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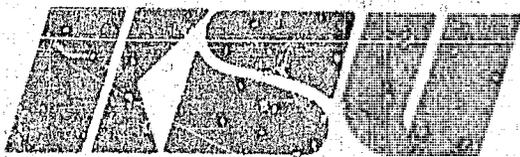
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*LDC Wheat Imports in 1985 and the  
Impact of Development Assistance  
on LDC Wheat Imports*



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## REPORT SUMMARY

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### SUMMARY STATEMENT

This paper presents a projection of 1985 wheat imports by Less Developed Countries (LDCs) and an analysis of the impact of development assistance on wheat imports by LDCs.

The projection exercise shows that 1985 wheat imports by LDCs as a group may be approximately the same in 1985 as in 1974, the base year for the projection. The projections show that most LDCs import more in 1985 than in 1974, but that possible big reductions in imports by China and India from 1974 to 1985 could largely offset these increases, thus causing total LDC wheat imports to be approximately the same in 1985 as in 1974. Projections of LDC wheat imports are very sensitive to small changes in assumptions; a range of projected import levels brought about by alternative assumptions is presented.

The paper analyzes the impact on LDC wheat imports of development assistance efforts aimed at reducing the rate of growth of population and at increasing the rate of growth of wheat (food) production. The analysis shows that a successful development assistance effort will reduce LDC wheat imports to a level below that which would have occurred in the absence of development assistance.

LDC WHEAT IMPORTS IN 1985  
AND THE IMPACT OF DEVELOPMENT ASSISTANCE  
ON LDC WHEAT IMPORTS

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LDC WHEAT IMPORTS IN 1985 AND THE IMPACT OF  
DEVELOPMENT ASSISTANCE ON LDC WHEAT IMPORTS

I. Introduction and Summary of Major Results

This paper has two objectives. First, it projects 1985 wheat imports by less-developed countries (LDCs). Second, it analyzes the impact of development assistance on wheat imports by LDCs.

The projection exercise shows that 1985 wheat imports by LDCs as a group may be approximately the same in 1985 as in 1974, the base year for the projection. The projections show that most LDCs import more in 1985 than in 1974, but that possible big reductions in imports by China and India from 1974 to 1985 could largely offset these increases, thus causing total LDC wheat imports to be approximately the same in 1985 as in 1974. Projections of LDC wheat imports are very sensitive to small changes in assumptions; a range of projected import levels brought about by alternative assumptions is presented.

The analysis of the impact of development assistance shows that development assistance will have the general result of reducing LDC wheat imports to a level below that which would have occurred in the absence of development assistance.

II. LDC Wheat Imports in 1985: An Illustrative Exercise

The objective of this exercise is to project LDC imports of wheat in 1985. Projections are carried out for individual LDCs and are then aggregated. The imports of wheat by a given LDC are measured as the gap between its consumption of wheat and its production of wheat. A country's projected wheat imports are measured by the difference between separate projections of consumption and production.

In this exercise projections are provided for 97 individual countries. These 97 countries account for about 99% of the LDC population. All countries in Asia except Japan and Israel are considered LDCs. Projections are provided for 29 Asian LDCs; these 29 countries accounted for 99.1% of the Asian LDC population in 1970. All countries in Africa except the Republic of South Africa are here considered LDCs. Projections are carried out for 39 African countries; these countries accounted for 98.3% of Africa's LDC population in 1970. All countries in South America except Argentina are here considered LDCs. Projections are carried out for 12 South American LDCs; these 12 countries accounted for 100% of South America's LDC population in 1970. Finally, all countries in Central America are here considered LDCs. Projections are provided for 17 countries; these countries accounted for 96.2% of the Central American LDC population in 1970. It is obvious that this study includes a very comprehensive look at LDCs.

The base year of the projections is 1974. The 1974 base-year figures for production and imports (and the sum of the two which equals consumption) are found by taking the average of the three years 1973, 1974, and 1975.

