5.20

[1] Paddy converted at 65 percent. - [2] Dry beans, dry peas, broad beans, chick-peas, lentils. - [3] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 8B. - FAR EAST (EXCLUDING MAINLAND CHINA): EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million metric tons									
GROSS EXPORTS										
Rice (milled equivalent)	8.96	3.05	3.08	3.55	3.51	4.00	3.32	3.56	3.85	3.80
Sugar (raw equivalent)	3.31	1.01	1.83	1.86	2.00	1.97	1.96	1.81	2.22	2.55
Vegetable oils and oilseeds (oil equivalent) [1]	1.79	1.32	1.31	1.60	1.64	1.51	1.29	1.25	1.43	1.52
Tea	0.36	0.39	0.47	0.40	0.47	0.44	0.49	0.45	0.45	0.46
Cotton (lint)	0.65	0.27	0.19	0.28	0.24	0.18	0.18	0.13	0.14	0.15
Jute	0.79	0.84	0.89	0.99	0.87	0.81	0.94	0.89	0.82	0.80
Rubber (natural) [2]	0.95	1.61	1.76	1.92	1.82	1.83	1.83	2.12	1.85	2.04
	Million cubic meters									
Broadleaved logs	...	0.76	2.20	2.50	2.92	3.27	3.82	5.35	6.10	6.60
Sawn hardwood	...	0.56	0.89	1.08	1.09	1.06	1.10	1.18	1.44	1.65
Plywood	...	0.02	0.17	0.24	0.30	0.36	0.49	0.71	0.49	0.50
	Million metric tons									
GROSS IMPORTS										
Wheat and wheat flour (wheat equivalent)	1.01	4.89	3.95	4.44	5.63	7.84	7.81	8.32	10.18	8.76
Rice (milled equivalent)	6.16	3.11	3.38	3.11	4.03	4.05	3.85	3.17	3.88	3.25
Barley	0.05	0.69	0.82	0.61	1.20	1.12	1.07	0.50	0.02	0.02
Maize	0.21	0.20	0.24	0.44	0.49	0.68	0.82	1.15	1.65	2.12
Sugar (raw equivalent)	1.72	1.17	2.56	2.30	2.07	1.82	2.08	1.91	2.08	2.23
Vegetable oils and oilseeds (oil equivalent) [3]	0.38	0.27	0.43	0.55	0.54	0.60	0.55	0.62	0.65	0.65
Cotton (lint)	0.89	0.52	0.74	0.66	0.86	0.89	0.75	0.90	1.15	1.25
Jute	0.04	0.27	0.25	0.29	0.23	0.18	0.14	0.12	0.21	0.16

[1] Excluding re-exports of copra from the Federation of Malaya and Singapore, but including unrecorded shipments of copra from Indonesia and the Philippines to the Federation of Malaya, Singapore, and North Borneo. - [2] Excluding imports into the Federation of Malaya and Singapore for re-export and exports from Hong Kong, but including unrecorded shipments from Indonesia to the Federation of Malaya and Singapore. - [3] Excluding copra imported into the Federation of Malaya and Singapore for re-export.

ANNEX TABLE 9A. - NEAR EAST: PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
	Million metric tons									
Wheat	9.50	10.95	13.56	14.08	15.21	17.82	16.54	16.21	16.38	15.71
Barley	4.24	4.67	5.87	5.40	6.18	7.45	6.39	5.92	5.93	5.84
Rice (milled equivalent) [1]	1.09	1.33	1.50	1.35	1.65	1.81	1.41	1.72	1.76	1.49
Total grains [2]	19.07	22.06	26.63	27.56	29.43	33.86	31.02	30.47	30.94	29.16
Sugar (centrifugal)	0.22	0.42	0.59	0.69	0.71	0.78	0.87	1.03	1.21	0.93
Pulses [3]	0.70	0.79	0.84	0.84	0.83	0.91	0.81	0.92	0.87	0.76
Citrus fruit	0.79	0.85	1.11	1.25	1.18	1.32	1.50	1.46	1.46	1.40
Dates	0.87	0.85	1.06	1.01	1.11	1.11	1.10	1.10	1.11	1.11
Bananas	0.05	0.07	0.09	0.10	0.11	0.11	0.14	0.12	0.12	0.13
Vegetable oils and oilseeds (oil equivalent)	0.32	0.41	0.52	0.50	0.61	0.53	0.63	0.61	0.63	0.64
Tobacco	0.09	0.12	0.13	0.15	0.15	0.16	0.14	0.16	0.17	0.17
Cotton (lint)	0.56	0.66	0.74	0.76	0.81	0.80	0.95	0.99	0.97	0.94
Milk (total)	9.70	10.41	10.62	11.62	11.68	12.02	13.12	13.31	13.12	13.15
Meat [4]	0.65	0.85	1.06	1.17	1.28	1.30	1.22	1.28	1.36	1.37
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	71	83	97	101	108	113	117	120	121	118

[1] Paddy converted at 65 percent. - [2] Wheat, barley, oats, maize, millet, sorghum, rice (milled equivalent), rye, mixed grain. - [3] Dry beans, dry peas, broad beans, chick-peas, lentils. - [4] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 9B. - NEAR EAST: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Million metric tons									
GROSS EXPORTS										
Wheat and wheat flour (wheat equivalent)	0.24	0.27	1.27	0.33	0.42	0.44	0.27	0.44	0.08	0.05
Barley	0.38	0.46	1.03	0.46	0.78	0.53	0.58	0.26	0.02	0.08
Rice (milled equivalent)	0.15	0.27	0.13	0.25	0.25	0.32	0.40	0.08	0.33	0.25
Total grains [1]	0.93	1.10	2.59	1.11	1.54	1.40	1.33	0.91	0.65	0.50
Citrus fruit [2]	0.30	0.20	0.36	0.30	0.35	0.37	0.39	0.46	0.51	0.37
Tobacco	0.04	0.07	0.07	0.06	0.07	0.09	0.06	0.07	0.06	0.09
Cotton (lint)	0.47	0.47	0.52	0.57	0.51	0.55	0.54	0.76	0.71	0.65
GROSS IMPORTS										
Wheat and wheat flour (wheat equivalent)	0.28	1.42	0.85	1.30	2.19	2.48	2.26	2.85	3.82	3.39
Total grains [1]	0.47	1.77	1.09	1.82	2.76	3.16	2.96	3.85	4.92	4.34
Sugar (raw equivalent)	0.35	0.55	0.74	0.86	0.94	0.93	1.05	1.13	1.09	1.18
	Million cubic meters									
Sawn softwood	...	0.38	0.71	0.63	0.55	0.58	0.64	0.73	0.77	0.67

[1] Wheat and wheat flour, barley, maize, oats, sorghums, millet, rice (milled). - [2] Oranges and lemons only.

ANNEX TABLE 10A. - AFRICA: PRODUCTION OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62 (Preliminary)
FARM PRODUCTS	*Million metric tons*									
Wheat	2.66	3.15	4.33	3.82	4.31	3.71	3.87	3.68	4.02	2.57
Barley	2.60	3.19	4.04	2.93	3.69	2.18	3.23	2.60	2.91	1.31
Maize	4.62	7.14	8.53	8.75	9.34	8.76	9.33	9.41	10.39	11.00
Millet and sorghum	9.31	10.65	11.44	11.47	11.82	12.23	12.03	12.33	12.64	12.76
Rice (milled equivalent)	1.11	1.55	1.71	1.78	1.74	1.89	1.89	1.85	1.97	2.01
Sugar (centrifugal)	0.95	1.36	1.64	1.83	1.97	2.15	2.23	2.34	2.04	2.52
Starchy roots	35.40	46.07	51.57	52.35	53.79	52.42	53.14	54.32	53.94	43.94
Pulses [2]	1.02	1.48	1.64	1.55	1.53	1.37	1.45	1.51	1.48	1.43
Citrus fruit	0.38	0.78	1.00	1.08	1.19	1.26	1.29	1.32	1.49	1.31
Bananas	0.30	0.64	0.79	0.91	0.84	0.93	0.89	0.92	0.90	0.91
Groundnuts (oil equivalent)	0.56	0.72	0.82	0.96	0.99	1.15	1.04	1.00	1.17	1.14
Vegetable oils and oilseeds (oil equivalent)	1.73	2.19	2.50	2.51	2.76	2.77	2.85	2.69	2.94	2.76
Coffee	0.14	0.28	0.39	0.51	0.51	0.53	0.61	0.67	0.77	0.74
Cocoa	0.49	0.50	0.49	0.52	0.58	0.45	0.57	0.66	0.86	0.82
Wine	2.14	1.72	2.51	2.07	2.50	2.15	2.04	2.62	2.28	2.22
Cotton (lint)	0.14	0.22	0.26	0.26	0.28	0.31	0.31	0.31	0.33	0.26
Sisal	0.16	0.23	0.29	0.30	0.31	0.33	0.35	0.37	0.38	0.37
Milk (total)	6.82	8.27	8.65	8.72	9.12	9.17	9.32	9.51	9.58	9.71
Meat [3]	1.52	1.89	2.05	2.00	2.09	2.09	2.15	2.15	2.17	2.18
	Indices, average 1952/53-1956/57 = 100									
Index of all farm products	71	83	97	101	108	113	117	120	121	118

	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Millions cubic meters								
FOREST PRODUCTS									
Sawnwood	1.31	1.77	1.73	1.89	1.88	1.96	1.94	1.95	2.00

[1] Paddy converted at 65 percent. - [2] Dry beans, dry peas, broad beans, chick-peas, lentils. - [3] Beef and veal, mutton and lamb, pork.

