

## CLOSING THE CEREALS GAP WITH TRADE AND FOOD AID

BARBARA HUDDLESTON

Cereal imports of developing countries have grown rapidly during the past two decades. The import demand of developing countries in 1990 could amount to as much as 175 million metric tons. In *Closing the Cereals Gap with Trade and Food Aid*, Research Report 43, Barbara Huddleston attempts, using a variety of assumptions, to find out how much of the total demand for food imports can be met on commercial terms and how much food aid will be required in 1990.

### TRADE AND FOOD AID TRENDS

Between 1961-63 and 1981, world imports of cereals increased nearly threefold, from about 81 million metric tons per year to an estimated 232 million tons. The share taken by developing countries averaged 37 percent between 1961 and 1975 but had climbed to 43 percent by 1981 (see Figure 1).

Most of the growth in import volume occurred in the middle- and high-income countries covered by the study, that is, those developing countries with per capita incomes greater than U.S. \$300 per year in 1976-78. Between 1961-63 and 1981 the volume imported by this group of 65 countries increased from 21 to 88 million metric tons, while the volume imported by the 34 low-income countries fluctuated around 10 million metric tons. Although the volume of cereals imported by low-income countries remained static, the direction of those imports shifted from Asia and toward Sub-Saharan Africa. However, even in Sub-Saharan Africa middle- and high-income countries accounted for about two-thirds of total cereal imports of the region.

The share of food aid in total cereal imports dropped sharply in Asia, North Africa/Middle East, and Latin America. It rose only in Sub-Saharan Africa (see Figure 2). In 1981, high-income developing countries imported 95 kilograms per person commercially and 1 kilogram as food aid; middle-income countries, 29 kilograms commercially and 2 kilograms as food aid; and low-income countries, less than 5 kilograms commercially and 3 kilograms as food aid.

Although the volume of cereal imports grew rapidly in many developing countries, in 1976-78 imports still supplied less than 10 percent of total staple consumption in about half of the 99 countries covered by this study. Among those developing countries that depended on imports for more than 10 percent of staple consumption, middle- and high-income countries were predominant. Whereas three-fourths of the middle-income countries and even more of the high-income countries depended on imports for that much of consumption, less than a fifth of the low-income countries did. Furthermore, in nearly half the countries studied, that dependence either remained stable or declined between 1961-63 and 1976-78. Most countries in North Africa/Middle East, about half of those in Latin America and Sub-Saharan Africa, and a few in Asia increased their dependence on imports. For the Third World as a whole, dependence on cereal imports increased from 6.0 to 8.5 percent of total staple consumption between 1961-63 and 1976-78.

The total value of cereals imported into developing countries nearly doubled between 1961-63 and 1976-78, but the price of a ton fell by 20 percent in real terms. This decrease may be attributed partly to the fall of the real price of wheat

over the past two decades and partly to the increasing proportion of lower-priced corn in the total import mix. As a result, the cost of cereal imports grew less than the volume.

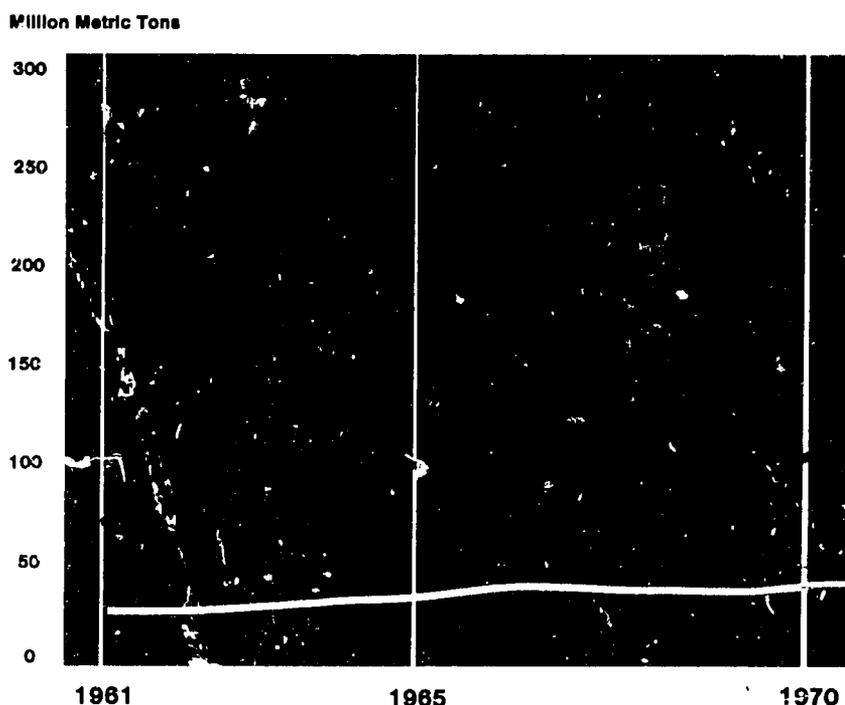
### FOREIGN EXCHANGE AND FOOD SUPPLY CONTRIBUTIONS OF FOOD AID

Food aid reduced the total cost of cereals imported by middle- and high-income countries in 1976-78 by 2 to 5 percent. But it reduced the total cost of cereals imported by low-income countries by about a third. The total cost of cereal imports, however, is only a small part of the export earnings of any region or set of countries grouped by income. This is also the case for the true cost of those imports—that is, the amount of its own foreign exchange a country must actually spend after grants and subsidies are subtracted from the total cost.

On average, both the ratio of the total cost of cereal imports to export earnings and the ratio of their true cost to export earnings were less than 5 percent for more than two-thirds of the countries for which data on export earnings were available, showing that the average cost of cereal imports generally did not strain the balance of payments. But for some countries these ratios are high. Even when they are low on average, they can be high in some years. For 22 countries these ratios sometimes exceeded 10 percent, and for 10, they sometimes exceeded 25 percent. Ratios that high show that the cost of cereal imports could be a problem in some years.

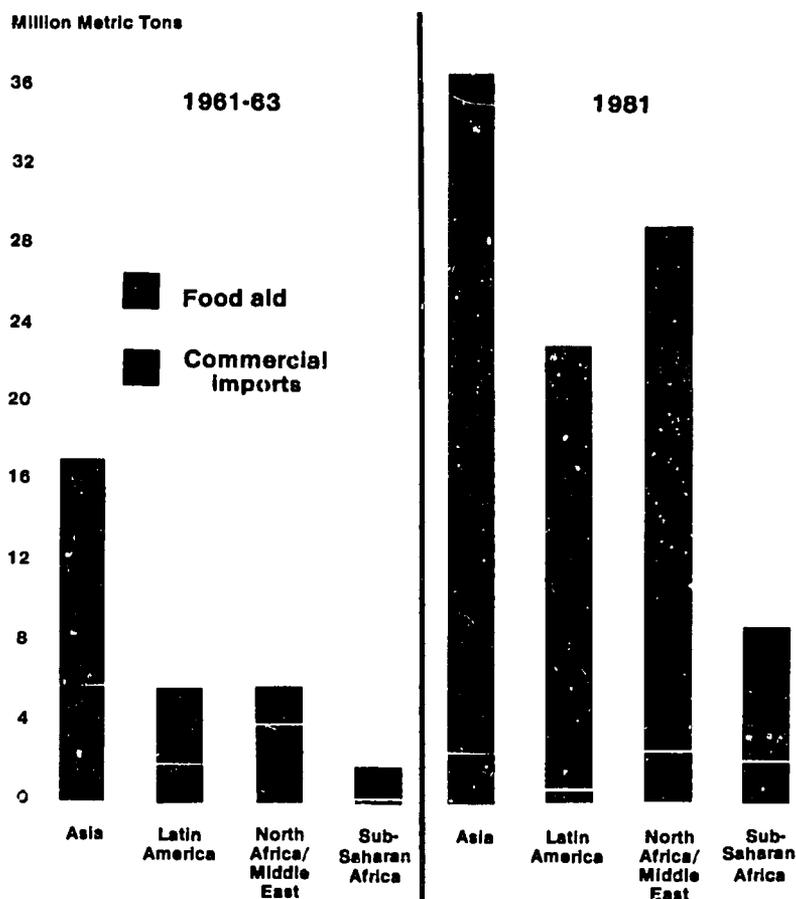
In slightly more than half of the countries covered by this study, average per capita calorie intake in 1977-79 was, at worst, 2 percent below standards defined by an expert group formed jointly by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). But average per capita calorie intake was lower in the rest. And it was more than 10 percent below the standard in more than a quarter of the countries studied, a sign that food supplies were seriously inadequate. Although about half of the countries with inadequate supplies increased their dependence on cereal imports after 1961-63, imports were still less than 10 percent of total staple consumption in all but 6 of them in 1976-78. Food aid was important for most, however, averaging 39 percent of cereal

Figure 1—Cereal imports of the world and developing countries

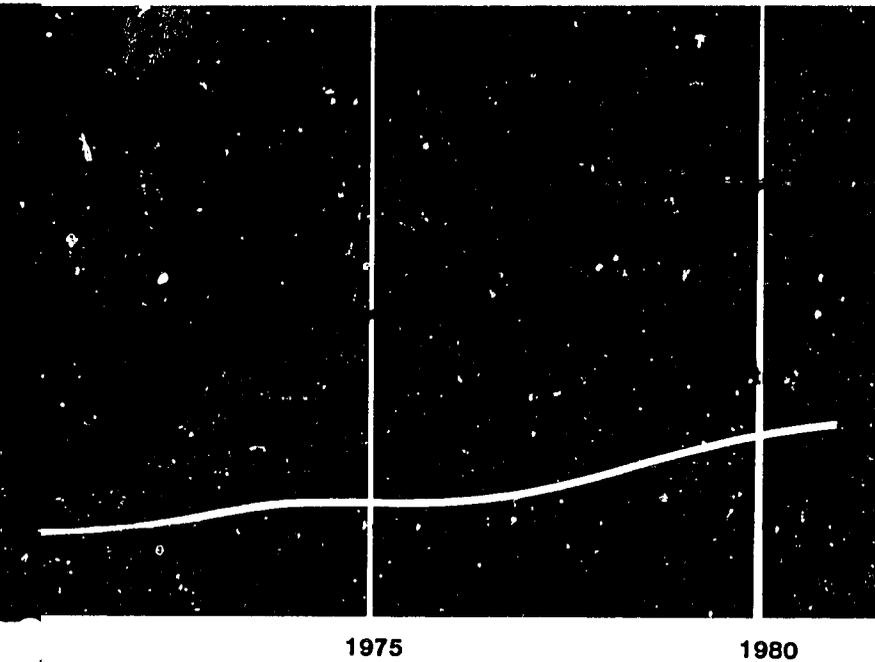


The cereal imports of the world and developing countries have been growing slightly faster than the world's cereal imports.

Figure 2—Volume of total cereal imports and food aid, by region, 1961-63 and 1981



Developing countries imported much larger amounts of cereals in 1976-78 than they did in 1961-63, but they received less food aid, except in Sub-Saharan Africa. But even the countries there bought most of the cereals they imported.



1975 1980

both more than doubled since 1961, with developing countries since 1975.

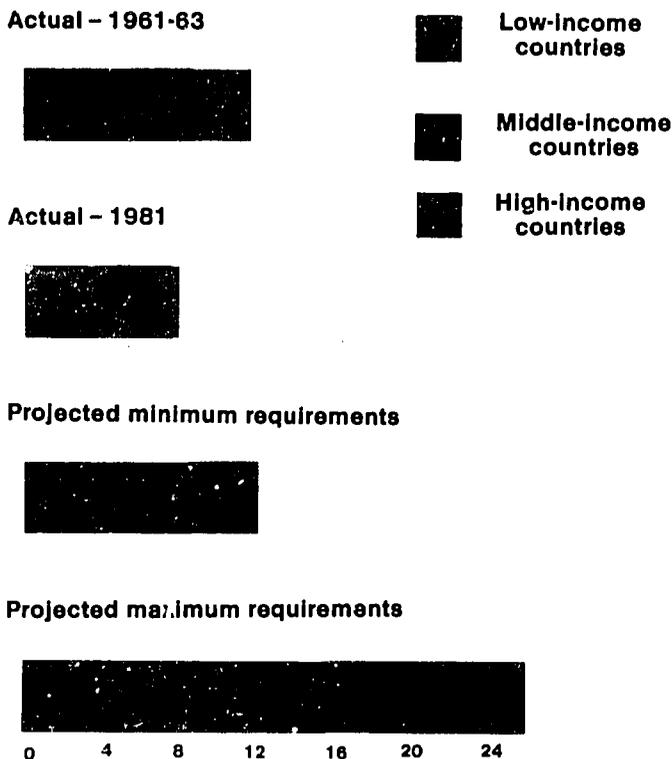
imports for the group as a whole in the latter period. Thus, countries that have seriously inadequate food supplies do not depend heavily on cereal imports, but much of what they do import is food aid. No comparable generalization can be made about the association between import dependence, food aid, and the adequacy of food supply for countries where the food supply is more adequate.

### FACTORS ASSOCIATED WITH IMPORT GROWTH

A comparison of the growth rates of cereal imports with those of other variables that reflect economic performance and market demand suggests that cereal imports grew fastest in two groups of countries. One group is the middle- and high-income countries in which the growth rates of economic variables were high and the share of food aid in total cereal imports declined. The other is the low-income countries in which the growth rates for GNP, export earnings, and staple crop production were all low, but in which the share of food aid increased. The growth of cereal imports exceeded the growth of population for developing countries as a whole, but occurred almost entirely in middle- and high-income countries where the share of food aid in cereal imports declined. Per capita cereal imports of high-income groups in all four geographical regions and of the middle-income group in Sub-Saharan Africa increased strikingly, whereas food aid per capita increased in only three groups—the low- and middle-income countries of Sub-Saharan Africa and the low-income countries of North Africa/Middle East.

When changes in the import dependence of the developing countries studied were correlated with changes in six other variables, the results showed that only a small part of the variation in the amount and direction of change among countries between 1961-63 and 1976-78 could be explained by per capita food aid. The largest amount could be explained by per capita staple crop production and the next largest by per capita GNP. These two variables and per capita food aid together could explain about three-fifths of the variation for developing countries as a group. When middle- and high-income countries were considered separately from low-income countries, the contribution of food aid was negligible for the former but sizable for the latter.

Figure 3—Actual food aid, 1961-63 and 1981 and projected food aid requirements, 1990



These projections assume that low-income countries will require food aid when the cost of cereal imports exceeds 2 percent of export earnings and middle-income countries will require it when the cost of cereal imports exceeds 5 percent of export earnings. High-income countries are assumed not to require food aid.

Projections show that there will be a fifth fewer middle- and low-income countries in 1990 than there were in 1981. Nevertheless, by the criteria adopted here, middle- and high-income countries will require more food aid in 1990 than the total provided in 1981.

## FUTURE FOOD AID REQUIREMENT

Four scenarios were used to project import demand to 1990. These projections became the starting point for estimating future food aid requirements. Projections show that 42 of the countries covered by this study will have high per capita incomes by 1990. They were assumed not to require food aid. Middle-income countries, those projected to have per capita incomes between \$300 and \$900 in 1977 U.S. dollars, will require between 4 and 11 million metric tons of food aid. This assumes that they require aid when cereal imports exceed 5 percent of export earnings. They will require 16 to 22 million tons if it is assumed that aid is required when imports exceed 2 percent of exports. Egypt, Morocco, and Tanzania would require especially large amounts of food aid under the first assumption. They and Ghana, Indonesia, Senegal, and Zambia would also require large amounts under the second assumption.

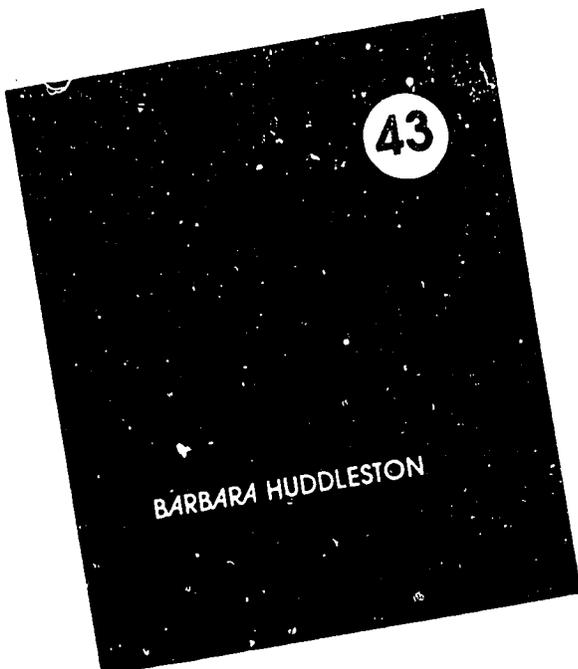
The projected requirement for low-income countries ranges from 6 to 14 million metric tons under the first assumption and 8 to 15 million tons under the second assumption. Among this group, the projections show that Bangladesh, Ethiopia, Nepal, Sri Lanka, Zaire, and the landlocked countries of the Sahel will require large amounts of food aid in 1990. Continued increases in production are projected to eliminate India's requirement for food aid in a normal year, although the country could still require help if faced with widespread crop failure.

Assuming that middle-income countries require aid when cereal imports exceed 5 percent of export earnings and that low-income countries require aid when imports exceed 2 percent of

exports, the total projected food aid requirement for all developing countries in 1990 ranges from 14 to 19 million metric tons for three scenarios for market demand and equals 24 million tons when nutritional requirements are taken into account (Figure 3). These results are consistent with FAO's estimate that 17.0 to 18.5 million metric tons of food aid would be required in 1985.

FAO estimates that less than one-third of this amount can be used in food aid projects that distribute food directly to especially needy groups. Such projects are desirable when they create additional demand for food among those who most need it and thus avoid disincentives for domestic agriculture. But the management costs of such projects constrain their expansion in many of the low-income countries where the greatest increases in food aid requirements are foreseen.

An alternative is to provide food aid that can be sold on the open market, with the proceeds going to the government for budgetary support, particularly for programs that increase employment and reach low-income people. Countries where marketing systems are not well developed may prefer such aid because it is easier to procure cereal imports for sale in urban markets than to create infrastructure and introduce reforms that will give local producers more incentive to supply these markets. But without clear provisions for using food aid and the funds it generates to improve marketing systems, this use of food aid may meet short-run needs at the expense of long-run development. Much more research is needed on the policy processes and institutional constraints within countries before policymakers can know how much food aid they can use effectively.



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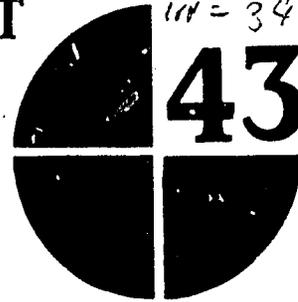
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# CLOSING THE CEREALS GAP WITH TRADE AND FOOD AID

Barbara Huddleston

**January, 1984**

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**Barbara Huddleston**

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# FOREWORD

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Food aid has been an important though controversial component of development assistance for more than a quarter of a century. In the early sixties, food aid comprised 15 percent of net official resource transfers from OECD countries to developing countries. Its importance declined after that, but it still represents an important share of official resource flows, averaging about 10 percent from 1967 to 1980. Furthermore, according to IFPRI's calculations, the proportion of total food aid transferred on a grant or grant-like basis rose from less than 60 to nearly 70 percent between 1961-63 and 1976-78. This is likely to increase further in the eighties as the geographical distribution of food aid flows continues to shift toward the low-income, food-deficit countries of Africa and South Asia.

Despite criticism, food aid remains a major element of bilateral and multilateral foreign assistance programs. It continues to get political support from farm groups because it is an outlet for commodity surpluses. But it also receives moral and intellectual support from many thoughtful people concerned with Third World development.

The benefits of low-priced food for low-income people are well documented. But using food aid to reduce the price of food, while it increases equity, may be only a palliative in an otherwise inequitable strategy of growth. This research demonstrates that the economies of many countries that were once major recipients of food aid have grown to the point that they now rely entirely on domestic production and commercial imports to supply domestic food needs. Furthermore, these are the countries that are best able to supply adequate amounts of food to meet per capita calorie requirements. By contrast, the economies of countries that have not yet grown much, and where average per capita calorie supplies are still seriously inadequate, despite the availability of food aid, will re-

quire the largest amounts of food aid in the future.

The analysis of historical data and the projections of future food aid requirements presented in this report lay the foundation for deeper analysis of food aid's contribution to equitable growth and economic effects in specific countries. IFPRI is evaluating the effects of food aid in Bangladesh and Senegal in cooperation with several food aid donors and is contemplating other country studies. Through its research on such topics as producer prices, input prices, and food subsidy policies, IFPRI also hopes to increase understanding of the benefits food aid can bring to the food strategies of developing countries.

IFPRI's research on food aid is particularly important as a part of its participation in the Consultative Group on International Agricultural Research. That group is dedicated to increasing food supplies to low-income people through cost-decreasing, output-increasing technological change in agriculture. Food aid can create a poor environment for the spread of such technology through its disincentive effects on farm prices, or it can improve that environment by facilitating development of labor-intensive rural infrastructure or relieving the social cost burden on governments, allowing them to give more attention to growth. These are vital issues. IFPRI research is concerned with the price, infrastructure, and social welfare effects of food aid in the context of technologically based agricultural growth. Future research reports will focus on these issues, drawing on a wide range of IFPRI's research to shed light on these vital food aid questions.

John W. Mellor

Washington, D.C.  
January 1984

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# 1

## SUMMARY

When work on this report began, no comprehensive data set could be found upon which to base an analysis of the extent to which food aid might be required to cover the projected gap between the supply and demand of cereals. The Food and Agriculture Organization of the United Nations (FAO) kept a complete trade series, which included figures for total cereal imports, that went as far back as 1948. However, no distinction was made between commercial imports and food aid. Summary records of shipments of cereal food aid by recipient and by donor have been prepared by FAO since 1970, but a longer series was unavailable. The International Food Policy Research Institute (IFPRI) therefore undertook to collect food aid data from four major donors (the United States, Canada, Australia, and the European Community) for the years following the inception of food aid programs in 1955.

The IFPRI data are organized by recipient, donor, and commodity for all major cereals. IFPRI's series for recent years does not include the increasing amounts of food aid being given by smaller donors. The IFPRI series also excludes processed cereal products so that the food aid data are compatible with the data for total cereal imports reported by FAO. A merger of the FAO and IFPRI series is being considered. If accomplished, it would be a complete, computerized food aid series organized by recipient, donor, and commodity for all major food aid commodities, and would be maintained and updated regularly by FAO. In this report, food aid volumes are taken from IFPRI data for the earlier years and from FAO data for years since 1975.

The c.i.f. value of food aid was not available from any source when work began. This report therefore presents a method for estimating the value of food aid, based on the c.i.f. value of cereal imports into developing countries. It also gives separate values for the elements of total cereal imports, namely commercial imports, grant aid, and concessional imports. The grant aid element of concessional imports is also estimated, so that the true foreign exchange cost of cereal imports for the recipient country can be

estimated using the value of commercial imports and the commercial value of concessional imports. This estimation is used to analyze the extent to which cereal imports have been or can become a burden on the balance of payments of developing countries in several income categories.

The volume of cereal imports into developing countries increased from an average of 30 million metric tons per year in 1961-63, the beginning period used in this study, to 64 million metric tons per year in 1976-78, and to 98 million tons in 1981. On a per capita basis, developing countries as a whole now import 30 kilograms per year as compared to 14 kilograms per year in 1961-63. For high-income developing countries—those with annual per capita incomes greater than U.S. \$900 in 1976-78—the increase was from 34 to 96 kilograms per year during the past two decades. For middle-income developing countries with annual per capita incomes of U.S. \$300 to U.S. \$900 in 1976-78, the increase was about the same as for developing countries as a whole. By contrast, per capita imports of cereals into low-income developing countries—those with annual per capita incomes less than U.S. \$300 in 1976-78—declined from 10 to 7 kilograms per year during the same period, although within this group the decline is attributable almost entirely to the drop in imports into India and Pakistan.

Most of the growth in the volume of cereals imported into developing countries occurred in middle- and high-income countries, which took over 90 percent of the total volume imported in 1981. In general, the increase in volume is such that the ratio of cereal imports to total staple consumption also increased. However, for many of the higher-income countries where this occurred, the increase in import dependence is associated with improvements of such economic indicators as per capita GNP, export earnings, diversification out of agriculture, and, in some cases, per capita staple crop production. For this group of countries, increased import dependence is associated with phaseout of food aid and increases in average per capita

calorie consumption to amounts that exceed minimum requirements established by a joint expert group of FAO and the World Health Organization (WHO). Furthermore, the strong growth that the export sectors of many of these countries showed meant that the true cost of cereal imports to them remained stable or declined as a proportion of export earnings, despite the tremendous increase in the volume of cereal imports.

Although the rate of growth for cereal imports into low-income countries is high, particularly in Sub-Saharan Africa, the size of the volume increase is small and import dependence is still low, though increasing. Whereas staple crop production in a number of countries with high rates of growth in cereal imports improved, declines in per capita staple crop production are common to many low-income countries. It is primarily in this group of countries that increasing food aid made the high growth in cereal imports possible, although in many of these countries the amounts are not significant, and they are rarely sufficient to offset inadequate calorie intake.

In looking at the relationships between trade growth, import dependence, food aid, and food supply adequacy in developing countries, several generalizations appear valid.

First, countries in which food availability appears adequate tend to be middle- or high-income countries, highly reliant on the world market, and with little need for food aid. Next, on the whole, food aid is not a major factor explaining cereal import dependence. On the contrary, countries tend to become more dependent on cereal imports as income grows and food aid is phased out. Third, in most low-income countries that rely primarily on agriculture for GNP growth, domestic staple crop production has not grown rapidly enough to provide an adequate food supply, and not enough is earned from exports to pay for the necessary imports. These countries are less dependent on imports than most higher-income countries, but they receive a larger share of total food aid flows, both on a per capita basis and in absolute amounts. Lastly, the low-income countries whose per capita production of staple crops is below average and whose average per capita calorie intake is inadequate are receiving increasing amounts of food aid. However, a few middle- and high-income countries that have more than adequate per

capita supplies of food still receive a disproportionate share. If some of the food aid now going to these few countries could be redirected to those with greater need, the nutritional status of underfed groups could be improved without increases in the total volume of food aid.

It is not possible to estimate a single number that will accurately indicate how much food aid will be required in some year in the future. Too many uncertainties influence the final outcome, including world economic conditions, fluctuations in world cereal markets, and variations in the growth rates of key variables.

Nevertheless, some general principles may be used to determine how much food aid a country needs. Using these principles and projecting past trends under alternative scenarios, the approximate future requirements of all developing countries can be estimated, although such estimates do not precisely indicate what individual countries are likely to require. If present trends continue, the number of high-income developing countries will increase to 42 out of the 99 countries covered by this study by 1990, and the number of middle- and low-income developing countries will drop from 73 to 57. Nearly 15 to 30 million metric tons of food aid would be required by these 57 countries under three alternative scenarios based on estimating the probable effective demand for cereal imports. Under a scenario that looks at the imports required to provide enough food to supply market demand and fill an estimated dietary energy gap, the food aid requirement is 22 to 34 million metric tons. Under this scenario, countries with particularly large nutrition requirements in 1990 include Bangladesh, Ethiopia, Tanzania, Zaire, and the land-locked countries of the Sahel.

Quantification of the food aid requirement provides an upper limit to the amount that can be used effectively. However, the actual demand for food aid in most countries is lower because economic conditions and management constraints restrict the amount that can be put to good use. Some economic environments are more hospitable than others to food aid programs that reach the poor. In hospitable environments food aid can be used in two ways. Food aid can be used to create additional demand, thus avoiding disincentive effects for domestic agriculture. However, the administrative

costs of demand-creating programs are usually high. Either countries must provide scarce management skills themselves or rely on expatriate voluntary agency personnel. This imposes one kind of constraint on the quantity of food aid a country can use effectively.

Food aid can also be sold on the open market, perhaps at subsidized prices for consumers, and the proceeds used to support farm prices or otherwise contribute to agricultural development. Although disincentives resulting from open market sales can be avoided if the right policies are

adopted, such as a dual pricing system, for example, changing economic policies that use imports to support a cheap food policy while taxing domestic agriculture is often politically difficult. From the donor's standpoint this imposes a second kind of constraint on the quantity of food aid a country can put to good use, even though there may be strong political pressure to increase the flow of food aid before policy changes favorable to domestic agriculture have been initiated. As a practical matter, therefore, increases in food aid are likely to be phased in gradually, in accordance with a recipient country's strategy for using it effectively.

# 2

## INTRODUCTION

Cereal imports into developing countries have grown rapidly during the past two decades. Under the most generous assumption about continuation of past trends, import demand in 1990 could amount to about 175 million metric tons for developing countries as a whole.<sup>1</sup> How much of this import demand can be met on commercial terms, and how much food aid will be required to meet it?

This question provided the starting point for the research reported here. It starts in Chapter 3 with a look at the several data series available for examining historical trends in food aid and cereals trade. A description of the food aid series compiled at the International Food Policy Research Institute (IFPRI) follows, and methods are presented for differentiating between commercial imports and food aid for both volumes and values contained in the total trade series available from the Food and Agriculture Organization of the United Nations (FAO).

In Chapter 4, the study draws on this data base to show the shifts that have occurred in the pattern of cereal trade and food aid flows since the early sixties. It discusses changes in the degree of dependence on cereal imports for different groups of developing countries and considers whether growth in export earnings has reduced the foreign exchange burden of cereal imports, despite

their increasing volume. It also quantifies the amount food aid has contributed to reduction of this foreign exchange burden. Finally, the contributions of commercial imports and food aid to nutrition, as reflected in the per capita availability of staple foods in countries at different levels of economic development, are examined.

Chapter 5 looks at trends in cereal trade and food aid in relation to other economic variables. It looks at whether and how food aid and other variables can explain the growth in the volume of cereals imported by developing countries and the increase in import dependence in a number of them. It also examines the proposition that food aid has not been a major factor contributing to the past growth of cereal imports into developing countries, once the influence of other variables has been taken into account.

Based on these results, the study presents in Chapter 6 a method for estimating food aid requirements in developing countries, both now and in the future, and in Chapter 7 the study discusses some economic issues relating to the effective use of food aid and the constraints that must be overcome if larger quantities of food aid are to be used without having a disincentive effect on domestic agriculture.

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<sup>1</sup> All tons are metric tons in this report.

# 3

## THE DATA BASE

The analyses carried out in this study include a historical review of grain trade and food aid patterns in developing countries and an assessment of the probable size of future food aid requirements and cereal imports. To carry out these analyses, a number of basic data series were needed, not all of which were readily available.

### Sources for Trade and Food Aid Data

Three different sources were available from which to choose a basic trade data series: the Production, Supply, and Distribution Tapes of the U.S. Department of Agriculture (USDA), the FAO Trade Tapes, and the United Nations (UN) Trade Data Summary. The USDA series contain trade data by crop year and are consistent with the production, stocks, and consumption series that the USDA also maintains for most developing countries. FAO maintains trade data for each member country by calendar year. This series includes the volumes and values of all agricultural imports and exports, by commodity, plus data for certain agricultural inputs and for total imports and exports. From this series a record of cereal imports can be obtained for each developing country back to 1948, if the country's official statistics extend back that far. The UN Statistical Office also keeps complete trade records back to 1948, based on official data submitted by member countries.

Leonardo Paulino and Shen Sheng Tseng note in *A Comparative Study of FAO and USDA Data on Production, Area, and Trade of Major Food Staples*, Research Report 19 (Washington, D.C.: IFPRI, 1980), that "the FAO data system has a more comprehensive coverage of countries and commodities, compared to the USDA data system." For this reason, and because a calendar year series is more useful, IFPRI chose to construct its entire data file for future projections work from FAO sources. In choosing between USDA and FAO data

this study follows the standard IFPRI practice of preferring FAO data. But in choosing between the FAO Trade Tapes and the UN Trade Summary, the problem arose of determining whether either series consistently included food aid in the annual figures for total cereal imports.

When work on this study began, there was no complete historical record of either the volumes or the values of food aid flows to developing countries since World War II. In much of the recent literature on the food situation in developing countries, calculations of total supply available to a country assume that import data include food aid volumes. Yet the value of these imports is usually given as if the country had paid commercial market prices for the entire volume imported. Thus if the volume data do include food aid, the true cost of food imports to the importing country is overstated; if they do not include food aid, the supply available in the country is understated.

FAO officials try to include food aid data wherever possible. Statistics supplied by the countries included in their data series usually include both concessional and commercial imports. There may, however, be some countries that do not include grant food aid if such imports do not pass through customs. There may also be a few countries that exclude concessional aid from their import data in certain years. The extent to which FAO import data include food aid was investigated by checking it against other trade series and against a comprehensive, independently constructed food aid series.

Whereas most food aid data are given by crop year, the rice series is given by calendar year. And not many countries receive rice as food aid. Rice was therefore selected as a representative crop for this investigation. Country import data revealed that countries that were major recipients of rice food aid imported no rice according to the UN Trade Data Summary, but imported large amounts according to the FAO and USDA trade tapes. Comparison of the FAO import totals for 1967-76 with the sum of the UN import totals

and the IFPRI food aid totals for the same period showed them to be roughly the same. Conversations with UN and FAO officials lent support to the hypothesis that the FAO trade series generally does include food aid, whereas the UN series does not.

It was then decided to use the FAO trade series for total cereal imports and the IFPRI food aid series for concessional and grant imports of cereals and to obtain a series for commercial imports by subtracting total cereal food aid from total cereal imports. In the few cases where this procedure produced anomalies in the series, individual checks were made to determine whether the import data for these countries included food aid. From these checks it appears that even the import data for countries that receive only grant food aid for emergency relief include food aid in the import data. Some countries appear to have negative commercial imports in certain years, but not for the whole period. This may either be because food aid was underreported in those years or, more likely, because food aid recorded as shipped in one calendar year was actually received in another. Three-year averaging eliminates many of these anomalies.

FAO publishes a series, "Food Aid Transactions Notified by Governments," that goes back to 1970; unpublished records for this series go back to 1964. This series shows flows by commodity to each recipient. The information is supplied by donors to FAO's Committee on Surplus Disposal (CSD) and is tabulated manually for publication in FAO's *Food Aid Bulletin*. One published table shows the volume and value of food aid transactions by recipient and commodity for each calendar year since 1970. Another shows the volume and value of food aid committed by each donor, by commodity, since not all donors are included in this series. Also, since the CSD is notified only to ensure that food aid transactions do not interfere with normal commercial trade, some food aid given specifically for humanitarian purposes and disaster relief does not have to be reported under CSD rules. The largest omission is U.S. Title II food aid, a program of grant aid for humanitarian and emergency relief projects amounting to well over a million tons of cereals a year. Similarly, some food aid given by other donors is apparently not reported to CSD and, therefore, not included in the series. Finally, the series shows planned food aid transactions, not actual shipments. It is,

therefore, not an accurate report of what countries receive in a given year.

A much more accurate record of the amounts of food aid received by developing countries is kept by FAO's Global Information and Early Warning System. Summary results are given separately by donor and by recipient for total cereals. They are based on shipment records received from donors and other information supplied by some recipients. A 10-year time series giving a single figure for the volume of total cereal food aid shipped by each donor for each fiscal year since 1970/71 is available in a special statistical supplement to the *Food Outlook* published in January 1982. All known donors are included. The cereals covered include processed commodities such as bulgur, rolled wheat, and blended foods (expressed in grain equivalent), in addition to bulk shipments of wheat and wheat flour, rice, and coarse grains. Records for noncereal food aid are not kept as part of this series. The published numbers are not broken down by type of cereal, and computerized data are only now becoming available for the years since 1977/78.

The Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) keeps records of the dollar value of food aid flows by donor and by recipient as part of its monitoring of official development assistance. These records give the total commercial value of food aid and the value of the grant component, including transport costs. The grant component varies from 20 to 100 percent of the commercial value, depending on whether the aid is given as a loan or a grant and on the financial terms of loans. These records have been published since 1969 and show total flows by donor. They are based on the responses by donors to annual DAC questionnaires. No quantity or commodity information is given for recipients.

The International Wheat Council (IWC) keeps records of aid shipments or cash payments donors make to fulfill their commitments under the Food Aid Convention. Under this convention, each donor agrees to ship a minimum quantity of cereal food aid each year. These commitments currently equal 7.6 million tons per year. The IWC records show volumes and values of food aid shipments by commodity and recipient but, as with FAO, they have been kept in raw form until recently and have been readily available only since 1979/80. Also, they do

not include the cereal aid flows not reported under the convention. These are primarily pledges by larger donors to the UN/FAO World Food Programme (WFP) and concessional loans that contain a grant element of less than 80 percent.