#### Wheat Consumption in 1985

The procedure here used to project consumption of wheat in 1985 is the following. First, for each country separately, we determine the ratio of 1985 population to 1974 population. Second, we estimate the ratio of 1985 per capita wheat consumption to 1974 per capita wheat consumption. Third, these two ratios are multiplied together to obtain the ratio of total wheat consumption in 1985 to total wheat consumption in 1974. And fourth, this last ratio is multiplied by the figure for total consumption of wheat in 1974 to obtain the projection of total wheat consumption in 1985.

(1) The ratio of 1985 population to 1974 population is found by using the most recent population forecast of the United Nations (5). The "Medium Variant" UN projection is used. The UN provides estimates of the rates of growth (annual rates of growth compounded continuously) of population for each of the five-year periods from 1970 to 2000. This study uses the rates that apply to the years from 1974 to 1985 to determine the ratio of 1985 population to 1974 population. As will be mentioned later, population growth is by far the dominant factor in the estimates of the growth of consumption, so this part of the exercise is important. Table 1 shows for each country the ratio of 1985 population to 1974 population.

(2) The ratio of 1985 per capita wheat consumption to 1974 per capita wheat consumption is found by estimating the average annual rate of growth of per capita wheat consumption for the period 1974 to 1985 and simply calculating the growth that will take place over 11 years at this rate. The estimate of the average annual rate of growth of per capita wheat consumption is found as the product of (a) the average annual rate of growth of per capita personal consumption expenditures (PCE) and (b) the per capita income elasticity of consumption of wheat. (Note that this model is limited in that the relative price of wheat is not included in the model as a determinant of wheat consumption. This amounts to the implicit assumption that the relative price does not change during the projection period. It should also be noted that calculations of income elasticities from historical data frequently make this same assumption about constant relative prices. To the extent that the assumption is unrealistic the estimated income elasticities will be biased.)

We use FAO projections of growth rates of PCE. The FAO has made projections of average annual growth rates for each of the four five-year periods from 1970

to 1990. We use the figures that apply to the periods containing the years 1974 to 1985 to calculate a single average rate of growth of PCE for the 11 year period 1974 to 1985. We do this for both the Trend rate of growth estimates of the FAO and the High rate of growth estimates of the FAO. Table 1 shows the average annual rate of growth of PCE (both Trend and High) for the period 1974-1985.

The "Trend" assumptions take into account actual growth of the late 1960s and, where possible, the first three years of the 1970s. The Trend rate of growth of PCE for the Developing countries for the period 1970-1985 averages 2.9%. The "High" rate of growth of PCE averages 3.7%. The High assumption "refers to the maximum growth rate for the economies compatible with the assumptions made for the United Nations Second Development Decade" (6:103). (The projections of PCE growth rates for the individual countries in our study are from FAO worksheets, copies of which were kindly loaned to us by USDA, ERS.)

The income elasticities used in this study were provided in the FAO Commodity Projections (1) either explicitly or implicitly. The FAO estimates of income elasticities were found by fitting various functional forms to historical data on per capita income and per capita wheat consumption in LDCs. In one functional form, the derived estimate of the income elasticity remains constant over time. For those countries to which the FAO applied this form and thereby assumed that income elasticity remains constant (at least for levels of income and consumption in the vicinity of the historical period), we simply take the FAO estimate of income elasticity and apply it to the period 1974-1985. For those countries to which the FAO applied other functional forms to obtain an equation containing wheat consumption and per capita income, and in which the derived estimates of income elasticity change over time as PCE and wheat consumption change, an alternative procedure was used to obtain a single estimate of income elasticity to be

used in this study. In these cases we used the FAO's forecast of PCE change and the consequent per capita wheat consumption change to calculate an arc-elasticity for the period 1975-1980. This calculated arc-elasticity was then used by this study and assumed to be realistic for the period 1974-1985. Table 1 shows the per capita income elasticity of consumption of wheat used in this study.\*

Having obtained estimates of both the average annual rate of growth of PCE and the income elasticity of consumption for each country, the product of the two is found and the product is the estimate of the average annual rate of growth of per capita wheat consumption for the period 1974-1985. Because we have a trend estimate and a high estimate of PCE growth we obtain two estimates for the rate of growth of per capita wheat consumption, a trend estimate and a high estimate. Table 1 shows the estimates of the average annual rates of growth of per capita wheat consumption.