ANNEX TABLE 10B. - AFRICA: EXPORTS AND IMPORTS OF MAJOR COMMODITIES

	Average 1934-38	Average 1948-52	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
GROSS EXPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)[1]	0.61	0.33	0.53	0.62	0.36	0.29	0.38	0.27	0.35	0.17
Barley	0.21	0.55	0.64	0.46	0.48	0.10	0.25	0.25	0.16	0.04
Maize	0.66	0.36	0.79	1.02	1.31	1.39	1.56	0.83	0.87	1.50
Sugar (raw equivalent)	0.68	0.71	1.00	1.04	1.08	1.15	1.18	1.11	0.97	0.93
Oranges	0.15	0.39	0.53	0.65	0.56	0.76	0.69	0.73	0.86	0.68
Bananas	0.14	0.22	0.34	0.37	0.35	0.40	0.39	0.37	0.38	0.42
Groundnuts and groundnut oil (oil equivalent)	0.34	0.32	0.50	0.46	0.59	0.55	0.67	0.63	0.57	0.66
Palm kernels and palm kernel oil (oil equivalent)	0.30	0.34	0.38	0.36	0.38	0.35	0.39	0.38	0.36	0.35
Palm oil	0.24	0.33	0.39	0.37	0.38	0.35	0.37	0.39	0.39	0.36
Coffee	0.13	0.28	0.34	0.44	0.52	0.53	0.54	0.59	0.63	0.67
Cocoa beans	0.46	0.48	0.47	0.48	0.52	0.57	0.44	0.56	0.64	0.78
Wine	1.40	1.13	1.59	1.90	1.53	1.90	1.52	1.63	1.74	1.26
Tobacco	0.03	0.06	0.09	0.08	0.09	0.08	0.08	0.09	0.11	0.12
Cotton (lint)	0.13	0.19	0.24	0.24	0.26	0.24	0.27	0.29	0.27	0.28
Sisal	0.16	0.22	0.27	0.29	0.30	0.32	0.34	0.36	0.37	0.36
	Million cubic meters									
Broadleaved logs	...	1.19	1.88	2.37	2.40	2.82	2.86	3.74	4.35	4.90
GROSS IMPORTS	*Million metric tons*									
Wheat and wheat flour (wheat equivalent)	0.28	0.75	0.75	0.78	0.98	0.93	0.78	1.64	1.74	1.92
Rice (milled equivalent)	0.39	0.18	0.24	0.36	0.35	0.46	0.38	0.53	0.50	0.56
Sugar (raw equivalent)	0.41	0.55	0.86	0.94	0.95	1.00	1.01	1.08	1.12	1.07

[1] Including coarse ground flour.

ANNEX TABLE 11. - TOTAL CATCH (LIVE WEIGHT) OF FISH, CRUSTACEANS AND MOLLUSKS IN SELECTED COUNTRIES [1]

	1938	1948	1955	1956	1957	1958	1959	1960	1961 (Preliminary)	Average 1955-59	
	Thousand metric tons									%	*Thousand metric tons*
WORLD TOTAL	*20 500.0*	*19 090.0*	*28 310.0*	*29 830.0*	*30 810.0*	*32 130.0*	*35 600.0*	*37 730.0*	*40 500*	*100.0*	*31 336 0*
A. 1959 catch: 1 000 000 tons and more										(57.5)	(18 027.0)
1 Japan	3 562.0	2 431.4	4 912.8	4 762.6	5 399.0	5 505.0	5 884.6	6 192.5	6 710.5	16.9	5 292.8
2 China (mainland)	...	...	2 518.0	2 640.0	3 120.0	4 060.0	5 020.0	...	...	11.1	3 471.6
3 United States	2 260.1	2 416.6	2 790.4	2 989.4	2 759.8	2 708.7	2 890.8	2 814.5	2 874.4	9.0	2 827.8
4 U.S.S.R.	1 523.0	1 485.0	2 495.0	2 616.0	2 531.0	2 621.0	2 756.0	3 051.0	...	8.3	2 603.8
5 Peru	...	47.7	213.3	297.3	483.1	930.2	2 152.4	3 531.4	5 243.1	2.6	815.3
6 Norway	1 152.5	1 504.0	1 813.4	2 201.3	1 754.8	1 438.8	1 663.9	1 598.9	1 509.4	5.6	1 774.4
7 Canada	836.8	1 052.9	965.0	1 105.5	997.1	1 007.6	1 054.4	928.6	...	3.3	1 025.9
B. 1959 catch: 500 000 tons and more but less than 1 000 000 tons										(20.6)	(6 438.4)
8 United Kingdom	1 198.1	1 206.1	1 100.4	1 050.4	1 014.7	999.0	988.9	923.8	...	3.3	1 030.7
9 Spain (incl. Ceuta and Melilla)	423.5	547.2	770.3	761.6	777.2	844.9	842.8	935.3	...	2.6	799.3
10 India	...	...	839.0	1 012.3	1 233.0	1 064.6	823.2	1 161.4	961.0	3.2	994.3
11 Germany, Fed. Rep.	776.5	408.7	814.8	800.6	791.7	743.1	768.0	674.0	...	2.5	783.6
12 Denmark and Faeroe Islands	160.1	318.2	530.9	579.3	638.9	704.8	760.9	690.6	...	2.1	643.0
13 South Africa and South West Africa	66.7	185.9	607.1	536.9	580.6	649.9	749.4	898.8	1 009.7	2.0	624.8
14 Indonesia	472.0	...	669.8	713.9	727.6	685.0	700.3	753.7	733.9	2.2	699.2
15 Iceland	327.2	478.1	480.3	517.3	502.7	580.4	640.8	592.8	...	1.7	544.3
16 France (incl. Algeria)	530.3	467.5	522.7	537.9	514.5	519.7	578.3	596.3	567.7	1.7	534.6
C. 1959 catch: 100 000 tons and more but less than 500 000 tons										(16.1)	(5 038.1)
17 Philippines	80.9	195.1	385.2	416.0	407.5	447.3	457.5	465.5	475.7	1.3	422.7
18 Portugal	247.2	292.1	424.7	472.2	470.3	455.5	427.8	475.1	...	1.4	450.1
19 Korea, South	838.3	285.2	262.2	346.0	408 1	395.1	382.1	342.5	412.4	1.1	358.7
20 Netherlands	256.2	294.1	319.5	298.1	300.8	313.8	319.6	314.7	346.0	1.0	310.4
21 Korea, North	925.2	...	312.0	...	291.5	...	...	...	...	1.0	300.7
22 Pakistan	...	...	270.9	277.0	282.8	283.7	290.1	304.5	319.1	0.9	280.9
23 Chile	32.2	64.6	214.3	188.3	213.1	225.8	272.5	339.7	429.8	0.7	222.9
24 Sweden	129.2	193.9	219.5	197.4	222.1	238.0	268.0	254.3	262.7	0.7	229.8
25 Angola	26.2	113.2	290.4	420.5	395.5	278.2	267.4	252.0	241.5	1.1	330.4
26 China (Taiwan)	89.5	83.5	180.3	193.2	208.0	229.7	246.3	259.1	312.4	0.7	211.5
27 Brazil	103.3	144.8	190.3	208.0	216.2	212.2	244.3	257.1	...	0.7	216.5
28 Italy	181.2	156.6	218.0	219.6	210.3	209.3	213.3	211.7	237.9	0.7	214.1
29 Thailand	161.0	161.0	213.0	217.9	234.5	196.3	204.7	220.9	...	0.7	213.3
30 Mexico	17.1	...	105.8	144.8	117.5	164.0	190.6	...	...	0.5	144.5
31 Poland	12.5	47.1	126.9	139.3	138.8	145.1	162.2	183.9	185.5	0.5	142.5
32 Viet-Nam, South	180.0	...	120.0	130.0	135.0	143.0	153.5	240.0	...	0.4	136.6
33 Congo (Léopoldville)	0.9	17.5	86.1	96.2	122.4	136.6	153.4	...	...	0.4	118.9
34 Cambodia	...	...	150.0	150.0	...	...	...	...	...	0.5	150.0
35 Federation of Malaya	...	139.0	136.8	138.5	138.3	139.5	145.9	167.1	178.4	0.4	139.8
36 Morocco	43.7	68.6	94.3	108.2	145.1	161.7	144.4	154.1	...	0.4	130.7
37 Germany, Eastern	...	...	68.6	74.9	96.5	93.2	105.6	...	...	0.3	87.8
38 Burma	...	...	...	100.0	100.0	...	...	...	...	0.3	100.0
39 Muscat and Oman	...	...	...	...	...	...	...	...	...	0.3	100.0

ANNEX TABLE 11. - TOTAL CATCH (LIVE WEIGHT) OF FISH, CRUSTACEANS AND MOLLUSKS IN SELECTED COUNTRIES [1] (*concluded*)