## **Cereal Food Aid Volumes: The IFPRI Series**

Since none of these three sources offered access to a complete set of food aid data, a major objective of this study was to create a historical series for cereal food aid that could be used easily by IFPRI and other interested users, and which could be easily expanded and updated later on, time and funds permitting. A basic series has been completed starting in 1955 with the first U.S. Public Law 480 programs and continuing through 1978, the last year for which a complete set of records could be obtained. It currently contains data supplied by four major donors—the United States, Canada, Australia, and the European Community (EC). The volume of food aid shipped by each donor to each recipient country is shown, by type of cereal, except for shipments from the EC, which only gave information on total cereals. It has been assumed throughout that the cereal food aid supplied by the EC is entirely wheat, although the EC does supply small quantities of other grains for food consumption at times. The figures represent the quantities exported in the year shown. For the United States, split-year data are shown as if the cereals were exported in the latter of the two calendar years. Though they are important nutritionally, bulgur and blended foods are not included because it was felt they would not make up a significant portion of total cereal imports in the absence of food aid, and this study focuses primarily on potential demand by developing countries for internationally traded cereals. Thus the commodity coverage of the food aid recorded in the IFPRI series is compatible with the coverage of the cereal classification in the FAO trade series.

Because it does not cover processed cereal products, the definition of cereals used by IFPRI is more limited than the one used by the IWC and the FAO for recording donor shipments of cereal food aid. Also, noncereal food aid is not covered, although nonfat dry milk and vegetable oils are often

used alone or in combination for special feeding projects intended to increase effective demand. A complete list of food aid commodities suitable for satisfying nutritional requirements would therefore include both processed cereal products and noncereal food aid.

Two qualifications regarding the IFPRI data series should be noted. First, since the amounts shown represent exports for the year in which they are recorded, they are not a precise record of shipments received during the year. Trade data for recipients are collected annually by FAO, using official statistics and replies by countries to specially designed questionnaires. However, food aid imports are usually not shown separately because most grain shipments enter through customs and are recorded as commercial imports at the face value of the contract, regardless of the source of finance. Procurement agencies undoubtedly keep records of aid shipments received, but no internationally agreed upon collection system has been established. Thus there is no good source for shipments received.

Second, not all donor countries are covered by the IFPRI series. The most serious lack is the absence of bilateral food aid data from the member countries of the EC. Shipment data published by FAO show a single figure for the EC that includes both Community and bilateral aid. In most years since 1970 this figure is more than double the amount reported to IFPRI as annual Community shipments—a difference of more than half a million tons a year. Smaller flows from the Scandinavian countries and cash aid for cereal imports provided by Japan are also missing. Work is continuing on collection of missing data by commodity and by donor. Food aid provided through the UN/FAO World Food Programme is not included because donor country shipment records include amounts supplied in fulfillment of pledges to the WFP.

A comparison of the IFPRI series with the FAO cereal shipment series shows that virtually all the differences can be accounted for by the countries not covered by IFPRI and by IFPRI's decision not to count bulgur and blended foods as cereal food aid (see Table 1).

Improvements in the data base require adding data for missing countries, clarifying differences between the records of commitments made and shipments received and

**Table 1—Comparison of the IFPRI and FAO series for the cereal food aid flows of major donors, 1972-78**

Donor	1972		1973		1974		1975	
	IFPRI	FAO	IFPRI	FAO	IFPRI	FAO	IFPRI	FAO
(1,000 metric tons)								
Australia	175	215	214	259	197	222	310	330
Canada	938	1,093	611	887	610	486	697	594
European Community and its member states	317	978	409	986	495	1,208	539	1,413
United States	6,806	9,259*	4,561	7,025*	2,167	3,198*	3,957	4,712*
Other Food Aid Convention donors	n.a.	787	n.a.	632	n.a.	475	n.a.	571
Other donors	n.a.	231	n.a.	320	n.a.	62	n.a.	753
Total	8,236	12,563	5,795	10,109	3,469	5,651	5,503	8,373

Donor	1976		1977		1978							
	IFPRI	FAO	IFPRI	FAO	IFPRI	FAO						
(1,000 metric tons)												
Australia		243		261		203		231		204		255
Canada		581		1,034		666		1,176		421		1,000
European Community and its member states		518		928		394		1,131		462		1,451
United States		3,557		4,284*		7,368		6,147*		6,172		5,896*
Other Food Aid Convention donors		n.a.		150		n.a.		266		n.a.		359
Other donors		n.a.		199		n.a.		137		n.a.		395
Total		4,899		6,856		8,631		9,088		7,259		9,356

Sources: The data from the Food and Agriculture Organization of the United Nations (FAO) are from FAO, *Food Outlook*, November 28, 1978. The data from the International Food Policy Research Institute (IFPRI) are from IFPRI, "Food Aid Tape," Washington, D.C., 1981.

Note: Where n.a. appears, the figures were not available for inclusion in IFPRI's series.

\* This figure includes the grain equivalent of bulgur, rolled wheat, and blended products from the United States, which amounted to over 1 million tons per year between 1972 and 1975, the last year for which data were provided.

their time of arrival in recipient countries, and reconciling different existing data series. A full set of data on food aid flows would cover noncereal commodities as well as cereals. Good series on dairy products and vegetable oils would be particularly useful, as the share of these commodities in food aid is likely to increase.

Data are available to interested users from the IFPRI series by recipient, by donor, by type of cereal, by mode of financing (whether grant or concessional), and by year from 1955 through 1978. Since the recent numbers in the IFPRI series are underestimated by an average of 10 to 15 percent, especially for Africa, this study uses FAO data for the years since 1975. Plans for further work envision close collaboration with other international organizations and bilateral agencies to create a single, consistent

data series for food aid that will be accessible to all interested users.

### Valuation of Food Aid Flows and Commercial Cereal Imports

An important part of this study is the attempt to distinguish the dollar value of food aid from the dollar value of commercial cereal imports and to determine what proportion of the total value of cereal imports countries that received food aid have actually paid. The proportion paid by recipients is referred to henceforth as the true cost of cereal imports. It is comprised of the c.i.f. value of commercial cereal imports plus the c.i.f. value of the nongrant component of concessional imports.

True cost refers to the present dollar value of total cereal imports that food aid recipients must finance from their own foreign exchange resources. The concept is useful for quantifying the value of the balance-of-payments support provided by food aid flows in the past.<sup>2</sup> It does not take into account the possibility that the world market price might have been lower had no food aid been provided. Because the United States supported the world market price until the early seventies, it is assumed here that during the sixties, when food aid volumes were large, the world market price would not have been significantly different if no food aid were provided. The same is true now that the United States is once again supporting the world market price, but it could change if the United States removes the price floor now provided by its loan rates for major cereal crops.

The current practice followed by FAO in its trade series is to give a value for total cereal imports that includes the c.i.f. value of all cereals brought in through customs, regardless of whether they are financed commercially or concessionally. Thus the trade data do not distinguish between commercial imports and food aid imports, and food aid imports are recorded at their commercial market value. Also, because imports are recorded at their c.i.f. value, the figures include the cost of ocean freight and handling charges in addition to the price of the grain itself. In the *Food Aid Bulletin*, FAO gives the f.o.b. world market value of food aid transactions notified by governments, by recipient country, but as noted above, the series is not complete nor is it broken down by commodity.

The aid element of a country's imports of cereals and other foods is more clearly recorded in its monetary accounts. There the market values of grant food aid and of the grant component of concessional food

aid are shown as unrequited official transfers. The ocean freight cost is also included if it is part of the aid-financed transaction. The country records a credit or receipt for the amount of the aid, and this credit offsets the debit or expenditure for the aid-financed food imports. In published balance-of-payments statistics, however, the amount of transfer attributable to food aid is not separated from other forms of official development assistance.

For this study an attempt has been made to determine the values of each element of total cereal imports into developing countries. These elements are pure commercial imports, pure grant aid imports, and concessional imports. Concessional imports are subdivided further into grant and commercial shares, depending on the amount of the grant element in each food aid loan. Since the food aid data were reported in volumes of grain supplied, it was decided to work with the quantity figures and assign values to them, based on average c.i.f. prices for each commodity imported in four major developing country regions.

The c.i.f. price is calculated from FAO data by dividing the total c.i.f. value by the total volume of cereals imported into each of the four developing country regions. The regional unit price is then used for each country within the region. The movement of prices for each commodity in all regions paralleled that of the World Bank commodity price series, with differences among regions attributable primarily to differences in ocean freight rates. All values are expressed in 1977 dollars, using the World Bank's c.i.f. index of international inflation as a deflator.<sup>3</sup>

For each cereal, the volume of concessional food aid received by a country was multiplied by the average annual c.i.f. price for that cereal in the region, and the results were summed to get the total value of con-

<sup>2</sup> Food aid given to provide a foreign exchange transfer is said to be given as balance-of-payments support. How the additional foreign exchange is used is a matter of choice for the recipient country. Food aid donors prefer that recipients use this foreign exchange transfer to finance additional consumption of cereals and other donated commodities, but Abbott has shown that this does not always happen. In either case the accounting value of the foreign exchange transfer is the same. Philip C. Abbott, "Developing Countries and International Grain Trade" (Ph.D. dissertation, Massachusetts Institute of Technology, 1976).

<sup>3</sup> Average nominal unit prices in the four regions for 1961-63 and 1976-78 in dollars per metric ton were:

	1961-63	1976-78
Africa	96.23	246.98
Asia	84.41	172.89
Latin America	79.10	160.30
Near East	72.15	192.17

cessional aid for each year. The value of concessional aid was then multiplied by an approximation of the grant element, selected according to the financing terms of each concessional food aid loan (see Appendix 1). The result, identified as grant-equivalent aid, was subtracted from the value of concessional aid to obtain commercial-equivalent aid, that is, the present value of the true foreign exchange cost of food aid to the government.<sup>4</sup>

Volumes of food aid given as pure grants were multiplied by the same average annual prices. The combined values of pure grant food aid and grant-equivalent aid constitute a series giving the total value of grant food aid received by recipient countries. Pure commercial imports are calculated by subtracting the sum of pure grant aid and concessional aid from the total value of cereal imports as reported by FAO. The true cost of cereal imports to a country in a given year is calculated as the sum of pure commercial imports and commercial-equivalent aid. A hypothetical example is shown in Table 2.

The grant element is a notional figure that does not correspond to an actual flow

of funds or of goods and services and is strongly affected by the rate of return used for discounting. It is nevertheless the best estimate obtainable at a given time for determining the value of the foreign exchange saving obtained by developing countries from concessional loan terms for a given quantity of cereal imports. The value of the foreign exchange saving may not always represent the value of the subsidy to the recipient country. Some countries receiving concessional food aid on 40-year repayment terms with low interest rates and a 10-year grace period before they must begin repaying either interest or principal may regard food aid as a virtually free good at the time it is received. For others, the food aid may represent unplanned additional imports for which they must pay a cost higher than that reflected in the market discount rate. Although it might be possible to quantify these considerations by using a social discount rate to calculate the grant element, the problem of obtaining appropriate empirical data to quantify this rate for individual countries remains to be solved. For this study, grant element calculations of the U.S. Department of Agriculture

**Table 2—Hypothetical calculation of the true cost of cereal imports**

Type of Aid	Volume	Commercial c.i.f. Price	Commercial Value
	(metric tons)	(U.S. \$/metric ton)	(U.S. \$)
Grant aid			
Wheat	5	150	750
Total	5	...	750
Concessional aid			
Wheat	50	150	7,500
Rice	10	300	3,000
Corn	20	100	2,000
Total	80	...	12,500
Grant element (40 percent)			
Grant equivalent of concessional aid		...	5,000
Commercial equivalent of concessional aid		...	7,500
Total cereal imports	100	...	18,000
Total food aid	85	...	13,250
Total commercial imports	15	317	4,750
True cost of cereal imports	...	...	12,250

<sup>4</sup> A market discount rate of 10 percent was applied uniformly, disregarding the time the loan was contracted and the opportunities for alternative uses of funds available to countries at nonmarket rates of return. Several authors have discussed factors that affect choice of discount rate for individual countries, calculating present value of a planned investment over time. However, it was not feasible to establish separate discount rates for each country included in this study.

based on a market discount rate of 10 percent have therefore been used, despite their imperfections.

Results of these calculations for each country in the IFPRI food aid data base for the period 1961-78 are available on request. The country coverage includes 79 of the 99

developing countries included in the study.<sup>5</sup> The other 20 countries received no food aid. The volume series shows grant, concessional, and total food aid and commercial cereal imports; the value series shows grant, grant-equivalent, commercial-equivalent, and total food aid and commercial cereal imports.

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<sup>5</sup> Indochina and some of the smaller island countries of the Caribbean and South Pacific are not included because of lack of data. Five small oil-exporting Arab countries are not included because their per capita incomes are exceptionally high.

# 4

## TRADE AND FOOD AID TRENDS

The wealth of information collected in the data base discussed in Chapter 3 provides a new foundation for the analysis of the role of food aid in world trade and its effects. This chapter discusses trends in cereal trade and food aid flows, including trends in world cereal trade, the share of cereal imports in total staple consumption in developing countries, the pattern of food aid flows, the foreign exchange cost of cereal imports to aid recipients, and the adequacy of their national food supply. It emphasizes differences in the patterns of change among low-, middle-, and high-income countries and among the four geographic regions in the developing world.

### The Changing Pattern of World Trade in Cereals

The most striking change in the world

cereal market since 1961 is simply the growth in the volume of commodities traded. As Table 3 indicates, total imports have increased from an average of 81 million tons per year in 1961-63 to an estimated 232 million tons in 1981. This growth has been most striking for centrally planned economies. They imported 13 percent of the total in the early sixties but take 25 percent now. In contrast, Western Europe imported 40 percent of the total in the earlier period but only about 20 percent in 1981.

The share developing countries had in world cereal imports averaged 37 percent between 1961 and 1975 but increased to an average of 40 percent for the period 1976-80 and 43 percent in 1981 (see Table 4). Among the 99 developing countries covered by this study, most of the growth in the absolute volume of imports occurred in middle- and high-income countries, that is, those with per capita incomes greater than \$300 per year

**Table 3—Volume of world trade in cereals by region, 1961-63, 1969-71, 1976-78, and 1981**

Region	1961-63		1969-71		1976-78		1981	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
(million metric tons)								
North Africa	2.8	0.6	3.5	0.8	9.9	0.2	15.2	0.1
Sub-Saharan Africa <sup>a</sup>	1.9	0.7	3.1	0.6	5.3	0.5	9.2	0.5
South Africa	0.2	2.0	0.3	1.3	0.1	2.6	0.5	4.5
North America	1.2	45.8	0.9	50.1	1.0	101.8	1.6	136.2
Central America	2.0	0.1	2.8	0.6	5.8	0.1	11.2	0.1
South America	3.7	5.7	5.4	11.0	9.3	14.9	12.1	19.1
Asia/Near East <sup>b</sup>	19.5	6.0	26.6	7.3	37.9	9.9	53.7	12.1
Japan	5.9	0.1	14.7	0.7	21.9	0.1	24.4	1.0
Western Europe	33.1	7.6	40.3	18.6	49.9	26.5	44.1	40.3
Eastern Europe	8.9	1.7	8.6	2.6	14.4	3.7	15.5	3.9
U.S.S.R.	1.6	7.6	2.7	7.9	17.8	3.2	43.7	2.6
Oceania	0.3	6.4	0.3	8.9	0.3	12.3	0.4	13.3
World total	81.1	84.1	109.2	110.5	173.6	175.8	231.7	233.8

Sources: Food and Agriculture Organization of the United Nations (FAO), *FAO Trade Yearbook*, various issues (Rome: FAO, various years).

<sup>a</sup> This excludes South Africa.

<sup>b</sup> This excludes Japan.

**Table 4—Volume of cereals imported annually by the world and developing countries, and developing countries' share of the world total**

Year	World Total	Developing Countries	Developing Countries' Share of the World Total
	(million metric tons)		(percent)
1961	75.7	29.0	38
1962	81.4	30.3	37
1963	86.2	32.8	38
1964	94.5	36.1	38
1965	102.2	36.0	35
1966	111.9	41.1	38
1967	103.0	40.3	39
1968	102.3	40.2	39
1969	97.3	34.6	36
1970	111.9	41.0	37
1971	117.7	42.2	36
1972	131.2	42.9	33
1973	161.6	55.1	34
1974	150.8	60.5	40
1975	158.3	59.1	37
1976	168.5	57.2	34
1977	162.6	63.1	39
1978	187.7	74.6	40
1979	201.3	83.0	41
1980	221.9	98.5	44
1981	231.7	100.1	43

Sources: Food and Agriculture Organization of the United Nations (FAO), "FAO Trade Tapes," Rome, 1974 and 1979; and FAO, *FAO Trade Yearbook, 1981*, vol. 35 (Rome: FAO, 1982).

Note: Developing countries include all those reported by FAO.

in 1976-78.<sup>6</sup> As Table 5 indicates, the average volume of imports into the 65 countries of this group increased from 21 million tons per year in 1961-63 to 52 million in 1976-78. By 1981 the volume had increased by as much again, to 88 million tons. In contrast,

for the 34 low-income countries covered by this study, total imports fluctuated around 10 million tons throughout the period.

Although the volume of cereal imports into low-income countries has remained static, an important shift away from Asia and toward Africa has taken place within that group. However, even in Africa, middle- and high-income countries still account for about two-thirds of total cereal imports, despite the increase in food aid to low-income countries (see Appendix 3, Tables 34-36).

Changes have also been taking place on the export side. Whereas the Soviet Union and Western Europe each supplied about 10 percent of the world's exports in 1961-63, the Soviet share fell to 1 percent by 1981 while the European share rose to 17 percent.<sup>7</sup> Taken together, the United States, Canada, and Australia had about the same share in both periods—62 percent in 1961-63 and 64 percent in 1981. Similarly, exporting countries in Asia and South America accounted for about 14 percent of the world market in both periods (see Table 3).

Out of the total increase of 151 million tons in world imports of cereals from 1961-63 to 1981 shown in Table 4, 40 percent was accounted for by wheat, the same amount by corn, 5 percent by rice, and the rest by other coarse grains (see Table 6). Among developing countries, the proportion accounted for by wheat was slightly higher—about 56 percent—whereas corn accounted for 29 percent, and rice and other coarse grains accounted for about 7.5 percent each.

The coarse grains other than corn imported into developing countries are primarily millet and sorghum for human consumption. Thus more than two-thirds of the cereals imported into developing countries are used as food. Nevertheless, the growth in the amount of corn imported for use as feed is

<sup>6</sup> In this report, developing countries are classified according to their per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. The cutoff between low-income countries and middle- or high-income countries is based on one established annually by the World Bank for use in each year's *World Development Report*. In addition, the International Development Association (IDA) of the Bank establishes a somewhat higher cutoff each year to determine eligibility for its highly concessional loans. In 1977 the IDA cutoff was \$581. The lower figure is used for this study because it differentiates more clearly between countries where per capita incomes are still very low and those where growth processes have begun to increase per capita income. The GNP data used in these calculations are from World Bank, "World Bank Atlas Tape," Washington, D.C., February 9, 1980; and the population data are from Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977).

<sup>7</sup> In the earlier period the Soviet Union was a major supplier of wheat to Eastern Europe, but it became a major importer of grain following a decision in the late sixties to increase livestock production.

**Table 5—Volume of commercial cereal imports, total cereal imports, and food aid received by developing countries and the share of food aid in total imports, by region and income group, 1961-63, 1976-78, and 1981**

Region or Income Group	Year	Commercial Imports	Food Aid <sup>a</sup>	Total Imports	Share of Food Aid In Total Imports
		(million metric tons)			(percent)
Asia	1961-63	11.4	5.7	17.1	33
	1976-78	22.2	4.2	26.4	16
	1981	33.9	2.5	36.4	7
Latin America	1961-63	3.7	1.9	5.6	34
	1976-78	14.2	0.4	14.6	3
	1981	22.5	0.6	23.0	2
North Africa/Middle East	1961-63	1.9	3.9	5.7	67
	1976-78	14.6	2.5	17.1	14
	1981	26.4	2.5	29.0	9
Sub-Saharan Africa	1961-63	1.5	0.1	1.6	8
	1976-78	4.1	0.9	4.9	18
	1981	6.7	2.0	8.8	23
High-income developing countries	1961-63	5.6	3.1	8.7	35
	1976-78	21.6	1.0	22.6	4
	1981	40.3	0.5	40.8	1
Middle-income developing countries	1961-63	9.4	3.2	12.6	25
	1976-78	26.7	2.7	29.3	9
	1981	43.4	3.4	46.8	7
Low-income developing countries	1961-63	3.4	5.3	8.7	61
	1976-78	6.8	4.3	11.1	39
	1981	5.8	3.8	9.6	40
Total developing countries	1961-63	18.5	11.6	30.0	39
	1976-78	55.1	8.0	63.0	13
	1981	89.5	7.6	97.2	8

Sources: The figures for total imports, food aid, and the share of food aid in total imports are from Appendix 3, Tables 34-36. The figures for commercial imports are the difference between total imports and food aid.

Notes: The figures in this table are for the 99 developing countries covered by this study. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

<sup>a</sup> Food aid totals for 1976-78 and 1981 do not include approximately 700,000 metric tons reported by FAO, most of which went to Indochina and Portugal.

striking, particularly in Asia and, to a lesser extent, in Latin America. Imports of corn into these two regions totaled less than 1.5 million tons in 1961-63, or about 8 percent of the world total of nearly 18 million tons. By 1981 corn imports into Asia and Latin America had grown to 17 million tons, or 22 percent of the total import volume of 79 million tons.

Although much of the corn produced locally in Eastern and Southern Africa, Central America, and the Caribbean is used as

food, CIMMYT estimates that more than 80 percent of the corn imported into developing countries is used for livestock feed. In corn-eating regions experiencing food deficits, one of the principal reasons corn has not been imported for human consumption is that white corn is preferred to the yellow corn available in world markets. Nevertheless, to the extent that corn meal or corn flour can substitute for traditional milled products, future imports may include more corn for human consumption.<sup>8</sup>

<sup>8</sup> Centro Internacional de Mejoramiento de Maíz y Trigo, *World Maize Facts and Trends, Report One: An Analysis of Changes in Production, Consumption, Trade and Prices over the Last Two Decades* (El Batán, Mexico: CIMMYT, 1981), pp. 10-11.

**Table 6—Imports of wheat and wheat flour, maize, and rice by region, 1961-63 and 1981**

Region	1961-63			1981		
	Wheat and Wheat Flour	Maize	Rice	Wheat and Wheat Flour	Maize	Rice
	(million metric tons)					
North Africa	2.8	0.2	0.0	12.2	2.2	0.1
Sub-Saharan Africa <sup>a</sup>	0.8	0.2	0.5	4.5	2.0	2.4
South Africa	0.2	0.0	0.1	0.3	0.0	0.1
North America	0.2	0.7	0.0	0.0	1.3	0.1
Central America	1.2	0.4	0.3	3.6	4.3	0.5
South America	3.5	0.1	0.0	8.2	2.4	0.3
Asia/Near East <sup>b</sup>	13.2	0.9	4.1	31.6	10.3	6.8
Japan	2.9	2.3	0.2	5.6	13.6	0.1
Western Europe	12.5	12.0	0.5	12.8	21.8	1.4
Eastern Europe	5.6	1.0	0.3	6.2	6.9	0.3
U.S.S.R.	1.4	0.0	0.2	18.7	14.6	1.3
Oceania	0.3	0.0	0.0	0.2	0.0	0.2
World total	44.3	17.7	6.2	104.1	79.4	13.6

Sources: Food and Agriculture Organization of the United Nations (FAO), *FAO Trade Yearbook*, various issues (Rome: FAO, various years).

<sup>a</sup> This excludes South Africa.

<sup>b</sup> This excludes Japan.

## Size and Rate of Change in Dependence on Cereal Imports Among Developing Countries

Almost all developing countries import some cereals, even such consistent exporters as Argentina and Thailand (see Appendix 2). These imports constitute only a small fraction of some countries' total consumption of staple foodstuffs, while for other countries that fraction is large. In all, 42 out of the 99 countries covered by this study had import dependence ratios, that is, a ratio of cereal imports to total staple consumption, of less than 10 percent in 1976-78. Of these, 17 had ratios of less than 2 percent (see Table 7 and Appendix 3, Table 37).<sup>9</sup>

Middle- and high-income countries are predominant in the 57 countries with an import dependence ratio greater than 10 percent. Whereas 74 percent of the middle-income countries and 85 percent of the high-

income countries had ratios greater than 10 percent, only 18 percent of the low-income countries did.

Despite the growth in import volumes in developing countries during the past two decades, in nearly half the countries under study the import dependence ratio scarcely increased or even declined between 1961-65 and 1976-78. Import dependence increased more than 5 percentage points in 37 of the countries studied and 3 to 5 percentage points in another 14 (see Table 8). For the Third World as a whole, cereal import dependence increased from 6 percent of total staple consumption in 1961-65 to 8.5 percent in 1976-78. When calculated as a percentage of staple food use instead of total staple consumption, the import dependence ratio is somewhat higher in both periods, amounting to 8 percent in the earlier and 11.5 percent in the later.

Table 9 reveals clear differences in the pattern of change in the four regions.

In most Asian countries, both import dependence and its rate of change are low.

<sup>9</sup> Countries are grouped into import dependence classes based on the ratio of cereal imports to staple crop consumption in 1976-78. Countries with high import dependence have ratios greater than 10 percent; countries with low import dependence have ratios less than 10 percent. The cereal import data used to calculate this come from FAO, "FAO Trade Tapes," Rome, 1974 and 1979. The data for staple consumption used come from FAO, "Global Agricultural Programming System Supply Utilization Accounts Tape," Rome, June 1980. Data for 1981 are not presented because accurate figures for total staple consumption are not available.

**Table 7—Cereal import dependence in 1976-78 by region and income group**

Income Group/Region	Total	Degree of Dependence					2 Percent or Less
		Greater than 75 Percent	Greater than 50 Percent	Greater than 25 Percent	Greater than 10 Percent	Greater than 2 Percent	
(number of countries)							
<b>High-income developing countries</b>							
Asia	5	2	0	3	0	0	0
Latin America	11	1	1	3	3	2	1
North Africa/Middle East	7	2	3	1	0	0	1
Sub-Saharan Africa	3	1	0	1	1	0	0
Total	26	6	4	8	4	2	2
<b>Middle-income developing countries</b>							
Asia	6	0	0	0	2	3	1
Latin America	12	0	1	3	7	1	0
North Africa/Middle East	8	1	1	2	4	0	0
Sub-Saharan Africa	13	1	1	1	5	3	2
Total	39	2	3	6	18	7	3
<b>Low-income developing countries</b>							
Asia	8	0	0	1	0	3	4
Latin America	1	0	0	0	1	0	0
North Africa/Middle East	2	0	0	0	0	1	1
Sub-Saharan Africa	23	0	0	3	1	12	7
Total	34	0	0	4	2	16	12
<b>Total developing countries</b>							
Asia	19	2	0	4	2	6	5
Latin America	24	1	2	6	11	3	1
North Africa/Middle East	17	3	4	3	4	1	2
Sub-Saharan Africa	39	2	1	5	7	15	9
Total	99	8	7	18	24	25	17

Sources: The classification of countries by degree of import dependence is presented in Appendix 3, Table 37.  
 Notes: Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

**Table 8—Distribution of the rate of change of cereal import dependence from 1961-65 to 1976-78 by region**

Region	Increase of More than 5 Percentage Points	Increase of 3 to 5 Percentage Points	Increase of 2 or Fewer Percentage Points or Decline
(number of countries)			
Asia	3	1	15
Latin America	11	2	11
North Africa/Middle East	11	1	5
Sub-Saharan Africa	12	10	17
Total	37	14	48

Sources: The classification of countries by degree of import dependence in 1961-65 and 1976-78 is presented in Appendix 3, Table 37, and the classification by size and direction of change is presented in Table 9.  
 Note: Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included.

Countries where this is not so account for only 4 percent of the region's population.

In most Latin American countries, import dependence is high. Taken together, these countries account for 56 percent of the region's population. Forty-nine percent of the population lives in countries where the rate of increase was also high, and 7 percent in countries where there was little or no increase.

In most countries of North Africa/Middle East, both import dependence and its rate of increase are high. These countries account for 63 percent of the region's population.

In Sub-Saharan Africa, three-fifths of the countries had low import dependence. They account for 90 percent of the region's population. Among them the rate of increase is high in countries accounting for 47 percent of the population. Countries where import dependence and its rate of increase are both high account for 9 percent of the region's population.

## **Declining Role and Changing Geographical Concentration of Food Aid**

While imports by developing countries have increased, food aid has declined, both absolutely and as a share of total imports. Total cereal food aid for the 99 countries covered by this study has dropped from about 11.5 million tons in 1961-63 to less than 8 million tons in 1981. The share of food aid in total imports of cereals dropped from nearly 40 percent to less than 10 percent during the 20-year period (see Table 5). And although per capita imports of cereals doubled, food aid per capita dropped by 60 percent (see Table 10).

Asia still has the largest share of total imports into developing countries (57 percent in 1961-63 and 38 percent in 1981), but the shares of North Africa/Middle East and Latin America increased from about 19 percent for each in the early sixties to 30 and 24 percent in 1981. The share of food aid in total cereal imports dropped sharply in all three regions, from 33 percent in Asia and 67 percent in North Africa/Middle East to about 8 percent in each region and from 34 percent to 2 percent in Latin America. By contrast, total cereal imports in Sub-Saharan Africa, which were 5 percent of the developing country total in 1961-63, were still less than

10 percent in 1981. However, food aid as a share of total imports increased from 8 percent to 23 percent.

Food aid has always occupied a much higher share of total cereal imports in low-income countries than in middle- or high-income countries, but the contrast is sharper now than it was in the early sixties. Food aid then equaled a quarter to a third of total cereal imports in middle- and high-income countries and two-thirds in low-income countries. By 1981 the food aid share in low-income countries had dropped to 40 percent, but it had fallen to about 7 percent in middle-income countries and to less than 2 percent in high-income countries. This shift reflects the higher rate of growth of total imports into middle- and high-income countries, rather than a significant shift of food aid to low-income countries. In this respect the primary change has been a decline in the proportion of food aid received by high-income countries and an increase in the proportion received by middle-income countries (see Figure 1).

In 1981 middle- and high-income countries together imported 83.7 million tons of cereals commercially and received 3.9 million tons as food aid, whereas low-income countries imported 5.8 million tons of cereals commercially and received 3.8 million tons as food aid (see Table 5). On a per capita basis, high-income countries took 95.3 kilograms per person commercially and 1.2 kilograms as food aid. For middle-income countries the figures were 28.8 kilograms and 2.3 kilograms, and for low-income countries they were 4.5 kilograms and 2.9 kilograms respectively (see Table 10). These data reveal even more sharply the greater importance of food aid for low-income countries (see Figure 2).

Nevertheless, for all income groups and for all regions except Sub-Saharan Africa, food aid per capita declined after the early sixties. This decline has been particularly pronounced in high-income countries, which received disproportionately high amounts relative to the size of their populations in the early period. But it should also be noted that food aid per capita in low-income countries is now less than half what it was 20 years ago, and that total imports of cereals per capita declined for this group alone.

Geographical distribution of food aid has shifted because a number of important recipients in the earlier period have since

**Table 9—Degree of cereal import dependence, 1976-78, and the size and direction of change since 1961-65**

Size and Direction of Change Since 1961-65	Degree of Import Dependence						Total
	> 75 Percent	≤ 75 > 50 Percent	≤ 50 > 25 Percent	≤ 25 > 10 Percent	≤ 10 > 2 Percent	≤ 2 > 0 Percent	
(percentage points)			(names and number of countries)				
Asia	2	0	4	2	6	5	19
Plus more than 25							0
Plus 11-25			Korea, Republic of				1
Plus 6-10			Sri Lanka	Papua New Guinea			3
Plus 3-5			Fiji				0
Plus or minus 2 or fewer				Mongolia	Bangladesh	Bhutan	10
					China	Burma	
					Indonesia	Nepal	
					Korea, Democratic People's Republic of	Thailand	
Minus more than 2	Singapore		Malaysia		Philippines		5
	Hong Kong				Pakistan	India	
Latin America	1	2	6	11	3	1	24
Plus more than 25			Venezuela				1
Plus 11-25		Cuba	Chile	Ecuador			7
			Dominican Republic	Haiti			
			Peru				
Plus 6-10			Surinam				
				Honduras			3
				Mexico			
Plus 3-5				Nicaragua			
Plus or minus 2 or fewer	Trinidad and Tobago	Jamaica		Colombia	Uruguay		2
		Costa Rica		Bolivia	Brazil	Argentina	9
				El Salvador			
				Guatemala			
				Panama			
Minus more than 2			Guyana		Paraguay		2

North Africa/Middle East	3	4	3	4	1	2	17
Plus more than 25	Jordan	Algeria	Iraq				5
Plus 11-25	Saudi Arabia	Cyprus	Egypt	Iran			5
	Lebanon	Libya		Yemen Arab Republic			
Plus 6-10				Morocco			1
Plus 3-5				Syria			1
Plus or minus 2 or fewer			Tunisia		Sudan	Afghanistan	3
Minus more than 2		Yemen, People's Democratic Republic of				Turkey	2
<hr/>							
Sub-Saharan Africa	2	1	5	7	15	9	39
Plus more than 25		Mauritania	Gambia				2
Plus 11-25			Gabon	Lesotho			4
			Guinea-Bissau				
Plus 6-10	Réunion		Somalia	Congo	Nigeria		6
			Senegal	Ivory Coast			
Plus 3-5				Liberia		Angola	10
				Ghana		Benin	
						Cameroon	
						Madagascar	
						Mozambique	
						Niger	
						Togo	
						Zaire	
Plus or minus 2 or fewer				Swaziland		Zambia	
						Guinea	14
						Mali	
						Sierra Leone	Burundi
						Tanzania	Central African Republic
						Upper Volta	Chad
							Ethiopia
							Kenya
							Malawi
							Rwanda
Minus more than 2	Mauritius			Botswana			Uganda
							Zimbabwe
							3

Sources: The classification of countries by degree of import dependence in 1961-65 and 1976-78 is presented in Appendix 3, Table 37.

Note: Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included.

**Table 10—Per capita volume of total cereal imports and food aid in developing countries by region and income group, 1961-63, 1976-78, and 1981**

Region or Income Group	Year	Food Aid Per Capita	Total Cereal Imports Per Capita
			(kilograms)
Asia	1961-63	3.82	11.54
	1976-78	2.06	12.98
	1981	1.13	16.13
Latin America	1961-63	8.31	25.00
	1976-78	1.17	43.26
	1981	1.55	63.47
North Africa/Middle East	1961-63	24.13	35.81
	1976-78	10.22	70.96
	1981	9.77	111.34
Sub-Saharan Africa	1961-63	0.62	7.87
	1976-78	2.89	16.21
	1981	6.02	26.00
High-income developing countries	1961-63	12.02	33.73
	1976-78	2.60	58.73
	1981	1.18	96.45
Middle-income developing countries	1961-63	3.27	12.89
	1976-78	2.04	22.10
	1981	2.26	31.13
Low-income developing countries	1961-63	6.34	10.41
	1976-78	3.56	9.19
	1981	2.94	7.42
Total developing countries	1961-63	5.59	14.49
	1976-78	2.74	21.59
	1981	2.36	30.19

Sources: The figures in this table are from Appendix 3, Tables 34-36.

Notes: The figures in this table are for the 99 developing countries covered by this study. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

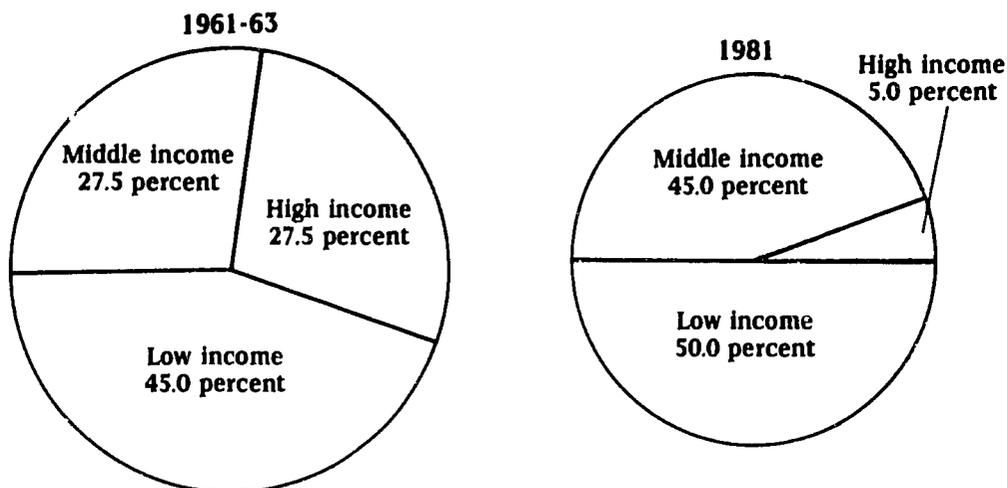
phased out large programs. Particularly notable in this respect are India and Pakistan in Asia; Brazil, Chile, and Colombia in Latin America; and Iran, Syria, Tunisia, and Turkey in North Africa/Middle East. Although some of these countries still rely on food aid to some extent, the volume received by these nine countries between 1961-63 and 1981 dropped almost 7 million tons (see Table 11). This freed about 3 million tons for distribution to newer recipients, primarily the smaller countries of Sub-Saharan Africa and the Caribbean, plus Bangladesh (formerly East Pakistan). The remainder of the drop in volume to major recipients in the early sixties repre-

sents the decline in the total volume of food aid to developing countries.