These rates are then used to obtain the ratio of 1985 per capita wheat consumption to 1974 per capita wheat consumption. Results are shown in Table 1.

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\*The FAO estimates used here show very high income elasticities for some countries, notably those in sub-saharan Africa. Our impression is that because aggregate data on wheat consumption, income, and population have been used in the estimating procedure, the resulting estimates of income elasticity may be erroneously high. For example, assume total wheat consumption growing at 7%, total income growing at 6%, and total population growing at 3%. These figures will result in per capita wheat consumption growing at 3.88% and per capita income growing at 2.91%. Income elasticity estimated with these figures appears to be 1.33. But assume wheat consumption takes place only in urban areas, and that urban population is growing at 5%. This will result in per capita wheat consumption growing at 1.9%. If urban per capita income grows at the national average of 2.91%, income elasticity is estimated to be 0.65. If urban per capita income grows faster than the national average, as is likely to be the case, income elasticity will be below 0.65. In sub-saharan Africa wheat consumption is largely an urban phenomenon and the rate of growth of urban population is higher than the rate of growth of total population. Perhaps income elasticities in sub-saharan Africa are not so high as some studies indicate.

(3) The ratio of 1985 total wheat consumption to 1974 total wheat consumption is found by multiplying the ratio of 1985 population to 1974 population by the ratio of 1985 per capita wheat consumption to 1974 per capita wheat consumption. Table 2 shows the results.

We can illustrate this with the projection for Egypt. The ratio of 1985 population to 1974 population is 1.2870. The ratio of 1985 per capita wheat consumption to 1974 per capita wheat consumption (trend) is 1.0245. Thus the ratio of 1985 total wheat consumption to 1974 total wheat consumption is 1.3184 (i.e.,  $1.2870 \times 1.0245$ ). The projection exercise shows a 31.84% increase in total wheat consumption due to a population increase of 28.7% and per capita consumption increase of 2.45%.

We can use the population growth ratio and the per capita consumption growth ratio to determine the relative importance of population growth and per capita consumption growth. For example, in the case of Egypt, population growth accounts for 92% of the increase in total wheat consumption ( $.2870 / (.2870 + .0245) = .92$ ) and per capita consumption for only 8% ( $0.245 / (.2870 + .0245) = .08$ ).

The results of our projections show that population accounts for most of the projected increase in wheat consumption in the period 1974 to 1985. In 90 of 97 countries, population growth accounts for more than one-half of total consumption growth. In 70 of 97 countries, population growth accounts for more than two-thirds of total consumption growth, and in 55 of 97 countries population growth accounts for more than three-fourths of total consumption growth. The fact that population growth is relatively more important than per capita consumption growth will be important in the argument that we present later.

(4) Total wheat consumption in 1985 is estimated by multiplying the ratio of 1985 total wheat consumption to 1974 total wheat consumption by an estimate of 1974 total wheat consumption.

For each country separately, 1974 wheat consumption is here reckoned as the sum of 1974 wheat production and 1974 wheat (and wheat flour) imports.

Strictly speaking we should subtract wheat exports from imports to obtain net imports, but in almost every case wheat exports are non-existent or negligible from LDCs so this extra step was not taken. No separate account is taken of wheat used for feed, wheat added to stocks, or wheat losses in storage. All are included in consumption. This amounts to an implicit assumption that over the period 1974 to 1985 these uses of wheat will grow at the same rate as wheat used for food. Table 2 shows the 1974 base year figures for wheat consumption. (The 1974 base year figures for wheat production and wheat imports which are summed to obtain the consumption figure are presented in Tables 3 and 4.) We use FAO data for production and imports (2,3). Table 2 also shows the estimates of 1985 total wheat consumption. For the LDCs as a whole, under the Trend rate of growth of PCE, wheat consumption rises from 145 MMT (Million Metric Tons) in 1974 to 203 MMT in 1985, an increase of 40%, or 3.1% per year. Under the High rate of growth of PCE, wheat consumption rises from 145 MMT in 1974 to 214 MMT in 1985, an increase of 48%, or 3.6% per year.