	1938	1948	1955	1956	1957	1958	1959	1960	1961	Average 1955-59	
	Thousand metric tons									%	*Thousand metric tons*
D. 1959 catch: 50 000 tons and more, but less than 100 000 tons										(2.2)	(694.9)
40 Turkey	76.0	...	111.5	139.5	116.7	101.3	96.7	...	...	0.4	113.1
41 Argentina	55.3	71.2	79.0	75.4	81.6	80.6	88.6	100.9	...	0.3	81.0
42 United Arab Republic	38.1	42.8	63.4	70.3	75.2	80.0	85.6	88.5	...	0.2	74.9
43 Venezuela	21.7	92.3	69.6	61.3	83.7	78.3	83.3	...	92.0	0.2	75.2
44 Greece	25.0	33.6	60.0	65.0	75.0	80.0	82.0	...	...	0.2	72.4
45 Finland	44.4	46.1	63.3	60.2	64.5	61.5	67.4	66.0	67.2	0.2	63.4
46 Hong Kong	...	34.3	57.5	57.2	67.2	69.5	67.0	62.3	63.0	0.2	63.7
47 Tanganyika	16.0	22.0	52.4	55.0	55.0	55.0	60.0	60.0	60.7	0.2	55.5
48 Australia	33.5	38.9	52.5	49.9	55.3	54.3	58.8	62.2	60.0	0.2	54.2
49 Belgium	42.8	71.1	80.0	69.1	62.9	64.3	57.5	63.7	61.4	0.2	66.8
50 Uganda	...	11.0	34.9	45.7	51.3	52.8	55.6	61.4	61.2	0.2	48.1
E. 1959 catch: less than 50 000 tons										(1.4)	(445.7)
51 Ceylon	...	24.0	31.3	40.3	38.5	40.7	48.3	51.1	61.8	0.1	39.8
52 New Zealand	27.0	35.7	39.2	38.4	39.0	39.3	41.4	...	...	0.1	42.2
53 Ireland	12.8	25.8	23.6	30.5	36.6	37.5	38.6	42.8	...	0.1	33.4
54 Ecuador	1.8	3.4	15.0	21.8	26.4	31.1	35.9	43.2	60.2	0.1	26.0
55 Ethiopia	...	...	6.2	11.0	13.5	27.9	34.7	19.1	17.2	—	11.8
56 Greenland	4.7	21.0	25.8	27.4	31.5	33.5	34.6	35.2	...	0.1	30.6
57 Yugoslavia	16.8	21.2	22.6	28.4	30.7	31.4	29.4	30.9	37.3	0.1	28.5
58 Cuba	10.0	8.3	12.8	15.6	22.0	21.9	28.2	31.2	31.1	0.1	20.1
59 Aden	...	20.0	34.8	21.8	22.6	21.5	24.4	22.3	47.4	0.1	25.0
60 Kenya	...	...	30.1	32.6	25.5	22.0	22.6	28.2	...	0.1	26.6
61 Colombia	10.0	15.0	18.0	21.2	30.1	25.0	21.1	29.7	...	0.1	23.1
62 Ryukyu Islands	12.0	7.7	13.6	13.7	15.8	16.5	21.0	15.2	16.1	0.1	16.1
63 Sudan	8.8	11.4	13.6	13.5	9.9	19.2	16.2	16.5	17.3	—	14.0
64 Tunisia	9.6	12.2	10.8	11.9	14.0	15.2	...	...	...	—	13.0
65 Israel	1.7	2.5	10.7	10.3	11.6	12.6	13.2	13.8	14.9	—	11.7
66 Singapore	1.5	2.3	6.2	9.6	13.8	12.3	11.5	9.2	9.7	—	10.7
67 Ruanda-Urundi	...	2.3	5.6	5.4	9.7	11.5	11.0	9.2	...	—	8.6
68 St. Pierre and Miquelon	1.9	2.2	6.8	9.3	7.9	8.3	9.4	10.3	13.6	—	8.3
69 Uruguay	3.6	3.5	4.9	5.4	6.9	6.4	4.1	5.2	4.7	—	5.5
70 Mauritius	2.0	1.6	1.7	1.7	1.7	1.6	1.3	1.4	1.5	—	1.6
71 Malta and Gozo	1.1	1.5	0.8	0.8	1.0	1.1	1.1	1.2	1.3	—	1.0
F. 1959 catch: less than 50 000 tons										(2.2)	(691.9)
120 countries not specified [2]	...	...	...	...	...	...	...	...	...	2.2	691.9

[1] Countries arranged in order of 1959 catch. - [2] These countries do not publish regularly annual fish catch statistics.

ANNEX TABLE 12. - UNITED STATES COMMODITY CREDIT CORPORATION: QUANTITY AND VALUE OF INVESTEMENT [1]

	Quantity (30 April)									Value (30 April)									
	1954	1955	1956	1957	1958	1959	1960	1961	1962	1954	1955	1956	1957	1958	1959	1960	1961 [2]		1962
	Thousand metric tons									*Million dollars*									
Wheat	24 208	28 156	29 073	24 453	24 174	33 937	35 512	37 888	34 209	2 155	2 633	2 795	2 411	2 402	3 105	3 253	3 389	(2 772)	2 459
Rice	58	763	1 322	804	732	535	455	240	34	6	98	232	107	104	81	65	27	(26)	5
Barley	622	2 044	1 987	1 774	2 698	3 242	3 383	2 184	1 344	34	107	92	87	114	155	113	100	(85)	52
Oats	589	1 052	1 222	650	732	1 376	646	598	557	32	58	60	32	32	57	27	24	(21)	21
Maize	20 568	22 255	29 192	34 801	37 211	39 206	45 291	45 012	43 587	1 296	1 437	1 926	2 289	2 414	2 486	2 786	3 091	(2 688)	1 952
Grain sorghum	1 029	2 927	2 887	2 040	8 295	13 498	14 964	18 784	19 070	60	167	128	105	393	706	833	1 048	(797)	810
Butter	165	149	34	16	45	20	27	40	144	245	212	44	21	60	26	35	54	(53)	191
Cheese	164	176	130	87	74	5	4	—	38	146	156	111	73	62	4	3	—	—	32
Dried milk	298	101	81	65	70	59	108	117	217	109	38	30	24	26	20	34	37	(35)	80
Soybeans	101	876	270	1 228	1 746	3 255	1 598	89	2 565	10	70	20	95	131	247	114	6	(6)	214
Linseed	382	201	41	351	59	279	18	6	5	56	25	5	42	7	31	2	1	(1)	1
Linseed oil	31	37	26	—	—	—	14	—	—	13	14	9	—	—	—	4	—	—	—
Cottonseed oil	469	170	5	—	—	27	—	—	—	185	64	2	—	—	7	—	—	—	—
Cotton linters	279	318	141	20	—	—	—	—	—	58	67	31	5	—	—	—	—	—	—
Cotton, upland	1 674	1 817	2 839	2 056	973	1 628	1 179	565	1 203	1 268	1 439	2 268	1 580	642	1 260	947	431	(410)	894
Wool	55	70	54	24	—	—	—	—	—	81	103	82	35	—	—	—	—	—	—
Tobacco	281	366	402	451	427	414	317	280	211	270	406	535	609	590	594	441	393	(393)	321
Other commodities										165	167	263	301	274	154	176	147	(141)	152
TOTAL										6 189	7 261	8 633	7 816	7 251	8 933	8 833	8 748	(7 428)	7 184
										Percentage									
Change from previous year										+ 97	+ 17	+ 19	— 9	— 7	+ 23	— 1	— 1		— 3

SOURCE: United States Department of Agriculture, Commodity Credit Corporation, *Report of financial conditions and operations*, 30 April 1955 - 30 April 1962.

[1] Stocks pledged for outstanding loans and stocks in price support inventory. - [2] Figures in brackets, revised in accordance with the change in accounting policy adopted by the CCC as of 30 June 1961, are for comparison with 1962.