While the geographical distribution of cereal imports and food aid in developing countries was shifting, equally important changes were taking place in the donor community. Whereas the United States once supplied nearly all food aid, it now supplies only about 55 percent of the total. Canada, Australia, and the EC are the most important of the other suppliers. Bilateral donors still try to develop markets and gain diplomatic leverage, but there is growing emphasis on using food aid to meet the basic food needs of recipient countries.<sup>10</sup>

<sup>10</sup> See Mitchel Wallerstein, *Food for War—Food for Peace: United States Food Aid in a Global Context* (Cambridge, Mass: MIT Press, 1980), for a complete discussion of the evolution of donor policies since the inception of food aid programs in 1954.

**Figure 1—Food aid shares by income group, 1961-63 and 1981**



Sources: The figures used here are from Appendix 3, Tables 34 and 36.

Notes: The total amount of food aid supplied in 1961-63 was 11.6 million metric tons. In 1981 it was 7.6 million. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

The concentration of food aid given by the four major donors in 1976-78 is shown in Table 12. Except for Egypt, Korea, and the Sudan, where the United States is the dominant supplier, all donors give more or less proportionate amounts to the top eight recipients. The United States gives a proportionately larger amount to several Latin American countries and relatively less to the Indian subcontinent and Africa, where EC aid is concentrated. Canada and Australia both give to a smaller number of countries, mostly in the Commonwealth, with which they have longstanding ties. Australia has concentrated its aid on Asia and East Africa, though that may have changed since a simple need matrix was introduced into the aid allocation process.

In value terms, about a quarter of food aid is channeled through the WFP (see Table 13). The WFP uses food donations pledged by donor governments to support feeding projects that are considered suitable for multilateral assistance, although the actual food shipments channeled through the WFP are recorded by most donors as part of their bilateral aid to the designated recipients. A small part of the project aid given by the WFP and bilateral donors consists of food

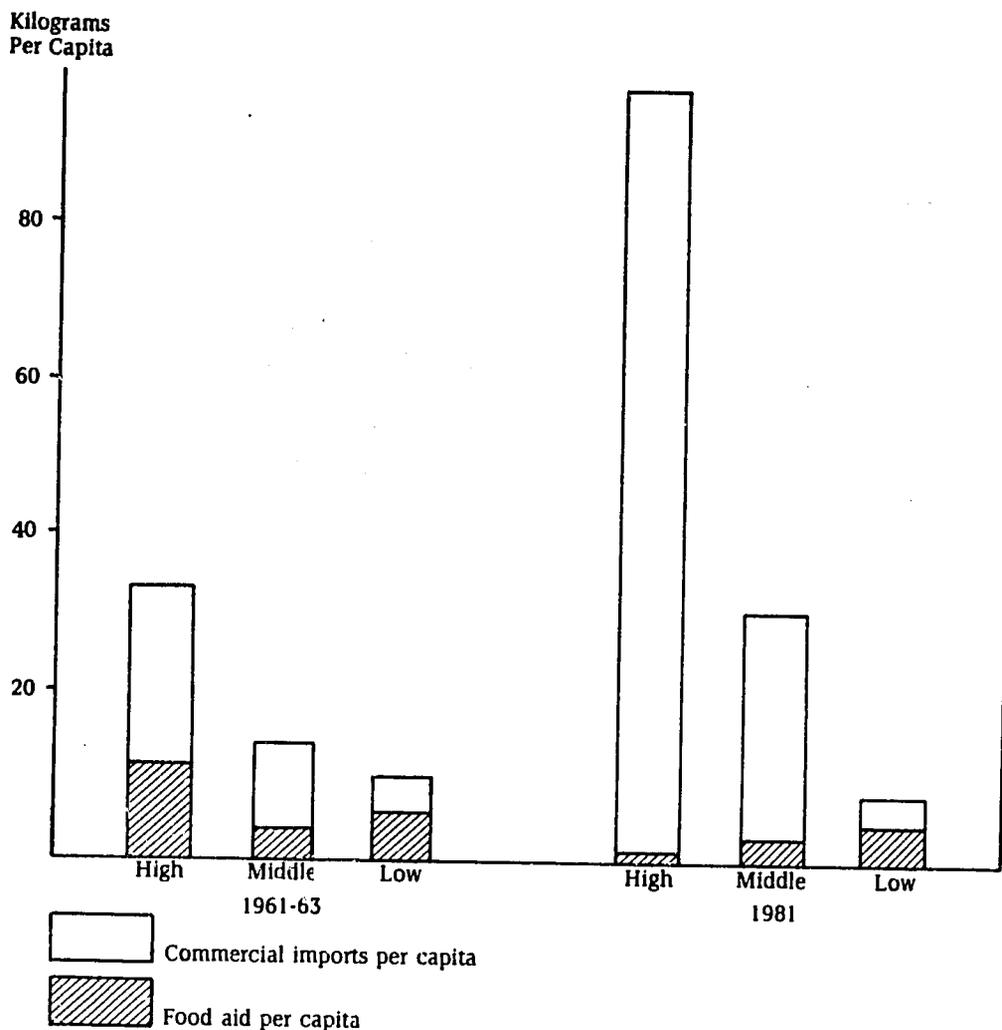
items other than cereals, principally vegetable oil, dairy products, and sugar. In terms of calorie content, these items still account for less than 10 percent of the total (see Table 14).

### **Contribution of Food Aid to Reduction in Foreign Exchange Cost of Cereal Imports**

Whereas the total value of cereal imports into developing countries nearly doubled between 1961-63 and 1976-78, the value of a ton declined from \$213 to \$168 in 1977 U.S. dollars. Thus the increase in the total cost of cereal imports was less pronounced than the increase in the volume for developing countries as a whole. This may be attributed partly to the fall of the real price of wheat over the past two decades, and partly to the increasing proportion of lower-priced corn in the total import mix.

The extent to which food aid contributes to a reduction in the cost of cereal imports depends on the terms on which it is given. As noted in the previous chapter, food aid given on a grant basis reduces the foreign

**Figure 2—Total cereal imports per capita and food aid per capita by income group, 1961-63 and 1981**



Sources: The figures used here are from Appendix 3, Tables 34 and 36.

Notes: Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

exchange cost of imports to zero. Food aid given on a concessional basis reduces the cost by the amount of the grant element in the loan. The true foreign exchange cost of cereal imports to a country that receives food aid is represented by the cost of commercial imports plus the cost of food aid after deducting grant and grant-equivalent portions.

The higher the grant and grant-equivalent portions, the greater the reduction in cost.

As a proportion of total food aid, pure grant aid has increased in all regions except North Africa/Middle East; in Sub-Saharan Africa it rose to 87 percent of total food aid in 1976-78 (see Table 15). This can be explained partly by the growing importance of WFP projects and the project-oriented programs of some of the newer bilateral donors. Also, the absolute value of concessional aid has dropped considerably, from a real value of \$2 billion in 1961-63 to about \$800 million

**Table 11—Volume of commercial cereal imports, total cereal imports, and food aid received by selected developing countries, 1961-63 and 1981**

Region/Country	1961-63			1981		
	Commercial Imports	Food Aid	Total Imports	Commercial Imports	Food Aid	Total Imports
	(1,000 metric tons)					
<b>Asia</b>						
Bangladesh	847	0	847	390	689	1,079
China	5,412	0	5,412	17,373	37	17,410
Hong Kong	663	13	676	801	0	801
India	820	3,499	4,319	1,088	435	1,523
Indonesia	946	246	1,192	1,575	404	1,979
Korea, Democratic People's Republic of	225	0	225	720	0	720
Korea, Republic of	174	595	769	7,363	324	7,687
Malaysia	747	...	747	1,244	0	1,244
Pakistan	0 <sup>a</sup>	1,189	832	36	269	305
Philippines	525	6	531	986	85	1,071
Singapore	662	...	662	1,258	0	1,258
Sri Lanka	554	103	657	435	232	667
Other	194	5	199	618	74	692
<b>Latin America</b>						
Brazil	959	1,186	2,145	5,569	2	5,571
Chile	117	160	277	1,371	21	1,392
Colombia	568	115	183	689	5	694
Cuba	794	2	796	2,094	0	2,094
Mexico	276	47	323	6,602	0	6,602
Peru	301	131	432	1,129	116	1,245
Venezuela	376	0	376	2,378	0	2,378
Other	845	217	1,062	2,619	418	3,037
<b>North Africa/Middle East</b>						
Algeria	397	115	512	3,232	29	3,261
Egypt	172	1,664	1,836	5,425	1,862	7,287
Iran	0 <sup>a</sup>	220	202	3,236	0	3,236
Iraq	197	12	209	2,275	0	2,275
Lebanon	290	21	311	660	32	692
Libya	106	29	135	942	0	942
Morocco	129	293	422	2,658	100	2,758
Saudi Arabia	232	2	234	4,100	0	4,100
Syria	0 <sup>a</sup>	249	206	941	30	971
Tunisia	20	317	337	866	94	960
Turkey	0 <sup>a</sup>	815	796	290	9	299
Other	406	134	540	1,797	382	2,179
<b>Sub-Saharan Africa</b>						
Nigeria	110	8	118	2,440	0	2,440
Other	1,401	121	1,522	4,301	2,040	6,341

Sources: The figures for total imports and food aid are from Appendix 3, Tables 34 and 36. Figures for commercial imports are the difference between total imports and food aid.

Note: The countries listed are developing countries that imported more than 300,000 metric tons of grain in 1961-63 or more than 500,000 metric tons in 1981.

<sup>a</sup> Food aid is assumed to be 100 percent of imports.

in 1976-78. Taking into account both the value of grant aid and the grant-equivalent portion of concessional aid, about 59 percent of the total value of food aid for all developing countries in 1961-63 was received on a grant or grant-equivalent basis. By 1976-78,

70 percent of a much smaller total was received on this basis.

Food aid reduced the total cost of cereal imports in 1976-78 by about a third for low-income countries, but by only 2 to 5 percent for middle- and high-income countries (see

**Table 12—Average annual shipments of cereal food aid by major donor and recipient, 1976-78**

Recipient Country	Total	Donors			United States
		Australia	Canada	European Community	
(1,000 metric tons)					
Egypt	1,778	10	28	64	1,676
Bangladesh	950	57	172	122	600
Korea, Republic of	608	0	0	0	608
India	602	40	167	58	337
Indonesia	549	46	21	3	479
Pakistan	406	20	53	30	303
Sri Lanka	295	10	26	24	236
Morocco	129	0	0	0	130
Chile	127	0	0	0	127
Jordan	104	0	0	16	86
Tunisia	91	0	0	0	91
Tanzania	79	4	30	4	41
Syria	73	0	0	2	71
Sudan	57	2	0	6	49
Lebanon	56	0	0	15	41
Jamaica	44	0	4	0	40
Ghana	40	2	27	7	4
Haiti	40	0	1	3	36
Mozambique	32	1	9	5	17
Bolivia	31	0	0	1	30
Somalia	31	0	5	13	14
Senegal	30	0	5	9	17
Ethiopia	29	2	0	4	23
Zaire	29	0	0	12	17
Philippines	28	6	0	3	19
Guinea	26	0	0	3	23
Peru	22	0	0	6	16
Afghanistan	21	2	0	2	18
Niger	19	0	2	5	12
Mauritania	15	0	2	2	11
Honduras	13	0	0	5	8
Yemen Arab Republic	12	0	0	6	6
Mali	11	0	3	2	6
Zambia	11	0	0	7	5
Other	95	17	0	17	61
<b>Total</b>	<b>6,928</b>	<b>219</b>	<b>555</b>	<b>456</b>	<b>5,698</b>

Source: International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981.

Note: The total is short about 500,000 metric tons for contributions of smaller donors, which are not recorded by the recipients.

Tables 16 and 17 and Appendix 3, Table 38). This is because low-income countries receive a higher proportion of food aid as pure grants, and food aid makes up a higher share of their total cereal imports.

Another way of looking at the contribution of food aid is to consider the amount by which

it has reduced the balance-of-payments burden of cereal imports. This can be done by looking at the total cost and the true cost of cereal imports as shares of export earnings.<sup>11</sup>

Table 17 shows that in Asia and North Africa/Middle East the ratio of the total cost of imports to earnings from exports declined

<sup>11</sup> Because cost data for food aid flows are available only from the IFPRI tape, which stops in 1978, the analysis does not cover more recent years. Also, export earnings series are not available for 17 of the 99 countries covered by this study.

**Table 13—Value of bilateral, multilateral, and total food aid, and the share of multilateral food aid in the total, selected years**

Year	Bilateral Food Aid	Multilateral Food Aid	Total Food Aid	Share of Multilateral Food Aid in the Total
	(U.S. \$ million)			(percent)
1964-66 <sup>a</sup>	1,375.0	14.8	1,389.8	1.0
1969	1,084.3	89.7	1,174.0	7.6
1971	1,050.2	166.9	1,217.1	13.7
1973	850.4	279.3	1,129.7	24.7
1975	1,581.4	498.0	2,079.4	23.9
1977	1,405.4	507.1	1,912.5	26.5

Source: Mitchel Wallerstein, *Food for War—Food for Peace: United States Food Aid in a Global Context* (Cambridge, Mass.: MIT Press, 1980), p. 230.

<sup>a</sup> This is the average food aid per year.

from about 10 percent to about 3 percent between 1961-63 and 1976-78; in Latin America and Sub-Saharan Africa it remained stable at about 3 percent. In all regions except Sub-Saharan Africa, food aid reduced this ratio in the early 1960s, but by 1976-78 there was no difference between the average ratios for the total cost and for the true cost of cereal imports for any region, or for the middle- and high-income groups. Food aid

reduced the average ratio from 4 to 3 percent for the low-income group. When concessional food aid is treated as if it entailed no cost to the recipient country, food aid reduced the ratio by 1 percent for North Africa/Middle East and the middle-income group, which probably reflects the large share of concessional aid Egypt had in these two categories.

The drop in the ratio of total cereal import costs to export earnings from 7 to 3 percent for developing countries as a group indicates that the growth rate of exports (including goods, services, and private remittances) was strong enough to more than cover the increased cost of cereal imports, even if food aid had not been available. Of course, this average masks considerable differences between countries. It also masks year-to-year variation in the ratio of cereal import costs to export earnings, which is quite large for some countries.

The data indicate that because of poor export performance, the total cost of cereal imports would cause greater strain on the balance of payments for low-income countries than for middle- and high-income countries were it not for food aid. In 1976-78 the median ratio of import costs to export earnings was 4 percent for 82 countries with export data; it was higher than 10 percent in just 10 countries (see Figure 3). For almost half the countries within the low-income group, the ratios were higher than the median in 1976-78; for a quarter the ratios were lower, and for the other quarter data were

**Table 14—Shares of food aid commodities in total calories provided, 1970/71 and 1980/81**

Commodity	1970/71	1980/81
	(percent)	
Wheat and wheat flour	69.3	61.4
Rice	13.5	16.6
Other cereals <sup>a</sup>	9.0	12.8
Edible vegetable oil	7.2	5.5
Skimmed milk powder	0.2	2.5
Other foods <sup>b</sup>	0.5	1.2

Source: Food and Agriculture Organization of the United Nations (FAO), *Food Aid Bulletin*, various issues.

Notes: The total is based on the figures for government transactions supplied by donors to the Committee on Surplus Disposal of FAO. These figures do not include U.S. Title II transactions and some other donations for humanitarian projects and emergency relief.

<sup>a</sup> Other cereals are calculated as maize.

<sup>b</sup> Other foods are calculated as sugar.

**Table 15—Value of grant aid and grant-equivalent aid as a proportion of total food aid, 1961-63 and 1976-78**

Region or Income Group/ Type of Aid	1961-63		1976-78	
	Value	Share of Total Food Aid	Value	Share of Total Food Aid
	(1977 U.S. \$ million)	(percent)	(1977 U.S. \$ million)	(percent)
<b>Asia</b>				
Grant aid	65	6	189	31
Grant-equivalent aid	668	58	226	37
Commercial-equivalent aid	421	36	189	31
Total food aid	1,154	100	604	99
<b>Latin America</b>				
Grant aid	23	6	14	28
Grant-equivalent aid	140	38	15	30
Commercial-equivalent aid	206	56	21	42
Total food aid	369	100	50	100
<b>North Africa/Middle East</b>				
Grant aid	178	26	73	16
Grant-equivalent aid	233	34	176	39
Commercial-equivalent aid	278	40	197	44
Total food aid	689	100	446	99
<b>Sub-Saharan Africa</b>				
Grant aid	11	37	137 <sup>a</sup>	87
Grant-equivalent aid	9	30	11	7
Commercial-equivalent aid	10	33	9	6
Total food aid	30	100	157 <sup>a</sup>	100
<b>High-income developing countries</b>				
Grant aid	76	13	11	7
Concessional aid	502	87	137	93
Total food aid	578	100	148	100
<b>Middle-income developing countries</b>				
Grant aid	138	24	92	24
Concessional aid	446	76	291	76
Total food aid	584	100	383	100
<b>Low-income developing countries</b>				
Grant aid	63	6	310 <sup>a</sup>	43
Concessional aid	1,009	94	416	57
Total food aid	1,072	100	726 <sup>a</sup>	100
<b>Total developing countries<sup>b</sup></b>				
Grant aid	277	12	413 <sup>a</sup>	33
Grant-equivalent aid	1,050	47	428	34
Commercial-equivalent aid	915	41	416	33
Total food aid	2,242	100	1,257 <sup>a</sup>	100

Source: International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981.

Notes: Grant-equivalent aid is the proportion of concessional food aid that is essentially free; commercial-equivalent aid is the proportion that the recipient must pay. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

<sup>a</sup> An additional U.S. \$79 million has been added for small donor aid to Africa.

<sup>b</sup> These are the 99 developing countries covered by this study.

lacking. Six of the 10 countries with ratios greater than 10 percent belonged to the low-income group; the other 4 belonged to the middle-income group but had per capita incomes of less than \$400 in 1977 U.S. dollars.

In contrast, the ratios for more than half of the middle- and high-income countries were lower than the median. For about a third they were higher, and for the remainder data were lacking (see Appendix 3, Table 39).

**Table 16—Value of total and commercial cereal imports and of food aid for developing countries, and the true cost of total imports, by region and income group, 1961-63 and 1976-78**

Region or Income Group	Year	Total Cereal Imports	Food Aid	Commercial Cereal Imports	True Cost of Cereal Imports
(1977 U.S. \$ million)					
Asia	1961-63	3,752	1,150	2,602	3,022
	1976-78	4,385	603	3,782	3,969
Latin America	1961-63	1,158	366	791	998
	1976-78	2,136	47	2,089	2,108
North Africa/Middle East	1961-63	1,078	687	391	669
	1976-78	2,923	445	2,546	2,700
Sub-Saharan Africa	1961-63	411	30	381	391
	1976-78	1,114	77	1,040	1,048
High-income developing countries	1961-63	1,918	578	1,340	1,595
	1976-78	3,679	148	3,531	3,593
Middle-income developing countries	1961-63	2,492	583	1,908	2,175
	1976-78	4,690	383	4,306	4,470
Low-income developing countries	1961-63	1,989	1,072	917	1,310
	1976-78	2,189	641	1,618	1,762
Total developing countries	1961-63	6,399	2,233	4,165	5,080
	1976-78	10,558	1,172	9,457	9,825

Source: All figures are from Appendix 3, Table 38.

Notes: True cost is the c.i.f. value of commercial imports plus the discounted value of the part of concessionally financed food aid that the recipient must eventually pay. Income groups are based on per capita GNP in 1976-78 expressed in 1977 dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

Since the volume of cereals imported by low-income countries was much lower than the volume imported by middle- and high-income countries, the higher proportion of low-income countries with high ratios apparently reflects the poor export performance of these countries. Food aid reduced the cost for most low-income countries with high cereal import bills, but cereal imports still represented more than 4 percent of exports.

For many countries in all income groups, the ratio of cereal import costs to export earnings varies considerably from year to year. Out of 82 countries for which export earnings data were available, the mean ratio of the true cost of cereal imports to export earnings during 1961-78 was more than 5 percent for only 26. However, the maximum ratio was more than 5 percent for 47. For 22 countries this maximum exceeded 10 percent, and for 10 countries it was greater than 25 percent (see Table 18 and Appendix 3, Table 40). Thus, while the average cost of

cereal imports may not seriously strain the balance of payments, there may be problems for many developing countries in certain years, even though the trends for both the total and the true costs of their cereal imports as shares of export earnings have fallen.

### **Contribution of Cereal Imports and Food Aid to Adequacy of Supply in Developing Countries**

A principal reason why developing countries have been importing larger quantities of cereals on both commercial and concessional terms is so they can ensure that the food supply in the country will be large enough to meet effective demand without sharp price increases that would force consumption by low-income groups to fall below nutritionally adequate amounts. Although most countries want to provide enough food

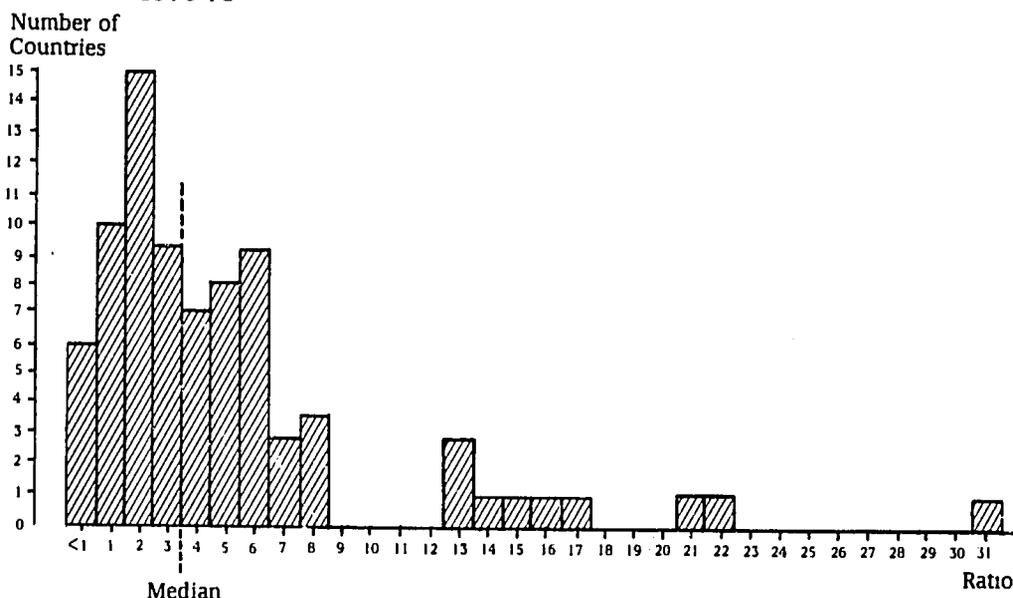
**Table 17—Value of total and commercial cereal imports and the true cost for developing countries as shares of export earnings, by region and income group, 1961-63 and 1976-78**

Region or Income Group	Year	Value of Total Cereal Imports	Value of Commercial Cereal Imports	True Cost of Cereal Imports	Coverage
Asia	1961-63	11	7	9	9 of 19 countries
	1976-78	3	3	3	14 of 19 countries
Latin America	1961-63	3	2	2	22 of 24 countries
	1976-78	4	4	4	23 of 24 countries
North Africa/Middle East	1961-63	9	1	5	10 of 17 countries
	1976-78	3	2	3	15 of 17 countries
Sub-Saharan Africa	1961-63	4	4	4	9 of 39 countries
	1976-78	3	3	3	29 of 39 countries
High-income developing countries	1961-63	5	3	4	17 of 26 countries
	1976-78	2	2	2	24 of 26 countries
Middle-income developing countries	1961-63	6	2	4	21 of 39 countries
	1976-78	4	3	4	32 of 39 countries
Low-income developing countries	1961-63	12	6	8	11 of 34 countries
	1976-78	4	3	3	25 of 34 countries
Total developing countries	1961-63	7	4	5	49 of 99 countries
	1976-78	3	3	3	81 of 99 countries

Source: All figures are from Appendix 3, Table 39.

Notes: True cost is the c.i.f. value of commercial imports plus the discounted value of the part of concessionally financed food aid that the recipient must eventually pay. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

**Figure 3—Distribution of the ratio of total cereal import costs to export earnings, 1976-78**



Source: The figures used here are from Appendix 3, Table 39.

**Table 18—Distribution of means and maxima for true cost of cereal imports as a share of export earnings, 1961-78**

Maxima	Means				Total
	0.05 or Less	0.06 – 0.09	0.10 – 0.25	Greater than 0.25	
	(number of countries)				
0.05 or less	35	0	0	0	35
0.06 – 0.09	13	2	0	0	15
0.10 – 0.25	8	8	6	0	22
Greater than 0.25	0	0	9	1	10
Total	56	10	15	1	82

Source: The figures in this table are derived from Appendix 3, Table 40.

Notes: Export earnings data are not available for 17 of the 99 developing countries covered by this study. True cost is the c.i.f. value of commercial imports plus the discounted value of the part of concessionally financed food aid that the recipient must eventually pay.

to eliminate hunger and malnutrition, not all have had equal success in doing so.

An FAO/WHO expert group has established a standard for nutritionally adequate consumption. It is expressed as an average per capita calorie requirement for each country, taking into account age and sex distribution and the normal activity levels of the country's population. This indicator does not reflect how consumption varies by income group, season, or the metabolism rates of individuals. Nevertheless, where average per capita calorie intake is well below the FAO/WHO standard, there is reason to believe that food supply and, therefore, consumption is inadequate for some population groups.

In 1977-79, average per capita calorie intake equaled or exceeded the FAO/WHO standard in 43 of the countries covered by this study and equaled at least 98 percent of the standard in another 9. Per capita calorie intake was less than 98 percent in 47 countries; in three-fifths of these 47 it was less than 90 percent (see Table 19 and Appendix 3, Table 41).

Fourteen countries in Asia had per capita food supplies equaling or exceeding 98 percent of the FAO/WHO standard; for 9 of them per capita calorie intake exceeded the standard. But four low-income countries on the Indian subcontinent—Bangladesh, Bhutan, India, and Nepal—containing more

**Table 19—Average per capita calorie intake in 1977-79 as a percentage of the FAO/WHO standard**

Region	Percent of the FAO/WHO Standard					Total
	> 100	≤ 100 ≥ 98	< 98 > 90	≤ 90 ≥ 80	< 80	
	(number of countries)					
Asia	9	5	0	4	1	19
Latin America	15	0	6	2	1	24
North Africa/Middle East	10	2	2	3	0	17
Sub-Saharan Africa	9	2	11	15	2	39
Total	43	9	19	23	4	99

Source: The figures in this table are derived from Appendix 3, Table 41.

Notes: Data for 1975-77 were used when data for 1977-79 were not available. The FAO/WHO standard is the per capita daily calorie requirement established for each country by an expert group from the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

than a third of the population of the region, had seriously inadequate per capita food supplies equaling 90 percent or less of the FAO/WHO standard. Data for China are less certain, but it appears that its food supplies also equaled less than 90 percent of the FAO/WHO standard. It has more than 40 percent of the region's population.

In 15 of 24 Latin American countries, average per capita calorie intake exceeded the FAO/WHO standard in 1977-79, but for 9 countries food supplies equaled less than 98 percent of the standard. Among these 9, food supplies equaled 90 percent or less for Bolivia and Peru, and for Haiti they equaled only 72 percent. These three countries contain about 8 percent of the region's population.

Ten of the 17 countries in North Africa/Middle East, including Egypt, had food supplies that equaled or exceeded the FAO/WHO standard in 1977-79; per capita calorie intake equaled 98 or 99 percent of the standard in two others, and exceeded 90 percent of the standard in 2 more. The 3 countries in this region with food supplies equaling less than 90 percent of the standard were Afghanistan, Jordan, and the People's Democratic Republic of Yemen. Together, they contain 8 percent of the region's population.

Food supplies in Sub-Saharan Africa exceeded the FAO/WHO standard in 9 of the 39 countries in 1977-79; in two other countries they equaled 98-100 percent of the standard. However, for 28 countries per capita calorie intake was less than 98 percent of the standard, and for 17 it was 90 percent or less. These 17, containing 46 percent of the region's population, are Angola, Botswana, Chad, Ethiopia, Ghana, Guinea, Kenya, Mali, Mauritania, Mozambique, Niger, Sierra Leone, Tanzania, Togo, Uganda, Upper Volta, and Zambia (see Appendix 3, Table 41).

In all, 27 countries had seriously inadequate per capita food supplies in 1977-79. For 14 of them current consumption is less than it was in 1961-63. During the past two decades per capita consumption fell in only one other country, Uruguay, but calorie intake is still more than adequate there.

Table 20 shows the share of imports in total staple consumption and the share of food aid in cereal imports for these 27 countries. The import dependence ratio increased in 15 of these countries between 1961-65 and 1976-78 but still equaled less than 10 percent for two-thirds of them in the later period. Food aid was quite important for

most of them, exceeding 10 percent of cereal imports for 21 and averaging 39 percent for the group as a whole. Thus, in general, countries that have seriously inadequate food supplies do not depend heavily on cereal imports, but a large share of the quantities they do import is food aid. Nineteen of these countries have low incomes, and only Jordan is a high-income country.

On a per capita basis, a few countries receive disproportionate shares of food aid in relation to need (Table 21). Among middle- and high-income countries, 45 had adequate food supplies in 1977-79. Of these 45, 35 were dependent on imports for more than 10 percent of total staple consumption, while the other 10 had lower import dependence ratios.

Of the countries with adequate food supplies and import dependence ratios greater than 10 percent, 21 received food aid and 14 did not. Those receiving food aid accounted for 38 percent of total food aid at that time. Two of them, Egypt and the Republic of Korea, took 30 of that 38 percent. For the group as a whole, food aid averaged 9 kilograms per capita.

Seven of the countries with adequate food supplies but lower import dependence ratios received some food aid, accounting for 1 percent of total food aid amounting to an average of 0.8 kilograms per capita. Four countries in this group received no food aid at all.

Nineteen middle- and high-income countries had inadequate food supplies in 1977-79. Sixteen were dependent on imports for more than 10 percent of total staple consumption; together they took 6 percent of total food aid. Three were not very dependent on imports and took less than 1 percent of total food aid. Food aid averaged 8.1 kilograms per capita for the group.

Among low-income countries, 7 had adequate food supplies and 27 had inadequate supplies in 1977-79. For 2 of those with adequate supplies, food aid averaged 27.94 kilograms per capita and import dependence exceeded 10 percent. For the other five, food aid averaged only 3.02 kilograms per capita and import dependence was less than 10 percent. Of the 27 countries with inadequate food supplies, 1 with low import dependence received no food aid, 22 with low import dependence received food aid averaging 3.89 kilograms per capita, and 3 with high import dependence received food aid averaging 15.96 kilograms per capita.

**Table 20—Import dependence, 1961-65 and 1976-78, food aid reliance, 1961-63 and 1976-78, and food supply adequacy, 1961-63 and 1977-79**

Region/Country	Daily Per Capita Calorie Consumption as a Percent of the FAO/WHO Standard		Cereal Import Dependence Ratio		Food Aid Reliance Ratio	
	1961-63	1977-79 <sup>a</sup>	1961-65	1976-78	1961-63	1976-78
	(percent)					
Countries with declining per capita consumption and consuming 90 percent or less of the FAO/WHO standard in 1977-79						
Asia						
Bangladesh	85	77	7	9	n.a.	75
India	93	90	5	2	81	36
Nepal	92	88	... <sup>b</sup>	... <sup>b</sup>	...	100
Latin America						
Haiti	87	81	7	18	57	35
Peru	95	90	19	30	30	3
North Africa/Middle East						
Afghanistan	86	81	1	1	57	46
Jordan	89	84	51	89	35	28
Sub-Saharan Africa						
Chad	98	75	... <sup>b</sup>	2	0	100
Ethiopia	90	75	... <sup>b</sup>	2	100	50
Ghana	88	87	6	11	15	25
Kenya	99	90	4	2	0	19
Mauritania	87	84	29	68	0	24
Mozambique	86	81	5	10	20	54
Niger	93	87	... <sup>b</sup>	4	0	92
Other countries consuming 90 percent or less of the FAO/WHO standard in 1977-79						
Asia						
Bhutan	86	89	2	1	0	1
Latin America						
Bolivia	68	87	20	20	56	8
North Africa/Middle East						
Yemen, People's Democratic Republic of	82	86	72	63	0	7
Sub-Saharan Africa						
Angola	78	88	4	9	0	7
Botswana	89	89	31	19	n.a.	16
Guinea	81	83	6	6	0	42
Mali	85	90	1	3	0	65
Sierra Leone	85	90	8	7	0	17
Tanzania	79	88	5	4	0	95
Togo	87	88	2	5	0	43
Uganda	89	89	1	... <sup>b</sup>	0	0
Upper Volta	80	85	1	3	0	50
Zambia	80	86	4	7	0	22

Sources: Daily per capita calorie consumption as a percent of the FAO/WHO standard is from Appendix 3, Table 41. The cereal import dependence ratios are from Appendix 3, Table 37. The food aid reliance ratios are from Appendix 3, Tables 34 and 35.

Notes: The FAO/WHO standard is the per capita daily calorie requirement established for each country by an expert group from the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO). Where n.a. appears, the data were not available.

<sup>a</sup> Data for 1975-77 were used when data for 1977-79 were not available.

<sup>b</sup> This ratio is less than 0.5 percent.

**Table 21—Total and per capita volumes of food aid for countries grouped by per capita income, food supply status, and degree of import dependence, 1976-78**

Country Group	Number of Countries	Total Food Aid		Mean Food Aid Per Capita
		Volume	Share of Developing Country Total	
		(1,000 metric tons)	(percent)	(kilograms)
<b>Middle- and high-income countries</b>				
Countries with adequate food supply receiving food aid				
Import dependence greater than 10 percent	21	3,059	38.6	8.79
Import dependence 10 percent or less	6	87	1.1	0.78
Total	27	3,146	39.7	7.01
Countries with adequate food supply not receiving food aid				
Import dependence greater than 10 percent	14	0	0.0	0.00
Import dependence 10 percent or less	4	0	0.0	0.00
Total	18	0	0.0	0.00
Countries with inadequate food supply receiving food aid				
Import dependence greater than 10 percent	16	447	5.6	8.15
Import dependence 10 percent or less	3	32	0.4	1.58
Total	19	479	6.0	7.12
Countries with inadequate food supply not receiving food aid				
Import dependence 10 percent or less	1	0	0.0	0.00
<b>Low-income countries</b>				
Countries with adequate food supply receiving food aid				
Import dependence greater than 10 percent	2	363	4.6	27.94
Import dependence 10 percent or less	5	1,181	14.9	3.02
Total	7	1,544	19.5	10.14
Countries with inadequate food supply receiving food aid				
Import dependence greater than 10 percent	4	150	1.9	15.96
Import dependence 10 percent or less	22	2,605	32.9	3.89
Total	26	2,755	34.8	5.74
Countries with inadequate food supply not receiving food aid				
Import dependence 10 percent or less	1	0	0.0	0.00

Sources: The figures on food aid are derived from Appendix 3, Table 35. The classification of countries by adequacy of food supply and degree of import dependence is from Appendix 3, Table 41.

Notes: Mean food aid per capita is the average of the observations in the group, not weighted by population size. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Food supply is considered adequate if it exceeds 98 percent of the FAO/WHO standard.

The results of this analysis indicate that if the mean for per capita food aid had been higher for low-income countries with inadequate food availability and lower for middle- and high-income countries with adequate food availability, the seriousness

of the food supply problem could have been reduced even with no increase in total food aid. It does appear, however, that, on the whole, large quantities of food aid are flowing to countries that need it, though in insufficient amounts.

# 5

## SOURCES OF TRADE GROWTH AND THE ROLE OF FOOD AID

Imports are the difference between effective demand and domestic supply. There are many reasons why imports grow. In this chapter, several of these reasons are examined.

Three related indicators of import behavior are analyzed: total imports, per capita imports, and the ratio of imports to total staple consumption. The rate of growth in import volumes is affected by the size of a country's population and the initial amount of cereals it imports, but the sources of growth are to be found in factors such as growth in population, national income, foreign exchange availability, and domestic staple crop supply.<sup>12</sup> The relationship of these factors to growth in total imports is explored. Per capita imports are then examined to let the determinants of import demand be seen apart from effects caused by the sizes of the countries considered.

Increases in per capita imports of cereals do not indicate whether import demand has grown because of growth in total demand or whether it has grown because of stagnant or declining domestic staple crop production. If total per capita consumption grows as fast as or faster than per capita imports, then import dependence need not increase or may even decline, despite the growth of cereal imports. However, if staple crop production does not keep pace with the increase in total demand, then import dependence may increase, even when import volumes do not grow rapidly. The importance of cereal imports in a country's food economy is better reflected by the ratio of cereal imports to total staple consumption. It is useful to explore how much this ratio has increased and the factors associated with it in more detail, because an increase in import dependence (or a decline in self-sufficiency) is

often referred to in political bodies as undesirable for Third World countries and is attributed in part to the disincentive effect of food aid on domestic staple crop production.