#### Wheat Production in 1985

In contrast to the methodology of projecting consumption used above, which is the standard methodology, the methodology of projecting production is much less standardized. We here use a very simple approach. On the basis of an examination of the rates of growth of wheat production over the period 1962 to 1974, or a shorter period of time within that period, we decided upon the rates of growth to be used for the projection period 1974 to 1985. Obviously it is a matter of judgement which rates to use. There is no set of rates that would be used by all analysts. What can be done is to make clear just what the assumed rates are so that it is clear to all just what the assumptions are that are

determining the final totals. We will set out the rates that we use. In addition, we will carry out a simple sensitivity test to determine how changes in the assumed rates of growth can affect the projected totals for production, and, consequently, imports. It will be seen that very small changes in the assumed rates of growth for the important wheat producers can cause drastic changes in the import projections.

Table 3 shows for each country the average annual rate of growth of wheat production for the twelve-year period 1962 to 1974, and for the last half of that period, from 1968 to 1974. This represents an attempt to see if the rates of growth differed in the last part of the period from the average for the period as a whole. The rates of growth assumed by this study for the period 1974 to 1985 are also shown. While no single "decision rule" was applied to obtain the assumed rate of growth for the projection period from the historical rates of growth, we can make a couple of statements about the rates we assume. First, no negative rates are assumed. Even in those countries where wheat production declined steadily during the 1962 to 1974 period it is assumed that wheat production will not decline further. Wheat production is assumed to remain at the 1974 level -- i.e. a zero rate of growth is assumed for the period 1974 to 1985. Second, in most other cases, simple examination of the growth rates of the recent past was used to guide what are essentially "guesses" about likely future growth rates. Our impression is that our "guesses" are biased on the conservative side. It can be seen that in almost all cases other than the countries where production has been declining, we assume rates for the future that are below recently achieved rates. There are at least two reasons for assuming a slowing of the rate of growth of production. First, to some extent recent rapid rates represent the adoption of new (e.g. Green Revolution) technology. Perhaps the rate of adoption of new technology will slow. Second,

recent increases in the relative price of energy may somewhat retard future production growth.

Table 3 shows the projected level of wheat production in 1985. Our analysis shows production of wheat in LDCs increasing from approximately 105 MMT in 1974 to approximately 163 MMT in 1985. This is a total increase of 54%, or 4.0% per year for the period 1974 to 1985. (Production grew at 4.7% per year from 1962 to 1974 so our projection assumes a slowing of recent rapid growth.)

#### Wheat Imports in 1985

Using the results of the consumption projection and the production projection we now compute 1985 imports. 1985 imports are defined as the difference between 1985 consumption and 1985 production.

Table 4 shows the estimate of 1985 imports -- for both the Trend and the High growth rates of PCE -- and the import data for 1962 and 1974. At this point we discuss only the Trend estimate, reserving for the next section all discussion of alternative estimates.

The Trend estimate shows 1985 imports of 40.5 MMT, a total practically the same as the 1974 total of 39.4 MMT. Thus the basic projection of this paper is that 1985 LDC wheat imports will in total be approximately the same as 1974 LDC wheat imports.

While 1985 total imports are the same as 1974 total imports, the regional totals reveal a mixed picture. 1985 imports in Africa are projected to be 4.7 MMT higher in 1985 than in 1974 -- with 3.2 MMT of this accounted for by Morocco, Algeria, Tunisia, Libya, and Egypt. Central America's imports increase by 1.3 MMT and South America's by 1.0 MMT. Offsetting the increased imports of these three regions of 7 MMT is a projected 6 MMT decrease in Asia's imports. The decrease is due to a shift from big 1974 imports in China and India to near self-sufficiency in 1985. China moves from imports of 5.3 MMT in 1974 to -0.2 MMT in

1985. India moves from imports of 4.6 MMT in 1974 to 0.9 MMT in 1985. In addition, Turkey is projected to be an exporter again -- shifting from imports of 0.5 MMT in 1974 to exports of 1.5 MMT in 1985. These three countries by themselves account for a decline of wheat imports over the period from 1974 to 1985 of 11.0 MMT. The other countries of Asia account for an increase of imports of approximately 5 MMT.