ANNEX TABLE 13A. - FOOD SUPPLIES AVAILABLE FOR HUMAN CONSUMPTION IN SELECTED COUNTRIES

Country	Period	Cereals	Starchy roots	Sugar	Pulses and nuts	Vege-tables	Meat	Eggs	Fish [1]	Milk [2]		Fats
										Fat	Protein	
		Kilograms per caput per year										
WESTERN EUROPE												
Austria	1948/49-1950/51	130	108	23	3	61	30	4	2	5	6	15
	1954/55-1956/57	118	96	31	2	63	47	8	3	7	8	18
	1960/61	108	88	36	3	69	57	12	4	7	8	18
Belgium-Luxembourg	1948/49-1950/51	106	148	28	4	60	47	12	7	4	5	21
	1954/55-1956/57	100	150	28	4	65	53	14	7	4	6	22
	1960/61	91	148	33	4	68	58	15	8	5	7	21
Denmark	1948/49-1950/51	104	141	36	7	72	62	9	18	8	10	18
	1954/55-1956/57	90	131	48	5	62	63	8	14	8	8	26
	1960/61	78	127	42	6	70	65	10	16	9	9	28
Finland	1949/50-1950/51	122	119	31	2	18	29	5	12	12	12	15
	1954/55-1956/57	118	109	38	2	19	32	8	11	13	13	18
	1959/60	113	92	40	2	21	32	6	11	12	12	19
France	1948/49-1950/51	122	133	23	6	140	56	10	6	4	5	14
	1954/55-1956/57	111	130	26	6	132	69	10	6	5	6	17
	1959/60	105	109	31	6	132	73	11	6	6	7	18
Germany, Federal Republic	1948/49-1950/51	114	210	24	4	51	29	5	8	4	6	16
	1954/55-1956/57	96	157	28	4	45	48	10	7	6	7	25
	1960/61	83	131	29	3	48	57	13	7	6	7	25
Greece	1948/49-1950/51	154	34	9	12	66	11	3	6	3	3	15
	1954-56	158	39	10	14	99	17	4	7	4	4	17
	1960	163	36	13	14	118	23	6	8	5	5	18
Ireland	1948/49-1950/51	134	190	35	2	59	53	12	3	7	9	18
	1954-56	128	155	42	2	61	55	16	4	8	10	20
	1960	111	144	47	3	62	62	14	5	9	11	21
Italy	1948/49-1950/51	150	38	12	9	81	15	6	4	3	3	10
	1954/55-1956/57	145	48	16	9	96	20	8	5	4	4	14
	1960/61	142	52	21	9	138	27	9	5	4	4	17
Netherlands	1948/49-1950/51	98	159	36	4	68	28	5	6	7	9	23
	1954/55-1956/57	90	96	39	4	66	43	10	5	7	9	24
	1960/61	83	101	42	4	61	49	12	4	8	9	26
Norway	1948/49-1950/51	116	128	24	3	28	33	7	25	11	10	23
	1954/55-1956/57	95	105	39	4	34	37	8	20	12	9	26
	1960/61	81	105	39	4	34	38	8	19	12	9	24
Portugal	1948-50	120	108	12	10	107	16	3	16	1	1	14
	1954-56	125	113	15	8	110	17	3	18	1	1	16
	1960	116	98	18	8	104	19	4	19	1	1	15
Spain	1952/53-1953/54	123	104	10	15	102	14	5	10	2	2	16
	1954/55-1956/57	117	113	13	16	102	14	5	10	2	3	16
	1960/61	116	118	17	14	124	19	6	14	2	3	19
Sweden	1948/49-1950/51	88	120	44	3	25	49	11	16	11	10	20
	1954/55-1956/57	76	102	42	3	25	50	11	18	10	9	21
	1960/61	70	87	41	3	29	49	12	18	10	9	22
Switzerland	1948/49-1950/51	117	89	38	6	73	44	9	2	11	11	15
	1954/55-1956/57	101	74	40	7	75	51	10	3	10	10	17
	1960/61	93	73	41	7	69	58	10	3	10	9	20
United Kingdom	1948/49-1950/51	106	115	39	5	61	50	13	12	7	7	21
	1954/55-1956/57	88	98	47	6	58	68	13	10	7	7	22
	1960/61	81	95	48	6	63	73	15	10	7	7	22
Yugoslavia	1952-53	190	64	8	8	32	20	2	1	3	3	8
	1954-56	186	60	10	10	39	23	2	1	3	4	9
	1960	186	70	15	10	56	30	3	1	4	5	13

ANNEX TABLE 13A. - FOOD SUPPLIES AVAILABLE FOR HUMAN CONSUMPTION IN SELECTED COUNTRIES (*continued*)

Country	Period	Cereals	Starchy roots	Sugar	Pulses and nuts	Vegetables	Meat	Eggs	Fish [1]	Milk [2]		Fats
										Fat	Protein	
		Kilograms per caput per year										
NORTH AMERICA												
Canada	1948/49-1950/51	75	75	46	7	70	70	15	6	8	9	20
	1954/55-1956/57	74	68	44	5	72	81	16	6	8	9	20
	1960/61	70	...	44	5	75	79	16	8	8	9	19
United States	1948-50	77	52	41	8	105	82	22	5	9	8	20
	1954-56	69	49	41	7	98	92	21	5	9	9	21
	1960	66	47	41	7	97	95	19	5	8	9	21
LATIN AMERICA												
Argentina	1948	126	88	35	2	40	116	7	2	5	5	16
	1954-56	105	83	34	3	49	108	7	2	5	5	18
	1959	120	67	31	3	44	91	7	2	4	3	16
Brazil	1948-50	86	112	25	24	7	26	2	2	1	1	7
	1954-56	103	117	32	26	19	26	3	2	2	2	8
	1957	106	118	31	27	21	29	3	3	2	2	8
Chile	1948	134	80	25	6	54	38	2	7	2	2	6
	1954-56	137	76	31	8	67	31	4	9	3	3	7
	1957	129	92	37	8	77	31	4	10	3	3	7
Colombia	1956-58	61	84	51	9	13	41	3	1	2	2	6
Ecuador	1954-56	78	78	25	12	23	11	4	3	3	3	4
	1957-59	74	90	22	13	30	15	5	4	3	3	4
Mexico	1954-56	128	10	33	19	24	20	4	2	2	2	10
	1957-59	124	8	33	21	24	24	6	2	3	3	9
Paraguay	1957-59	84	229	15	15	36	48	1	–	3	2	4
Peru	1952	103	169	20	9	50	20	3	2	1	1	6
	1959	87	151	26	9	78	18	1	5	1	1	8
Surinam	1959	98	15	23	7	12	10	3	11	1	1	9
Uruguay	1948-50	99	51	33	3	22	115	7	1	6	5	14
	1954-56	99	61	33	2	37	109	7	1	6	6	17
Venezuela	1952-53	82	89	33	15	10	19	4	6	3	3	6
	1954-56	81	78	32	13	10	20	5	6	3	3	7
	1959	82	92	37	16	16	25	4	8	4	4	9
FAR EAST												
Ceylon	1952-53	118	35	16	32	42	3	2	5	1	1	4
	1954-56	125	34	17	34	42	3	1	5	1	1	4
	1960	138	22	19	29	42	3	1	7	1	1	4
China: Taiwan	1948-50	138	74	9	[3] 6	62	11	2	6	–	–	2
	1954-56	148	68	9	[3] 9	58	17	2	10	–	–	3
	1960	160	68	9	[3] 11	61	16	2	11	–	–	5
India	1949/50-1950/51	112	8	12	21	16	1	–	1	[4] 2	[4] 2	[5] 3
	1954/55-1956/57	126	11	14	24	16	1	–	1	[4] 3	[4] 2	[5] 3
	1960/61	140	11	14	24	...	2	–	1	[4] 3	[4] 2	[5] 4
Japan	1948-50	157	62	4	[6] 7	61	2	1	13	–	–	1
	1954-56	151	63	12	[6] 16	68	4	3	20	–	–	3
	1960	150	68	15	[6] 18	87	6	5	23	1	1	4
Pakistan	1949/50-1950/51	160	...	12	8	18	4	–	1	[4] 2	[4] 2	[5] 3
	1954/55-1956/57	150	...	14	8	18	4	–	2	[4] 3	[4] 2	[5] 4
	1959/60	165	6	15	6	18	4	–	2	[4] 2	[4] 2	[5] 3
Philippines	1952-53	124	48	...	3	30	11	2	11	–	–	3
	1956	116	47	10	4	32	9	3	14	–	–	3
	1960	125	46	10	6	30	14	3	15	–	–	4

ANNEX TABLE 13A. - FOOD SUPPLIES AVAILABLE FOR HUMAN CONSUMPTION IN SELECTED COUNTRIES (*concluded*)

Country	Period	Cereals	Starchy roots	Sugar	Pulses and nuts	Vege-tables	Meat	Eggs	Fish [1]	Milk [2]		Fats
										Fat	Protein	
		Kilograms per caput per year										
NEAR EAST												
Israel	1950/51	133	45	19	8	103	15	19	16	4	5	15
	1954/55-1956/57	140	47	25	8	116	21	15	8	5	5	16
	1959/60	120	39	29	6	115	32	18	7	4	5	17
Syria	1957	162	10	11	11	59	12	1	1	1	4	6
Turkey	1948/49-1950/51	186	18	6	10	56	14	1	1	2	3	7
	1954/55-1956/57	201	29	10	13	76	14	2	2	2	3	8
	1959/60	196	38	8	15	81	13	1	2	3	4	8
United Arab Republic	1948/49-1950/51	174	11	13	12	46	10	1	3	[4] 4	[5] 2	[5] 4
	1954/55-1956/57	188	9	13	10	66	13	1	5	[4] 3	[5] 2	[5] 4
	1958/59	185	8	12	10	77	13	1	5	[4] 2	[5] 2	[5] 5
AFRICA												
Libya	1959	115	17	28	7	80	10	2	1	2	2	8
Cyrenaica	1957	115	6	33	4	20	8	2	1	5	4	5
	1958	109	8	33	4	17	8	2	1	6	5	5
Mauritius	1955-56	131	17	39	11	28	6	–	6	1	1	9
	1960	129	15	40	10	24	6	2	6	1	2	13
Rhodesia and Nyasaland, Federation of:												
Southern Rhodesia	1951-53	184	12	13	14	26	30	1	2	1	1	2
	1953	201	10	12	16	26	29	1	2	1	1	2
South Africa	1948-50	156	16	39	3	34	42	3	6	3	3	5
	1954-56	149	14	37	4	38	43	3	8	3	3	6
	1959/60	140	21	39	4	35	43	3	11	3	3	5
OCEANIA												
Australia	1948/49-1950/51	97	50	53	5	66	110	12	4	6	6	15
	1954/55-1956/57	93	46	52	4	61	112	10	4	7	6	16
	1959/60	88	53	50	5	60	114	10	5	7	7	16
New Zealand	1948-50	90	52	50	3	79	103	13	7	11	9	16
	1954-56	86	52	43	3	73	105	14	7	11	10	19
	1960	87	57	42	4	70	110	17	7	11	11	20

[1] Estimated edible weight. - [2] Milk and milk products excluding butter expressed in terms of fat and protein. - [3] Including soybean curd in terms of soybean. - [4] Including milk for making butter. - [5] Excluding butter. - [6] Including "miso" and "shoyu" (soybean preparations) in terms of soybean.