This chapter investigates the hypothesis that the influence of food aid on the growth of trade and on import dependence is small compared to that of other factors, except in some low-income countries where the growth rates for total imports and food aid are high but the volumes of both are small and import dependence is low. If the import demand for cereals is inelastic with respect to the supply of foreign exchange, then the hypothesis that food aid has not contributed much to the growth of cereal imports in developing countries is plausible because the food aid will simply substitute for commercial imports rather than create additional demand. Even if import demand is somewhat elastic with respect to the supply of foreign exchange, including food aid, the effect of food aid on the growth rate of cereal imports may be insignificant if the share of the food aid transfer in the total supply of foreign exchange or in the total volume of cereal imports is negligible.

Increases in import dependence can be accounted for by the effect of higher per capita incomes on demand or by growth in demand plus changes in the economic structure that put more emphasis on export industries and less on staple crop production. A decrease of staple crop production and an increase in urbanization without an increase in incomes can also trigger an increase in the demand for cereal imports if foreign exchange is allocated to meet this additional demand. It is hypothesized that food aid is important primarily in this situation.

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<sup>12</sup> Other factors could include changes in the degree of urbanization and industrialization and world price trends. The first is considered in the multiple regression presented later in this chapter. Because the real prices for major cereals declined from 1961 to 1978, some of the increase in developing country imports could be attributed to this factor. However, reliable price elasticities of import demand are not available for individual countries, so it was not possible to estimate how much influence real prices had.

## Contribution of Initial Import Volumes and Population Size to Current Import Volumes

Much of the absolute growth in import volume occurred in countries that initially imported large amounts of grain. In 1981, 23 countries imported at least 1 million tons of cereals. They accounted for 82 percent of the cereals imported into the 99 developing countries covered by this study. Eighteen of these countries also ranked among the top 23 importers in 1961-63 and accounted for two-thirds of the cereal imports of that period. Using rank order correlation to test the hypothesis that the volume imported in 1981 tended to be highest in countries that were also large importers in the earlier period, a Spearman correlation coefficient of 0.85 was obtained, and it was significant at the 95 percent level.

Among the 24 countries with import growth rates of 10 percent or greater during the period 1961-78, only 7 were large importers—all of them also oil exporters. Each of the others imported less than 300,000 tons in 1961-63 and less than 500,000 tons in 1976-78. Together these 17 countries accounted for only 2.3 million tons of the 32.8 million ton increase in imports by developing countries during the period, while the 7 oil-exporting countries accounted for 11.3 million tons. Thus, in over two-thirds of countries with high growth rates for imports, the initial volume was small. A rank order correlation test of the hypothesis that countries with high growth rates have low starting volumes gave a Spearman correlation coefficient of  $-0.13$ , which was significant at the 90 percent level.

Looking at import volume in relation to population size, 21 of the 23 large importers in 1981 ranked among the top 38 in size (those with populations over 9 million). Thus nearly all countries with large imports had large populations, but nearly half of the countries with large populations imported smaller amounts. This suggests that population size is a condition necessary but not sufficient to bring about large import volumes.

## Contribution of Growth in GNP, Foreign Exchange, and Staple Crop Production to Growth in Trade

The growth rates of cereal imports were compared with growth rates of other indicators of economic performance and market demand, that is, GNP, export earnings, and production of staple crops (Appendix 3, Table 42). The comparison suggests that cereal imports have grown fastest for two types of countries (see Table 22): those in the middle- and high-income groups where the growth rates of the other three indicators were strong and the share of food aid in total cereal imports declined from 31 to 4 percent between 1961 and 1978; and countries in the low-income group where growth rates for GNP, export earnings, and staple crop production were all weak, but food aid increased from 9 to 39 percent of the total volume of cereal imports.<sup>13</sup>

Among countries with high import growth rates (greater than 10 percent), most of the volume increase occurred in the middle- and high-income groups where growth rates for all three economic performance indicators were also high. These two groups took 13.0 million of the 13.6 million ton increase imported by countries with high import growth rates, while the share of food aid in their total cereal imports dropped from 31 to 4 percent.

Among countries with moderately high import growth rates (5 to 10 percent), middle- and high-income countries again accounted for most of the volume growth between 1961-63 and 1976-78. These countries took more than 10 million tons of the total volume increase of 12.8 million for this group. Growth rates for GNP, export earnings, and production of staple crops were strong, and the share of food aid declined to 4 percent for high-income countries in this group; but for the middle-income countries the growth rate for export earnings was low, and in 1976-78 food aid, though declining, still accounted for about 19 percent of their total imports of cereals.

<sup>13</sup> Looking only at the relationships between growth in food imports, per capita GNP, and staple crop production, John Mellor obtains similar results in a paper entitled "Third World Development: Food, Employment, and Growth Interactions," *American Journal of Agricultural Economics* 64 (May 1982): 304-311.

**Table 22—Volume of cereal imports and the share of food aid in cereal imports, 1961-63 and 1976-78, and mean values for growth rates of GNP, export earnings, and staple crop production, by income group, 1961-78**

Rate of Growth of Cereal Imports/ Income Group	Number of Countries	Cereal Imports		Food Aid Share		Mean Values for Growth Rates		
		1961-63	1976-78	1961-63	1976-78	GNP	Export Earnings	Staple Crop Production
		(1,000 metric tons)				(percent)		
Faster than 10 percent								
High-income countries	8	2,760	11,350	29	6	7.5	13.7	1.8
Middle-income countries	6	660	5,057	38	1	7.0	17.5	0.6
Low-income countries	10	106	677	9	39	3.2	4.6	0.8
From 5 percent to 10 percent								
High-income countries	6	1,126	4,432	15	4	6.4	9.7	2.3
Middle-income countries	14	4,110	10,933	60	19	5.2	6.4	5.2
Low-income countries	10	2,349	4,993	16	39	3.9	8.2	1.5
From 2 percent to 5 percent								
High-income countries	8	3,355	5,892	38	2	6.5	11.6	1.0
Middle-income countries	12	7,368	12,909	7	4	4.8	7.5	3.0
Low-income countries	7	969	1,620	14	36	4.3	3.3	2.4
Slower than 2 percent								
High-income countries	4	1,488	875	56	0	5.2	11.1	-1.8
Middle-income countries	7	483	445	9	7	7.3	7.0	3.7
Low-income countries	7	5,269	3,855	90	40	3.4	1.5	2.6

Sources: Figures for cereal imports and food aid share are from Appendix 3, Tables 34 and 35. The mean values for growth rates are derived from Appendix 3, Table 42.

Notes: Mean values for growth rates are the averages of the observations in the group, not weighted by population size. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300.

In countries with low import growth rates (2 to 5 percent), the volume of cereal imports increased by about 8.7 million tons from 1961-63 to 1976-78. The largest increase (5.5 million tons) occurred in the middle-income group, where GNP and staple crop production growth rates were strong and export earnings grew moderately rapidly. These countries received only small amounts of food aid throughout the period.

Low-income countries in all three groups together accounted for a total volume increase of only 4 million tons; two-thirds of this increase occurred in the group with moderately high import growth rates where the rate of growth for export earnings was also moderately strong. In the groups with high and low import growth rates, neither GNP nor export earnings grew rapidly. At the same time, the share of food aid in total

cereal imports more than doubled, from a range of 9 to 16 percent in 1961-63 to a range of 36 to 39 percent in 1976-78.

The growth rates for cereal imports of a final group were low or negative, and the volume of grain that they imported declined absolutely from 7.2 to 5.2 million tons. The share of food aid in the imports of these countries also declined. For middle- and high-income countries, food aid dropped from 44 to 2 percent of total imports, which increased slightly. But in low-income countries where exports grew slowly, total imports dropped by 1.5 million tons and food aid declined from 90 to 40 percent of the total.

These data show that there is a clear relationship between growth in the volume of cereals imported and growth in GNP and export earnings; where necessary, food aid has apparently substituted for export earnings

in financing cereal imports, but this accounts for only a small portion of the total growth in cereal imports in developing countries since 1961 and is concentrated in low-income countries and in a subset of middle-income countries where export earnings grew slowly. The data do not, however, show a clear relationship between the growth rate for staple crop production and that for cereal imports, although in the groups where volume increases were large, the growth rate for production of staple crops was usually strong.

## **Growth in Per Capita Imports and the Role of Food Aid**

The same relationships can be observed when the effects of initial import volume and population size on growth rates of cereal imports are discounted. Cereal imports have grown faster than population both for the world as a whole and for developing countries as a group,<sup>14</sup> but this growth has occurred almost entirely in middle- and high-income countries where the importance of food aid has fallen. The per capita cereal imports of high-income groups in all four geographical regions have increased strikingly. From a range of 22 to 72.5 kilograms in 1961-63, their cereal imports grew to between 66.4 and 181.3 kilograms per capita by 1981. In contrast, the per capita imports of low-income countries in Asia, North Africa/Middle East, and Sub-Saharan Africa and middle-income countries in Asia were low in both periods, ranging from 5 to 11 kilograms in 1961-63 and 5 to 18 in 1981. The per capita imports of middle-income countries in Sub-Saharan Africa were also low in the first period, but they increased to 32.5 kilograms in 1981.

Food aid per capita increased in only three groups—low-income countries and middle-income countries of Sub-Saharan Africa and low-income countries of North Africa/Middle East. In the two low-income groups food aid accounted for half to three-quarters of total per capita imports. Food aid per capita was also high in low-income countries of Asia, accounting for about 40

percent of per capita imports in 1981. However, both imports and food aid have declined since the early sixties. Middle-income countries of North Africa/Middle East received the largest volume of per capita food aid in 1981 (16.6 kilograms), but this represented a significant decline since 1961-63 and was only 13 percent of total per capita imports (see Appendix 3, Tables 34-36).

These data again indicate that food aid is important primarily in low-income countries where total import volumes are low, but financial assistance is needed to pay for even these small amounts.

## **Economic Structure, Food Aid, and Changes in Degree of Dependence on Imports**

In order to evaluate the strength of association between changes in import dependence, food aid, and other variables representing the underlying economic structure of the recipient country, correlation techniques were employed. The following variables were considered in cross-sectional analysis: per capita GNP, share of exports in GNP, share of agriculture in GDP, degree of urbanization, per capita staple crop production, and per capita food aid. Growth of per capita GNP represents the dynamism of the economy. Changes in the share of exports in GNP and per capita food aid represent the two components of foreign exchange availability, while changes in the share of agriculture in GDP and degree of urbanization represent the structure of the economy—how industrialized it is and how much migration there is out of rural areas in search of nonagricultural employment. Growth in per capita staple crop production represents the capacity of domestic agriculture to supply market demand for food.

Simple correlations between changes in import dependence and each of these variables across all 99 countries studied show a correlation that is significant at the 5 percent level for all variables except per capita food

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<sup>14</sup> During the past two decades world population grew from 3 billion to 4.3 billion. On a per capita basis, cereal imports increased from approximately 25 kilograms per year in the beginning period to about 52 kilograms per year at the present time. Within the developing group, per capita imports of cereals have risen from 15 kilograms to 31 kilograms per year during the same period.

aid (see Table 23). For middle- and high-income countries alone, changes in neither the share of exports in GNP nor per capita food aid are significant, though the other four variables are. By contrast, changes in per capita food aid show a significant correlation with changes in import dependence for low-income countries, as do changes in per capita GNP, the share of agriculture in GDP, and per capita staple crop production.

Partial correlation analysis supports the hypothesis that, while there is a significant relationship between per capita food aid and import dependence when controlling for other variables, the contribution of food aid to import dependence is likely to be low. It is only when low-income countries are considered as a group that partial correlations between food aid and import dependence suggest a stronger link.

The amount of variation in the degree of change in import dependence between 1961-63 and 1976-78 that can be explained by per capita food aid after controlling for other variables is 7 percent for developing countries as a whole, yet the cumulative amount explained by all six variables is 61 percent (see Table 24). Of this, more than half is explained by per capita staple crop production and another quarter by per capita GNP.

Looking only at per capita GNP, per capita staple crop production, and per capita food aid for middle- and high-income countries as one group and for low-income countries as another, the amount of variation explained is about the same for both—51 percent for the former and 48 percent for the latter. However, when controlling for per capita GNP and per capita staple crop production the amount for middle- and high-income countries explained by per capita food aid is only 2 percent, whereas for low-income countries it is 25 percent.

In summary, this correlation tends to support the hypothesis that the contribution of food aid to import dependence among developing countries as a group is weak, but for low-income countries where import dependence is more likely to be sensitive to increases in foreign exchange its contribution is stronger. Correlation analysis does not permit a greater understanding of causal relationships; hence even for low-income countries where the association of food aid with import dependence appears strong, results may be biased by spurious relationships with factors not adequately specified. These questions require more elaborate analysis of the relationships in individual countries.

**Table 23—Simple correlations of changes in import dependence and associated variables between 1961-63 and 1976-78**

Variable Correlated with Import Dependence	All Countries	Middle- and High-Income Countries	Low-Income Countries
Per capita GNP	0.50	0.50	0.32
Ratio of export earnings to GNP	0.26	n.s.	n.s.
Degree of urbanization	0.30	0.38	n.s.
Share of agriculture in GDP	-0.44	-0.44	-0.46
Per capita staple crop production	-0.33	-0.33	-0.40
Per capita food aid	n.s.	n.s.	0.38

Sources: GNP figures are from World Bank, "World Bank Atlas Tape," Washington, D.C., February 9, 1980. Population figures are from Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977). Figures for export earnings are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. Figures for the degree of urbanization and the share of agriculture in GDP are from World Bank, *World Development Report, 1979* (Washington, D.C.: World Bank, 1979). Figures for production of staple crops are from FAO, "FAO Production Tapes," Rome, 1975 and 1979. Figures for food aid are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981, or from FAO, *Food Aid Bulletin*, October 1981, whichever is higher.

Notes: Where n.s. appears, the correlation coefficient was not significant at the 5 percent level. The rest of the correlation coefficients are significant at the 5 percent level. Figures for degree of urbanization are for 1960 and 1975; figures for share of agriculture in GDP are for 1960 and 1977. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included.

**Table 24—Proportion and cumulative proportion of variation in the change in import dependence explained by associated variables**

Variable	Correlation with Import Dependence, Controlling for Previous Variables	Proportion of Variation Explained by Addition of Variable	Proportion of Variation Unexplained	Cumulative Proportion of Variation Explained
<b>All countries</b>				
GNP per capita	0.3802	0.1446	0.8554	0.1446
Ratio of export earnings to GNP	0.0228	0.0004	0.8550	0.1450
Degree of urbanization	0.0823	0.0058	0.8492	0.1508
Share of agriculture in GDP	-0.1569	0.0209	0.8283	0.1717
Per capita staple crop production	-0.6681	0.3697	0.4586	0.5414
Per capita food aid	0.3819	0.0669	0.3917	0.6083
<b>Middle- and high-income countries</b>				
GNP per capita	0.5014	0.2514	0.7486	0.2514
Per capita staple crop production	-0.5678	0.2413	0.5073	0.4927
Per capita food aid	0.1485	0.0221	0.4852	0.5148
<b>Low-income countries</b>				
GNP per capita	0.3237	0.1048	0.8952	0.1048
Per capita staple crop production	-0.3654	0.1195	0.7757	0.2243
Per capita food aid	0.5719	0.2537	0.5220	0.4780

Sources: GNP figures are from World Bank, "World Bank Atlas Tape," Washington, D.C., February 9, 1980. Population figures are from Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*. ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977). Figures for export earnings are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. Figures for the degree of urbanization and the share of agriculture in GDP are from World Bank, *World Development Report, 1979* (Washington, D.C.: World Bank, 1979). Figures for production of staple crops are from FAO, "FAO Production Tapes," Rome, 1975 and 1979. Figures for food aid are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981, or from FAO, *Food Aid Bulletin*, October 1981, whichever is higher.

Notes: Figures for degree of urbanization are for 1960 and 1975; figures for share of agriculture in GDP are for 1960 and 1977. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included.

# 6

## ESTIMATION OF IMPORT DEMAND AND FOOD AID REQUIREMENTS IN 1990

This chapter draws upon the data base and analysis in the previous chapters in order to project import demand and food aid requirements to 1990. Because future economic conditions and underlying relationships are uncertain, no definitive estimates of future import demand or food aid requirements can be made. The approach used here is to project demand and food aid needs under differing sets of assumptions.

This chapter first reviews the methodologies and findings of previous projection studies by FAO, the World Bank, USDA, and IFPRI. Drawing on IFPRI's earlier work, two projections of import demand for cereals are presented using different assumptions regarding income growth and market demand. One derives import demand by subtracting trend projections of staple crop production from projected cereal demand using 1975 as a base and assuming high income growth. The other uses 1977 as a base, assumes high income growth, and adds an amount to cover the estimated dietary energy gap. A third scenario uses trend projections of total staple consumption and subtracts trend production. A fourth uses trend projection of cereal import volumes directly.

Given the cereal import volumes projected under these four scenarios, the final section develops food aid requirement projections. Countries are not considered eligible for future food aid if their economic activity as measured by per capita GNP is expected to be high enough to allow them to meet domestic nutritional needs. This section restates import demand projections in dollar value terms. Under each demand scenario, food aid requirements for eligible countries are estimated to be the import demand values that exceed either 2 percent or 5 percent of export earnings, assuming that these earnings continue to grow at their past trend rate.

### FAO, USDA, and IFPRI Approaches Compared

Projections of cereal import demand and food aid requirements in developing countries have been published by FAO, the World Bank, and IFPRI. In general, the most recent results published by these organizations are consistent with each other, although there are differences in methodology and refinement of demand estimates. The most comprehensive long-run projections are those of FAO, while the most detailed short-run projections are those of USDA.<sup>15</sup> The purposes of the projections are different, and the methodologies employed reflect these differences.

The FAO report addresses longer-run trends affecting the ability of the world community to abolish hunger and create a new international economic order. It covers 90 developing countries and 34 developed countries. It projects national demand for food at constant relative prices for 27 commodities or groups of commodities for 1990 and 2000 using 1974-76 as the base period.

Three scenarios are included, using the period from 1961-65 to 1979 or 1980 as the basis for trends. One assumes trend growth in per capita consumption and production but assumes nothing about the rate of economic growth; the other two assume high and moderate economic growth rates. Assumptions are made about the improvement in agricultural production that would occur under the two growth assumptions and what that improvement would imply for the demand for land, imported and domestically manufactured inputs, and other agricultural investments. The production estimates for different crops then become the basis for estimating how much would be exported

<sup>15</sup> FAO, *Agriculture: Toward 2000* (Rome: FAO, 1981); USDA, Economics, Statistics and Cooperatives Service, "Projected Food Assistance for FY82 Budget Planning," internal memorandum, Washington, D.C., July 3, 1980; and USDA, Economic Research Service, *World Food Aid Needs and Availabilities, 1981*, Foreign Agricultural Economics Report 168 (Washington, D.C.: USDA, 1981).

and how much would be available for domestic food consumption and other domestic uses.

The gap between domestic food supply and projected demand gives the estimate of imports needed. For developing countries as a group, the share of cereal imports to be filled with food aid is projected to remain constant. Cereal imports are projected to be 135 million tons in 1990 under the trend scenario, 110 million tons under the high growth scenario, and 121 million tons under the moderate growth scenario, with food aid requirements of 26, 15, and 24 million tons for the three scenarios. Estimates of the value of agricultural exports show that Latin America and Asia can be expected to improve their capacity to finance cereal imports commercially, whereas the cereal gaps of Sub-Saharan Africa and parts of North Africa/Middle East can be expected to increase significantly without comparable increases in the capacities of these countries to finance needed imports commercially.

An earlier set of FAO projections was used to make a preliminary calculation of food aid requirements in 1985. Out of cereal imports of 95 million tons in 1985, estimated from past trends, food aid requirements were projected at 17 to 18.5 million tons. An additional 60 to 71 million tons were projected to be required to make enough cereals available to provide nutritionally adequate diets in 1985.<sup>16</sup>

The result is similar to the preliminary figure of 69 million tons projected by IFPRI as the size of the gap between current supply available and a nutritionally adequate supply in 55 needy countries in 1975, though the FAO result implies that somewhat less was needed in the past.<sup>17</sup>

Two bilateral donors—Australia and the United States—have attempted to develop formulas for allocating available food aid. The Australian model works from per capita GNP, the import dependence ratio, the import coverage of foreign exchange reserves, the debt-service ratio, and the quality-of-life index. It also compares estimates obtained from its allocation formula with estimates of

what allocations would be if aid were allocated among needy countries on the basis of population size. The results are quite similar. The Australian model does not estimate global need.<sup>18</sup>

The USDA estimates are more elaborate and take account of such factors as the existing dietary composition of total calorie intake and the effects of a country's foreign exchange reserve position and current debt-service obligations on the availability of current export earnings for commercial food imports. The estimates published for 1982 put the amount of food aid necessary to maintain actual per capita calorie intake in 1978-81 at 13 million tons and the amount necessary to provide nutritionally adequate supplies to low-income countries at 28 million tons. The demand estimates for cereal imports are based on consumption estimates for those staple commodities that comprise two-thirds of total calorie intake for each country. The past four-year average is used for the status quo estimate, and the wheat equivalent of the number of calories supplied by each commodity in a nutritionally adequate diet is used for the normative estimate. Production and stocks are based on forecasts for the coming year. The capacity to import is estimated as the ratio of the value of commercial cereal imports to export earnings for the past four years, adjusted for foreign exchange reserve surpluses and debt-service obligations.

The advantages of this method are that it can take account of dynamic changes in both demand and export earnings through a moving four-year average, and forecasts on the supply and price side are readily available. For longer-run projections, this much sophistication is not possible, because foreign exchange reserves and debt-service obligations cannot be projected with confidence and because past consumption patterns are not appropriate for projecting future demand in a growing economy.

IFPRI therefore used a method similar to the FAO approach to estimate the import requirement in 1990 and a simpler version of the USDA approach to estimate a country's

<sup>16</sup> WFP, Committee on Food Aid Policies and Programmes, "Food Aid Requirements and Food Aid Targets in the Eighties," WFP/CFA: 8/4-B, FAO, Rome, September 1979.

<sup>17</sup> John W. Mellor and Barbara Huddleston, "Programming United States Food Aid to Meet Humanitarian and Developmental Objectives," WP 78/18/PUB, International Food Policy Research Institute, Washington, D.C., May 1978.

<sup>18</sup> This model is reported in USDA, "Projected Food Assistance."

capacity to finance commercial cereal imports in 1990. The objective was to present approximate figures for the longer-run food aid outlook and to show how planning to meet current requirements can be improved by relating annual targets to the projected requirement some years hence.

## Estimation of Import Demand

In *Food Needs of Developing Countries: Projections of Production and Consumption to 1990*, Research Report 3, IFPRI presents four estimates of the potential demand for cereal imports in 82 developing market economies. These estimates were updated and a fifth added for presentation to the conference at the Food and Fertilizer Technology Center in Taiwan in June of 1980.<sup>19</sup> The estimates include one that holds per capita staple food consumption constant at a base level, one that assumes that income growth continues at past trends, one that assumes that income growth continues at 75 percent of past trends, and one that takes into account the gap between estimated market demand and estimated nutritional requirements in each country. In the original report, this last estimate was calculated simply by assuming that nutritional requirements equal 110 percent of the amount required to satisfy minimum per capita calorie requirements and taking this amount to represent total demand. In the revision, a dietary energy gap is calculated as the difference between nutritional requirements, as defined above, and market demand, estimated under assumptions of both high and low income growth. The past share of staple foods in total calorie consumption in each country is then used to calculate the proportion of the dietary energy gap that cereals would need to fill. It is assumed that domestic production of staple crops continues to grow at its past trend rate in all scenarios, and import demand in each scenario is the difference between projected consumption and projected production.

The results presented in the 1980 paper range from a low of 75 million tons for import demand at 1977 per capita consumption

levels to a high of 153 million tons for import demand at 1977 per capita consumption levels plus the additional amounts generated by continued high growth of income and dietary energy requirements.

For this study two 1990 import demand estimates were selected following procedures adopted by IFPRI. One estimates effective demand for cereals in 1990 by using UN medium variant population growth rates for 1960-90 and assuming consumption will equal the 1975 per capita amount plus the additional amount required to satisfy market demand if per capita GNP continues to grow at rates prevailing between 1960 and 1974, as estimated by the World Bank. Income elasticity coefficients for consumption of major cereals and other staple foods, by country, were supplied by FAO. The other approach estimates market demand, assuming high income growth and using 1977 as the base year, and adds to this the share of the dietary energy gap that cereals would need to fill. Import demand in both cases is the difference between total consumption, projected by these two methods, and 1990 staple crop production, projected on the basis of a log-trend for the period 1961-78.

Two other estimates take the 1961-78 log-trend of total staple consumption in 1990 minus the 1990 production trend, and the log-trend of cereal import volumes. For countries with a clear time-trend in either total consumption or cereal imports, these alternatives probably give reasonably good estimates, though in countries where income growth is causing significant changes in consumption and import patterns, they are less reliable.

The import demand scenarios used in this report are shown in Table 25, along with actual cereal imports for 1981, by country.

In making the demand projections, consideration was given to adjusting GNP growth rates on a country-by-country basis on the assumption that the more recent trend would deviate sharply from trends of the longer 15 to 17 year periods used in other IFPRI projections. However, experiments with the data showed that such adjustments affected only five countries, and the differences did not appear significant enough to justify singling

<sup>19</sup> International Food Policy Research Institute, *Food Needs of Developing Countries: Projections of Production and Consumption to 1990*, Research Report 3 (Washington, D.C.: IFPRI, 1977); and Leonardo Paulino, "A General View of the World Food Situation," in *Food Situation and Potential in the Asian and Pacific Region*, ASPA-FFTC Book Series 17 (Taipei: Food and Fertilizer Technology Center, 1980).

**Table 25—Volume of cereal imports in 1981 and requirements in 1990 under four scenarios**

Region/Country	Actual 1981	IFPRI Procedures		Trend Consumption Minus Trend Production	Trend Cereal Imports Projected
		1975 Per Capita Base Plus High Income Growth	Dietary Energy Gap		
			(million metric tons)		
Asia	36.5	24.0	25.1	30.1	57.2
Large importers	35.8	23.0	23.6	27.0	56.4
Bangladesh	1.1	6.3	7.7	3.4	4.3
China	17.4	n.a.	n.a.	0.0	12.4
Hong Kong	0.8	0.8	1.1	1.3	0.9
India	1.5	0.0	0.0	0.0	0.7
Indonesia	2.0	7.0	4.3	8.5	5.8
Korea, Democratic People's Republic of	0.7	n.a.	n.a.	0.5	2.5
Korea, Republic of	7.7	5.8	7.6	7.4	23.3
Malaysia	1.2	0.9	0.4	2.6	1.6
Pakistan	0.3	0.0	0.0	0.0	0.8
Philippines	1.1	0.0	0.0	1.7	1.4
Singapore	1.3	1.8	1.7	0.9	1.1
Sri Lanka	0.7	0.4	0.6	0.7	1.6
Other	0.7	1.0	1.5	3.1	0.8
Bhutan	...	n.a.	n.a.	0.0	...
Burma	...	0.6	1.0	1.3	...
Fiji	0.1	n.a.	n.a.	0.1	0.1
Mongolia	0.2	n.a.	n.a.	0.4	0.2
Nepal	...	0.4	0.5	0.6	...
Papua New Guinea	0.2	n.a.	n.a.	0.7	0.2
Thailand	0.2	0.0	0.0	0.0	0.3
Latin America	23.1	15.1	30.3	21.2	59.9
Large importers	20.0	13.4	25.4	17.3	55.2
Brazil	5.6	2.1	9.1	0.0	4.3
Chile	1.4	1.7	1.9	1.5	3.5
Colombia	0.7	0.0	0.0	2.3	1.4
Cuba	2.1	1.5	1.4	3.9	3.5
Mexico	6.6	4.0	8.3	4.0	35.1
Peru	1.2	2.6	2.4	2.4	1.8
Venezuela	2.4	1.5	2.3	3.2	5.6
Other	3.1	1.7	4.9	3.9	4.7
Argentina	...	0.0	0.0	0.0	...
Bolivia	0.3	0.3	0.4	0.4	0.3
Costa Rica	0.2	0.0	0.0	0.0	0.2
Dominican Republic	0.4	0.2	0.5	0.8	0.8
Ecuador	0.3	0.0	0.0	0.2	1.0
El Salvador	0.1	0.1	0.0	0.2	0.2
Guatemala	0.2	0.3	0.4	0.1	0.2
Guyana	0.1	0.0	0.0	0.1	0.1
Haiti	0.2	0.0	0.1	0.4	0.3
Honduras	0.1	0.0	0.0	0.1	0.2
Jamaica	0.5	0.4	0.3	0.9	0.8
Nicaragua	0.1	0.3	0.2	0.0	0.1
Panama	0.1	0.1	0.0	0.0	0.1
Paraguay	0.1	0.0	0.0	0.0	...
Surinam	0.1	0.0	0.0	0.0	0.1
Trinidad and Tobago	0.3	0.2	3.0	0.4	0.3
Uruguay	...	0.0	0.0	0.3	...
North Africa/Middle East	29.1	24.6	32.0	42.4	40.9
Large importers	26.9	21.0	28.8	40.0	38.6
Algeria	3.3	3.2	3.7	6.2	7.1
Egypt	7.3	4.9	7.5	6.2	8.1
Iran	3.2	2.0	2.7	8.7	6.6
Iraq	2.3	3.7	4.0	2.5	4.1

Table 25—Continued

Region/Country	IFPRI Procedures			Trend Consumption Minus Trend Production	Trend Cereal Imports Projected
	Actual 1981	1975 Per Capita Base Plus High Income Growth	Dietary Energy Gap		
			(million metric tons)		
Lebanon	0.7	1.1	1.0	1.1	1.1
Libya	0.9	0.6	0.9	2.5	2.9
Morocco	2.8	2.3	3.7	6.1	3.8
Saudi Arabia	4.1	1.3	1.7	1.7	2.6
Syria	1.0	0.9	2.3	2.1	1.4
Tunisia	1.0	1.0	1.3	1.6	0.9
Turkey	0.3	0.0	0.0	1.3	...
Other	2.2	3.6	3.2	2.4	2.3
Afghanistan	0.1	1.7	1.8	0.2	...
Cyprus	0.4	0.2	0.3	1.0	1.3
Jordan	0.6	0.7	0.8	0.6	0.5
Sudan	0.3	0.0	0.0	0.0	0.3
Yemen Arab Republic	0.5	n.a.	n.a.	0.4	n.a.
Yemen, People's Democratic Republic of	0.3	1.0	0.3	0.2	0.2
Sub-Saharan Africa	8.7	28.9	29.8	15.1	17.7
Large importers	2.4	20.9	17.0	5.4	7.3
Nigeria	2.4	20.9	17.0	5.4	7.3
Other	6.3	8.0	12.8	9.7	10.4
Angola	0.2	0.2	0.5	0.9	0.5
Benin	0.1	0.3	0.5	0.1	0.1
Botswana	0.1	n.a.	n.a.	0.1	0.0
Burundi	...	0.4	0.4	0.0	0.0
Cameroon	0.1	0.0	0.0	1.2	0.4
Central African Republic	...	n.a.	n.a.	0.2	0.0
Chad	...	0.2	0.6	0.0	0.1
Congo	0.1	n.a.	n.a.	0.1	0.1
Ethiopia	0.2	2.0	3.0	0.1	0.8
Gabon	...	n.a.	n.a.	0.1	0.1
Gambia	...	0.0	0.2	0.0	0.1
Ghana	0.3	1.2	0.9	0.5	0.3
Guinea	0.1	0.0	0.2	0.1	0.1
Guinea-Bissau	...	n.a.	n.a.	0.1	0.2
Ivory Coast	0.6	0.0	0.1	0.2	0.5
Kenya	0.5	0.0	0.0	0.0	...
Lesotho	0.1	n.a.	n.a.	0.2	0.4
Liberia	0.1	0.0	0.1	0.1	0.1
Madagascar	0.3	0.7	0.7	0.5	0.5
Malawi	0.1	0.0	0.0	0.2	0.1
Mali	0.1	0.0	0.4	0.3	0.7
Mauritania	0.2	n.a.	n.a.	0.3	0.4
Mauritius	0.2	n.a.	n.a.	0.2	0.2
Mozambique	0.4	0.0	0.0	0.3	0.4
Niger	0.1	0.2	0.1	0.2	0.8
Réunion	0.1	n.a.	n.a.	0.2	0.2
Rwanda	...	0.0	0.0	0.0	0.1
Senegal	0.5	0.0	1.3	0.1	0.7
Sierra Leone	0.1	0.1	0.2	0.0	0.1
Somalia	0.4	0.3	0.4	0.3	0.3
Swaziland	...	n.a.	n.a.	0.0	0.0
Tanzania	0.3	1.5	1.8	0.4	0.3
Togo	0.1	n.a.	n.a.	0.2	0.0
Uganda	...	0.0	0.0	0.2	0.0
Upper Volta	0.1	0.1	0.5	0.0	0.2
Zaire	0.5	0.0	0.0	1.3	1.1
Zambia	0.3	0.7	0.6	0.7	0.5
Zimbabwe	...	0.2	0.3	1.3	0.0

**Table 25—Continued**

Sources: The figures for 1981 imports are from Food and Agriculture Organization of the United Nations (FAO), *FAO Trade Yearbook, 1981*, vol. 35 (Rome: FAO, 1982). The figures for trend cereal imports are projected from data in FAO, "FAO Trade Tapes," Rome, 1974 and 1979. The figures for total cereal demand using 1975 per capita base plus high income growth are from International Food Policy Research Institute, *Food Needs of Developing Countries: Projections of Production and Consumption to 1990*, Research Report 3 (Washington, D.C.: IFPRI, 1977). The figures for dietary energy gap use a staples component of 110 percent of minimum calorie requirements and assume high-income growth. They are from working tables for Leonardo Paulino, "A General View of the World Food Situation," in *Food Situation and Potential in the Asian and Pacific Region*, ASPA-FFTC Book Series 17 (Taipei: Food and Fertilizer Technology Center, 1980), pp. 1-27. The figures for trend consumption are projected from data in FAO, "Global Agricultural Programming System Supply Utilization Accounts Tape," Rome, 1980. The figures for production are projected from FAO, "FAO Production Tapes," Rome, 1975 and 1979.

Notes: Where n.a. appears, the data were not available. Where . . . appears, the figure was negligible.

out those countries for a different methodology.

Similarly, it has been argued that the trend for growth rates in staple crop production in the 1970s is a more valid basis for projection than a trend that extends back to the early sixties, when "green revolution" technologies had not yet taken hold. There are significant differences between the two series for about half the countries covered in this study, but about half are higher and half lower than the 1961-78 growth rate. Therefore, the longer series was preferred for looking at trends in developing countries as a whole.

An attempt was made to estimate an import demand function for coarse grains in developing countries, based on the assumption that cereal imports will begin to increase sharply when growth in a country's income passes a certain critical point and animal feed becomes an important factor in total staple consumption. A cross-sectional analysis was tried for a sample of countries that had low per capita incomes in 1945 but that are now classed as high-income countries. This sample included Israel, Japan, South Africa, Taiwan, and Yugoslavia, none of which were covered by this study.

The early experiments did not give clear results, and the work was discontinued after further analysis of feed use patterns indicated that income elasticities for coarse grain

consumption differed too widely among countries to permit the implied assumption of similarity that a single import demand function would require.<sup>20</sup> A model for trade behavior of individual developing countries in world cereal markets has been developed by Abbott and refined by Scobie for Egypt, but this work uses constant elasticity functions and thus does not try to estimate a function that captures the presumed kink in demand for cereals that should occur in some identifiable range of GNP per capita.<sup>21</sup>

Finally, a word of caution is in order about the procedure for estimating nutritional requirements. Estimates of the amount of additional food aid required by food deficit countries to eliminate malnutrition vary considerably. This is primarily because of differences in assumptions about the nutritional consequences of income distribution patterns and different definitions of the minimum adequate calorie consumption standard.

In a recent survey article, T. N. Srinivasan notes some of the problems.<sup>22</sup> First, the requirement varies among individuals of the same body weight and energy expenditure for metabolic reasons that are not clearly understood. Also, an individual may safely vary his own intake either from day to day or from season to season with no observable ill effect. The Reutlinger-Selowsky model estimates average per capita intake for each

<sup>20</sup> The difficulties of the cross-sectional approach show up clearly in recent work by Jabara. She attempted to estimate separate import demand functions for wheat, corn, and rice for 20 middle-income countries, but her results are questionable, because of collinearity among independent variables. See Cathy L. Jabara, "Grain Imports by Middle Income Developing Countries: Economic and Political Factors Affecting Import Demand," paper presented at the Trade Research Consortium, Arlington, Virginia, June 24-26, 1981.

<sup>21</sup> Phillip C. Abbott, "Developing Countries and Grain Trade"; and Grant M. Scobie, *Government Policy and Food Imports: The Case of Wheat in Egypt*, Research Report 29 (Washington, D.C.: IFPRI, 1981).

<sup>22</sup> T. N. Srinivasan, "Malnutrition: Some Measurement and Policy Issues," *Journal of Development Economics* 8 (February 1981): 3-19.

income class rather than for populations as a whole, but this average still does not account for variations in individual requirements. Furthermore, clinical evidence, consumption surveys, and calorie intake estimates do not show the same relationship between the amount consumed and the health of an individual. Sukhatme estimates that the number of malnourished individuals in India may be 15 to 20 percent rather than 50 percent when individual variations are taken into account. Finally, even if the number of malnourished can be correctly estimated, the degree of caloric inadequacy for different individuals is not known.