Clearly the aggregate result reported above -- wheat imports in 1985 at roughly the same level as 1974 -- is very sensitive to the assumptions we have made. In the next section we analyze this and some other issues.

#### Wheat Imports in 1985 Under Alternative Assumptions

It is well known that the difference between two large numbers is very sensitive to small changes in the two large numbers.\* It is simple to illustrate the impact on the import projection of alternative assumptions about consumption and production. We consider two consumption projections (the Trend and the High) and three production projections (Low, Basic, and High).

The "Trend" consumption projection showed consumption increasing from 145 MMT in 1974 to 203 MMT in 1985. The "High" consumption projection showed consumption increasing to 214 MMT in 1985. The 1985 "High" total is about 5.3% higher than the "Trend" total. (The "Trend" average annual rate of growth 1974 to 1985 is 3.1%; the "High" average annual rate of growth is 3.6%.)

We consider three production projections. The "Basic" production projection showed production increasing from 105 MMT in 1974 to 163 MMT in 1985. (This

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\*For example, assume the true value of 1985 consumption is 100, and the true value of 1985 production is 80. In this event, the true value of 1985 imports will be 20. Now assume small errors in estimating 1985 consumption (say - 5%) and production (say + 5%). These small errors in the projections for consumption and production will cause imports to be estimated as 11 (= consumption of 95 minus production of 84). The small (5%) errors in projecting consumption and production have caused the import projection to be 45% below the true value. This example illustrates that the import projections here reported, and of course projections by other, must be used cautiously.

implies an average annual rate of growth of about 4.0%. Recall that the aggregate rate rests on assumptions made separately for each producing country.) The "Low" projection assumes that the average annual rate of growth 1974 to 1985 is 3.5%. This results in "Low" production of 154 MMT in 1985 -- about 5.5% below the "Basic" projection. The "High" projection assumes that the average annual rate of growth 1974 to 1985 is 4.5%. This results in "High" production of 171 MMT in 1985; about 5.1% above the "Basic" projection. (These alternative production projections are solely for illustrative purposes. They represent  $\pm$  0.5% changes in the basic projection.)

The following Table shows the various 1985 import levels that result from the six possible combinations of the two consumption projections and the three production projections. The "Trend" consumption projection and the "Basic" production projection result in the import projection discussed earlier, which represents practically no increase over 1974 imports.

1985 LDC Wheat Imports Under Alternative Assumptions (MMT)

Consumption Projection	Production Projection		
	Low (154 MMT)	Base (163 MMT)	High (171 MMT)
Trend (203 MMT)	49	40	32
High (214 MMT)	60	51	43

The range of 1985 imports projections is from 32 MMT to 60 MMT. The combination of "High" production and "Trend" consumption shows a 7 MMT decrease in the annual level of imports from 1974 to 1985. The combination of "Low" production and "High" consumption shows a 21 MMT increase. A range this wide brought about with only modest changes in assumptions about consumption and production should lead to caution in stating and using results.

Although the consumption and production projections are carried out separately the underlying assumptions should be consistent. In reality, the level of production and the level of consumption are linked: high production leads to high income leads to high consumption. Thus we should be careful about pairing High consumption with Low production, or Low consumption with High production. Perhaps these combinations are less probable than others. If this is so, we might reasonably argue that 1985 imports are likely to fall in the range 40-50 MMT -- representing, at one extreme, no increase over 1974 levels, and, at the other extreme, a 25% increase. It would appear, on the basis of the assumptions incorporated into the projections of this study, that wheat imports are likely to increase much less rapidly in the years after 1974 than they did increase in the years before 1974.

#### Comparison with World Bank Staff Projections

A number of projection exercises have been done in recent years (4,6,7,8). Most of them do not present separate projections for different cereals. But the World Bank Staff Working Paper No. 247 of November 1976 did present projections of wheat imports by LDCs in 1985. The results of that exercise -- here referred to as Bank Staff Projections -- are compared here with the results of our study.