ANNEX TABLE 13B. - CALORIE AND PROTEIN CONTENT OF NATIONAL AVERAGE FOOD SUPPLIES IN SELECTED COUNTRIES

Country	Period	Calories	Total protein (grams)	Animal protein (grams)
		Per caput per day		
WESTERN EUROPE				
Austria	1948/49-1950/51	2 670	77	30
	1954/55-1956/57	2 900	85	42
	1960/61	3 010	88	47
Belgium-Luxembourg	1948/49-1950/51	2 890	84	38
	1954/55-1956/57	2 970	88	44
	1960/61	2 910	88	48
Denmark	1948/49-1950/51	3 240	105	60
	1954/55-1956/57	3 360	91	52
	1960/61	3 330	93	57
Finland	1948/49-1950/51	2 980	96	52
	1954/55-1956/57	3 160	98	55
	1959/60	3 090	93	52
France	1948/49-1950/51	2 800	92	40
	1954/55-1956/57	2 890	95	47
	1959/60	2 990	99	53
Germany, Fed. Rep.	1948/49-1950/51	2 730	79	32
	1954/55-1956/57	2 990	79	43
	1960/61	2 950	80	48
Greece	1948/49-1950/51	2 490	76	17
	1954-56	2 720	87	23
	1960	2 930	95	28
Ireland	1948-50	3 430	96	47
	1954-56	3 540	99	54
	1960	3 570	96	59
Italy	1948/49-1950/51	2 350	70	19
	1954/55-1956/57	2 550	74	23
	1960/61	2 740	80	28
Netherlands	1948/49-1950/51	2 930	82	39
	1954/55-1956/57	2 940	80	43
	1960/61	2 980	80	47
Norway	1948/49-1950/51	3 100	99	53
	1954/55-1956/57	3 160	89	50
	1960/61	2 980	82	48
Portugal	1948-50	2 320	67	21
	1954-56	2 450	70	23
	1960	2 420	70	27
Spain	1952/53-1953/54	2 490	70	18
	1954/55-1956/57	2 520	71	20
	1960/61	2 720	75	22
Sweden	1948/49-1950/51	3 110	87	52
	1954/55-1956/57	2 980	84	53
	1960/61	2 920	81	53
Switzerland	1948/49-1950/51	3 170	96	51
	1954/55-1956/57	3 130	93	52
	1960/61	3 190	89	51
United Kingdom	1948/49-1950/51	3 130	90	45
	1954/55-1956/57	3 260	86	50
	1960/61	3 270	87	52
Yugoslavia	1952-53	2 690	87	20
	1954-56	2 780	89	22
	1960	3 070	96	26

ANNEX TABLE 13B. - CALORIE AND PROTEIN CONTENT OF NATIONAL AVERAGE FOOD SUPPLIES IN SELECTED COUNTRIES (*continued*)

Country	Period	Calories	Total protein (grams)	Animal protein (grams)
		Per caput per day		
NORTH AMERICA				
Canada	1948/49-1950/51	3 110	93	57
	1954/55-1956/57	3 150	97	63
	1960/61	3 100	94	62
United States	1948-50	3 180	91	61
	1954-56	3 150	94	66
	1960	3 120	92	65
LATIN AMERICA				
Argentina	1948	3 240	110	66
	1954-56	3 070	97	58
	1959	2 950	91	48
Brazil	1948-50	2 180	55	15
	1954-56	2 580	65	18
	1957	2 650	67	19
Chile	1948	2 370	73	23
	1954-56	2 540	77	26
	1957	2 570	77	26
Colombia	1956-58	2 200	48	23
Ecuador	1954-56	2 170	52	13
	1957-59	2 230	56	18
Mexico	1954-56	2 380	64	17
	1957-59[1]	2 440	68	20
Paraguay	1957-59	2 500	68	26
Peru	1952	2 070	58	10
	1959	2 060	52	13
Surinam	1959	1 810	41	14
Uruguay	1948-50	2 900	95	61
	1954-56	2 960	96	62
Venezuela	1952-53	2 030	53	19
	1954-56	2 010	54	21
	1959	2 300	64	27
FAR EAST				
Ceylon	1952-53	1 990	41	6
	1954-56	2 070	44	8
	1960	2 150	47	9
China: Taiwan	1948-50	1 980	43	8
	1954-56	2 210	53	13
	1960	2 390	57	14
India	1949/50-1950/51	1 630	44	5
	1954/55-1956/57	1 840	49	6
	1960/61	1 990	53	6
Japan	1948-50	1 900	49	9
	1954-56	2 100	63	15
	1960	2 240	68	18
Pakistan	1949/50-1950/51	2 010	48	8
	1954/55-1956/57	1 990	46	8
	1959/60	2 080	48	7
Philippines	1952/53	1 790	44	11
	1956	1 770	44	13
	1960	1 950	49	15

ANNEX TABLE 13B. - CALORIE AND PROTEIN CONTENT OF NATIONAL AVERAGE FOOD SUPPLIES IN SELECTED COUNTRIES (*concluded*)

Country	Period	Calories	Total protein (grams)	Animal protein (grams)
		Per caput per day		
NEAR EAST				
Israel	1950/51	2 680	88	34
	1954/55-1956/57	2 870	88	31
	1959/60	2 770	83	34
Syria	1957	2 330	78	17
Turkey	1948/49-1950/51	2 510	81	15
	1954/55-1956/57	2 780	88	14
	1959/60	2 830	91	16
United Arab Republic	1948/49-1950/51	2 370	70	12
	1954/55-1956/57	2 570	75	13
	1958/59	2 520	73	12
AFRICA				
Libya	1959	2 180	53	10
Cyrenaica	1957	2 110	55	16
	1958	2 090	55	18
Mauritius	1955-56	2 290	47	10
	1960	2 350	45	11
Rhodesia and Nyasaland, Fed of:				
Southern Rhodesia	1951-53	2 450	75	16
	1953	2 630	81	16
South Africa	1948-50	2 640	73	27
	1954-56	2 590	74	31
	1959/60	2 570	74	32
OCEANIA				
Australia	1948/49-1950/51	3 220	97	66
	1954/55-1956/57	3 230	91	59
	1959/60	3 260	93	61
New Zealand	1948-50	3 360	100	67
	1954-56	3 400	103	70
	1960	3 490	110	75

ANNEX TABLE 14A. - REGIONAL AND WORLD[1] INDICES OF VOLUME AND VALUE OF AGRICULTURAL IMPORTS, BY COMMODITY GROUPS

	Average 1934-38	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100										
Import volume											
WESTERN EUROPE											
Food and feed	112	96	103	103	112	127	127	129	138	141	141
Beverages and tobacco	110	90	104	112	120	122	131	132	132	145	149
Raw materials	116	96	106	107	108	113	123	106	112	117	115
All agricultural products	113	95	104	106	112	122	126	123	129	134	135
NORTH AMERICA											
Food and feed	89	92	99	94	96	99	109	125	124	122	125
Beverages and tobacco	67	99	102	86	95	103	101	98	111	108	114
Raw materials	94	110	92	77	87	82	74	65	84	66	66
All agricultural products	81	100	99	86	93	96	96	97	107	101	104
LATIN AMERICA											
Food and feed	58	88	102	102	104	99	117	123	118	118	99
Beverages and tobacco	82	111	105	110	103	102	116	120	83	100	106
Raw materials	32	94	95	130	120	114	124	119	112	129	132
All agricultural products	57	91	102	106	106	101	118	122	114	118	103
FAR EAST[2]											
Food and feed	99	82	98	95	98	114	126	124	119	139	130
Beverages and tobacco	91	91	97	103	119	137	132	121	127	141	179
Raw materials	121	75	102	103	101	129	133	117	144	177	197
All agricultural products	106	80	99	98	99	120	128	122	127	151	153
NEAR EAST											
Food and feed	44	89	98	90	118	150	165	169	204	231	213
Beverages and tobacco	69	100	104	102	117	108	118	119	129	122	125
Raw materials	34	80	104	143	106	107	127	143	164	161	183
All agricultural products	50	91	100	96	117	137	151	155	183	199	189
AFRICA											
Food and feed	72	85	104	108	121	134	143	135	167	180	188
Beverages and tobacco	61	87	103	108	114	132	119	115	112	123	126
Raw materials	33	88	110	139	139	136	155	151	141	179	198
All agricultural products	66	85	104	110	120	133	137	130	150	164	171
OCEANIA											
Food and feed	58	89	96	106	114	124	131	138	127	127	132
Beverages and tobacco	72	96	107	115	120	115	125	125	125	131	131
Raw materials	68	116	111	153	157	136	133	154	138	137	91
All agricultural products	66	95	104	122	128	123	129	138	129	131	120
WORLD[1]											
Food and feed	100	92	102	100	108	120	126	129	135	141	138
Beverages and tobacco	87	94	103	100	109	113	117	116	121	126	132
Raw materials	110	96	103	102	103	110	115	101	112	118	120
All agricultural products	100	94	102	101	107	116	121	118	126	132	132