In summary, then, the problems are of two kinds—the total calorie requirement for nutritional adequacy may be overestimated, and the requirements of malnourished groups cannot be divined from aggregate estimates. In some early experiments at IFPRI, the over-estimation problem was clearly demonstrated by calculating average minimum daily requirements using accepted norms for different family members and estimates of average family size for different geographic regions. As Table 26 shows, per capita consumption in 4 of 11 regions—China and 3 of the 4 African regions—was inadequate according to the FAO standard but adequate according to the IFPRI calculation. This finding does not imply that the nutrition situation in Africa is not serious. But it does indicate how easy it is to shift the aggregate picture with a slight change in statistical methodology. It also reemphasizes the point that poor distribution of food is probably a more important cause of hunger than the unavailability of food in many locations.

This study does not attempt to address the nutritional effects of food distribution patterns within countries and their implications for the size and composition of food aid requirements, but work on this is planned.

## Estimation of Food Aid Requirements

The volumes of import demand obtained by each of the five methods described above

were valued at a fixed price for wheat, as if world market prices for wheat were stable at the equilibrium level that prevailed during the period 1960-75. This price is not the expected price for any given year. It is the average of the actual prices for U.S. soft red winter wheat at Atlantic ports for 1960-75, expressed in 1977 dollars. This period includes both the gradual decline in the real price of wheat in the sixties, and the sharp price increases of 1973-75. It presumes that the trend of real prices will not decline further, but that similar price fluctuations will occur again in the eighties.

The price used, \$181.00 per ton, is equal to the average c.i.f. price paid by developing countries in 1976-78 and is approximately equivalent to the \$155.80 mean of the probability distribution based on the same set of observations, plus a 15 percent increment for transportation costs. Only for the small number of countries importing large quantities of rice will the use of the wheat price result in undervaluation of the cost of cereal imports. No attempt has been made to adjust for this in this study, though it could affect the results for a few countries, such as Indonesia, the Ivory Coast, and Senegal.

The total value of cereal imports under each scenario was compared to the projected value of export earnings for 1990. Export earnings are projected at the trend for 1961-78. This is lower than the high growth rate of the 1960s and higher than the low growth rate of the 1970s, but is consistent with recent World Bank projections.<sup>23</sup>

Two estimates of food aid requirements have been derived from these data. One assumes that cereal imports having a value in excess of 5 percent of export earnings would require concessional financing, and the other assumes that those in excess of 2 percent would require such financing. These ratios are used because the average for all developing countries is currently about 5 percent and is expected to decline to about 2 percent by the mid-eighties and beyond.<sup>24</sup> Although a few countries noted in Chapter 4 have higher ratios and others have lower ratios than the 5 percent average, there is no reason to assume that the actual ratio of an individual country indicates its ability to

<sup>23</sup> World Bank, *Biennial Review of Commodity Price Forecasts* (Washington, D.C.: World Bank, 1982).

<sup>24</sup> World Bank, Economics and Policy Division, "Grain Storage and Distribution in the 1980s: An Approach Paper," Internal Document, Washington, D.C., n.d.

**Table 26—Alternative estimates of calorie requirements in developing country regions**

Region	FAO/WHO Minimum Daily Requirement	IFPRI Adjusted Minimum Daily Requirement	1975-77 Average Per Capita Calorie Intake
Region 1 China	2,366	2,161	2,337
Region 2 South and Southeast Asia	2,251	2,081	2,002
Region 3 India	2,210	2,077	1,996
Region 4 Temperate North Africa/Middle East	2,459	2,164	2,605
Region 5 Africa/Middle East semiarid tropics	2,363	2,050	2,162
Region 6 Equatorial Africa	2,412	2,055	2,162
Region 7 East and South Africa	2,300	2,051	2,162
Region 8 Central America/Caribbean (maize)	2,310	2,076	2,488
Region 9 Central America/Caribbean (mixed cereals)	2,280	2,076	2,488
Region 10 Tropical South America	2,377	2,078	2,488
Region 11 Temperate South America	2,397	2,075	2,488

Sources: The minimum daily requirements of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) are from FAO, *Fourth World Food Survey* (Rome: FAO, 1977); the adjusted minimum daily requirements of the International Food Policy Research Institute (IFPRI) are from Kathleen Zaffina, "Food Aid and Nutritional Requirements in Developing Countries," IFPRI, Washington, D.C., n.d., (mimeographed). The figures for average per capita calorie intake in 1975-77 are from FAO, *Food Balance Sheets—1975-77 Average and Per Caput Food Supplies, 1961-65 Average, 1967 to 1977* (Rome: FAO, 1980).

afford its cereal imports better than the developing country average does. This is because some countries may be paying a high proportion of their export earnings for essential cereal imports but sacrificing equally vital capital goods imports, without which growth will be stymied, while others may have low ratios, but only because other demands for scarce foreign exchange are given priority over cereal imports. Rather than try to estimate an appropriate ratio for each country individually, this study therefore applies the averages to all countries. The use of more than one demonstrates the difference that assumptions about the proportion of export earnings allocated to commercial cereal imports make in estimating food aid requirements.

Requirements for food aid are estimated as if 1990 were a normal year for all countries.

In reality, fluctuations in the values of exports and cereal imports will have a significant effect on the amount of food aid a country would require from one year to another. Annual application of the procedure used in this study would result in estimates of food aid requirements that responded to the food security needs of recipients, but the aggregate amount required could vary considerably from one year to another. The extent of this possible variation is shown, using a scenario that uses food aid to make up the difference between actual cereal imports and the amount needed to meet 100 percent of the FAO/WHO standard for 1976-78 and 1983.

One constraint that is imposed is an eligibility criterion for individual countries. As indicated in Chapter 5, GNP per capita serves as a good proxy for several criteria that affect a country's requirement for food aid.

High GNP per capita is generally associated with a strong export sector and hence with the capacity to finance needed cereal imports on commercial terms. Also, high GNP per capita practically ensures that food supplies will be adequate in the aggregate. Therefore, countries that in 1976-78 had per capita incomes of \$900 or more in 1977 dollars were assumed not to require food aid.<sup>25</sup>

For middle-income countries (those with per capita incomes between \$300 and \$900 in 1977 dollars), per capita supply availability is one indicator of need, and export strength is another. The mean for per capita staple crop production averaged 211 kilograms per year for all developing countries in 1976-78, that is, almost 2000 calories per day. In most countries at or above the mean, this amount if distributed equitably, would be enough to maintain adequate consumption, even where some part of the supply is consumed by livestock. The adequacy of the food supply is also indicated by the total per capita availability of calories in relation to the FAO/WHO standard established for each country. As pointed out earlier, this standard has been challenged as being too high, and it does not take equity considerations into account. However, it does indicate roughly whether a country has enough food to feed its total population adequately.

Export strength represents the ability of a country to finance necessary cereal imports on commercial terms. It is reflected by the performance of the export sector in relation to the total economy, which is measured by the ratio of export earnings to GNP, and by the size of the foreign exchange reserve, which is measured by the ratio of foreign exchange holdings to average annual merchandise imports.<sup>26</sup> The mean export/GNP ratio for all developing countries in 1976-78 was 0.324. Countries with higher ratios could, therefore, be judged to have stronger export sectors, and countries with lower ratios could be judged to have weaker export

sectors. Some countries with stronger export sectors nevertheless have weak foreign exchange positions, as shown by foreign exchange/import ratios of less than 0.25 (see Appendix 3, Table 43).

On the basis of these indicators, middle-income countries can be classified in the following categories: exports or reserves strong, production strong; exports and reserves weak, production strong; exports or reserves strong, production weak; or exports and reserves weak, production weak.

It is assumed that countries in which both indicators are strong do not need food aid. It is also assumed that countries in which per capita staple crop production is high but the balance of payments is weak do not need food aid. These countries may face balance-of-payments problems if they now import cereals, or if per capita intake does not reflect the adequacy of aggregate supply and they wish to import to make up the apparent deficiency. But the apparent food problem in such countries appears to be more a problem of distribution and market performance than of supply availability. Countries with weak food supply and mixed or weak balance-of-payments positions are assumed to need food aid.

All low-income countries that need to import cereals in order to obtain adequate food supplies are assumed to require food aid for balance-of-payments support since their export sectors are still weak and foreign exchange is badly needed to import capital goods during the early stages of growth.

## Estimation Results

The amount of food aid required by middle-income countries in 1976-78 is estimated to have been 4.5 million tons, and in 1983 it is estimated to be 6.6 million tons, assuming that these countries pay up to 5 percent

<sup>25</sup> Of the 99 developing countries considered in this analysis, 26 fell in this category—5 in Asia, 11 in Latin America, 7 in North Africa/Middle East, and 3 in Sub-Saharan Africa. High-income developing countries may still face serious balance-of-payments problems from time to time, as Mexico did in 1982. However, when such problems arise, the structural adjustments required are likely to go beyond the economic support that can be provided by highly concessional loans for cereal imports. Some relaxation of credit requirements may, however, be envisioned. The volume of food aid to these 26 countries amounted to 955,000 tons in 1976-78.

<sup>26</sup> The export/GNP ratio for middle-income countries may sometimes be misleading since there is a tendency for small countries to have higher ratios because their internal markets are smaller. Where larger countries have low export/GNP ratios but good import growth rates, their basic strength is captured instead by the foreign exchange reserve indicator.

of their export earnings for commercial imports before becoming eligible for food aid. Using the same assumption, food aid requirements in middle-income countries in 1990 are projected to fall within the range of 3.6-10.7 million tons, although the number of middle-income countries projected to be eligible for food aid is smaller (see Tables 27 and 28). Table 29 shows that the number of high-income countries would increase from 26 in 1976-78 to 42 in 1990, and the number of countries potentially eligible for food aid would drop from 73 to 57. Most of this change is accounted for by the middle-income countries that become high-income countries, although some low-income countries do become middle-income countries.

In the scenario that assumes that countries pay only 2 percent of their export earnings for commercial imports of cereals before receiving food aid, the food aid requirement for middle-income countries in 1990 more than doubles, ranging from 15.6 to 21.9 million tons. The reason for this is that for many middle-income countries the projected ratio of cereal imports to export earnings in 1990 is not much higher than 5 percent. Therefore with a 5 percent commercial import criterion, these countries require little concessional assistance. However, they are eligible for substantially more when the criterion is lowered to 2 percent.

With the 5 percent criterion, Egypt, Morocco, and Tanzania require large amounts of food aid, particularly under scenarios in which past growth rates of consumption are maintained or the entire amount of the country's estimated dietary energy requirement is supplied. With the 2 percent criterion, other large recipients include Ghana, Indonesia, Senegal, and Zambia.

Table 27 shows that for several middle-income countries the actual volume required could fluctuate substantially from one year to another, depending on the volume of domestic staple crop production, world market prices for cereals, and the volume and value of a country's export earnings. For example, the estimated requirement for Egypt in 1976-78 was 2.5 million tons, whereas in 1983 it was only 0.7 million tons. Table 27 also demonstrates that when actual food aid flows are compared to requirements in the recent past, there are some middle- and high-income countries in all four regions that would not have required food aid under the criteria presented in this study, but there

are others that would have required much more than was given.

The requirement for food aid fluctuates in low-income countries as well. The combination of good domestic production, strong markets for commodity exports, and low world prices for cereals can relieve even those countries where the food situation is generally unsatisfactory from having to depend on food aid in some years. Of the 34 low-income countries shown in Table 30 only Burma, Burundi, Madagascar, and Sierra Leone did not require food aid in 1976-78, assuming that they had to pay only 2 percent of their export earnings for commercial cereal imports. In 1983, however, 11 out of these 34 countries did not require food aid.

An argument can be made that stable food aid programs can be more effectively managed than sharp annual adjustments in aid in response to fluctuations in a country's food security requirement. However, if food aid is kept stable, an estimation procedure such as the one presented here will help determine what the average size of the food aid program should be. If an average is used, based on expected fluctuations around an estimated trend requirement, the food aid might substitute for commercial imports in some years. This, however, would be compensated for by the country's having to make extra commercial imports in other years to meet exceptionally high or costly import requirements.

While Table 30 shows that low-income countries in all regions would have required substantially more food aid in 1983 than in 1976-78, principally because the purchasing power of their major export commodities fell, the results are dominated by the size of the estimated requirement for India and Bangladesh. These two countries together account for more than 70 percent of the total volume required in both years, estimated here to be 26 million tons in 1976-78 and 46 million tons in 1983. The higher amount in 1983 is attributable to a severe drought that affected the rice crop of the previous year in much of South Asia. In both cases, the reason the figure is so high is that this estimate would bring average per capita calorie consumption up to 100 percent of the FAO/WHO standard. Since the current food supply in both countries is at least 10 percent below the norm and the populations of both are large, the so-called nutrition gap is huge. While the actual need may be considerably

**Table 27—Required cereal food aid for 1976-78 and 1983 and actual cereal food aid for 1976-78 and 1980/81, middle- and high-income countries**

Region/Income Group/Country	Required		Actual	
	1976-78	1983	1976-78	1980/81
	(1,000 metric tons)			
<b>Asia</b>				
Middle-income countries				
China	0	0	0	37
Philippines	0	0	69	85
Thailand	0	0	1	19
High-income countries				
Fiji	0	0	10	6
Korea, Republic of	0	0	608	324
Total	0	0	688	471
<b>Latin America</b>				
Middle-income countries				
Bolivia	196	0	31	54
Colombia	0	0	20	5
Cuba	0	n.a.	n.a.	n.a.
Dominican Republic	60	0	25	71
Ecuador	0	0	5	6
El Salvador	0	261	4	50
Guatemala	0	75	12	14
Guyana	0	n.a.	1	4
Honduras	0	285	14	31
Nicaragua	0	114	2	59
Paraguay	0	0	7	11
Peru	819	0	28	116
High-income countries				
Brazil	0	0	3	2
Chile	0	0	139	21
Costa Rica	0	0	1	1
Jamaica	0	0	48	36
Panama	0	0	2	2
Total	1,075	735	342	483
<b>North Africa/Middle East</b>				
Middle-income countries				
Egypt	2,527	687	1,778	1,862
Lebanon	0	n.a.	68	32
Morocco	0	67	129	100
Syria	0	0	82	30
Tunisia	0	0	126	94
Yemen Arab Republic	0	146	28	4
Yemen, People's Democratic Republic of	146	121	11	29
High-income countries				
Algeria	0	0	13	29
Cyprus	0	0	10	5
Iraq	0	0	3	0
Jordan	0	0	116	71
Turkey	0	0	3	9
Total	2,673	1,021	2,367	2,265
<b>Sub-Saharan Africa</b>				
Middle-income countries				
Botswana	0	0	5	11
Cameroon	0	0	4	9
Congo	0	0	3	2
Ghana	251	2,023	57	93
Kenya	0	1,454	9	172
Liberia	0	135	1	26
Mauritania	138	276	35	95
Mauritius	0	107	14	21
Nigeria	0	n.a.	1	0
Senegal	322	451	74	138
Swaziland	0	n.a.	0	1
Zambia	28	381	22	75
Zimbabwe	0	n.a.	0	25

**Table 27—Continued**

Region/Income Group/Country	Required		Actual	
	1976-78	1983	1976-78	1980/81
	(1,000 metric tons)			
High-income countries				
Ivory Coast	0	0	3	1
Total	739	4,827	228	669
Total middle- and high-income developing countries	4,487	6,583	3,625	3,888

Sources: Figures for actual food aid in 1976-78 are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981, or from Food and Agriculture Organization of the United Nations (FAO), *Food Aid Bulletin*, October 1981, whichever is higher. Figures for actual food aid in 1980/81 are from FAO, *Food Aid Bulletin*, October 1982. The source for minimum per capita calorie requirements is FAO, *Fourth World Food Survey* (Rome: FAO, 1977). The sources for population are FAO, *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977) and United Nations, *Monthly Bulletin of Statistics* 36 (December 1982). The source for actual consumption in 1977 is FAO, *Food Balance Sheets—1975-77: Average and Per Caput Food Supplies, 1961-65 Average, 1967 to 1977* (Rome: FAO, 1980). Average annual imports in 1976-78 are from Appendix 3, Table 35. Export earnings in 1976-78 are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. Estimated production and estimated export earnings in 1983 are from U.S. Department of Agriculture, Economic Research Service, *World Food Aid Needs and Availabilities, 1982* (Washington, D.C.: USDA, 1982). Estimated imports in 1983 are from working tables provided by the Foreign Agricultural Service of the U.S. Department of Agriculture.

Notes: The figures for food aid requirements in 1976-78 and 1983 are based on estimates of import demand, defined as the difference between the amount of cereals required to satisfy 100 percent of the minimum per capita calorie requirement established by a joint expert group of FAO and the World Health Organization (WHO) and the amount supplied from domestic production. Import demand for 1976-78 is calculated as the sum of average annual imports in 1976-78 and the difference between required consumption and actual consumption in 1977. Import demand for 1983 is calculated as the sum of estimated imports and the difference between required consumption and estimated production. These import demand estimates are valued at a price of U.S. \$181 per metric ton for 1976-78 and U.S. \$173 per metric ton for 1983. The share of estimated import demand in export earnings in those years is calculated and the excess over 5 percent is estimated to be the food aid requirement. Seventeen middle-income developing countries that neither received nor required food aid in either period are not included in this table. Where n.a. appears, the data were not available.

smaller if new, lower estimates of the amount of malnutrition are correct, there is no question that significantly larger amounts of food aid are needed to alleviate hunger in these two countries.<sup>27</sup>

By 1990 the number of low-income countries requiring food aid in a normal year drops to 20 out of the 25 countries still belonging to this category (see Table 31). Because the projected ratio of cereal imports to export earnings far exceeds 5 percent for most low-income countries, there is little difference in the amount of the projected food aid requirement under scenarios using 5 percent and those using 2 percent of export earnings as the basis for determining how

much a country shall be expected to import commercially before becoming eligible for food aid. Under the 5 percent criterion, the range is 6.3 to 14.0 million tons, whereas under the 2 percent criterion it is 8.3 to 15.3 million tons. Countries that the estimates show will have large requirements in 1990 are Bangladesh, Ethiopia, Nepal, Sri Lanka, Zaire, and the landlocked countries of the Sahel. Continued improvement in production performance is projected to eliminate India's requirement for food aid in a normal year under the four scenarios used to estimate food aid requirements in 1990, although the country could still require help if faced with widespread crop failure.

<sup>27</sup> Similar results were obtained by USDA in its estimation of nutrition-based requirements for 1982-83. Out of a total requirement of 34.5 million tons, 12 million went to India, 7 million to Bangladesh, and 9.8 million to Sub-Saharan Africa. USDA, Economic Research Service, *World Food Aid Needs and Availabilities, 1982* (Washington, D.C.: USDA, 1982).

**Table 28—Projections for middle-income countries with financial constraints on cereal imports and the amount of food aid required, 1990**

Region/Country	Ratio of Projected Cereal Import Value to Projected Export Earnings			
	Income Based on Effective Demand	Dietary Energy Basis	Demand Based on the Trend of Past Consumption	Trend Import Values Projected
	(percent)			
Asia				
Indonesia	2.2	1.4	2.7	2.6
Papua New Guinea	n.a.	n.a.	5.2	2.9
Philippines	0.0	0.0	2.8	1.2
Latin America				
Bolivia	2.0	2.6	2.6	1.6
Guyana	0.0	0.0	4.9	3.5
Honduras	0.0	0.0	1.2	2.3
North Africa/Middle East				
Egypt	6.1	9.3	5.0	8.0
Morocco	5.6	9.0	14.8	8.6
Yemen Arab Republic	n.a.	n.a.	0.2	8.8
Sub-Saharan Africa				
Cameroon	0.0	0.0	6.4	1.6
Gambia	0.0	33.6	0.0	10.3
Ghana	166	12.5	7.0	3.3
Mauritania	n.a.	n.a.	41.9	48.8
Nigeria	3.6	3.0	0.9	1.6
Senegal	0.0	11.6	0.9	6.0
Tanzania	28.8	34.5	7.6	5.4
Togo	n.a.	n.a.	7.6	0.8
Zambia	13.4	11.5	13.4	4.7

Region/Country	Requirements							
	Income Based on Effective Demand		Dietary Energy Basis		Demand Based on the Trend of Past Consumption		Trend Import Values Projected	
	5 Percent	2 Percent	5 Percent	2 Percent	5 Percent	2 Percent	5 Percent	2 Percent
	(million metric tons)							
Asia	0.00	0.65	0.00	0.00	0.02	3.07	0.00	1.93
Indonesia	0.00	0.65	0.00	0.00	0.00	2.15	0.00	1.80
Papua New Guinea	n.a.	n.a.	n.a.	n.a.	0.02	0.43	0.00	0.13
Philippines	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00
Latin America	0.00	0.00	0.00	0.09	0.00	0.15	0.00	0.05
Bolivia	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.06
Guyana	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03
Honduras	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
North Africa/Middle East	1.11	2.75	5.11	8.77	6.21	9.87	10.17	18.72
Egypt	0.87	3.29	3.47	5.89	2.17	4.59	2.44	4.86
Morocco	0.24	1.47	1.64	2.88	4.04	5.28	1.47	2.71
Yemen Arab Republic	n.a.	n.a.	n.a.	n.a.	0.00	0.00	6.26	11.15
Sub-Saharan Africa	2.52	12.49	3.33	9.93	1.31	2.50	0.48	1.24
Cameroon	0.00	0.00	0.00	0.00	0.26	0.82	0.00	0.00
Gambia	0.00	0.00	0.17	0.19	0.00	0.00	0.03	0.05
Ghana	0.84	1.05	0.54	0.76	0.14	0.36	0.00	0.09
Mauritania	n.a.	n.a.	n.a.	n.a.	0.26	0.28	0.31	0.33
Nigeria	0.00	9.44	0.00	5.54	0.00	0.00	0.00	0.00
Senegal	0.00	0.00	0.74	1.08	0.00	0.00	0.12	0.45
Tanzania	1.24	1.40	1.54	1.86	0.14	0.29	0.02	0.18
Togo	0.00	0.00	0.00	0.00	0.07	0.15	0.00	0.00
Zambia	0.44	0.60	0.34	0.50	0.44	0.60	0.00	0.14
Total	3.63	17.90	8.44	18.79	7.54	15.59	10.65	21.94

(continued)

**Table 28—Continued**

Sources: Cereal import values are the import demand projections shown in Table 25, valued in 1977 U.S. dollars at a price of \$181 per metric ton. Export earnings are projected from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. The amount of food aid required is calculated assuming that concessional financing is needed for all quantities whose values exceed either 5 percent or 2 percent of export earnings.

Notes: The countries included in the table have per capita incomes projected to be between U.S. \$300 and U.S. \$900 in 1990, expressed in 1977 dollars, and to have ratios of cereal imports to export earnings projected to be equal to or greater than 2 percent in one or more of the scenarios. Countries with per capita incomes projected to be greater than U.S. \$900 in 1990 and with cereal imports projected to be greater than 5 percent of export earnings are the Dominican Republic, Peru, Syria, the People's Democratic Republic of Yemen, Chile, Jamaica, Mexico, Cyprus, and Trinidad and Tobago. Where n.a. appears, the data were not available.

**Table 29—Number of countries by region and per capita income, 1976-78 and 1990**

Region	1976-78			1990		
	Less than \$300	\$300-\$900	More than \$900	Less than \$300	\$300-\$900	More than \$900
	(number of countries)					
Asia	8	6	5	6	4	9
Latin America	1	12	11	1	5	18
North Africa/Middle East	2	8	7	2	5	10
Sub-Saharan Africa	23	13	3	16	18	5
Total	34	39	26	25	32	42

Sources: Figures for 1976-78 are derived from Appendix 3, Table 42. Figures for 1990 are projected from income data in World Bank, "World Bank Atlas Tape," Washington, D.C., February 9, 1980 and population data in Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977).

Notes: The figures for per capita income in both periods are expressed in 1977 U.S. dollars.

**Table 30—Required cereal food aid for 1976-78 and 1983 and actual cereal food aid for 1976-78 and 1980/81, low-income countries**

Region/Country	Required		Actual	
	1976-78	1983	1976-78	1980/81
	(1,000 metric tons)			
Asia				
Bangladesh	5,245	9,287	1,022	689
Bhutan	26	n.a.	0	1
Burma	0	n.a.	8	7
India	13,588	21,400	1,019	435
Indonesia	219	0	636	404
Nepal	228	n.a.	2	41
Pakistan	600	3,777	464	269
Sri Lanka	1,038	1,705	346	232
Total	20,944	36,169	3,497	2,078
Latin America				
Haiti	437	700	54	79
North Africa/Middle East				
Afghanistan	n.a.	331	31	80
Sudan	104	1,551	64	193
Total	104	1,882	95	273

(continued)

Table 30—Continued

Region/Country	Required		Actual	
	1976-78	1983	1976-78	1980/81
	(1,000 metric tons)			
Sub-Saharan Africa				
Angola	n.a.	n.a.	9	20
Benin	64	0	8	11
Burundi	0	n.a.	4	12
Central African Republic	9	n.a.	2	3
Chad	49	489	29	15
Ethiopia	1,797	3,975	67	235
Gambia	71	0	9	18
Guinea	n.a.	377	29	27
Guinea-Bissau	n.a.	79	17	25
Lesotho	n.a.	81	18	43
Madagascar	0	393	8	26
Malawi	25	284	3	17
Mali	144	623	25	42
Mozambique	n.a.	0	97	139
Niger	185	0	55	6
Rwanda	46	0	12	15
Sierra Leone	0	0	7	10
Somalia	208	798	70	315
Tanzania	464	0	120	210
Togo	57	0	11	4
Uganda	237	0	0	52
Upper Volta	262	477	24	50
Zaire	n.a.	0	29	77
Total	3,698	7,576	653	1,372
Total low-income countries	25,183	46,027	4,299	3,802
Total developing countries	29,670	52,610	7,924	7,690

Sources: Figures for actual food aid in 1976-78 are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981, or from Food and Agriculture Organization of the United Nations (FAO), *Food Aid Bulletin*, October 1981, whichever is higher. Figures for actual food aid in 1980/81 are from FAO, *Food Aid Bulletin*, October 1982. The source for minimum per capita calorie requirements is FAO, *Fourth World Food Survey* (Rome: FAO, 1977). The sources for population are FAO, *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977) and United Nations, *Monthly Bulletin of Statistics* 36 (December 1982). The source for actual consumption in 1977 is FAO, *Food Balance Sheets—1975-77 Average and Per Caput Food Supplies, 1961-65 Average, 1967 to 1977* (Rome: FAO, 1980). Average annual imports in 1976-78 are from Appendix 3, Table 35. Export earnings in 1976-78 are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. Estimated production and estimated export earnings in 1983 are from U.S. Department of Agriculture, Economic Research Service, *World Food Aid Needs and Availabilities, 1982* (Washington, D.C.: USDA, April 1982). Estimated imports in 1983 are from working tables provided by the Foreign Agricultural Service of the U.S. Department of Agriculture.

Notes: The figures for food aid requirements in 1976-78 and 1983 are based on estimates of import demand, defined as the difference between the amount of cereals required to satisfy 100 percent of the minimum per capita calorie requirement established by a joint expert group of FAO and the World Health Organization (WHO) and the amount supplied from domestic production. Import demand for 1976-78 is calculated as the sum of average annual imports in 1976-78 and the difference between required consumption and actual consumption in 1977. Import demand for 1983 is calculated as the sum of estimated imports and the difference between required consumption and estimated production. These import demand estimates are valued at a price of U.S. \$181 per metric ton for 1976-78 and U.S. \$173 per metric ton for 1983. The share of estimated import demand in export earnings in those years is calculated and the excess over 2 percent is estimated to be the food aid requirement. Where n.a. appears, the data were not available.

**Table 31—Projections for low-income countries with financial constraints on cereal imports and the amount of food aid required, 1990**

Region/Country	Ratio of Projected Cereal Import Value to Projected Export Earnings				
	Income Based on Effective Demand		Dietary Energy Basis	Demand Based on the Trend of Past Consumption	Trend Import Values Projected
Asia	(percent)				
Bangladesh	39.7		48.5	21.4	16.7
Burma	94.0		156.0	202.6	0.9
Nepal	8.9		11.3	13.5	...
Sri Lanka	8.3		12.6	14.7	31.1
Latin America					
Haiti	0.0		1.7	6.9	5.7
North Africa/Middle East					
Sudan	0.0		0.0	0.0	5.2
Sub-Saharan Africa					
Benin	8.6		14.4	2.9	1.9
Central African Republic	28.1		n.a.	28.1	2.3
Chad	9.1		116.0	0.0	22.3
Ethiopia	38.6		57.9	1.9	10.9
Madagascar	36.3		36.3	26.0	40.6
Malawi	0.0		0.0	6.1	5.2
Mali	0.0		18.7	14.0	69.2
Niger	7.1		3.6	7.1	14.7
Rwanda	0.0		0.0	0.0	3.3
Sierra Leone	0.0		20.2	0.0	10.1
Somalia	16.1		21.4	16.1	18.2
Uganda	0.0		0.0	17.1	1.4
Upper Volta	7.5		37.8	0.0	13.7
Zaire	0.0		0.0	7.0	4.7

Region/Country	Requirements							
	Income Based on Effective Demand		Dietary Energy Basis		Demand Based on the Trend of Past Consumption		Trend Import Values Projected	
	5 Percent	2 Percent	5 Percent	2 Percent	5 Percent	2 Percent	5 Percent	2 Percent
Asia	(million metric tons)							
Bangladesh	6.41	7.18	8.52	9.29	4.71	5.49	3.10	3.72
Burma	5.50	5.98	6.91	7.38	2.60	3.08	1.85	2.33
Nepal	0.57	0.59	0.97	0.99	1.27	1.29	0.00	0.00
Sri Lanka	0.18	0.31	0.28	0.41	0.38	0.51	0.00	0.00
Sri Lanka	0.16	0.30	0.36	0.51	0.46	0.61	1.25	1.39
Latin America								
Haiti	0.00	0.00	0.00	0.00	0.11	0.28	0.04	0.22
Haiti	0.00	0.00	0.00	0.00	0.11	0.28	0.04	0.22
North Africa/Middle East								
Sudan	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.18
Sudan	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.18
Sub-Saharan Africa								
Benin	2.99	3.53	5.43	6.00	1.57	2.57	3.14	4.30
Benin	0.12	0.23	0.33	0.43	0.00	0.03	0.00	0.00
Central African Republic	0.16	0.18	n.a.	n.a.	0.16	0.18	0.00	0.00
Chad	0.07	0.09	0.58	0.59	0.00	0.00	0.09	0.11
Ethiopia	1.74	1.90	2.74	2.90	0.00	0.00	0.30	0.46
Madagascar	0.60	0.66	0.60	0.66	0.41	0.46	0.69	0.75
Malawi	0.00	0.00	0.00	0.00	0.03	0.13	0.01	0.11
Mali	0.00	0.00	0.29	0.36	0.19	0.26	1.37	1.43
Niger	0.06	0.14	0.00	0.04	0.06	0.14	0.27	0.35
Rwanda	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Sierra Leone	0.00	0.00	0.15	0.18	0.00	0.00	0.05	0.08
Somalia	0.21	0.26	0.30	0.36	0.21	0.26	0.24	0.30
Uganda	0.00	0.00	0.00	0.00	0.14	0.18	0.00	0.00
Upper Volta	0.03	0.07	0.44	0.48	0.00	0.00	0.12	0.16
Zaire	0.00	0.00	0.00	0.00	0.37	0.93	0.00	0.50
Total	9.40	10.71	13.95	15.29	6.39	8.34	6.29	8.42

(continued)

## Table 31—Continued

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Sources: Cereal import values are the import demand projections shown in Table 25, valued in 1977 U.S. dollars at a price of \$181 per metric ton. Export earnings are projected from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. The amount of food aid required is calculated assuming that concessional financing is needed for all quantities whose values exceed either 5 percent or 2 percent of export earnings.

Notes: The countries included in the table have per capita incomes projected to be less than U.S. \$300 in 1990, expressed in 1977 dollars, and to have ratios of cereal imports to export earnings projected to be equal to or greater than 2 percent in one or more of the scenarios. Where n.a. appears, the data were not available.

Under the 5 percent criterion, the total food aid requirement for all eligible countries in 1990 is thus estimated to be 13 to 17 million tons for the three scenarios that represent different estimates of effective demand, and 22 million tons when dietary energy requirements are also taken into account. Under the 2 percent criterion, the effective demand estimates are between 24 and 30 million tons, while the dietary energy estimate is 34 million tons. If the 5 percent criterion were to be applied to middle-income countries, and the 2 percent criterion to low-income countries, the totals would range from 14 to 19 million tons for the three

effective demand scenarios and equal 24 million tons for the dietary energy scenario.

FAO has estimated that 17.0 to 18.5 million tons will be required as food aid in 1985, a range that is consistent with the figures obtained using the 5 percent criterion. Thus this analysis seems to support the FAO estimates as a realistic indication of the approximate amount of the food aid requirement in developing countries. Assuming that food aid increases to 18 million tons by 1990 and that present trends continue, this would mean that commercial imports could increase to as much as 158 million tons by 1990.

## ISSUES IN FOOD AID PROGRAM DESIGN

The large requirements for food aid projected in Chapter 6 may not be met. The budgetary costs for donors may be too high or the supply of grain too low. Or it may be believed that food aid programs create disincentives for domestic agricultural production, fail to improve the nutrition of low-income families, or are not cost-effective. Estimation of donor costs and the availability of commodities is beyond the scope of this report.<sup>28</sup> But there is by now a large body of evidence about how food aid affects domestic agricultural production, and how it contributes to nutrition and its cost-effectiveness.

This chapter begins by taking note of research findings on how food aid affects production and nutrition and the cost-effectiveness of food aid. It then discusses in more detail some theoretical principles governing the economic effects of food aid and draws on the analysis presented in earlier chapters to suggest what its effects probably were in the past, although noting that definite conclusions cannot be reached without models of specific countries. Finally, it notes that poor policy environments and institutional constraints may prevent food aid from having the desired effects in the future, unless the aid is programmed in ways that prevent negative consequences and foster long-run development. Empirical evidence on how this can be done is discussed separately for programs that permit the cash sale of food aid and those that target nutrition interventions to especially needy groups.

Theory gives no clear answer to the question of whether or not food aid creates a disincentive for domestic agricultural pro-

duction. Food aid can create a disincentive for domestic agriculture under certain conditions, but those conditions are not always present, and where they are, policies are available that can prevent or offset the disincentive. Food aid can be used in several types of economic environments: in economies that do not normally import but use food aid to supplement domestic supply; in open economies where domestic prices are set by the world market and food aid substitutes for commercial imports; and in open economies where prices are regulated to stabilize domestic markets and where the degree to which food aid supplements or substitutes for commercial imports is indeterminate. There is likely to be a disincentive for production only when food aid is largely or fully supplemental; if domestic prices are regulated, the disincentive can be partly offset by government policy. Empirical evidence suggests that most major recipients of food aid in the past were countries with chronic food deficits where prices were regulated and food aid was either not supplemental or only partly so.<sup>29</sup>

The evidence about whether food aid improves the nutritional status of low-income families is mixed. Food aid has the effect of an income transfer, with the increase in consumption dependent on the income elasticities of demand for food of the recipient groups and the size of the income transfer. When the income transfer is made by reducing the price of a commodity used for food aid, the price elasticity of demand for that commodity relative to other commodities will also affect consumption. When the in-

<sup>28</sup> Estimates differ about whether world market supply will keep pace with growth in demand without causing the trend in world prices to increase. Calculations by USDA show that in some years the dollar cost of providing food aid could equal or exceed the saving in outlays for government farm support programs, thus reducing the budgetary incentive to increase food aid substantially. For the European Community also, the development assistance portion of food aid costs has been increasing relative to the price support share. However, donors are still more likely to make the necessary budgetary allocations for food aid, which serves multiple purposes, than for a comparable amount of cash aid to developing countries. See USDA, *New Directions for U.S. Food Assistance: A Report of the Special Task Force on the Operation of Public Law 480* (Washington, D.C.: USDA, 1978); and European Community, Directorate-General for Agriculture, *Green Europe Newsletter on the Common Agricultural Policy*, various issues.

<sup>29</sup> Phillip C. Abbott and F. Desmond McCarthy, "The Welfare Effects of Tied Food Aid," CP-81-8, International Institute for Applied Systems Analysis, Laxenburg, Austria, March 1981.

come transfer is made by distributing food directly to target recipients, there is some evidence that the consumption increase may be greater than if the aid were given as cash, perhaps because the distribution of the two kinds of aid within families differs. There is also increasing evidence that significant increases in food consumption and related improvements in nutritional status are more likely to occur in groups where incomes are so low that calorie intake is seriously substandard; in low-income families where basic food needs are being met, expenditure of additional income on food is more likely to be used to improve the quality of the diet than to increase the number of calories consumed.<sup>30</sup>

Findings about whether food aid programs are cost-effective depend on the objective function against which a program's costs are measured. The cost of administering and monitoring more targeted distribution programs is higher per unit of food delivered, but a determination of whether or not higher-cost programs produce proportionately greater benefits can only be made for each specific program.<sup>31</sup>

The implications of these findings for formulating appropriate policies and making decisions about how best to use increased quantities of food aid are treated in more depth in the remainder of this chapter.