ANNEX TABLE 14A. - REGIONAL AND WORLD [1] INDICES OF VOLUME AND VALUE OF AGRICULTURAL IMPORTS BY COMMODITY GROUPS (*concluded*)

	Average 1934-38	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	..... *Indices, average 1952-53 = 100*										
Import value											
WESTERN EUROPE											
Food and feed	44	98	99	95	104	121	122	114	121	124	121
Beverages and tobacco	40	82	105	134	130	125	138	144	128	135	133
Raw materials	38	99	98	96	100	99	110	82	81	93	87
All agricultural products	42	96	100	102	107	115	121	109	110	117	113
NORTH AMERICA											
Food and feed	34	92	101	95	92	96	107	126	129	123	121
Beverages and tobacco	13	79	103	110	99	101	97	86	84	78	76
Raw materials	34	111	79	62	86	78	69	51	72	64	54
All agricultural products	25	91	96	93	94	94	93	89	94	88	84
LATIN AMERICA											
Food and feed	18	87	100	94	93	83	99	99	95	92	77
Beverages and tobacco	20	83	108	140	105	95	112	118	85	78	77
Raw materials	17	99	84	111	122	106	112	98	97	123	111
All agricultural products	18	88	99	100	97	87	102	101	94	94	81
FAR EAST [2]											
Food and feed	23	79	96	83	80	91	107	98	92	104	101
Beverages and tobacco	37	78	97	104	115	111	105	107	110	104	124
Raw materials	38	84	91	95	96	115	117	92	102	135	150
All agricultural products	28	81	95	87	86	99	110	96	96	114	117
NEAR EAST											
Food and feed	15	89	92	71	88	110	130	116	133	146	140
Beverages and tobacco	23	99	103	129	149	117	133	124	127	121	109
Raw materials	10	83	98	139	106	102	125	121	135	156	160
All agricultural products	16	91	94	88	102	111	130	118	132	141	134
AFRICA											
Food and feed	22	84	101	100	106	118	123	114	131	139	142
Beverages and tobacco	22	81	105	115	112	119	115	120	100	102	96
Raw materials	13	95	94	111	141	123	136	104	108	152	147
All agricultural products	22	84	101	104	109	118	122	115	122	131	132
OCEANIA											
Food and feed	20	90	95	98	102	111	121	120	109	107	111
Beverages and tobacco	31	97	105	139	148	118	131	135	128	112	109
Raw materials	24	130	94	118	149	128	116	117	112	129	69
All agricultural products	26	103	99	120	133	118	124	125	117	114	99
WORLD [1]											
Food and feed	35	92	99	92	97	109	116	111	116	119	116
Beverages and tobacco	26	81	104	122	115	113	117	115	106	105	103
Raw materials	36	99	93	90	97	98	103	78	84	95	91
All agricultural products	34	92	98	98	101	107	113	103	105	110	107

[1] Excluding U.S.S.R., eastern Europe, and Mainland China. - [2] Excluding Mainland China.

ANNEX TABLE 14B. - REGIONAL AND WORLD [1] INDICES OF VOLUME AND VALUE OF AGRICULTURAL EXPORTS, BY COMMODITY GROUPS

	Average 1934-38	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100										
Export volume											
WESTERN EUROPE											
Food and feed	90	79	104	119	130	124	142	142	146	160	171
Beverages and tobacco	79	71	107	107	113	129	132	159	114	130	159
Raw materials	183	86	109	103	128	149	138	134	175	159	171
All agricultural products	95	79	105	117	128	126	141	143	145	158	170
NORTH AMERICA											
Food and feed	33	94	93	77	90	125	119	121	135	146	163
Beverages and tobacco	93	100	111	100	120	111	110	105	104	110	111
Raw materials	158	131	83	130	79	139	211	138	113	222	187
All agricultural products	61	102	92	89	90	126	136	123	128	158	164
LATIN AMERICA											
Food and feed	128	108	112	116	118	127	137	146	140	154	149
Beverages and tobacco	87	98	104	85	97	105	98	97	113	114	111
Raw materials	108	90	120	124	118	126	94	111	134	116	134
All agricultural products	105	100	109	103	108	117	111	117	126	128	129
FAR EAST [2]											
Food and feed	249	96	98	105	122	123	128	113	119	134	138
Beverages and tobacco	109	92	105	116	99	123	122	128	118	119	134
Raw materials	113	95	100	96	111	102	98	98	107	96	103
All agricultural products	159	95	100	102	113	113	112	108	113	113	120
NEAR EAST											
Food and feed	85	81	111	140	101	124	127	127	106	131	115
Beverages and tobacco	53	95	108	103	96	99	140	95	102	92	121
Raw materials	87	87	116	95	107	96	102	99	142	131	119
All agricultural products..	83	86	114	108	104	104	113	106	128	126	118
AFRICA											
Food and feed	84	90	105	122	122	128	126	142	133	125	132
Beverages and tobacco	74	92	103	109	126	133	141	128	146	160	166
Raw materials	69	87	101	105	111	116	112	116	131	125	129
All agricultural products	76	90	103	113	121	128	130	130	138	141	146
OCEANIA											
Food and feed	86	95	106	95	106	115	108	98	121	116	146
Beverages and tobacco	127	86	113	104	115	130	148	141	162	214	256
Raw materials	72	99	100	92	105	106	118	108	128	125	129
All agricultural products	79	97	103	94	105	110	113	103	125	121	138
WORLD [1]											
Food and feed	97	93	102	102	111	124	127	128	134	143	154
Beverages and tobacco	86	95	104	97	107	116	115	112	121	126	130
Raw materials	106	98	103	105	106	114	120	110	124	130	130
All agricultural products	97	95	103	102	109	119	122	119	128	136	142

ANNEX TABLE 14B. - REGIONAL AND WORLD [1] INDICES OF VOLUME AND VALUE OF AGRICULTURAL EXPORTS, BY COMMODITY GROUPS (*concluded*)

	Average 1934-38	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100										
Export value											
WESTERN EUROPE											
Food and feed	38	82	101	111	118	118	135	128	131	146	149
Beverages and tobacco	51	83	104	102	117	123	140	162	122	137	178
Raw materials	59	92	110	100	119	137	141	105	130	128	133
All agricultural products	41	85	102	109	118	120	136	130	130	144	151
NORTH AMERICA											
Food and feed	15	98	91	72	80	109	105	103	110	117	135
Beverages and tobacco	45	87	114	104	123	113	122	120	120	130	134
Raw materials	47	128	76	118	74	113	161	100	72	145	130
All agricultural products	24	102	90	84	82	110	117	104	103	124	134
LATIN AMERICA											
Food and feed	37	112	108	105	106	109	130	125	119	128	121
Beverages and tobacco	14	75	105	110	97	102	93	84	80	81	75
Raw materials	34	98	112	119	109	109	84	84	89	88	99
All agricultural products	26	92	108	110	102	106	105	98	95	99	95
FAR EAST [2]											
Food and feed	59	93	102	96	95	96	102	93	97	101	102
Beverages and tobacco	46	98	108	149	129	139	135	141	128	127	119
Raw materials	40	109	84	79	121	104	99	85	114	115	98
All agricultural products	47	102	94	96	114	107	106	97	111	112	103
NEAR EAST											
Food and feed	33	80	103	123	89	118	118	111	98	113	96
Beverages and tobacco	30	93	113	121	120	130	191	129	120	93	108
Raw materials	29	104	99	95	100	96	106	90	105	112	99
All agricultural products	30	97	101	105	100	105	118	99	105	111	99
AFRICA											
Food and feed	28	85	103	115	110	119	118	123	116	111	116
Beverages and tobacco	20	84	102	133	124	118	126	141	131	131	121
Raw materials	20	90	92	89	93	97	95	83	93	99	95
All agricultural products	23	86	100	116	112	114	116	121	117	116	112
OCEANIA											
Food and feed	38	91	108	94	102	107	102	96	125	115	136
Beverages and tobacco	40	81	112	139	124	115	131	164	162	177	184
Raw materials	22	97	107	92	94	96	122	79	91	94	95
All agricultural products	29	95	107	93	97	101	113	87	107	104	114
WORLD [1]											
Food and feed	32	94	100	96	99	110	117	112	116	123	129
Beverages and tobacco	24	81	106	119	111	113	113	112	103	104	102
Raw materials	34	105	95	96	102	103	112	87	98	110	103
All agricultural products	31	94	100	101	103	109	114	105	108	115	116

[1] Excluding the U.S.S.R., eastern Europe and Mainland China. - [2] Excluding Mainland China.

ANNEX TABLE 15. - WORLD AVERAGE EXPORT UNIT VALUES OF AGRICULTURAL PRODUCTS

	1934-38	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	Indices, average 1952-53 = 100															
All agricultural products	34.0	88.0	98.8	89.4	92.7	116.7	102.7	97.3	99.4	94.2	91.7	93.7	87.5	84.7	85.3	81.4
Food and feed	37.0	105.2	116.5	100.8	89.8	101.7	101.5	98.5	93.0	89.0	89.4	91.3	87.4	87.4	85.8	83.6
Cereals	33.0	106.9	124.1	100.2	84.6	92.0	101.0	99.0	84.4	79.4	76.3	75.2	74.0	72.7	71.6	71.7
Edible oils and oilseeds	29.2	101.4	127.1	106.3	95.1	123.2	98.2	101.8	96.8	86.8	90.8	90.4	90.1	97.7	92.6	86.1
Meat	41.5	70.2	82.6	86.6	81.1	93.9	99.6	100.4	102.5	101.9	101.2	100.6	104.3	105.8	109.1	106.5
Dairy products	43.5	95.9	115.1	108.5	83.7	92.9	101.4	98.6	95.5	95.4	96.7	90.8	80.6	91.9	90.4	84.6
Beverages and tobacco	28.0	72.5	75.4	72.3	88.8	98.6	98.8	101.2	123.3	104.6	97.7	98.0	98.8	86.8	83.5	79.0
Agricultural raw materials	33.5	69.6	86.0	82.5	100.8	157.3	107.9	92.1	92.2	95.5	91.0	94.7	78.7	78.2	85.9	79.5
	U.S. $ per metric ton															
Wheat	31.1	87.6	106.1	88.5	71.5	74.1	78.6	79.7	68.2	65.8	62.8	63.5	62.6	62.2	61.9	63.3
Wheat flour	44.8	130.2	139.8	116.1	96.8	106.1	113.1	112 1	103.9	92.9	86.9	85.9	81.7	77.6	75.4	76.6
Barley	25.8	93.2	105.4	64.9	59.1	71.9	77.4	62.9	53.1	55.7	55.1	50.9	51.3	52.6	52.7	47.4
Maize	18.8	78.6	93.2	64.2	60.4	77.7	85.3	69.7	60.8	61.5	59.9	55.1	50.5	50.2	50.1	49.4
Rice (milled)	29.2	141.7	164.1	152.2	126.9	135.1	167.1	183.5	146.9	117.7	115.5	115.5	120.1	110.3	101.3	103.1
Sugar (raw)	38.3	107.4	99.0	98.5	104.0	116.1	110.0	97.4	99.0	95.1	95.4	116.4	99.8	94.4	89.1	86.8
Apples	66.3	139.8	118.4	78.6	98.6	101.3	112.8	103.6	120.6	97.5	123.1	136.8	155.3	111.6	140.8	126.4
Bananas	30.6	95.0	100.0	105.0	103.7	100.6	97.2	99.9	99.9	100.1	102.8	102.4	93.1	86.8	84.9	84.9
Oranges and tangerines	56.5	120.6	115.8	126.0	107.7	102.9	102.7	95.9	105.1	102.1	124.5	134.8	127.7	104.9	110.4	115.2
Raisins	123.3	285.7	260.7	242.1	226.8	270.6	229.4	201.6	207.2	240.6	274.5	280.2	327.2	316.8	265.1	269.8
Copra	45.4	176.6	252.1	170.0	195.4	219.1	144.3	191.4	172.6	149.6	142.5	139.4	167.7	203.3	173.8	145.7
Palm kernels	37.0	109.9	132.1	148.8	120.2	173.1	155.7	152.0	136.3	121.6	123.5	120.5	125.1	159.4	156.8	134.5
Soybeans	37.7	130.0	134.0	100.6	95.1	122.1	114.4	108.3	113.3	94.9	96.0	91.1	86.6	84.4	83.3	94.5
Groundnuts (shelled)	50.6	158.5	214.2	209.5	149.3	210.0	225.4	210.3	210.2	185.7	195.0	203.8	171.7	164.4	183.4	167.4
Olive oil	268.8	1 018.5	950.4	738.7	547.5	783.2	584.1	586.0	529.0	560.9	719.5	664.5	598.2	501.4	517.6	533.9
Coconut oil	83.9	317.4	413.4	348.3	333.2	394.2	258.9	306.7	289.0	237.6	232.9	241.3	277.8	349.0	288.9	232.4
Palm oil	61.2	182.8	279.5	254.1	206.0	309.6	243.9	188.5	184.6	200.0	217.4	220.9	200.4	204.2	193.8	206.3
Palm kernel oil	108.4	287.1	360.8	373.8	293.9	366.0	250.1	295.7	265.9	240.3	236.5	242.4	253.3	316.6	296.7	238.1
Soybean oil	120.3	525.2	539.1	340.0	320.4	461.5	307.7	309.9	317.1	321.7	343.3	338.4	304.0	254.3	234.5	282.7
Groundnut oil	129.4	433.6	489.1	482.3	388.0	495.5	394.9	419.7	404.4	319.4	397.5	405.5	361.8	326.5	354.0	356.6
Cattle (per head)	36.3	100.8	116.3	114.7	121.6	132.8	110.8	117.6	129.6	125.2	124.8	125.7	136.2	144.5	141.3	129.2
Beef and veal	121.3	305.4	323.9	362.1	353.7	459.2	501.3	439.8	464.7	452.1	419.1	440.0	503.8	577.4	598.0	570.2
Mutton and lamb	213.7	262.9	287.0	314.7	245.2	268.5	291.4	325.1	386.2	417.4	415.6	449.8	414.5	365.9	387.4	365.4
Bacon, ham, salted pork	409.0	618.6	776.2	751.6	612.5	650.1	711.8	674.1	666.0	663.6	722.7	679.2	706.3	667.5	681.8	660.8
Canned meat	270.0	481.9	593.4	639.5	733.3	846.1	858.9	954.9	906.5	873.9	869.2	826.7	854.3	891.8	905.3	901.3
Cheese	323.5	644.9	766.0	749.7	583.2	630.2	686.1	658.6	648.6	674.9	742.3	709.3	637.0	741.1	724.0	710.2
Butter	424.6	866.1	1 109.6	1 078.5	816.0	883.9	957.4	963.1	970.7	951.5	927.0	784.5	641.2	897.4	831.3	717.9
Eggs (in the shell)	283.4	670.7	776.1	730.5	584.1	631.0	689.1	686.6	628.4	649.9	642.0	608.4	596.3	536.8	563.1	558.4
Milk, condensed and evaporated	134.5	329.6	379.9	347.2	287.0	329.2	352.1	327.2	310.6	310.1	317.5	330.1	311.2	307.9	308.8	307.5
Milk, powdered	191.7	554.4	604.4	486.2	334.5	445.2	514.8	458.9	410.9	377.2	375.0	437.4	372.8	356.7	401.9	363.1

ANNEX TABLE 15. - WORLD AVERAGE EXPORT UNIT VALUES OF AGRICULTURAL PRODUCTS (*concluded*)

	1934-38	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961 (Preliminary)
	U.S. $ per metric ton															
Potatoes	31.8	63.3	59.1	47.9	46.2	53.9	59.6	57.6	51.7	46.9	59.7	52.2	59.7	57.6	61.2	53.4
Oilseed cake and meal	23.6	95.0	92.0	62.2	58.2	74.1	75.5	72.6	71.9	73.3	67.7	61.8	54.7	67.7	67.8	66.4
Coffee	182.3	494.5	510.3	580.5	959.2	1 075.0	1 104.4	1 141.3	1 401.0	1 075.7	1 048.4	1 021.7	918.2	749.6	721.7	680.7
Cocoa	117.4	469.1	707.3	461.4	558.0	711.2	688.2	660.5	1 070.2	818.0	580.8	563.0	844.6	738.8	593.5	483.0
Tea	515.8	1 135.8	1 200.5	1 112.3	986.2	1 043.1	947.6	998.2	1 327.3	1 413.6	1 255.0	1 228.3	1 208.5	1 194.2	1 214.4	1 072.3
Wine	86.9	286.0	241.1	206.1	164.8	180.8	171.4	165.1	147.3	143.0	155.4	169.8	216.1	174.3	178.7	200.7
Tobacco (unmanufactured)	567.6	1 151.1	1 114.8	1 118.5	1 096.7	1 126.3	1 163.8	1 228.1	1 224.7	1 267.4	1 227.6	1 342.3	1 292.3	1 290.9	1 294.9	1 280.7
Linseed	44.9	217.1	222.0	180.0	148.9	166.8	170.4	129.0	112.7	130.3	143.5	115.5	123.9	130.4	128.9	124.5
Linseed oil	105.3	618.7	561.2	370.6	318.3	390.3	397.5	231.1	166.9	205.4	313.3	245.8	250.7	212.1	246.8	248.4
Cotton	261.2	650.5	856.4	797.6	837.7	1 169.9	1 002.5	771.5	828.2	804.9	739.9	741.7	680.5	593.1	630.4	635.1
Jute	63.9	306.9	327.6	301.1	243.6	327.6	250.2	175.9	185.1	189.4	184.0	209.5	195.2	177.6	223.7	266.1
Sisal	77.1	244.4	299.3	291.8	272.4	423.5	374.6	204.7	176.7	157.3	158.9	141.2	139.9	173.5	213.3	197.9
Wool (greasy)	446.0	723.6	1 027.8	1 164.1	1 527.5	2 589.8	1 413.1	1 593.4	1 549.2	1 357.3	1 379.6	1 600.3	1 133.8	1 085.0	1 166.0	1 140.5
Rubber (natural)	282.7	389.0	414.4	342.2	662.8	1 090.1	670.9	484.0	450.1	701.8	634.0	603.5	519.3	661.8	745.1	539.9