## Economic Environments for Using Food Aid

Food aid, like any other form of development assistance, represents a fungible foreign exchange transfer. To counteract distortions perceived to arise from external causes and to increase consumer welfare, many developing countries operate administered pricing systems for staple food commodities. Because keeping consumer prices stable is usually

an important goal for such countries, cereal import demand may be inelastic with respect to the availability of foreign exchange. When food aid is available, these countries will use the extra foreign exchange to finance additional nonfood imports, which may or may not contribute to the overall economic development of the country, depending on the macroeconomic policy environment. When food aid is given purely as balance-of-payments support with no expectation that it will add to total food supply, the criterion for evaluating its effectiveness must be the performance of the entire economy.

Even if the additional foreign exchange provided by food aid is used to import additional cereals, the dampening effect of the extra supply on domestic prices may be at least partially offset by the demand response. If demand is quite elastic with respect to price, as it usually is in countries that require food aid, the price decline will be small and there could be a net gain in welfare.<sup>32</sup> If a government uses fiscal measures to realize this gain as government revenue, the gain can finance input subsidies, infrastructure development, or farm price support. Food aid sold on the open market generates government revenues known as counterpart funds. Their use is frequently monitored by donors to ascertain whether a country actually spends the additional budgetary resource productively. However, counterpart funds, like foreign exchange transfers, are also fungible. So the use of these funds can only be assessed meaningfully if it is reviewed in light of overall budgetary priorities and other macroeconomic policies.

One line of argument suggests that food aid is adverse for economic development because it provides budgetary support that allows governments to avoid making the politically difficult decision to change policies that favor urban industry and urban consumers at the expense of agriculture.<sup>33</sup>

<sup>30</sup> G. H. Beaton and Hossain Ghassemi, "Supplementary Feeding Programmes for Young Children in Developing Countries," report prepared for UNICEF and the ACC Sub-Committee on Nutrition of the United Nations, New York, 1979; and Eileen T. Kennedy and Per Pinstrup-Andersen, *Nutrition-Related Policies and Programs: Past Performances and Research Needs* (Washington, D.C.: IFPRI, 1983).

<sup>31</sup> Beaton and Ghassemi, "Supplementary Feeding Programmes."

<sup>32</sup> Franklin M. Fisher, "A Theoretical Analysis of the Impact of Food Surplus Disposal on Agricultural Production in Recipient Countries," *Journal of Farm Economics* 45 (November 1963): 863-875.

<sup>33</sup> T. W. Schultz, "Effects of the International Donor Community on Farm People," *American Journal of Agricultural Economics* 62 (December 1980): 873-878.

Another is that food aid can provide an incentive for governments to pursue policies that favor agriculture, because it supplies an essential wage good so that investment in labor-intensive rural infrastructure can occur. This also has the secondary effect of contributing to growth in the real incomes of landless laborers.<sup>34</sup>

Evaluation of the merits of these and other hypotheses about whether or not food aid contributes to a country's economic performance requires models that explain the behavior of domestic cereals markets and that show how these markets fit into their national economies. Such models are being developed. A study by Grant Scobie incorporates food aid considerations into a model explaining the behavior of the Egyptian wheat market. The study analyzes this market in the context of balance-of-payments constraints, models its interactions with the cotton market, and emphasizes the significance of domestic pricing policies. Food aid is treated as a source of foreign exchange and acts through the model to affect prices, production, imports, and the allocation of foreign exchange resources. Using a somewhat different approach, Joachim von Braun estimates demand and supply functions for wheat in the Egyptian market. These show that the response of demand to changes in prices is elastic enough so that any addition to supply provided by food aid can be absorbed with little effect on domestic prices and thus on production.

Yair Mundlak and his several collaborators have developed a general equilibrium model encompassing economy-wide sectoral models that link behavior in agriculture and the rest of the economy. This model could be enhanced to include food aid considerations. It would then permit analysis of the dynamic interaction of food aid transfers with other factors that influence economic growth and structural change, such as wage rates and labor migration, interest rates and investment flows, product prices and technological change, transport and service costs and infrastructure development, trade and exchange rate policies, and the degree of

market competition. The effect of food aid would be a function of the dynamic relationships between a number of different variables that affect economic growth and structural change in developing countries.<sup>35</sup>

The evidence presented for developing countries for 1961-78 shows that increases in cereal import dependence generally occur when economic growth has progressed far enough that a country can afford to pay for increased per capita imports on commercial terms. Large increases generally do not occur when a country is still poorly developed and relies heavily on food aid to finance cereal imports. This finding is consistent with the view that in the past developing countries have usually either substituted food aid for commercial imports, so that no production disincentive was felt, or regulated domestic policies to offset the potential disincentive effect of food aid. The results of this study also demonstrate that countries become self-reliant with nutritionally adequate food supplies only after economic growth has raised average per capita incomes above the poverty line. This suggests that it is realistic to view food aid as a potentially useful resource transfer during the early stages of economic development, and to envisage phasing it out once real per capita income reaches a certain level.

It should be noted, however, that the economic conditions that low-income countries face today are not the same as those that the countries of Latin America, North Africa, and Southeast Asia faced a quarter century ago when their growth was just beginning. Today's middle- and high-income developing countries grew by developing export industries as well as domestic agriculture. For many of today's low-income countries, the prospects for developing strong export sectors are less clear, and some have argued that staple crop agriculture must instead provide the catalyst for growth. This means that policies affecting the efficient use of food aid become all the more important since they will impinge directly on the ability of the country to achieve its growth and development objectives.

<sup>34</sup> John W. Mellor, "Food Price Policy and Income Distribution in Low-Income Countries," *Economic Development and Cultural Change* 27 (October 1978): 1-26, discusses the kind of policy environment required to satisfy this condition.

<sup>35</sup> Grant M. Scobie, *Government Policy and Food Imports*; Joachim von Braun, "Effects of Food Aid in Recipient Countries," *Economics*, vol. 25 (Tübingen: Institute for Scientific Cooperation, 1982), pp. 18-47; Domingo Cavallo and Yair Mundlak, *Agriculture and Economic Growth in an Open Economy: The Case of Argentina*, Research Report 36 (Washington, D.C.: IFPRI, 1982).

The estimates of food aid requirements given in Chapter 6 are presented as orders of magnitude of the additional demand that food aid could fill in low- and middle-income countries, provided that programs to generate transfer of income for people consuming less than the FAO/WHO standard are also established. They are not precise estimates of the actual amount of food aid that will be required when economic policy considerations are taken into account, nor do they take into account institutional limitations that may prevent countries from using all of their estimated food aid requirement effectively.

Considerably more research is needed on the policy processes and institutional constraints of individual countries before definitive answers can be given about the amounts of food aid they can use effectively. Nevertheless, the literature does suggest that some techniques may be more effective than others in specific situations.

## Uses of Food Aid for Cash Sale

Middle-income developing countries should be reaching the point where they can manage targeted food distribution programs without external assistance. However, these countries will need concessional assistance from time to time if they are to keep importing the amount of cereals necessary to supply domestic markets at stable prices. The amount of assistance required will fluctuate from year to year, according to fluctuations in domestic crop production and the volume of cereal imports required, world cereal prices, and the value of export earnings and foreign exchange reserves in relation to the value of total import requirements and debt servicing obligations.<sup>36</sup> Because the aid requirement fluctuates, the most appropriate form of support is program aid. The food commodities given as program aid are sold on the open market, and the proceeds are used for general budgetary support in a policy environment conducive to agricultural growth.

For administrative reasons, it may be more practical to keep food aid flows stable

and let the country adjust to fluctuations in its balance-of-payments position in other ways. This would be particularly true for countries, such as Egypt, where the import requirement is more or less stable around a trend. For such countries food aid provided as a fixed or gradually declining proportion of total cereal imports may make supplies more secure and prove easier to manage than varying the amount in response to balance-of-payments fluctuations. However, if this procedure is adopted, care must be taken to reduce the size of the food aid program if trends in the country's domestic supply position and commercial import capacity improve.

In many low-income countries, inadequate domestic food production and lack of purchasing power combine to depress consumption for large numbers of poor people. Until per capita incomes in these countries rise, it can be assumed that they will face pressing balance-of-payments problems and that imports of cereals will have to be financed primarily with concessional or grant assistance. The amount of food aid required will therefore be equal to the amount of additional imports needed to bring per capita consumption up to a minimum nutritional standard for different sexes, age groups, and types of activity. This equals the difference between domestic production and the total supply required to meet both effective market demand and unsatisfied nutritional needs.

Since there is a chronic requirement for additional food to improve nutrition in many low-income countries, the more appropriate form of support may often be project aid, which uses commodities to finance targeted food subsidies or distribution programs that reach the poor directly with additional food. This approach may not, however, always be selected for several reasons. First, administrative mechanisms for reaching target groups in rural areas are frequently nonexistent or costly. Second, because their resources are limited, governments may not give budgetary priority to alleviating chronic malnutrition and may therefore not provide the resources necessary to make project food aid effective. Third, low-income consumers may have real needs

<sup>36</sup> Alberto Valdés and Panos Konandreas, "Assessing Food Insecurity Based on National Aggregates in Developing Countries," in *Food Security for Developing Countries*, ed. Alberto Valdés (Boulder, Colo.: Westview Press, 1981), pp. 25-51.

that can be met through open-market sales at subsidized prices, which keep their food costs low.

If there are subsidies for food consumption to create demand, many governments find it difficult to limit their use to those most in need, and the sale of food aid is an attractive alternative to domestic procurement in countries where marketing systems are not well developed. It is easier to procure cereal imports for sale in urban markets than to create infrastructure and introduce policy reforms that will give local producers more incentives to supply these markets. This use of food aid for cash sale contributes little to long-term development.

There are, however, several ways that food aid given for cash sale can be used productively by low-income countries. One is to support reforms in policy. If they have a small grain reserve created with food aid, governments can introduce price and procurement policies that can allow markets to operate freely within a price band that protects the interests of both consumers and producers. If weather conditions reduce harvests in some years, additional food aid may be needed to support the government's new price policy. This use of program food aid as a food security cushion and incentive for rationalizing price policies is being tried on an experimental basis in Bangladesh and Mali.<sup>37</sup> As experience accumulates, this approach may be adapted for other low-income countries where food aid and price policy reform both are needed.

Aid sold for cash can also finance the nonfood costs of targeted distribution programs. Lack of resources to finance administrative and transport costs often prevents implementation of much-needed targeted food distribution programs. And where food aid is being used to support development-related activities, such as road-building or nutrition education programs, cash sale of a portion of the food for tools, materials, and supervisory personnel is needed. Complementary financial resources can often mean the difference between success or failure for such projects.

Finally, food aid that is sold can provide budget support for infrastructure develop-

ment. As noted above, the uses of counterpart funds generated by cash sale of food aid are often indistinguishable from the uses of other public funds. However, when a specific development project such as construction of a road, a dam, or a grain elevator requires external assistance and food aid is the only resource available, proceeds from the cash sale of food aid may be designated to provide financial support for the project. This approach is sometimes proposed as an alternative to food-for-work projects, on grounds that cash payments to workers at market wage rates encourage higher quality work and cost less to administer than commodity payments. But this approach is feasible only if assurance can be provided that the additional food supplied will actually find its way into the markets where additional demand is being created. Monitoring costs for this approach may therefore be as high or higher than those of providing food directly to target groups.

## Use of Food Aid for Targeted Nutrition Interventions

Some middle-income countries are self-sufficient in that they can satisfy market demand, but they cannot fully meet the nutritional requirements of some groups. As a country becomes economically developed, it should, in principle, be preparing to take responsibility for programs that meet the needs of these special groups. However, in middle-income countries where these programs would be terminated if food aid for targeted food distribution programs were phased out, it may be desirable to continue food aid support until the country has taken complete financial and administrative control of the programs.

In low-income countries, chronically malnourished groups will require supplementary food for a long time. To reach these groups, some form of targeted nutrition intervention will generally be required. The intervention does not have to be a program that distributes food to the target groups directly. It can accomplish its objective by providing additional quantities of a less-

<sup>37</sup> Edward Clay, "Food Aid and the Economic Development of Bangladesh," IDS/DP 147, University of Sussex, Institute of Development Studies, Brighton, December 1979; Bangladesh, "Food Production Programme, 1980/81-1984/85," Dhaka, November 1980; Charles Humphreys, "Comments on the Case of Mali," presentation at the ADC Seminar on Improving the Development Effectiveness of Food Aid in Africa, Abidjan, August 1981.

preferred food through local markets where demand for the food will be primarily among the poor, or through fair-price shops that limit access to those who hold ration cards.<sup>38</sup> But direct distribution programs have been preferred in many countries because private voluntary organizations take the responsibility and bear some of the cost for administering them.

Where natural disasters recur frequently, some relief help is required nearly every year. Programs that respond to this need entail direct distribution of food for humanitarian reasons, but because of their continuing nature and the usual requirement that beneficiaries undertake some useful activity in exchange for the food they receive, they can also foster rural-based development.<sup>39</sup> The WFP has the longest experience with project food aid that is justified on humanitarian grounds but is designed to stimulate long-term development.

Since 1963, the WFP has given food to governments to distribute directly to beneficiaries. Ninety percent of WFP's resources are used to support projects that aid economic and social development, while only 10 percent are classified as emergency and food security assistance. About 60 percent of the developmental projects have been for agricultural and rural development, about 30 percent for development of human resources, and about 10 percent for the construction or improvement of physical infrastructure. Emphasis is currently being given to projects that will increase production of foodcrops and to projects that will improve the nutrition of mothers and preschool and primary school children.<sup>40</sup>

The primary factor constraining expansion of targeted nutrition interventions in low-income countries will probably be the amount of management support that can be provided. Funds, personnel, and physical capacity for storing, transporting, and distributing the grain are all scarce. It seems reasonable to assume that the primary factors determining the amount of food aid actually used for targeted distribution programs during the coming decade will be the budget priority the recipient country gives to administrative support, the amount of administrative support the donors are willing to provide, and the amount of external administrative support the recipients are willing to accept.<sup>41</sup>

FAO estimates that less than one-third of the 17.0 to 18.5 million tons of food aid it thinks will be needed by 1985 can be used in targeted food aid projects. Most of the rest will have to be sold on the open market and used for general budget support, with a small amount designated for genuine emergency relief.<sup>42</sup> While the total food aid requirement may differ from the preliminary FAO estimates, the small proportion FAO allocates to targeted projects indicates how difficult it may be to expand direct distribution programs significantly, despite their attractive demand-creating features.

In conclusion, it is vital that decisions about the appropriate use or combination of uses of commodity assistance be coordinated with other elements of the recipient country's food and agricultural policies and the donor countries' assistance programs. Only then can the international community hope to make effective use of food aid to help fill the cereal gaps of the current decade.

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<sup>38</sup> Kennedy and Pinstrup-Andersen, *Nutrition-Related Policies*.

<sup>39</sup> Gunvant Desai, *Impact of Scarcity on Farm Economy and Significance of Relief Operations*, CMA Monograph No. 84 (Ahmedabad: Indian Institute of Management, 1979).

<sup>40</sup> WFP, "Briefing Note," May 1990.

<sup>41</sup> In Bangladesh, for example, it has been estimated that the country could employ more than twice as many rural laborers in food-for-work projects than it does now, but administrative constraints prevent such expansion of the program. Hjalmar Brundin, *Food for Work: Saturation Level and Constraints to Expansion* (Dhaka: USAID, 1978).

<sup>42</sup> The portion allocated to targeted food aid projects is based on results of a country survey conducted by FAO on expected food aid needs and absorptive capacity. WFP, Committee on Food Aid Policies and Programmes, "Food Aid Requirements and Food Aid Targets in the Eighties," Submission by the Executive Director, Agenda Item 8(a), Eighth Session, Rome, October 22-31, 1979.

## APPENDIX 1: CALCULATION OF THE GRANT ELEMENT

Most countries report the dollar value of cereal imports by recording the c.i.f. contract price on each shipment arriving at a port of entry and multiplying that price times the quantity delivered. Concessional food aid is contracted for at commercial market prices, with the subsidy given through easy credit terms rather than as a reduction in price. The value of the subsidy is referred to as the grant element of concessional food aid.

The idea of a grant element first appeared in the economic literature in the sixties as a measure of the concessionality of foreign aid. It was designed by economists to measure the resource transfer of development loans and aid contracts according to the softness of their terms. It is now employed primarily by government officials in donor countries to rank the softness of their assistance.

The theoretical underpinning for this calculation was described in several articles published in the sixties. The grant element of foreign aid is defined by Ohlin as the "difference between the face value of the loan and the present value of all future repayments (amortization and interest payments) discounted at a proper rate of interest."<sup>43</sup> In a later publication, the OECD elaborates on this concept, pointing out that "this imputed grant element depends on the difference between the rate of interest on the loan and the rate of return which could have been obtained through alternative uses, taking the whole lifetime of the loan into account."<sup>44</sup>

Computing the grant element requires selecting a discount rate. The degree of concessionality in a food aid loan agreement is a function of the interest rate charged for the loan, the length of the repayment period, the length of the grace period, and the discount rate. Selection of one number for the discount rate for every year that the loan is outstanding presents problems that have been the subject of lengthy debate among econ-

omists. A common practice when evaluating social projects has been to use a 10 percent discount rate, and this is also the practice followed by donors in calculating the grant element of food aid.

The grant element reflects the value of food aid to recipient countries in the sense that it estimates how much the foreign exchange cost of a given quantity of cereal imports is reduced by the terms of a grant or loan. It does not allow for the possibility that recipient countries may attach a lower foreign exchange value to food aid than is reflected by its commercial market price. Nor does it allow for the possibility that the entire commercial import bill for the recipient might have been lower if world market prices had not been supported and if the quantities disposed of through PL 480 had been sold commercially instead. These costs of food aid to the recipient would reduce the value of the aid as estimated by the grant element. Also, to the extent that the 10 percent discount rate does not accurately reflect the social opportunity cost of investment, the grant element will be estimated incorrectly. Finally, if actual payment and commodity disbursement schedules deviate from those stated in a loan agreement, this could affect the ultimate value of the grant element.

The grant element used in this study is derived from calculations made by the U.S. Department of Commerce for each different set of possible loan terms (see Appendix 1, Table 32). The grant element is expressed as a percentage of the total value of any loan having a specific set of terms. The grant element formula calculated by the United States was applied to the actual loan terms for each concessional food aid agreement included in the historical data. The grant element for each loan calculated in this way was then assigned a value of 20, 40, 60, or 80 percent according to the following table:

<sup>43</sup> Goran Ohlin, "The Grant Element in Development Lending and the Growth of Service Charges," in *Foreign Aid Policies Reconsidered* (Paris: OECD, 1966).

<sup>44</sup> Organization for Economic Cooperation and Development, *Development Assistance Efforts and Policies: 1967 Review* (Paris: OECD, 1968).

**Table 32—Grant element according to loan terms**

Time to Maturity	Grace Period	Interest for Grace Period	Interest for Repayment Period	Grant Element
	(years)		(percent)	
40	10	2	3	0.67
40	10	2	2.5	0.68
40	10	1	2.5	0.74
30	10	2	3	0.64
30	6	2	3	0.58
30	6	1	2.5	0.65
30	5	2	3	0.57
25	6	3	4	0.48
24	3	3	3	0.47
23	3	2	3	0.49
21	5	2	3	0.51
21	4	2	3	0.49
21	2	0.75	0.75	0.57
20	5	2	3	0.50
20	2	2	3	0.44
20	2	2	2.5	0.46
20	2	1	2.5	0.47
20	2	0.75	2	0.50
20	2	0.75	0.75	0.55
20	2	3.5	3.5	0.38
20	2	3	3	0.42
20	2	2.5	2.5	0.45
20	1	2.5	5	0.31
20	1	1	2.5	0.44
20	1	3	3	0.40
20	1	0.75	0.75	0.53
19	5	2	3	0.49
19	1	3	5	0.30
19	1	2.5	5	0.30
19	2	3.5	3.5	0.38
19	1	3.5	3.5	0.30
19	1	3	3	0.39
19	1	2.5	2.5	0.42
19	1	0.75	0.75	0.52
18	4	2	3	0.46
18	1	3.5	3.5	0.35
18	1	3	3	0.38
18	1	1	2.5	0.42
18	1	3.5	3.5	0.35
18	1	2.5	2.5	0.41
18	1	0.75	0.75	0.50
16	2	5.5	5.5	0.24
16	2	4	4	0.32
16	2	3.5	3.5	0.35
15	2	2	3	0.38
15	1	5.5	5.5	0.22
15	1	5	5	0.25
15	1	2.5	2.5	0.37
15.5	1.5	6.25	6.25	0.19
14	1	4	4	0.28
12.25	1.25	2	3	0.32
12	3	3	3	0.34
10	1	0.75	0.75	0.36
7	1	6.875	6.875	0.09
5	1	5.125	5.125	0.12
5	1	4.78	4.78	0.13

Source: U.S. Department of Commerce, private communication, January 1981.

Notes: The grace period is the time before the first payment is due. The grant element is the proportion of the loan that is subsidized. It is estimated assuming that a part of the principal is repaid each year following the grace period and that there are no complicating conditions. In practice virtually no loans meet these conditions.

Range of Actual Grant Element Calculated by U.S. Department of Commerce (percent)	Grant Element Assigned by IFPRI (percent)
0-29	20
30-49	40
50-69	60
70-100	80

This permitted grouping loans in four categories according to the degree of concessionality. These categories are "little grant" (0-29 percent), "a fair amount of grant" (30-49 percent), "a great deal of grant" (50-69 percent), and "almost all grant" (70-100 percent). This procedure captures most of the differences needed to estimate the degree of concessionality of U.S. food aid without requiring a precise estimate of the value of the grant element of food aid for each recipient country.

Only about 58 percent of the country-years in which Title I grain was shipped are accounted for by documents that record loan terms. The grant element is arbitrarily assumed to be 50 percent for the missing country-years.

Through 1971, some PL 480 loans allowed repayment in the nonconvertible currency

of the recipient country. These local currency loans have been assigned a grant element of 80 percent. Because no repayment in convertible currency is required, one view is that local currency loans have a grant element of 100 percent. But the loan agreements stipulate uses to which the funds generated by local currency repayments may be put in the recipient country, thus restricting the flexibility of the country in the use of the local currency accounts. Thus it was decided to use a grant element of less than 100 percent.<sup>45</sup>

Other non- Title II loans, those under AID and barter, have been assigned grant elements of 50 percent. Grain sent under these two programs is a small portion of the total. There is sometimes a problem because grain deliveries to one country in a certain year can occur under two sets of loan terms, usually involving different grains. Where that happens, the set of terms that accounts for the larger of the two grain shipments is used.

Loan terms for agricultural commodities other than cereals were used where necessary. For example, the sets of terms from soybean or cotton sales were used where it seemed reasonable to assume that only one Commodity Credit Corporation loan covered all agricultural goods for a given country and year. This practice was followed only if there were no loan terms available for cereals.

<sup>45</sup> In his work on Title I PL 480, J. A. Pincus counted 20 percent of the value of the contract as loans and 80 percent as grants. One argument for such an assumption is that some of this money was going to be spent by the donor in the recipient country anyway (John A. Pincus, "The Cost of Foreign Aid," in *Foreign Aid*, ed. by Jagdish Bhagwati and Richard S. Eckaus [Middlesex, England: Penguin Books, 1970]).

## APPENDIX 2:

### IMPORT DEPENDENCE IN EXPORTING COUNTRIES

Gross imports are used in this study to indicate cereal import volume, since this is the quantity a country would have to finance. The benefit obtained from exporting cereals then shows up as a contribution to export earnings. Since consumption data include only net cereal imports, that is, gross imports minus exports, it can be argued that a ratio of gross imports to total staple consumption overstates the import dependence ratio for exporting countries. However, where the imported cereals and the exported cereals are of different types, as they often are, domestic demand may be inelastic with respect to the exported commodities; therefore, these commodities should not be considered ready substitutes for the imported cereals that constitute the numerator of the import dependence ratio.

The cereal exports of 22 of the 99 coun-

tries covered by this study were more than 2 percent of total staple consumption in the period 1976-78. The figures for these countries are shown in Appendix 2, Table 33, as are the cereals that dominate their consumption imports and exports. Even if the import dependence ratio were reduced by the total quantity of cereals exported, the import dependence classification does not change for any of these 22 countries. However, there are a few countries that export staple crops despite domestic food availability that is inadequate and import requirements that are apparently unmet. In some cases this is because the exported commodity is not the preferred staple of the majority of the country's population; in other cases, the anomaly is the result of marketing practices of the country's state trading agency.

**Table 33—Cereal imports, exports, and consumption for developing country exporters, dependence ratios, and domestic food supply adequacy, 1976-78**

Region/Country	Exports as a Share of Total Staple Consumption, 1976-78	Dominant Cereals Consumed	Dominant Cereals Imported
	(percent)		
<b>Asia</b>			
Bhutan	6.20	Rice	...
Burma	8.21	Rice	...
Korea, Democratic People's Republic of	8.42	Rice	Wheat
Nepal	3.90	Rice	...
Pakistan	5.79	Wheat	Wheat
Singapore	47.47	Rice/wheat/maize	Maize/wheat/rice
Thailand	45.08	Rice	...
<b>Latin America</b>			
Argentina	98.26	Wheat	...
Brazil	2.97	Rice/wheat	Wheat
Costa Rica	7.19	Rice/wheat	Wheat/coarse grains
Guyana	47.02	Rice/wheat	Wheat/coarse grains
Surinam	54.46	Rice/wheat	Maize/wheat
Uruguay	24.72	Wheat/rice	Wheat
<b>North Africa/Middle East</b>			
Lebanon	3.45	Wheat	Maize/barley/wheat
Sudan	2.98	Sorghum	Wheat
Syria	2.62	Wheat	Wheat
Turkey	4.34	Wheat	...
<b>Sub-Saharan Africa</b>			
Kenya	3.40	Maize	Wheat
Mozambique	4.78	Maize/sorghum	Wheat
Niger	2.50	Millet	Sorghum
Swaziland	4.25	Maize	Coarse grains
Zimbabwe	3.42	Maize	...

(continued)

**Table 33—Continued**

Region/Country	Dominant Cereals Exported	Gross Import Dependence Ratio	Net Import Dependence Ratio	Domestic Food Supply Adequacy
<b>Asia</b>				
Bhutan	Rice	1	-5	89
Burma	Rice/maize	0	-8	103
Korea, Democratic People's Republic of	Maize	7	-1	121
Nepal	Rice	0	-4	102
Pakistan	Rice	6	0	90
Singapore	Wheat/maize	143	96	131
Thailand	Rice/maize	1	-44	98
<b>Latin America</b>				
Argentina	Maize/wheat	0	-98	142
Brazil	Maize/rice	10	6	105
Costa Rica	Rice	25	18	115
Guyana	Rice	31	-16	108
Surinam	Rice	41	-12	101
Uruguay	Rice/wheat	5	-21	106
<b>North Africa/Middle East</b>				
Lebanon	Maize	81	78	101
Sudan	Sorghum	6	3	100
Syria	Barley	16	3	111
Turkey	Wheat	0	-4	116
<b>Sub-Saharan Africa</b>				
Kenya	Maize	2	-1	90
Mozambique	Maize	10	5	81
Niger	Millet	4	1	87
Swaziland	Rice	11	7	98
Zimbabwe	Maize/rice	1	-2	106

Sources: Commodities imported and exported are from Food and Agriculture Organization of the United Nations (FAO), *FAO Trade Yearbook, 1978*, vol. 32 (Rome: FAO, 1979). Commodities consumed are from FAO, "Global Agricultural System Supply Utilization Accounts Tape," Rome, June 1980. Gross import dependence ratios are from Appendix 3, Table 37.

Notes: Where . . . appears, the figure was negligible. The gross import dependence ratio is the share of cereal imports in total staple consumption. The net import dependence ratio is the gross import dependence ratio minus the share of exports in total staple consumption. Exports for Singapore and Lebanon represent reexport trade rather than exports from domestic production. Food supply adequacy is calculated as the ratio of average per capita calorie intake in 1977-79 to the per capita daily calorie requirement established by an expert group of FAO and the World Health Organization.

## APPENDIX 3: SUPPLEMENTARY TABLES

Table 34—Total and per capita food aid by volume and food aid as a share of cereal imports by country, 1961-63

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Asia	1,479.5	17,068	5,656	33.1	3.82	11.54
High-income countries	39.9	2,894	608	21.0	15.24	72.53
High import dependence	39.9	2,894	608	21.0	15.24	72.53
Hong Kong	3.3	676	13	2.0	3.88	204.80
Korea, Republic of	26.0	769	595	77.0	22.88	29.58
Malaysia	8.4	747	...	...	...	88.93
Singapore	1.8	662	...	...	...	367.78
Fiji	0.4	40	0	0.0	0.00	0.02
Middle-income countries	747.1	6,279	6	0.1	0.01	8.40
High import dependence	3.0	73	0	0.0	0.00	24.33
Mongolia	1.0	35	n.a.	n.a.	n.a.	35.00
Papua New Guinea	2.0	38	0	0.0	0.00	19.00
Low import dependence	744.1	6,206	6	0.1	0.01	8.34
China	675.7	5,412	0	0.0	0.00	8.01
Korea, Democratic People's Republic of	11.2	225	0	0.0	0.00	20.09
Philippines	29.2	531	6	1.0	0.21	18.18
Thailand	28.0	38	0	0.0	0.00	1.36
Low-income countries	692.5	7,895	5,042	63.9	7.28	11.40
High import dependence	10.4	657	103	15.7	9.90	63.17
Sri Lanka	10.4	657	103	15.7	9.90	63.17
Low import dependence	682.1	7,238	4,939	68.2	7.24	10.61
Bangladesh	54.2	847	0	0.0	0.00	15.63
Bhutan	0.9	4	0	0.0	0.00	4.44
Burma	23.2	42	5	11.0	0.22	1.81
India	448.6	4,319	3,499	31.0	7.80	9.68
Indonesia	97.4	1,192	246	21.0	2.53	12.29
Nepal	9.5	2	...	...	...	0.21
Pakistan	48.3	832	1,189	100.0 <sup>a</sup>	24.61	17.23
Latin America	223.7	5,594	1,858	33.2	8.31	25.00
High-income countries	160.1	3,536	1,404	39.7	8.77	22.09
High import dependence	60.4	1,376	218	15.8	3.61	22.78
Chile	8.0	277	160	58.0	20.00	34.63
Costa Rica	1.3	55	5	10.0	3.71	42.30
Jamaica	1.7	166	6	3.6	3.53	97.65
Mexico	38.8	323	47	14.6	1.21	8.32
Panama	1.2	42	...	...	...	35.00
Surinam	0.3	13	...	...	...	43.33
Trinidad and Tobago	0.9	124	0	0.0	0.00	137.78
Venezuela	8.2	376	0	...	0.00	45.85
Low import dependence	99.7	2,160	1,186	54.9	11.90	21.67
Argentina	21.2	4	0	0.0	0.00	0.19
Brazil	75.8	2,145	1,186	55.0	15.66	28.30
Uruguay	2.7	11	...	5.0	...	4.07
Middle-income countries	59.8	2,009	426	21.2	7.12	33.60
High import dependence	57.9	1,923	383	19.9	6.62	33.21
Bolivia	4.0	159	89	56.0	22.47	39.75
Colombia	17.0	183	115	63.0	6.78	10.76
Cuba	7.3	796	2	2.0	0.27	109.04
Dominican Republic	3.4	67	17	25.0	5.05	20.30
Ecuador	4.6	45	4	8.0	0.87	9.78
El Salvador	2.7	68	6	9.0	2.24	25.19

(continued)

Table 34—Continued

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Guatemala	4.2	74	15	20.0	3.55	17.62
Guyana	0.6	41	...	...	...	68.33
Honduras	2.0	27	...	2.0	...	13.50
Nicaragua	1.6	31	4	14.0	2.57	19.38
Peru	10.5	432	131	30.0	12.48	41.14
Low import dependence	1.9	86	43	50.5	22.63	45.26
Paraguay	1.9	86	43	50.5	22.63	45.26
Low-income countries	3.8	49	28	57.1	7.37	12.90
High import dependence	3.8	49	28	57.1	7.37	12.90
Haiti	3.8	49	28	57.1	7.37	12.90
North Africa/Middle East	159.2	5,740	3,869	67.4	24.13	35.81
High-income countries	53.4	2,165	1,053	48.6	19.34	39.76
High import dependence	24.5	1,369	238	17.4	9.34	53.52
Algeria	10.1	512	115	22.5	11.28	50.20
Cyprus	0.6	58	3	5.0	5.17	96.67
Iraq	7.3	209	12	5.7	1.65	28.63
Jordan	1.8	221	77	34.8	42.78	122.78
Libya	1.5	135	29	21.0	19.93	90.00
Saudi Arabia	4.2	234	2	1.0	0.48	55.71
Low import dependence	28.9	796	815	100.0 <sup>a</sup>	28.20	27.54
Turkey	28.9	796	815	100.0 <sup>a</sup>	28.20	27.54
Middle-income countries	79.2	3,428	2,764	80.6	34.90	43.28
High import dependence	79.2	3,428	2,764	80.6	34.90	43.28
Egypt	27.3	1,836	1,664	90.6	60.95	67.25
Iran <sup>b</sup>	22.7	202	220	100.0 <sup>a</sup>	9.68	8.90
Lebanon <sup>b</sup>	2.0	311	21	7.0	10.65	155.50
Morocco	12.2	422	293	69.0	23.98	34.59
Syria	4.8	206	249	100.0 <sup>a</sup>	51.88	42.92
Tunisia	4.4	337	317	94.0	72.52	76.59
Yemen Arab Republic	4.5	3	0	0.0	0.00	0.65
Yemen, People's Democratic Republic of	1.2	111	0	0.0	0.00	92.50
Low-income countries	26.6	147	52	35.4	1.95	5.53
Low import dependence	26.6	147	52	35.4	1.95	5.53
Afghanistan	14.2	40	23	57.0	1.61	2.82
Sudan	12.4	107	29	27.0	2.34	8.63
Sub-Saharan Africa	208.4	1,640	129	7.9	0.62	7.87
High-income countries	4.5	133	0	0.0	0.00	29.56
High import dependence	4.5	133	0	0.0	0.00	29.56
Gabon	0.5	7	0	0.0	0.00	14.00
Ivory Coast	3.6	60	0	0.0	0.00	16.67
Réunion	0.4	66	0	0.0	0.00	165.00
Middle-income countries	91.0	905	26	2.9	0.29	9.95
High import dependence	15.7	547	18	3.3	1.15	34.84
Botswana	0.5	32	n.a.	n.a.	n.a.	64.00
Congo	1.0	16	n.a.	n.a.	n.a.	16.00
Ghana	7.2	99	15	15.0	2.09	13.75
Liberia	1.3	33	3	8.0	2.30	25.38
Mauritania	1.0	47	0	0.0	0.00	47.00
Mauritius	0.7	109	0	0.0	0.00	155.71
Senegal	3.7	204	0	0.0	0.00	55.14
Swaziland	0.3	7	n.a.	n.a.	n.a.	23.33
Low import dependence	75.3	358	8	2.2	0.11	4.75
Cameroon	5.1	30	...	1.0	...	6.00
Kenya	8.6	78	0	0.0	0.00	9.07
Nigeria	54.3	118	8	7.0	0.15	2.17
Zambia	3.4	32	0	0.0	0.00	9.41
Zimbabwe	3.9	100	0	0.0	0.00	25.64

(continued)

Table 34—Continued

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Low-income countries	112.9	602	103	17.1	0.91	5.33
High import dependence	4.0	60	8	13.3	2.00	15.00
Gambia	0.4	11	0	0.0	0.00	27.50
Guinea-Bissau	0.4	4	0	0.0	0.00	8.00
Lesotho	0.9	7	n.a.	n.a.	n.a.	7.78
Somalia	2.3	38	8	21.0	3.43	16.52
Low import dependence	108.9	542	95	17.5	0.87	4.98
Angola	4.9	35	0	0.0	0.00	7.14
Benin	2.2	9	0	0.0	0.00	4.09
Burundi	3.0	5	0	0.0	0.00	1.67
Central African Republic	1.4	5	0	0.0	0.00	3.57
Chad <sup>a</sup>	3.1	4	0	0.0	0.00	1.33
Ethiopia	20.9	7	10	100.0 <sup>a</sup>	0.48	0.34
Guinea	3.3	50	0	0.0	0.00	15.15
Madagascar	5.6	24	...	1.0	...	4.29
Malawi	3.6	9	0	0.0	0.00	2.50
Mali	4.3	9	0	0.0	0.00	2.09
Mozambique	6.9	68	13	20.0	1.89	9.86
Niger	3.1	5	0	0.0	0.00	1.61
Rwanda	2.9	0	0	0.0	0.00	0.00
Sierra Leone	2.2	30	0	0.0	0.00	13.64
Tanzania	10.6	114	0	0.0	0.00	10.75
Togo	1.5	9	0	0.0	0.00	6.00
Uganda <sup>c</sup>	7.9	27	0	0.0	0.00	3.42
Upper Volta	4.4	11	0	0.0	0.00	2.50
Zaire	17.1	121	72	60.0	4.22	7.08

Sources: Population figures are from Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977). Figures for total cereal imports are from FAO, "FAO Trade Tape," Rome, 1974. Figures for food aid are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Where n.a. appears, the data were not available. Where ... appears, the figure was negligible. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> Food aid was assumed to be 100 percent of imports.

<sup>b</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>c</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 35—Total and per capita food aid by volume and food aid as a share of cereal imports by country, 1976-78**

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Asia	2,034.9	26,408	4,185	15.8	2.06	12.98
High-income countries	56.0	6,493	618	9.5	11.04	115.96
High import dependence	56.0	6,493	618	9.5	11.04	115.96
Hong Kong	4.1	794	0	0.0	0.00	193.66
Korea, Republic of	36.2	3,450	608	18.0	16.81	95.30
Malaysia	12.8	1,228	0	0.0	0.00	95.94
Singapore	2.3	955	0	0.0	0.00	432.12
Fiji	0.6	66	10	15.0	15.89	105.93
Middle-income countries	979.8	10,995	70	0.6	0.07	11.22
High import dependence	4.4	177	0	0.0	0.00	40.23
Mongolia	1.5	76	0	0.0	0.00	50.67
Papua New Guinea	2.9	101	0	0.0	0.00	34.83
Low import dependence	975.4	10,818	70	0.6	0.07	11.09
China	866.8	9,374	0	0.0	0.00	10.81
Korea, Democratic People's Republic of	16.7	478	0	0.0	0.00	28.62
Philippines	47.0	847	69	8.0	1.47	18.02
Thailand	44.9	119	1	0.8	0.02	2.65
Low-income countries	999.1	8,920	3,497	39.2	3.50	8.93
High import dependence	14.6	1,163	346	29.8	23.70	79.66
Sri Lanka	14.6	1,163	346	29.8	23.70	79.66
Low import dependence	984.5	7,757	3,151	40.6	3.20	7.88
Bangladesh	77.8	1,355	1,022	75.0	13.13	17.42
Bhutan	1.2	5	...	1.0	0.24	4.17
Burma	32.7	5	8	100.0 <sup>a</sup>	0.25	0.15
India	641.3	2,852	1,019	35.7	1.59	4.45
Indonesia	143.3	2,627	636	24.0	4.44	18.33
Nepal	13.2	1	2	100.0 <sup>a</sup>	0.12	0.08
Pakistan	75.0	912	464	51.0	6.18	12.16
Latin America	337.2	14,588	396	2.7	1.17	43.26
High-income countries	239.8	9,770	193	2.0	0.80	40.74
High import dependence	94.3	5,746	190	3.3	2.01	60.93
Chile	10.7	987	139	14.0	13.00	92.24
Costa Rica	2.1	96	1	1.0	0.48	45.71
Jamaica	2.1	371	48	13.0	22.99	176.67
Mexico	63.2	2,267	0	0.0	0.00	35.87
Panama	1.8	62	2	4.0	1.35	34.44
Surinam	0.4	48	0	0.0	0.00	120.00
Trinidad and Tobago	1.0	211	0	0.0	0.00	211.00
Venezuela	13.0	1,704	0	0.0	0.00	13' 08
Low import dependence	145.5	4,024	3	0.1	0.02	2' 66
Argentina	26.1	5	0	0.0	0.00	0.19
Brazil	116.2	3,977	3	...	0.03	34.23
Uruguay	3.2	42	0	0.0	0.00	13.13
Middle-income countries	92.7	4,663	149	3.2	1.61	50.30
High import dependence	89.9	4,613	142	3.1	1.58	51.31
Bolivia	5.7	229	31	8.0	5.44	40.18
Colombia	27.6	524	20	4.0	0.73	18.99
Cuba	9.9	1,780	n.a.	n.a.	n.a.	179.80
Dominican Republic	5.5	204	25	9.0	4.57	51.64
Ecuador	7.6	276	5	2.0	0.59	36.32
El Salvador	4.4	139	4	3.0	0.98	31.59
Guatemala	6.5	132	12	9.0	1.82	20.31
Guyana	0.8	54	1	1.0	1.25	67.50
Honduras	3.2	83	14	17.0	4.26	25.94
Nicaragua	2.5	75	2	3.0	0.81	30.00
Peru	16.2	1,037	28	3.0	1.70	64.01
Low import dependence	2.0	50	7	14.0	2.50	17.86
Paraguay	2.8	50	7	14.0	2.50	17.86

(continued)

**Table 35--Continued**

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Low-income countries	4.7	155	54	34.8	11.49	32.98
High import dependence	4.7	155	54	34.8	11.49	32.98
Haiti	4.7	155	54	34.8	11.49	32.98
North Africa/Middle East	241.0	17,101	2,462	14.4	10.22	70.96
High-income countries	82.9	5,906	145	2.5	1.75	71.24
High import dependence	41.0	5,872	142	2.4	3.46	143.22
Algeria	16.7	2,273	13	...	0.78	136.11
Cyprus	0.7	276	10	4.0	14.80	394.29
Iraq	11.8	1,221	3	...	0.23	103.47
Jordan	2.9	419	116	28.0	57.87	144.48
Libya	2.6	599	0	0.0	0.00	230.38
Saudi Arabia	6.3	1,084	0	0.0	0.00	172.06
Low import dependence	41.9	34	3	8.8	0.07	0.81
Turkey	41.9	34	3	8.8	0.07	0.81
Middle-income countries	118.4	10,931	2,222	20.3	18.77	92.32
High import dependence	118.4	10,931	2,222	20.3	18.77	92.32
Egypt	39.4	5,079	1,778	32.0	5.12	128.91
Iran <sup>a</sup>	34.9	2,324	0	0.0	0.00	66.59
Lebanon <sup>b</sup>	3.0	608	68	11.0	22.27	202.67
Morocco	18.5	1,387	129	9.0	6.97	74.97
Syria	7.7	412	82	20.0	10.61	55.51
Tunisia	6.0	645	126	20.0	20.91	107.17
Yemen Arab Republic <sup>b</sup>	7.1	316	28	9.0	3.90	44.51
Yemen, People's Democratic Republic of	1.8	162	11	7.0	6.09	0.00
Low-income countries	39.7	264	95	36.0	2.39	6.65
Low import dependence	39.7	264	95	36.0	2.39	6.65
Afghanistan	20.3	68	31	46.0	1.53	3.35
Sudan	19.4	196	64	32.7	3.30	10.10
Sub-Saharan Africa	304.7	4,940	881	17.8	2.89	16.21
High-income countries	6.1	380	3	0.8	0.49	62.30
High import dependence	6.1	380	3	0.8	0.49	62.30
Gabon	0.5	36	...	...	0.37	72.00
Ivory Coast	5.1	238	3	1.0	0.53	46.67
Réunion	0.5	106	0	0.0	0.00	212.00
Middle-income countries	134.8	2,754	225	8.2	1.67	20.43
High import dependence	22.2	1,100	189	17.2	8.51	49.55
Botswana	0.7	31	5	16.0	7.03	44.29
Congo	1.4	45	3	7.0	2.13	32.14
Ghana	10.4	229	57	25.0	5.50	22.02
Liberia	1.8	64	1	2.0	0.73	35.56
Mauritania	1.3	146	35	24.0	26.18	112.31
Mauritius	0.9	145	14	10.0	15.13	161.11
Senegal	5.2	424	74	17.0	14.14	81.54
Swaziland	0.5	16	...	2.0	0.61	32.00
Low import dependence	112.6	1,654	36	2.2	0.32	14.69
Cameroon	6.6	104	4	4.0	0.60	15.76
Kenya	14.2	48	9	19.0	0.66	3.38
Nigeria	79.7	1,378	1	...	0.00	17.29
Zambia	5.3	100	22	22.0	4.07	18.87
Zimbabwe	6.8	24	0	0.0	0.00	3.53
Low-income countries	163.8	1,805	653	36.2	3.99	11.03
High import dependence	5.5	298	114	38.3	20.73	54.18
Gambia	0.5	48	8	18.0	16.45	96.00
Guinea-Bissau	0.5	34	17	50.0	32.14	68.00
Lesotho	1.2	69	18	26.0	14.99	57.50
Somalia	3.3	147	70	47.0	20.91	44.55

(continued)

**Table 35—Continued**

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid 's a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Low import dependence	158.3	1,508	539	35.7	3.40	9.53
Angola	6.6	130	9	7.0	1.30	19.70
Benin	3.2	42	8	19.0	2.50	13.13
Burundi	3.9	12	4	33.0	1.00	3.08
Central African Republic	1.9	7	2	21.0	0.80	3.68
Chad	4.2	19	29	100.0 <sup>a</sup>	6.84	4.52
Ethiopia	29.3	134	67	50.0	2.29	4.57
Guinea	4.6	68	29	42.0	6.20	14.78
Madagascar	8.5	132	8	6.0	0.91	15.53
Malawi	5.2	29	3	9.0	0.48	5.58
Mali	6.0	39	25	65.0	4.25	6.50
Mozambique	9.7	180	97	54.0	9.99	18.56
Niger	4.9	59	55	92.0	11.20	12.04
Rwanda	4.4	12	12	100.0	2.72	2.72
Sierra Leone	3.1	40	7	17.0	2.21	12.90
Tanzania	16.4	126	120	95.0	7.33	7.68
Togo	2.4	26	11	43.0	4.66	10.83
Uganda <sup>c</sup>	12.0	6	0	0.0	0.00	0.50
Upper Volta	6.1	49	24	50.0	3.99	8.03
Zaire	25.9	398	29	7.0	1.11	15.37

Sources: Population figures are from Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977). Figures for total cereal imports are from FAO, "FAO Trade Tape," Rome, 1979. Figures for food aid are from International Food Policy Research Institute, FAO, "Food Aid Tape," Washington, D.C., 1981, or from FAO, *Food Aid Bulletin*, October 1981, whichever is higher. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Where . . . appears, the figure was negligible. Population figures represent an average of a trend estimate for 1978 and United Nations medium variant projections for 1976 and 1977. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> Food aid was assumed to be 100 percent of imports.

<sup>b</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>c</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 36—Total and per capita food aid by volume and food aid as a share of cereal imports by country, 1981**

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Asia	2,258.9	36,436	2,549	7.0	1.13	16.13
High-income countries	61.1	11,077	330	3.0	5.40	181.29
High import dependence	61.1	11,077	330	3.0	5.40	181.29
Hong Kong	5.2	801	0	0.0	0.00	155.53
Korea, Republic of	38.7	7,687	324	4.0	8.37	198.53
Malaysia	14.2	1,244	0	0.0	0.00	86.27
Singapore	2.4	1,258	0	0.0	0.00	515.57
Fiji	0.6	87	6	7.0	9.58	135.94
Middle-income countries	1,128.4	19,750	141	0.7	0.12	17.50
High import dependence	4.7	328	0	0.0	0.00	69.79
Mongolia	1.7	173	0	0.0	0.00	101.17
Papua New Guinea	3.0	155	0	0.0	0.00	51.50
Low import dependence	1,123.7	19,422	141	0.7	0.12	17.28
China	1,007.8	17,410	37	...	0.04	17.28
Korea, Democratic People's Republic of	18.3	720	0	0.0	0.00	39.30
Philippines	49.5	1,071	85	8.0	1.71	21.62
Thailand	48.1	221	19	8.0	0.39	4.59
Low-income countries	1,069.4	5,609	2,078	37.0	1.94	5.24
High import dependence	15.0	667	232	34.8	15.47	44.47
Sri Lanka	15.0	667	232	34.8	15.47	44.47
Low import dependence	1,054.4	4,942	1,846	37.4	1.75	4.69
Bangladesh	90.6	1,079	689	64.0	7.61	11.91
Bhutan	1.3	30	1	4.0	0.80 <sup>a</sup>	20.00 <sup>a</sup>
Burma	36.2	14	7	50.0	0.19	0.38
India	676.2	1,523	435	28.6	0.64	2.25
Indonesia	150.5	1,979	404	20.0	2.68	13.15
Nepal	15.0	12	41	100.0 <sup>b</sup>	2.73	0.80
Pakistan	84.6	305	269	88.0	3.18	3.61
Latin America	362.6	23,013	562	2.4	1.55	63.47
High-income countries	257.4	17,100	62	0.4	0.24	66.43
High import dependence	104.8	11,475	60	0.5	0.57	109.49
Chile	11.3	1,392	21	2.0	1.89	123.29
Costa Rica	2.3	177	1	...	0.35	77.97
Jamaica	2.2	459	36	8.0	16.31	206.76
Mexico	71.2	6,602	0	0.0	0.00	92.74
Panama	1.9	89	2	3.0	1.19	45.88
Surinam	0.4	51	0	0.0	0.00	127.50
Trinidad and Tobago	1.2	327	0	0.0	0.00	274.79
Venezuela	14.3	2,378	0	0.0	0.00	166.18
Low import dependence	152.6	5,025	2	0.0	0.01	36.86
Argentina	28.1	10	0	0.0	0.00	0.35
Brazil	121.6	5,571	2	...	0.01	45.83
Uruguay	2.9	44	0	0.0	0.00	15.02
Middle-income countries	100.1	5,680	421	7.4	4.21	56.74
High import dependence	96.8	5,612	410	7.3	4.24	57.98
Bolivia	5.8	253	54	22.0	9.44	43.92
Colombia	28.7	694	5	1.0	0.17 <sup>a</sup>	24.22 <sup>a</sup>
Cuba	9.7	2,094	0	0.0	0.0	215.43
Dominican Republic	5.8	427	71	17.0	12.34 <sup>a</sup>	74.13 <sup>a</sup>
Ecuador	8.6	317	6	2.0	0.09	32.88
El Salvador	4.9	123	50	40.0	10.02	25.10
Guatemala	7.5	186	14	7.0	1.84	24.87
Guyana	0.9	63	4	6.0	4.33	70.00
Honduras	3.8	144	31	21.0	8.06	37.70
Nicaragua	2.8	66	59	88.0	20.85	23.40
Peru	18.3	1,245	116	9.0	6.34	68.11
Low import dependence	3.3	68	11	16.2	3.33	20.61
Paraguay	3.3	68	11	16.2	3.33	20.61

(continued)

Table 36—Continued

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Low-income countries	5.1	233	79	33.9	15.49	45.69
High import dependence	5.1	233	79	33.9	15.49	45.69
Haiti	5.1	233	79	33.9	15.49	45.69
North Africa/Middle East	260.1	28,960	2,538	8.8	9.77	111.34
High-income countries	94.9	11,893	114	1.0	1.21	125.32
High import dependence	49.5	11,594	105	0.9	2.12	234.22
Algeria	19.6	3,261	29	1.0	1.49	166.46
Cyprus	0.6	397	5	1.0	8.28	620.31
Iraq	13.5	2,275	0	0.0	0.00	168.14
Jordan	3.4	619	71	11.0	21.19	184.23
Libya	3.1	942	0	0.0	0.00	304.84
Saudi Arabia	9.3	4,100	0	0.0	0.00	439.91
Low import dependence	45.4	299	9	3.0	0.20	6.59
Turkey	45.4	299	9	3.0	0.20	6.59
Middle-income countries	129.9	16,665	2,151	12.9	16.57	128.29
High import dependence	129.9	16,665	2,151	12.9	16.57	128.29
Egypt	43.5	7,287	1,862	26.0	42.84	167.33
Iran <sup>c</sup>	39.3	3,236	0	0.0	0.00	82.30
Lebanon <sup>c</sup>	2.7	692	32	5.0	11.90	257.25
Morocco	20.7	2,758	100	4.0	4.86	133.56
Syria	9.3	971	30	3.0	3.27	104.30
Tunisia	6.5	960	94	10.0	14.38	147.47
Yemen Arab Republic <sup>c</sup>	5.9	509	4	1.0	0.71	85.69
Yemen, People's Democratic Republic of	2.0	252	29	12.0	14.43	126.00
Low-income countries	35.3	402	273	67.9	7.73	11.39
Low import dependence	35.3	402	273	67.9	7.73	11.39
Afghanistan	16.4	97	80	83.0	4.89	5.91
Sudan	18.9	305	193	63.0	10.20	16.14
Sub-Saharan Africa	337.8	8,781	2,040	23.2	6.02	26.00
High-income countries	9.4	756	...	...	...	80.43
High import dependence	9.4	756	...	...	...	80.43
Gabon	0.6	35	0	0.0	0.00	62.50
Ivory Coast	8.3	619	...	...	0.01	74.58
Réunion	0.5	102	0	0.0	0.00	204.00
Middle-income countries	144.8	4,712	668	14.2	4.61	32.54
High import dependence	25.6	1,316	387	29.4	15.12	51.41
Botswana	0.9	50	11	20.0	13.29	68.23
Congo	1.6	56	2	3.0	1.08	35.44
Ghana	12.1	256	93	36.0	7.74	21.23
Liberia	2.0	111	26	23.0	12.65	54.41
Mauritania	1.7	182	95	53.0	56.79	108.33
Mauritius	0.9	175	21	12.0	22.02	186.17
Senegal	5.8	458	138	30.0	23.79	78.83
Swaziland	0.6	20	1	5.0	1.58	35.09
Low import dependence	119.2	3,396	281	8.3	2.36	28.49
Cameroon	8.7	106	9	8.0	0.98	12.25
Kenya	17.2	534	172	32.0	10.02	31.14
Nigeria	79.7	2,440	0	0.0	0.00	30.62
Zambia	6.0	295	75	25.0	12.62	49.50
Zimbabwe	7.6	21	25	100.0 <sup>b</sup>	3.32	2.76
Low-income countries	183.6	3,313	1,372	41.4	7.47	18.04
High import dependence	7.5	602	401	66.6	53.47	80.27
Gambia	0.6	48	18	38.0	29.68	77.42
Guinea Bissau	0.6	27	25	96.0	43.79	46.55
Lesotho	1.4	95	43	46.0	31.68	69.34
Somalia	4.9	432	315	73.0	64.35	88.16

(continued)

**Table 36—Continued**

Region/Income Group/Country	Population	Total Cereal Imports	Food Aid	Food Aid as a Share of Cereal Imports	Per Capita Food Aid	Per Capita Cereal Imports
	(million)	(1,000 metric tons)		(percent)	(kilograms per capita)	
Low import dependence	176.1	2,711	971	35.8	5.51	15.39
Angola	7.3	244	20	8.0	2.77	33.61
Benin	3.5	93	11	12.0	3.15	26.57
Burundi	4.4	19	12	63.0	2.69	4.37
Central African Republic	2.4	13	3	19.0	1.06	5.70
Chad	4.6	14	15	100.0 <sup>b</sup>	3.23	3.08
Ethiopia	32.2	207	235	100.0 <sup>b</sup>	7.32	6.44
Guinea	5.2	134	27	20.0	5.32	26.02
Madagascar	9.0	268	26	10.0	2.85	29.91
Malawi	6.1	113	17	15.0	2.71	13.46
Mali	7.2	102	42	41.0	5.87	14.25
Mozambique	10.8	369	139	38.0	12.88	34.17
Niger	5.5	89	6	7.0	1.08	16.24
Rwanda	5.1	16	15	93.0	2.90	3.13
Sierra Leone	3.6	57	10	17.0	2.69	15.97
Tanzania	18.5	265	210	79.0	11.36	14.38
Togo	2.7	62	4	7.0	1.55	22.88
Uganda <sup>d</sup>	13.6	37	52	100.0 <sup>b</sup>	3.83	2.72
Upper Volta	6.3	71	50	70.0	7.95	11.36
Zaire	28.1	538	77	14.0	2.74 <sup>a</sup>	19.16 <sup>a</sup>

Sources: Population figures are either from United Nations, *Monthly Bulletin of Statistics* 36 (December 1982) or derived from Food and Agriculture Organization of the United Nations (FAO), *World Population Estimates and Projections, 1950-2000*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977). Figures for total cereal imports are from FAO, *FAO Trade Yearbook, 1981*, vol. 35 (Rome: FAO, 1982). Figures for food aid are from FAO, *Food Aid Bulletin*, October 1982. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Where . . . appears, the figure was negligible. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This is based on a trend estimate of population made using data from earlier years.

<sup>b</sup> Food aid was assumed to be 100 percent of imports.

<sup>c</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>d</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 37—Staples consumed as food, total staples consumed, and the ratio of imports to total staples consumed, by country, 1961-65 and 1976-78**

Region/Income Group/ Country	1961-65			1976-78		
	Staples Con- sumed as Food	Total Staples Consumed	Ratio of Cereal Imports to Total Staples Consumed	Staples Con- sumed as Food	Total Staples Consumed	Ratio of Cereal Imports to Total Staples Consumed
	(1,000 metric tons)		(percent)	(1,000 metric tons)		(percent)
Asia	255,435	333,835	5	384,054	491,685	5
High-income countries	7,734	8,952	32	11,817	15,484	46
High import dependence	7,734	8,952	32	11,817	15,484	46
Hong Kong	517	638	106	615	925	86
Korea, Republic of	5,529	6,161	12	8,447	10,825	32
Malaysia	1,349	1,603	47	2,240	2,929	42
Singapore	259	454	146	407	669	143
Fiji	80	96	42	108	136	49
Middle-income countries	131,181	187,893	3	205,209	281,088	4
High import dependence	462	647	11	768	1,067	17
Mongolia	138	257	14	276	485	16
Papua New Guinea	324	390	10	492	582	17
Low import dependence	130,719	187,246	3	204,441	280,021	4
China	118,863	171,866	3	184,685	254,677	4
Korea, Democratic People's Republic of	2,483	4,022	5	4,276	6,852	7
Philippines	4,525	5,109	10	8,165	9,193	9
Thailand	4,848	6,249	1	7,315	9,299	1
Low-income countries	116,520	136,990	6	167,028	195,113	5
High import dependence	1,629	1,778	37	2,394	2,661	44
Sri Lanka	1,629	1,778	37	2,394	2,661	44
Low import dependence	114,891	135,212	5	164,634	192,452	4
Bangladesh	9,764	11,236	7	13,610	15,457	9
Bhutan	182	242	2	254	332	1
Burma	3,712	4,175	1	6,250	6,791	...
India	77,925	92,134	5	100,214	124,285	2
Indonesia	14,433	16,949	7	24,469	27,678	9
Nepal	1,886	2,369	...	2,529	3,096	...
Pakistan	6,989	8,107	10	13,308	14,812	6
Latin America	37,057	63,382	9	54,713	103,281	14
High-income countries	28,080	51,319	7	40,936	83,721	12
High import dependence	10,706	15,089	9	16,971	27,908	21
Chile	1,366	1,966	14	1,984	2,822	35
Costa Rica	168	239	23	250	387	25
Jamaica	203	225	74	330	497	75
Mexico	7,343	10,593	3	11,870	19,995	11
Panama	182	290	14	253	406	15
Surinam	46	55	24	...	115	42
Trinidad and Tobago	139	160	77	176	267	79
Venezuela	1,259	1,561	24	2,040	3,419	50
Low import dependence	17,374	36,230	6	23,965	55,813	7
Argentina	3,639	8,826	...	4,245	13,383	...
Brazil	13,355	26,681	8	19,248	41,495	9
Uruguay	380	723	1	472	935	4
Middle-income countries	8,412	11,370	18	13,059	18,705	25
High import dependence	8,070	10,680	18	12,502	17,577	26
Bolivia	531	806	20	779	1,165	20
Colombia	2,044	2,521	7	3,289	4,665	11
Cuba	1,022	1,365	58	1,609	2,500	71
Dominican Republic	414	480	14	711	896	32
Ecuador	549	1,041	4	894	1,513	18
El Salvador	364	439	15	637	810	17
Guatemala	668	835	9	965	1,202	11
Guyana	93	117	35	136	174	31
Honduras	347	478	6	513	703	12
Nicaragua	237	312	10	352	471	16
Peru	1,801	2,286	19	2,617	3,478	30

(continued)

Table 37—Continued

Region/Income Group/ Country	1961-65			1976-78		
	Staples Con- sumed as Food	Total Staples Consumed	Ratio of Cereal Imports to Total Staples Consumed	Staples Con- sumed as Food	Total Staples Consumed	Ratio of Cereal Imports to Total Staples Consumed
	(1,000 metric tons)	(1,000 metric tons)	(percent)	(1,000 metric tons)	(1,000 metric tons)	(percent)
Low import dependence	342	690	13	557	1,128	4
Paraguay	342	690	13	557	1,128	4
Low-income countries	565	693	7	718	855	18
High import dependence	565	693	7	718	855	18
Haiti	565	693	7	718	855	18
North Africa/Middle East	30,869	47,652	12	49,541	78,712	22
High-income countries	10,924	21,819	10	17,111	34,988	17
High import dependence	4,078	5,678	24	7,431	10,140	58
Algeria	1,687	2,137	24	3,464	4,183	54
Cyprus	99	196	30	133	475	58
Iraq	1,113	1,892	11	2,080	2,936	42
Jordan	291	433	51	325	468	89
Libya	211	274	49	399	874	68
Saudi Arabia	677	746	31	1,030	1,204	90
Low import dependence	6,846	16,141	5	9,680	24,848	0
Turkey	6,846	16,141	5	9,680	24,848	0
Middle-income countries	15,071	20,252	17	25,618	35,831	31
High import dependence	15,071	20,252	17	25,618	35,831	31
Egypt	6,032	7,551	24	8,665	11,452	44
Iran <sup>a</sup>	3,537	4,723	4	8,051	10,927	21
Lebanon <sup>a</sup>	341	447	70	586	752	81
Morocco	2,518	3,775	11	4,364	6,827	20
Syria	911	1,578	13	1,413	2,572	16
Tunisia	654	898	37	1,210	1,761	37
Yemen Arab Republic <sup>a</sup>	929	1,145	...	1,081	1,282	25
Yemen, People's Democratic Republic of	149	155	72	248	258	63
Low-income countries	4,874	5,581	3	6,812	7,893	6
Low import dependence	4,874	5,581	3	6,812	7,893	6
Afghanistan	3,135	3,657	1	3,920	4,442	1
Sudan	1,739	1,924	6	2,892	3,451	6
Sub-Saharan Africa	40,394	52,304	3	57,986	72,543	7
High-income countries	985	1,280	10	1,614	2,139	18
High import dependence	985	1,280	10	1,614	2,139	18
Gabon	89	103	7	95	132	27
Ivory Coast	831	1,083	6	1,429	1,873	13
Réunion	65	94	70	90	134	79
Middle-income countries	16,686	23,511	4	24,470	32,275	9
High import dependence	2,761	3,455	16	3,866	4,858	23
Botswana	92	103	31	125	165	19
Congo	187	196	8	277	291	15
Ghana	1,217	1,586	6	1,693	2,170	11
Liberia	215	230	14	296	321	20
Mauritania	145	161	29	200	214	68
Mauritius	113	119	92	158	164	88
Senegal	741	981	21	1,038	1,376	31
Swaziland	51	79	9	79	157	11
Low import dependence	13,925	20,056	2	20,604	27,417	6
Cameroon	1,097	1,396	2	1,710	2,248	5
Kenya	1,812	2,203	4	2,526	3,022	2
Nigeria	9,392	14,419	1	13,767	18,802	7
Zambia	683	897	4	1,054	1,447	7
Zimbabwe	941	1,141	9	1,547	1,898	1
Low-income countries	22,723	27,513	2	31,902	38,129	5
High import dependence	645	770	8	852	988	30
Gambia	80	101	11	101	125	39
Guinea-Bissau	80	105	4	101	120	28
Lesotho	197	248	3	259	314	21
Somalia	288	316	12	391	429	34

(continued)

**Table 37—Continued**

Region/Income Group/ Country	1961-65			1976-78		
	Staples Con- sumed as Food	Total Staples Consumed	Ratio of Cereal Imports to Total Staples Consumed	Staples Con- sumed as Food	Total Staples Consumed	Ratio of Cereal Imports to Total Staples Consumed
	(1,000 metric tons)		(percent)	(1,000 metric tons)		(percent)
Low import dependence	22,078	26,743	2	31,050	37,141	4
Angola	783	933	4	1,216	1,438	9
Benin	456	588	1	634	780	5
Burundi	708	899	1	913	1,158	1
Central African Republic	330	422	1	436	557	1
Chad	755	925	...	670	802	2
Ethiopia	3,971	4,447	...	4,981	5,510	2
Guinea	610	821	6	801	1,069	6
Madagascar	1,093	1,559	2	1,709	2,386	5
Malawi	870	1,159	1	1,391	1,746	2
Mali	863	1,066	1	1,182	1,441	3
Mozambique	1,299	1,448	5	1,615	1,812	10
Niger	883	1,233	...	1,181	1,601	4
Rwanda	577	692	...	1,008	1,191	1
Sierra Leone	327	367	8	478	534	7
Tanzania	2,088	2,449	5	3,080	3,590	4
Togo	361	470	2	483	595	5
Uganda <sup>b</sup>	1,582	2,238	1	2,538	3,469	...
Upper Volta	967	1,108	1	1,295	1,472	3
Zaire	3,555	3,919	3	5,439	5,990	7

Sources: Consumption figures are from Food and Agriculture Organization of the United Nations (FAO), "Global Agricultural Programming System Supply Utilization Accounts Tape," Rome, June 1980. Figures for cereal imports are from FAO, "FAO Trade Tapes," Rome, 1974 and 1979. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is based on data presented in this table.

Notes: Where ... appears, the figure was negligible. Staples include cereals, root crops, pulses, groundnuts, bananas, and plantains, expressed in cereal equivalents. The ratios for 1961-65 use import data for 1961-63. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>b</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 38—Values of food aid, commercial cereal imports, and total cereal imports and the true cost of cereal imports, by country, 1961-63 and 1976-78**

Region/Income Group/Country	1961-63				1976-78			
	Total Cereal Imports	Food Aid	Com-mercial Cereal Imports	True Cereal Import Cost	Total Cereal Imports	Food Aid	Com-mercial Cereal Imports	True Cereal Import Cost
	(1977 U.S. \$ million)							
Asia	3,752	1,150	2,602	3,022	4,385	603	3,782	3,960
High-income countries	722	114	608	647	1,003	101	902	942
High import dependence	722	114	608	647	1,003	101	902	942
Hong Kong	185	3	182	182	173	0	173	173
Korea, Republic of	147	111	36	76	465	101	364	404
Malaysia	207	...	207	206	206	0	206	206
Singapore	174	...	174	174	146	0	146	146
Fiji	9	0	9	9	13	0	13	13
Middle-income countries	1,225	1	1,224	1,224	1,629	4	1,625	1,625
High import dependence	15	0	15	15	40	0	40	40
Mongolia	5	n.a.	5	5	12	n.a.	12	12
Papua New Guinea	12	0	10	10	28	0	28	28
Low import dependence	1,210	1	1,209	1,209	1,589	4	1,585	1,585
China	1,037	0	1,037	1,037	1,381	0	1,381	1,381
Korea, Democratic People's Republic of	42	0	42	42	74	0	74	74
Philippines	122	1	121	121	114	4	110	110
Thailand	9	0	9	9	20	0	20	20
Low-income countries	1,805	1,035	770	1,151	1,753	498	1,255	1,402
High import dependence	148	20	128	134	190	43	147	156
Sri Lanka	148	20	128	134	190	43	147	156
Low import dependence	1,657	1,015	642	1,017	1,563	455	1,108	1,246
Bangladesh	196	0	196	196	201	162	39	77
Bhutan	1	0	1	1	1	0	1	1
Burma	8	1	7	7	1	1	0	0
India	967	709	258	524	601	102	499	513
Indonesia	325	69	256	311	633	125	508	576
Nepal	1	...	1	1	...	...	...	...
Pakistan	159	236	-77	-33	126	65	61	79
Latin America	1,158	366	791	998	2,136	47	2,089	2,108
High-income countries	713	276	437	595	1,383	29	1,354	1,369
High import dependence	284	43	241	260	838	29	809	824
Chile	56	31	25	41	167	24	143	156
Costa Rica	12	1	11	11	16	...	16	16
Jamaica	37	1	36	37	66	5	61	63
Mexico	60	10	50	52	256	0	256	256
Panama	8	...	8	8	9	...	9	9
Surinam	3	...	3	3	7	0	7	7
Trinidad and Tobago	33	0	33	33	41	0	41	41
Venezuela	75	...	75	75	276	0	276	276
Low import dependence	429	233	196	335	545	...	545	545
Argentina	4	0	4	4	1	0	1	1
Brazil	423	233	190	329	538	...	538	538
Uruguay	2	...	2	2	6	0	6	6
Middle-income countries	436	85	350	396	723	12	711	713
High import dependence	422	77	344	386	717	12	705	707
Bolivia	31	18	13	24	33	4	29	30
Colombia	46	23	23	35	70	1	69	69
Cuba	177	...	177	177	285	n.a.	285	285
Dominican Republic	15	5	10	12	58	1	57	57
Ecuador	10	1	9	10	41	...	41	41
El Salvador	15	1	14	14	21	...	21	21
Guatemala	16	2	13	14	18	1	17	17
Guyana	9	...	9	9	10	...	10	10
Honduras	6	...	6	6	13	2	11	12
Nicaragua	9	1	8	8	13	...	13	13
Peru	88	26	62	77	155	3	152	152
Low import dependence	14	8	6	10	6	...	6	6
Paraguay	14	8	6	10	6	...	6	6

(continued)

Table 38—Continued

Region/Income Group/Country	1961-63				1976-78			
	Total Cereal Imports	Food Aid	Com-mercial Cereal Imports	True Cereal Import Cost	Total Cereal Imports	Food Aid	Com-mercial Cereal Imports	True Cereal Import Cost
	(1977 U.S. \$ million)							
Low-income countries	9	5	4	7	30	6	24	26
High import dependence	9	5	4	7	30	6	24	26
Haiti	9	5	4	7	30	6	24	26
North Africa/Middle East	1,078	687	391	669	2,923	445	2,546	2,700
High-income countries	445	188	257	315	1,209	18	1,191	1,198
High import dependence	292	41	251	252	1,201	18	1,183	1,190
Algeria	101	21	80	80	384	1	383	383
Cyprus	11	1	10	10	35	...	35	35
Iraq	51	2	49	51	300	0	300	300
Jordan	39	13	26	25	71	17	54	61
Libya	22	4	18	18	115	0	115	115
Saudi Arabia	68	...	68	68	296	0	296	296
Low import dependence	153	147	6	63	8	0	8	8
Turkey	153	147	6	63	8	0	8	8
Middle-income countries	603	490	113	331	1,667	349	1,319	1,480
High import dependence	603	490	113	331	1,667	349	1,319	1,480
Egypt	305	295	10	169	711	282	429	561
Iran <sup>a</sup>	48	39	9	25	443	0	443	443
Lebanon <sup>a</sup>	64	3	61	62	90	9	82	86
Morocco	65	52	13	22	186	21	165	173
Syria	34	44	-10	8	71	21	50	61
Tunisia	61	57	4	19	77	14	63	69
Yemen Arab Republic <sup>a</sup>	1	0	1	1	...	2	51	51
Yemen, People's Democratic Republic of	25	0	25	25	36	...	36	36
Low-income countries	30	9	21	23	47	78	36	22
Low import dependence	30	9	21	23	47	78	36	22
Afghanistan	11	4	7	7	12	3	9	10
Sudan	19	5	14	16	35	75	27	-12
Sub-Saharan Africa	411	30	381	391	1,114	77	1,040	1,048
High-income countries	38	0	38	38	84	0	84	84
High import dependence	38	0	38	38	84	0	84	84
Gabon	2	0	2	2	10	0	10	10
Ivory Coast	18	0	18	18	50	...	50	50
Réunion	18	0	18	18	24	0	24	24
Middle-income countries	228	7	221	224	671	18	653	652
High import dependence	146	5	141	143	220	15	205	204
Botswana	6	n.a.	6	6	5	n.a.	5	5

**Table 38—Continued**

Region/Income Group/Country	1961-63				1976-78			
	Total Cereal Imports	Food Aid	Com-mercial Cereal Imports	True Cereal Import Cost	Total Cereal Imports	Food Aid	Com-mercial Cereal Imports	True Cereal Import Cost
	(1977 U.S. \$ million)							
Low import dependence	130	22	108	115	304	52	255	262
Angola	8	0	8	8	23	0	23	23
Benin	3	0	3	3	7	...	7	7
Burundi	1	0	1	1	3	...	3	3
Central African Republic	1	0	1	1	2	...	2	2
Chad	2	0	2	2	5	1	4	4
Ethiopia	1	2	-1	-1	18	5	13	14
Guinea	15	0	15	15	15	7	8	9
Madagascar	6	...	6	6	32	...	32	31
Malawi	1	0	1	1	5	...	5	5
Mali	2	0	2	2	9	2	7	7
Mozambique	12	3	9	10	34	6	28	28
Niger	2	0	2	2	13	4	10	10
Rwanda	0	0	n.a.	n.a.	4	1	4	4
Sierra Leone	9	0	9	9	11	...	11	11
Tanzania	23	0	23	23	25	17	8	12
Togo	5	0	3	3	5	1	5	5
Uganda <sup>b</sup>	1	0	8	8	1	0	1	1
Upper Volta	3	0	3	3	11	1	10	10
Zaire	30	17	13	19	81	7	74	76

Sources: Figures for total cereal imports are from Food and Agriculture Organization of the United Nations (FAO), "FAO Trade Tapes," Rome, 1974 and 1979. Figures for food aid, commercial cereal imports, and the true cost of cereal imports are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981. Per capita income classification is from Appendix 3, Table 42. Import dependence classification is from Appendix 3, Table 37.