TIPOGRAFIA SQUARCI - ROMA

SPECIAL CHAPTERS

In addition to the usual review of the recent world food and agricultural situation, each issue of this report from 1956 has included one or more special studies of problems of longer-term interest. Special chapters in earlier issues have covered the following subjects:

1956	Some factors influencing the growth of international trade in agricultural products
	World fisheries: General trends and outlook with examples from selected countries
1957	Factors influencing the trend of food consumption
	Postwar changes in some institutional factors affecting agriculture
1958	Food and agricultural developments in Africa south of the Sahara
	The growth of forest industries and their impact on the world's forests
1959	Agricultural incomes and levels of livin in countries at different stages of economic development
	Some general problems of agricultural development in less developed countries in the light of postwar experience
1960	Programing for agricultural development
1961	Land reform and institutional change
	Agricultural extension, education and research in Africa, Asia and Latin America

SALES AGENTS FOR FAO PUBLICATIONS

Argentina	Editorial Sudamericana, S.A., Alsina 500, Buenos Aires.
Australia	R. W. Barclay, 90 Queen Street, Melbourne, C. 1., Victoria.
Austria	Wilhelm Frick Buchhandlung, Graben 27, Vienna 1.
Belgium	Agence et Messageries de la Presse, 14-22 rue du Persil, Brussels.
Bolivia	Librería y Editorial "Juventud," Plaza Murillo 519, La Paz.
Burma	(*Wholesale*) Orient Longmans Private Ltd., 17 Chittaranjan Avenue, Calcutta 13, India.
Canada	Queen's Printer, Ottawa.
Ceylon	M. D. Gunasena and Co. Ltd., 217 Norris Road, Colombo 11.
Chile	Sala y Grijalbo Ltda., Bandera 140-F, Casilla 180D, Santiago.
Colombia	"Agricultura Tropical," Avenida Jiménez No. 7-25, Ofcs. 811/816, Bogotá; Librería Central, Calle 14, No. 6-88, Bogotá.
Costa Rica	Imprenta y Librería Trejos S.A., Apartado 1313, San José.
Denmark	Ejnar Munksgaard, Norregade 6, Copenhagen K.
El Salvador	Manuel Navas y Cía., 1ª Avenida Sur 35, San Salvador.
Ethiopia	International Press Agency, P. O. Box No. 120, Addis Ababa.
Federation of Malaya	Caxton Stationers Ltd., 13 Market Street, Kuala Lumpur.
Finland	Akateeminen Kirjakauppa, 2 Keskuskatu, Helsinki.
France	Les Editions A. Pedone, 13 rue Soufflot, Paris 5e.
Germany	Paul Parey, Lindenstrasse 44-47, Berlin SW 61.
Greece	"Eleftheroudakis," Constitution Square, Athens; Institute of Scientific Publications, 9, Amerikis Street, Athens.
Guatemala	Sociedad Económico Financiera, Edificio Briz, Despacho 207, 6ª Av. 14-33, Zona 1, Guatemala.
Haiti	Max Bouchereau, Librairie "A la Caravelle," B. P. 111B, Port-au-Prince.
Hong Kong	Swindon Book Co., 26 Nathan Road, Kowloon.
Iceland	Halldor Jonsson, Mjostraeti 2, Reykjavik; Jonsson & Juliusson, Garöastraeti 2, Reykjavik.
India	(*Wholesale*) Orient Longmans Private Ltd., 17 Chittaranjan Avenue, Calcutta 13; Nicol Road, Ballard Estate, Bombay 1; 36A Mount Road, Madras 2; Kanson House, 24/1 Asaf Ali Road, Post Box 386, New Delhi; Gunfoundry Road, Hyderabad 1; (*Retail*) Oxford Book and Stationery Co., Scindia House, New Delhi; 17 Park Street, Calcutta.
Indonesia	Pembangunan Ltd., 84, Gunung Sahari, Jakarta.
Iran	Baghar Shariat, Atabak Road, Ferdowsi Str., Tehran.
Iraq	Mackenzie's Bookshop, Baghdad.
Ireland	The Controller, Stationery Office, Dublin.
Israel	Blumstein's Bookstores Ltd., P. O. Box 4101, Tel Aviv.
Italy	Libreria Internazionale U. Hoepli, Galleria Piazza Colonna, Rome; A.E.I.O.U., Via Meravigli 16, Milan.
Japan	Maruzen Company Ltd., 6 Tori-Nichome, Nihonbashi, Tokyo.
Korea	The Eul-Yoo Publishing Co., Ltd., 5, 2-Ka, Chong-ro, Seoul.
Lebanon	Librairies Antoine, B. P. 656, Beyrouth.
Mexico	Manuel Gómez Pezuela e Hijo, Donceles 12, México, D. F.
Morocco	Centre de diffusion documentaire du B. E. P. I., 8, rue Michaux-Bellaire, Rabat.
Netherlands	N. V. Martinus Nijhoff, Lange Voorhout 9, The Hague.
New Zealand	Whitcombe and Tombs Ltd., Auckland, Wellington, Hamilton, Christchurch, Dunedin, Invercargill, Timaru.
Nigeria	University Bookshop Nigeria Ltd., University College, Ibadan.
Norway	Johan Grundt Tanum Forlag, Karl Johansgt. 43, Oslo.
Pakistan	**East:** Orient Longmans Private Ltd., 17 Nazimuddin Road, Dacca. **West:** Mirza Book Agency, 65 The Mall, Lahore 3.
Panama	Agencia Internacional de Publicaciones, J. Menéndez, Plaza de Arango No. 3, Panamá.
Paraguay	Agencia de Librerías de Salvador Nizza, Calle Pte. Franco No. 39-43, Asunción.
Peru	Librería Internacional del Perú, S. A., Casilla 1417, Lima.
Philippines	The Modern Book Company, 518-520 Rizal Avenue, Manila.
Poland	Ars Polona, Krakowskie Przedmiescie 7, Warsaw.
Portugal	Livraria Bertrand S.A.R.L., Rua Garrett 73-75, Lisbon.
South Africa	Van Schaik's Book Store, Pty., Ltd., P. O. Box 724, Pretoria.
Spain	José Bosch Librero, Ronda Universidad 11, Barcelona; Librería Mundi-Prensa, Castelló 37, Madrid; Librería General, S. Miguel 4, Saragossa.
Sweden	C. E. Fritze, Fredsgatan 2, Stockholm 16; Gumperts A. B., Göteborg; Henrik Lindstahls Bokhandel, Odengatan 22, Stockholm.
Switzerland	Librairie Payot, S. A., Lausanne and Geneva; Hans Raunhardt, Kirchgasse 17, Zurich 1.
Taiwan	The World Book Company Ltd., 99 Chungking South Road, Section 1, Taipeh.
Thailand	Requests for FAO publications should be addressed to: FAO Regional Office for Asia and the Far East, Maliwan Mansion, Bangkok.
Turkey	Librairie Hachette, 469 Istiklal Caddesi, Beyoglu, Istanbul.
United Arab Republic	Librairie de la Renaissance d'Egypte, 9 Sh. Adly Pasha, Cairo.
United Kingdom and Crown Colonies	H. M. Stationery Office, P. O. Box 569, London S.E.I. *Branches at:* 13a Castle Street, Edinburgh 2; 35 Smallbrook Ringway, Birmingham 5; 50 Fairfax Street Bristol 1; 39 King Street, Manchester 2; 109 St. Mary Street, Cardiff; 80 Chichester Street, Belfast.
United States of America	Columbia University Press, International Documents Service, 2960 Broadway, New York 27, New York.
Uruguay	Hector d'Elia, Oficina de Representación de Editoriales, Plaza Cagancha 1342, Montevideo.
Venezuela	Suma, S. A., Calle Real de Sabana Grande, Caracas; Librería Politécnica, Apartado del Este, 4845, Caracas.
Yugoslavia	Drzavno Preduzece, Jugoslovenska Knjiga, Terazije 27/11, Belgrade; Cankarjeva Zalozba, P. O. Box 41, Ljubljana.
Other countries	Requests from countries where sales agents have not yet been appointed may be sent to: Distribution and Sales Section, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Price: $2,00 or 10s.

8.62/E/1/5600

FAO publications are priced in U.S. dollars and pounds sterling. Payment to FAO sales agents may be made in local currencies.