Notes: Where n.a. appears, the data were not available. Where ... appears, the figure was negligible. True cost is the c.i.f. value of commercial imports plus the discounted value of concessionally financed food aid that the recipient must eventually pay. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>b</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 39—Values of total cereal imports and commercial cereal imports, and the true cost of cereal imports as shares of export earnings, by country, 1961-63 and 1976-78**

Region/Income Group/Country	1961-63			1976-78		
	Total Cereal Imports	True Cost	Commercial Cereal Imports	Total Cereal Imports	True Cost	Commercial Cereal Imports
	(percent)					
<b>Asia</b>						
High-income countries						
High import dependence						
Hong Kong	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Korea, Republic of	57	29	14	4	3	3
Malaysia	7	7	7	3	3	3
Singapore	18	18	18	1	1	1
Fiji	n.a.	n.a.	n.a.	4	4	4
Middle-income countries						
High import dependence						
Mongolia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	n.a.	n.a.	n.a.	4	4	4
Low import dependence						
China	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Korea, Democratic People's Republic of	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	7	7	7	3	3	3
Thailand	1	1	1	...	...	...
Low-income countries						
High import dependence						
Sri Lanka	16	14	13	24	19	18
Low import dependence						
Bangladesh	n.a.	n.a.	n.a.	31	12	31
Bhutan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Burma	1	1	1	...	0	0
India	24	13	6	7	6	6
Indonesia	17	17	14	6	6	5
Nepal	n.a.	n.a.	n.a.	...	n.a.	...
Pakistan	n.a.	n.a.	n.a.	5	3	3
<b>Latin America</b>						
High-income countries						
High import dependence						
Chile	4	3	2	6	6	5
Costa Rica	5	4	4	2	2	2
Jamaica	7	7	7	6	6	6
Mexico	3	2	2	3	3	3
Panama	6	5	6	1	1	1
Surinam	n.a.	n.a.	n.a.	2	2	2
Trinidad and Tobago	4	4	4	3	3	3
Venezuela	1	1	1	3	3	3
Low import dependence						
Argentina	...	...	...	...	...	...
Brazil	12	9	5	4	4	4
Uruguay	...	...	...	1	1	1
Middle-income countries						
High import dependence						
Bolivia	17	13	7	5	4	4
Colombia	4	3	2	2	2	2
Cuba	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominican Republic	4	3	2	6	6	6
Ecuador	3	3	3	3	3	3
El Salvador	4	4	4	2	2	2
Guatemala	5	4	4	1	1	1
Guyana	10	10	9	3	3	3
Honduras	3	3	3	2	2	2
Nicaragua	4	3	3	2	2	2
Peru	6	5	4	8	7	7
Low import dependence						
Paraguay	12	9	5	2	2	2

(continued)

Table 39—Continued

Region/Income Group/Country	1961-63			1976-78		
	Total Cereal Imports	True Cost	Commercial Cereal Imports	Total Cereal Imports	True Cost	Commercial Cereal Imports
	(percent)					
Low-income countries						
High import dependence						
Haiti	22	16	9	15	13	12
North Africa/Middle East						
High-income countries						
High import dependence						
Algeria	n.a.	n.a.	n.a.	6	6	6
Cyprus	7	6	6	6	6	6
Iraq	3	3	3	4	4	4
Jordan	70	45	46	6	5	5
Libya	n.a.	n.a.	n.a.	1	1	1
Saudi Arabia	n.a.	n.a.	n.a.	1	1	1
Low import dependence						
Turkey	42	17	2	...	...	...
Middle-income countries						
High import dependence						
Egypt	23	13	1	16	13	10
Iran <sup>a</sup>	2	1	...	2	2	2
Lebanon <sup>a</sup>	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Morocco	7	2	...	8	7	7
Syria	8	2	-2	5	4	3
Tunisia	19	6	1	5	4	4
Yemen Arab Republic <sup>a</sup>	n.a.	n.a.	n.a.	6	5	5
Yemen, People's Democratic Republic of	n.a.	n.a.	n.a.	13	13	13
Low-income countries						
Low import dependence						
Afghanistan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sudan	3	3	2	5	n.a.	n.a.
Sub-Saharan Africa						
High-income countries						
High import dependence						
Gabon	n.a.	n.a.	n.a.	1	...	...
Ivory Coast	9	9	9	2	2	2
Réunion	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Middle-income countries						
High import dependence						
Botswana	n.a.	n.a.	n.a.	2	2	2
Congo	n.a.	n.a.	n.a.	3	3	3
Ghana	4	4	4	5	4	4
Liberia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mauritania	n.a.	n.a.	n.a.	14	12	13
Mauritius	n.a.	n.a.	n.a.	8	8	8
Senegal	n.a.	n.a.	n.a.	14	13	14
Swaziland	n.a.	n.a.	n.a.	1	1	1
Low import dependence						
Cameroon	n.a.	n.a.	n.a.	2	2	2
Kenya	10	10	10	...	...	...
Nigeria	3	3	3	3	3	3
Zambia	n.a.	n.a.	n.a.	1	1	1
Zimbabwe	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Low-income countries						
High import dependence						
Gambia	n.a.	n.a.	n.a.	13	12	13
Guinea-Bissau	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lesotho	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Somalia	15	14	14	22	18	17

(continued)

Table 39—Continued

Region/Income Group/Country	1961-63			1976-78		
	Total Cereal Imports	True Cost	Commercial Cereal Imports	Total Cereal Imports	True Cost	Commercial Cereal Imports
	(percent)					
Low import dependence						
Angola	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Benin	n.a.	n.a.	n.a.	6	6	6
Burundi	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Central African Republic	n.a.	n.a.	n.a.	2	2	2
Chad	n.a.	n.a.	n.a.	5	4	4
Ethiopia	n.a.	n.a.	n.a.	4	3	3
Guinea	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Madagascar	n.a.	n.a.	n.a.	8	8	8
Malawi	n.a.	n.a.	n.a.	2	2	2
Mali	n.a.	n.a.	n.a.	6	5	5
Mozambique	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Niger	n.a.	n.a.	n.a.	19	17	13
Rwanda	n.a.	n.a.	n.a.	3	3	3
Sierra Leone	14	14	14	7	7	7
Tanzania	5	5	5	5	2	1
Togo	n.a.	n.a.	n.a.	3	2	2
Uganda <sup>b</sup>	n.a.	n.a.	n.a.	...	...	...
Upper Volta	n.a.	n.a.	n.a.	7	6	6
Zaire	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Sources: Figures for total cereal imports are from Food and Agriculture Organization of the United Nations (FAO), "FAO Trade Tapes," Rome, 1974 and 1979. Figures for commercial cereal imports and the true cost of cereal imports are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981. Figures for export earnings are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Where n.a. appears, the data were not available. Where ... appears, the figure was negligible. True cost is the c.i.f. value of commercial imports plus the discounted value of concessionally financed food aid that the recipient must eventually pay. Export earnings include earnings from the export of goods and services and from unrequited private transfers. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>b</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 40—Mean, maximum, and minimum ratios of the true cost of cereal imports to export earnings, and standard deviations, by country, 1961-78**

Region/Income Group/Country	Mean	Maximum	Minimum	Standard Deviation
<b>Asia</b>				
<b>High-income countries</b>				
<b>High import dependence</b>				
Hong Kong	n.a.	n.a.	n.a.	n.a.
Korea, Republic of	0.11	0.46	0.02	0.10
Malaysia	0.05	0.08	0.03	0.02
Singapore	0.04	0.07	0.01	0.02
Fiji	0.06	0.08	0.04	0.01
<b>Middle-income countries</b>				
<b>High import dependence</b>				
Mongolia	n.a.	n.a.	n.a.	n.a.
Papua New Guinea	0.04	0.06	0.03	0.01
<b>Low import dependence</b>				
China	n.a.	n.a.	n.a.	n.a.
Korea, Democratic People's Republic of	n.a.	n.a.	n.a.	n.a.
Philippines	0.05	0.08	0.02	0.02
Thailand	0.01	0.01	...	...
<b>Low-income countries</b>				
<b>High import dependence</b>				
Sri Lanka	0.22	0.45	0.12	0.09
<b>Low import dependence</b>				
Bangladesh	0.34	0.62	-0.04	0.26
Bhutan	n.a.	n.a.	n.a.	n.a.
Burma	...	0.01	-0.01	0.01
India	0.12	0.22	-0.01	0.07
Indonesia	0.10	0.20	0.05	0.05
Nepal	0.00	...	...	...
Pakistan	0.04	0.11	...	0.04
<b>Latin America</b>				
<b>High-income countries</b>				
<b>High import dependence</b>				
Chile	0.05	0.14	0.02	0.03
Costa Rica	0.04	0.05	0.02	0.01
Jamaica	0.06	0.08	0.04	0.01
Mexico	0.02	0.09	...	0.03
Panama	0.02	0.07	...	0.02
Surinam	0.02	0.03	0.01	...
Trinidad and Tobago	0.04	0.05	0.02	0.01
Venezuela	0.02	0.03	0.01	0.01
<b>Low import dependence</b>				
Argentina	...	0.02	0.00	0.01
Brazil	0.07	0.13	0.02	0.03
Uruguay	0.01	0.06	-0.02	0.02
<b>Middle-income countries</b>				
<b>High import dependence</b>				
Bolivia	0.11	0.38	0.04	0.10
Colombia	0.03	0.05	0.01	0.01
Cuba	n.a.	n.a.	n.a.	n.a.
Dominican Republic	0.04	0.10	...	0.03
Ecuador	0.03	0.04	0.02	0.01
El Salvador	0.03	0.04	0.01	0.01
Guatemala	0.02	0.04	0.01	0.01
Guyana	0.03	0.05	0.01	0.01
Honduras	0.02	0.05	0.02	0.01
Nicaragua	0.03	0.05	0.02	0.01
Peru	0.06	0.16	0.02	0.03
<b>Low import dependence</b>				
Paraguay	0.05	0.10	0.01	0.03
<b>Low-income countries</b>				
<b>High import dependence</b>				
Haiti	0.13	0.52	0.04	0.13

(continued)

Table 40—Continued

Region/Income Group/Country	Mean	Maximum	Minimum	Standard Deviation
North Africa/Middle East				
High-income countries				
High import dependence				
Algeria	0.04	0.08	0.01	0.02
Cyprus	0.06	0.11	0.02	0.03
Iraq	0.02	0.07	...	0.02
Jordan	0.19	0.53	0.04	0.17
Libya	0.01	0.02	0.01	0.01
Saudi Arabia	0.01	0.03	...	0.01
Low import dependence				
Turkey	0.02	0.10	0.01	0.03
Middle-income countries				
High import dependence				
Egypt	0.16	0.32	0.07	0.07
Iran <sup>a</sup>	0.01	0.03	...	0.01
Lebanon <sup>a</sup>	n.a.	n.a.	n.a.	n.a.
Morocco	0.05	0.11	-0.01	0.03
Syria	0.06	0.18	-0.02	0.05
Tunisia	0.05	0.16	-0.01	0.04
Yemen Arab Republic <sup>a</sup>	0.10	0.17	0.03	0.06
Yemen, People's Democratic Republic of	0.14	0.38	0.06	0.09
Low-income countries				
Low import dependence				
Afghanistan	n.a.	n.a.	n.a.	n.a.
Sudan	0.03	0.05	-0.05	0.03
Sub-Saharan Africa				
High-income countries				
High import dependence				
Gabon	0.01	0.01	...	...
Ivory Coast	0.03	0.05	0.01	0.01
Réunion	n.a.	n.a.	n.a.	n.a.
Middle-income countries				
High import dependence				
Botswana	0.02	0.02	0.01	...
Congo	0.03	0.03	0.02	...
Ghana	0.03	0.06	0.01	0.01
Liberia	n.a.	n.a.	n.a.	n.a.
Mauritania	0.09	0.15	0.05	0.03
Mauritius	0.12	0.18	0.07	0.04
Senegal	0.12	0.18	0.07	0.04
Swaziland	0.01	0.01	0.01	...
Low import dependence				
Cameroon	0.03	0.03	0.02	...
Kenya	0.01	0.05	...	0.01
Nigeria	0.02	0.06	0.01	0.01
Zambia	0.01	0.05	0.01	0.01
Zimbabwe	n.a.	n.a.	n.a.	n.a.
Low-income countries				
High import dependence				
Gambia	0.08	0.17	0.04	0.05
Guinea-Bissau	n.a.	n.a.	n.a.	n.a.
Lesotho	n.a.	n.a.	n.a.	n.a.
Somalia	0.15	0.25	0.08	0.05
Low import dependence				
Angola	n.a.	n.a.	n.a.	n.a.
Benin	0.04	0.08	0.02	0.02
Burundi	n.a.	n.a.	n.a.	n.a.
Central African Republic	0.02	0.03	0.01	0.01
Chad	0.03	0.03	0.01	0.01
Ethiopia	0.01	0.04	-0.01	0.01
Guinea	n.a.	n.a.	n.a.	n.a.
Madagascar	0.07	0.14	0.02	0.04
Malawi	0.03	0.10	0.01	0.02

(continued)

**Table 40—Continued**

Region/Income Group/Country	Mean	Maximum	Minimum	Standard Deviation
Mali	0.13	0.69	0.01	0.19
Mozambique	n.a.	n.a.	n.a.	n.a.
Niger	0.01	0.03	-0.04	0.02
Rwanda	0.03	0.06	...	0.02
Sierra Leone	0.06	0.15	0.03	0.03
Tanzania	0.05	0.22	0.01	0.06
Togo	0.02	0.04	...	0.01
Uganda <sup>b</sup>	0.02	0.03	0.01	0.01
Upper Volta	0.04	0.08	...	0.02
Zaire	0.02	0.04	0.01	0.01

Sources: Figures for total cereal imports are from Food and Agriculture Organization of the United Nations (FAO), "FAO Trade Tapes," Rome, 1974 and 1979. Figures for the true cost of cereal imports are from International Food Policy Research Institute, "Food Aid Tape," Washington, D.C., 1981. Figures for export earnings are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Where n.a. appears, the data were not available. Where ... appears, the figure was negligible. True cost is the c.i.f. value of commercial imports plus the discounted value of concessionally financed food aid that the recipient must eventually pay. Export earnings include earnings from the export of goods and services and from unrequited private transfers. Where figures for the entire period 1961-78 were not available, those for the longest time series available were used. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>b</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 41—Average per capita consumption and its share of daily requirements by country, 1961-63 and 1977-79**

Region/Income Group/Country	1961-63		1977-79		
	Average Per Capita Consumption	Share of Minimum Requirement	Average Per Capita Consumption	Share of Minimum Requirement	Minimum Daily Requirement
	(calories)	(percent)	(calories)	(percent)	(calories)
<b>Asia</b>					
High-income countries					
High import dependence					
Hong Kong	2,472	108	2,745	120	2,290
Korea, Republic of	2,081	89	2,837	121	2,350
Malaysia	2,445	110	2,562	115	2,230
Singapore	2,412	105	3,003	131	2,300
Fiji	2,487	109	2,582 <sup>a</sup>	113	2,280
Middle-income countries					
High import dependence					
Mongolia	2,309	95	2,704	111	2,430
Papua New Guinea	2,002	88	2,243 <sup>a</sup>	98	2,280
Low import dependence					
China	1,942	82	1,997 <sup>bc</sup>	85	2,360
Korea, Democratic People's Republic of	2,429	104	2,833	121	2,340
Philippines	1,880	83	2,211	98	2,260
Thailand	2,105	95	2,175	98	2,220
Low-income countries					
High import dependence					
Sri Lanka	2,140	96	2,200	99	2,220
Low import dependence					
Bangladesh	1,953	85	1,787	77	2,310
Bhutan	1,992	86	2,058 <sup>a</sup>	89	2,310
Burma	1,920	89	2,223	103	2,160
India	2,046	93	1,996	90	2,210
Indonesia	1,945	99	2,203	192	2,160
Nepal	2,023	92	1,941	88	2,200
Pakistan	1,830	79	2,270	98	2,310
<b>Latin America</b>					
High-income countries					
High import dependence					
Chile	2,552	105	2,662	109	2,440
Costa Rica	2,158	96	2,571	115	2,240
Jamaica	1,993	89	2,662 <sup>a</sup>	119	2,240
Mexico	2,537	109	2,771	119	2,330
Panama	2,317	100	2,331	101	2,310
Surinam	2,008	89	2,284 <sup>a</sup>	101	2,260
Trinidad and Tobago	2,419	100	2,686 <sup>a</sup>	111	2,420
Venezuela	2,172	88	2,625	106	2,470
Low import dependence					
Argentina	3,238	138	3,345	142	2,350
Brazil	2,382	100	2,498	105	2,390
Uruguay	2,927	110	2,822	106	2,670
Middle-income countries					
High import dependence					
Bolivia	1,631	68	2,090	87	2,390
Colombia	2,163	98	2,246 <sup>a</sup>	97	2,320
Cuba	2,414	104	2,672	116	2,310
Dominican Republic	1,875	88	2,169	96	2,260
Ecuador	1,845	81	2,111 <sup>a</sup>	92	2,290
El Salvador	1,808	79	2,145	94	2,290
Guatemala	1,903	87	2,062	94	2,190
Guyana	2,364	104	2,444	108	2,270
Honduras	1,936	86	2,151	95	2,260
Nicaragua	2,187	97	2,368	105	2,250
Peru	2,230	95	2,106	90	2,350
Low import dependence					
Paraguay	2,475	107	2,891	125	2,310

(continued)

**Table 41—Continued**

Region/Income Group/Country	1961-63		1977-79		Minimum Daily Requirement
	Average Per Capita Consumption	Share of Minimum Requirement	Average Per Capita Consumption	Share of Minimum Requirement	
	(calories)	(percent)	(calories)	(percent)	(calories)
Low-income countries					
High import dependence					
Haiti	1,961	87	1,835	81	2,260
North Africa/Middle East					
High-income countries					
High import dependence					
Algeria	1,925	80	2,363	98	2,400
Cyprus	2,437	98	3,156	127	2,480
Iraq	2,012	83	2,323 <sup>a</sup>	96	2,410
Jordan	2,199	89	2,068 <sup>a</sup>	84	2,460
Libya	1,788	76	3,305	140	2,360
Saudi Arabia	2,159	89	2,669	110	2,420
Low import dependence					
Turkey	2,788	111	2,931	116	2,520
Middle-income countries					
High import dependence					
Egypt	2,578	103	2,779 <sup>a</sup>	111	2,510
Iran <sup>c</sup>	1,849	77	2,936 <sup>a</sup>	122	2,400
Lebanon <sup>c</sup>	2,410	97	2,508	101	2,480
Morocco	2,258	93	2,640	109	2,420
Syria	2,442	98	2,765	111	2,480
Tunisia	1,965	82	2,698	113	2,390
Yemen Arab Republic <sup>d</sup>	2,062	85	2,281	94	2,420
Yemen, People's Democratic Republic of	1,976	82	2,064	86	2,410
Low-income countries					
Low import dependence					
Afghanistan	2,107	86	1,973 <sup>a</sup>	81	2,440
Sudan	1,870	80	2,339	99	2,350
Sub-Saharan Africa					
High-income countries					
High import dependence					
Gabon	2,157	92	2,403 <sup>a</sup>	103	2,340
Ivory Coast	2,236	97	2,528	109	2,310
Réunion	2,491	110	2,770	122	2,270
Middle-income countries					
High import dependence					
Botswana	2,054	89	2,071 <sup>a</sup>	89	2,320
Congo	2,018	91	2,228 <sup>a</sup>	100	2,220
Chana	2,023	88	1,996	87	2,300
Liberia	1,920	89	2,396	104	2,310
Mauritania	2,006	87	1,951	84	2,310
Mauritius	2,332	103	2,560 <sup>a</sup>	113	2,270
Senegal	2,068	87	2,239 <sup>a</sup>	94	2,380
Swaziland	1,957	84	2,283 <sup>a</sup>	98	2,320
Low import dependence					
Cameroon	2,094	98	2,442	105	2,330
Kenya	2,298	99	2,085	90	2,320
Nigeria	2,156	91	2,295	97	2,360
Zambia	1,853	80	1,986	86	2,310
Zimbabwe	2,481	104	2,546 <sup>a</sup>	107	2,390
Low-income countries					
High import dependence					
Gambia	2,184	92	2,283 <sup>a</sup>	96	2,380
Guinea-Bissau	2,070	90	2,340	101	2,310
Lesotho	2,091	92	2,140 <sup>a</sup>	94	2,280
Somalia	1,900	82	2,173	94	2,310
Low import dependence					
Angola	1,828	78	2,066	88	2,345
Benin	2,104	91	2,154 <sup>a</sup>	94	2,300

*(continued)*

**Table 41—Continued**

Region/Income Group/Country	1961-63		1977-79		
	Average Per Capita Consumption	Share of Minimum Requirement	Average Per Capita Consumption	Share of Minimum Requirement	Minimum Daily Requirement
	(calories)	(percent)	(calories)	(percent)	(calories)
Burundi	2,043	88	2,260	97	2,320
Central African Republic	2,094	90	2,143	95	2,260
Chad	2,325	98	1,973 <sup>a</sup>	75	2,380
Ethiopia	2,097	90	1,737	75	2,330
Guinea	1,867	81	1,921 <sup>a</sup>	83	2,310
Madagascar	2,354	104	2,428	107	2,270
Malawi	1,943	84	2,238	96	2,320
Mali	2,000	85	2,116 <sup>a</sup>	90	2,350
Mozambique	2,008	86	1,906	81	2,340
Niger	2,189	93	2,051 <sup>a</sup>	87	2,350
Rwanda	1,913	82	2,191	94	2,320
Sierra Leone	1,962	85	2,082	90	2,300
Tanzania	1,839	79	2,040	88	2,320
Togo	1,997	87	2,035 <sup>a</sup>	88	2,300
Uganda <sup>e</sup>	2,066	89	2,071 <sup>a</sup>	89	2,330
Upper Volta	1,902	80	2,024	85	2,370
Zaire	1,931	87	2,156	97	2,220

Sources: The minimum daily requirements and the 1961-63 average per capita consumption figures are from Food and Agriculture Organization of the United Nations (FAO), *Fourth World Food Survey* (Rome: FAO, 1977). The 1977-79 average per capita consumption figures are from FAO, *FAO Production Yearbook, 1980*, vol. 34 (Rome: FAO, 1981). Where 1977-79 data were not available, figures from 1975-77 are from FAO, *Food Balance Sheets—1975-77 Average and Per Caput Food Supplies, 1961-65 Average, 1967 to 1977* (Rome: FAO, 1980). Figures for China for 1976-78 are from population and consumption data presented in Appendix 3, Tables 35 and 37. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This figure is for 1975-77, not 1977-79.

<sup>b</sup> This figure is for 1976-78, not 1977-79.

<sup>c</sup> More recent data for China indicate that average per capita calorie consumption is more than adequate compared to the minimum daily requirement (Alan Piazza, *Trends in Food and Nutrient Availability in China, 1950-81*, World Bank Staff Working Paper No. 607 [Washington, D.C.: World Bank, 1983]).

<sup>d</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>e</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 42—GNP per capita, 1976-78, and growth rates for key economic indicators by country, 1961-78**

Region/Income Group/Country	GNP Per Capita 1976-78	Growth Rates				
		Cereal Imports	Population	GNP	Export Earnings	Staple Crop Production
	(1977 U.S. \$)			(percent)		
<b>Asia</b>						
High-income countries						
High import dependence						
Hong Kong	2,713	1.2	1.7	8.7	n.a.	-14.5
Korea, Republic of	981	10.3	2.2	9.5	27.7	4.0
Malaysia	985	13.9	2.9	6.9	7.5	3.9
Singapore	2,811	2.0	1.9	9.7	13.0	-0.8
Fiji	1,289	2.8	2.4	5.9	6.8	0.4
Middle-income countries						
High import dependence						
Mongolia	869	-2.2	3.0	4.5	n.a.	3.9
Papua New Guinea	507	6.6	2.4	6.0	9.0	2.1
Low import dependence						
China	426	3.2	1.7	6.1	n.a.	3.2
Korea, Democratic						
People's Republic of	612	18.5	2.7	7.2	n.a.	4.0
Philippines	434	3.0	3.1	5.6	6.3	4.5
Thailand	419	7.6	3.2	7.7	8.9	4.4
Low-income countries						
High import dependence						
Sri Lanka	160	2.6	2.3	4.2	-0.2	4.7
Low import dependence						
Bangladesh	86	6.6	2.4	2.2	10.8	1.7
Bhutan	92	1.8	2.2	2.0	n.a.	2.3
Burma	132	0.4	2.3	3.2	-5.6	1.7
India	155	-7.9	2.3	3.6	4.0	2.8
Indonesia	297	7.7	2.6	6.5	14.6	3.1
Nepal	110	2.8	2.2	3.0	11.4	1.0
Pakistan	205	0.4	3.0	5.8	14.0	4.7
<b>Latin America</b>						
High-income countries						
High import dependence						
Chile	1,236	9.9	1.9	2.7	5.5	0.3
Costa Rica	1,347	4.2	3.0	6.5	8.6	5.6
Jamaica	1,079	5.6	1.5	3.5	2.5	3.2
Mexico	1,186	24.7	3.3	6.0	10.8	3.7
Panama	1,226	3.7	3.0	5.8	16.3	2.6
Surinam	1,609	7.7	2.5	6.1	5.6	6.2
Trinidad and Tobago	2,824	3.4	1.1	3.6	4.3	4.0
Venezuela	2,738	9.5	3.0	6.2	5.4	3.7
Low import dependence						
Argentina	1,805	-9.5	1.4	4.0	5.3	3.2
Brazil	1,419	2.7	2.9	8.1	10.2	3.0
Uruguay	1,316	-0.3	1.1	1.5	4.4	1.2
Middle-income countries						
High import dependence						
Bolivia	432	2.5	2.4	4.9	10.7	2.7
Colombia	686	7.5	3.3	5.7	7.2	4.2
Cuba	657	5.3	2.0	0.4	n.a.	4.4
Dominican Republic	765	10.1	3.3	6.7	6.6	2.5
Ecuador	792	11.9	3.3	7.5	11.2	0.9
El Salvador	572	3.4	3.3	5.1	6.5	4.8
Guatemala	817	4.5	2.9	5.9	8.8	2.5
Guyana	524	1.8	2.3	4.0	0.1	1.0
Honduras	438	7.5	3.2	4.3	6.6	1.6
Nicaragua	813	4.7	3.1	5.3	6.3	2.4
Peru	726	5.1	2.9	4.9	3.0	1.8
Low import dependence						
Paraguay	745	-4.7	2.7	5.5	9.0	4.2

(continued)

Table 42—Continued

Region/Income Group/Country	GNP Per Capita 1976-78	Growth Rates				
		Cereal Imports	Population	GNP	Export Earnings	Staple Crop Production
	(1977 U.S. \$)					
Low-income countries						
High import dependence						
Haiti	236	7.2	1.5	2.0	11.7	0.1
North Africa/Middle East						
High-income countries						
High import dependence						
Algeria	1,177	11.0	3.3	6.2	11.1	1.4
Cyprus	1,685	12.6	1.2	5.2	9.5	-0.2
Iraq	1,596	14.9	3.3	7.5	12.3	-0.4
Jordan	985	3.9	0.6	7.9	21.7	-6.0
Libya	6,417	11.7	4.0	9.5	10.4	5.1
Saudi Arabia	8,380	9.3	2.8	12.9	30.0	-3.7
Low import dependence						
Turkey	1,109	-6.7	2.5	6.7	23.6	3.1
Middle-income countries						
High import dependence						
Egypt	326	5.9	2.5	5.6	9.5	2.0
Iran <sup>a</sup>	n.a.	19.9	2.9	n.a.	18.9	4.4
Lebanon <sup>a</sup>	n.a.	4.4	2.9	n.a.	n.a.	-0.5
Morocco	601	9.3	2.8	5.5	7.4	2.3
Syria	877	8.2	3.2	7.2	10.3	2.0
Tunisia	832	5.0	2.2	6.9	12.5	4.7
Yemen Arab Republic <sup>a</sup>	n.a.	35.6	2.8	n.a.	32.7	-0.8
Yemen, People's Democratic Republic of	340	0.6	2.8	14.3	-3.6	3.6
Low-income countries						
Low import dependence						
Afghanistan	156	-1.7	2.4	2.7	n.a.	1.4
Sudan	278	2.7	3.0	2.7	2.2	4.7
Sub-Saharan Africa						
High-income countries						
High import dependence						
Gabon	3,173	11.4	1.1	6.4	15.0	1.4
Ivory Coast	1,121	7.0	2.4	7.2	9.0	4.1
Réunion	2,777	3.1	2.5	4.8	n.a.	-0.8
Middle-income countries						
High import dependence						
Botswana	544	-2.4	2.2	12.1	22.7	5.9
Congo	516	7.6	2.3	3.3	13.3	1.2
Ghana	378	4.7	2.5	2.0	1.8	1.1
Liberia	409	3.4	2.1	5.4	n.a.	3.4
Mauritania	307	9.0	2.0	3.2	-3.0	-4.6
Mauritius	719	2.2	1.8	3.8	7.9	6.6
Senegal	365	4.0	2.4	2.0	6.7	0.5
Swaziland	548	5.3	2.6	9.1	4.4	6.7
Low import dependence						
Cameroon	491	8.9	1.8	5.0	9.4	2.4
Kenya	301	-1.8	3.3	6.0	7.0	4.5
Nigeria	508	17.0	2.6	6.5	17.9	0.7
Zambia	447	2.3	3.1	4.2	-2.6	2.0
Zimbabwe	469	-8.5	3.7	4.9	n.a.	3.1
Low-income countries						
High import dependence						
Gambia	216	6.2	1.8	6.3	4.1	0.7
Guinea-Bissau	262	14.4	3.4	1.2	n.a.	-3.2
Lesotho	262	13.4	1.8	8.3	n.a.	-0.8
Somalia	131	8.3	2.4	2.0	5.9	0.6
Low import dependence						
Angola	278	10.1	2.0	2.8	n.a.	0.8
Benin	206	7.4	2.6	3.2	8.2	1.0
Burundi	140	5.1	1.6	4.7	n.a.	2.0

(continued)

**Table 42—Continued**

Region/Income Group/Country	GNP Per Capita 1976-78	Growth Rates				
		Cereal Imports	Population	GNP	Export Earnings	Staple Crop Production
	(1977 U.S. \$)					
				(percent)		
Central African Republic	234	2.0	2.1	3.1	-0.1	2.4
Chad	134	13.4	2.0	1.0	-2.4	-1.6
Ethiopia	112	17.0	2.3	3.9	4.7	1.1
Guinea	212	2.1	2.3	3.5	n.a.	1.4
Madagascar	220	11.3	2.8	2.0	-1.0	1.8
Malawi	167	9.2	2.4	6.1	6.4	2.5
Mali	117	17.1	2.3	3.6	7.1	1.0
Mozambique	136	6.8	2.3	2.7	n.a.	0.9
Niger	199	19.5	2.9	1.1	6.5	0.2
Rwanda	169	14.7	2.8	4.6	14.0	6.8
Sierra Leone	205	2.7	2.3	2.9	-1.1	2.8
Tanzania	209	4.7	2.9	5.7	2.1	2.3
Togo	283	3.7	2.9	7.8	5.4	-0.3
Uganda <sup>b</sup>	n.a.	-3.9	2.8	n.a.	-4.6	2.7
Upper Volta	125	10.5	2.2	3.0	3.3	1.5
Zaire	205	8.7	2.8	3.3	4.1	2.7

Sources: GNP figures are from World Bank, "World Bank Atlas Tape," Washington, D.C., February 9, 1980. Population figures are from Food and Agriculture Organization of the United Nations (FAO), *World Population and Projections*, ESC/ACP/WD.76/1 Rev. (Rome: FAO, February 1977). Figures for cereal imports are from FAO, "FAO Trade Tapes," Rome, 1974 and 1979. Figures for export earnings are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. Figures for production of staple crops are from FAO, "FAO Production Tapes," Rome, 1975 and 1979. The per capita income classification is based on data presented in this table. The import dependence classification is from Appendix 3, Table 37.

Notes: Where n.a. appears, the data were not available. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>b</sup> This was assumed to be a low-income country even though GNP data were lacking.

**Table 43—Ratio of reserve monetary funds to merchandise imports, average of 1975-77**

Region/Income Group/Country	Ratio of Reserve Monetary Funds to Merchandise Imports, Average of 1975-77
<b>Asia</b>	
High-income countries	
High import dependence	
Hong Kong	n.a.
Korea, Republic of	0.203
Malaysia	0.429
Singapore	0.329
Fiji	n.a.
Middle-income countries	
High import dependence	
Mongolia	n.a.
Papua New Guinea	n.a.
Low-import dependence	
China	n.a.
Korea, Democratic People's Republic of	n.a.
Philippines	0.373
Thailand	0.510
Low-income countries	
High import dependence	
Sri Lanka	0.108
Low import dependence	
Bangladesh	n.a.
Bhutan	n.a.
Burma	0.542
India <sup>a</sup>	0.274
Indonesia	0.172
Nepal	n.a.
Pakistan	0.185
<b>Latin America</b>	
High-income countries	
High import dependence	
Chile	0.109
Costa Rica	0.075
Jamaica	0.126
Mexico	0.220
Panama	0.057
Surinam	n.a.
Trinidad and Tobago	0.387
Venezuela	1.040
Low import dependence	
Argentina	0.290
Brazil	0.396
Uruguay	0.368
Middle-income countries	
High import dependence	
Bolivia	0.280
Colombia	0.362
Cuba	n.a.
Dominican Republic	0.126
Ecuador	0.303
El Salvador	0.182
Guatemala	0.321
Guyana	0.185
Honduras	0.175
Nicaragua	0.206
Peru	0.243
Low import dependence	
Paraguay	0.396
Low-income countries	
High import dependence	
Haiti	0.114

(continued)

**Table 43—Continued**

Region/Income Group/Country	Ratio of Reserve Monetary Funds to Merchandise Exports, 1975-77
<b>North Africa/Middle East</b>	
<b>High-income countries</b>	
High import dependence	
Algeria	0.279
Cyprus	0.602
Iraq <sup>b</sup>	0.817
Jordan	0.451
Libya	0.596
Saudi Arabia	1.986
Low import dependence	
Turkey	0.276
<b>Middle-income countries</b>	
High import dependence	
Egypt	0.076
Iran <sup>c</sup>	0.534
Lebanon <sup>c</sup>	n.a.
Morocco	0.159
Syria	0.340
Tunisia	0.247
Yemen Arab Republic <sup>c</sup>	n.a.
Yemen, People's Democratic Republic of	n.a.
<b>Low-income countries</b>	
Low import dependence	
Afghanistan	n.a.
Sudan	0.082
<b>Sub-Saharan Africa</b>	
<b>High-income countries</b>	
High import dependence	
Gabon	n.a.
Ivory Coast	0.064
Réunion	n.a.
<b>Middle-income countries</b>	
High import dependence	
Botswana	n.a.
Congo	n.a.
Ghana	0.145
Liberia	n.a.
Mauritania	0.300
Mauritius	0.385
Senegal	0.030
Swaziland	n.a.
Low import dependence	
Cameroon	0.081
Kenya	0.208
Nigeria	0.743
Zambia	0.167
Zimbabwe	n.a.
<b>Low-income countries</b>	
High import dependence	
Gambia	0.431
Guinea-Bissau	n.a.
Lesotho	n.a.
Somalia	0.367
Low-import dependence	
Angola	n.a.
Benin	0.161
Burundi	n.a.
Central African Republic	n.a.
Chad	0.094
Ethiopia	0.783
Guinea	n.a.
Madagascar	0.121
Malawi	0.261

*(continued)*

**Table 43—Continued**

Region/Income Group/Country	Ratio of Reserve Monetary Funds to Merchandise Exports, 1975-77
Mali	0.043
Mozambique	n.a.
Niger <sup>c</sup>	0.370
Rwanda	0.317
Sierra Leone	0.211
Tanzania	0.108
Togo	n.a.
Uganda <sup>d</sup>	n.a.
Upper Volta <sup>b</sup>	0.472
Zaire <sup>b</sup>	0.176

Sources: Figures for reserve monetary funds and merchandise imports are from International Monetary Fund, "International Financial Statistics Tape," Washington, D.C., 1981. The per capita income classification is from Appendix 3, Table 42. The import dependence classification is from Appendix 3, Table 37.

Notes: Where n.a. appears, the data were not available. Income groups are based on per capita GNP in 1976-78 expressed in 1977 U.S. dollars. High-income countries had per capita incomes greater than U.S. \$900; middle-income countries, between U.S. \$300 and U.S. \$900; and low-income countries, less than U.S. \$300. Import dependence is the ratio of total cereal imports to total staple consumption, expressed as the cereal equivalent of the crops included. Import dependence is high when it is greater than 10 percent and low when it is less than 10 percent.

<sup>a</sup> This figure is for 1974-76, not 1975-77.

<sup>b</sup> This figure is for 1973-75, not 1975-77.

<sup>c</sup> This was assumed to be a middle-income country even though GNP data were lacking.

<sup>d</sup> This was assumed to be a low-income country even though GNP data were lacking.

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