Comparison is not easy. The country coverage of the two studies differs. In contrast with our projections, the Bank Staff Projections do not include the People's Republic of China, Mongolia, North Korea, Vietnam, Cambodia, Cuba, and some of the smaller Caribbean countries, but do include Israel, Argentina, Bahrain, Kuwait and Qatar. In addition, our projections use calendar years and our 1974 base year is the average of the three years 1973, 1974, and 1975. The Bank Staff Projections use crop years and the base year is not a three-year average. We use FAO data on imports and production; the Bank Staff Projections use USDA data. We can make only a rough attempt to reconcile the differences because the Bank Staff Working Paper does not provide country-level data for all the countries included in the projections.

The Bank Staff Projections show wheat imports increasing from 31.2 MMT in 1974 to 57.7 MMT in 1985. Our basic projection shows wheat imports increasing from 39.4 MMT in 1974 to only 40.5 MMT in 1985.

The difference in the 1974 base year figures appears to be due mostly to differences in country coverage. We can subtract the imports of the People's Republic of China Mongolia, North Korea, Vietnam, Cambodia and Cuba from our base-year imports, and add the imports of Argentina and Israel in an attempt to get roughly similar country coverage. The difference in the base-year figures is thereby reduced to less than 2 MMT from the initial difference of more than 8 MMT. Presumably, most of the remaining difference is due to the averaging used in this study to obtain base-year data and to the different years (calendar vs. crop) used.

There are big differences in the projections for 1985. And even after an attempt is made to get comparable country coverage the differences remain. The Bank Staff Projections present 1985 totals for six regions. When these are compared with comparable totals from our projections, it appears that there is not much difference for four regions: East Africa, West Africa, Latin America, and East Asia. The big differences are accounted for by South Asia and EMENA (Europe-Middle East-North Africa).

The Bank Staff Projections show South Asia (India, Pakistan, Bangladesh, Sri Lanka, Burma, and Nepal) with 1985 imports of 17.6 MMT. Our study projects 1985 imports of 5.9 MMT. The difference is due to differences in both the consumption and production forecasts. In our study, the weighted average rate of growth of production for the period 1974-1985 is about 4.8%; the Bank Staff Projections have a rate of about 4.0%. In our study, the weighted average rate of growth of consumption is about 3.5% (this is, of course, the result of assumptions about population growth, income growth, and income elasticity). The Bank Staff Projections have a forecasted rate of growth of consumption of about 4.6%. It can be seen

that our study projects a higher rate of growth of production and a much lower rate of growth of consumption, thus leading to a much lower import projection.

It appears that the major reason for the higher rate of growth of consumption in the Bank Staff Projections is that the income elasticity assumed by the Bank Staff Projections for each of the countries of South Asia is 1.4. The income elasticities assumed in our study (following FAO estimates of income elasticities) are in the range 0.35 to 0.67. We think the Bank Staff elasticity assumption is far too high. We are aware of no other estimates of income elasticities for the countries of South Asia that are nearly so high. We think the Bank Staff consumption projection may be too high on account of the assumed high income elasticity.

The other region where the projection results differ substantially is EMENA. The Bank Staff Projections show the EMENA region importing 20.6 MMT in 1985. Our study indicates imports of approximately 13.1 MMT. Can we account for the difference of 7.5 MMT? Analysts at the Bank have kindly provided us with their detailed projections for sub-regions within EMENA. For the seven countries, Algeria, Egypt, Iran, Iraq, Libya, Morocco, and Tunisia, the Bank Staff Projections indicate imports of 12.0 MMT. For the same countries we project imports of 11.9 MMT. For the thirteen other countries of the region, the Bank Staff projects imports of 8.6 MMT. For these same countries we project imports of only 1.2 MMT (net). Of the thirteen countries, we see eleven countries (Bahrain, Cyprus, Israel, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia, Syria, Yeman AR, and Yemen PDR) importing approximately 2.8 MMT and two countries (Turkey and Afghanistan) exporting approximately 1.6 MMT (Turkey accounting for 1.5 MMT).<sup>\*</sup> Thus, we estimate net imports for the thirteen countries of 1.2 MMT.

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<sup>\*</sup>We did not make projections for Israel, Bahrain, Kuwait, or Qatar. For the estimate mentioned in the text, we assume 0.33 MMT for Israel and a total of 0.09 MMT for Bahrain, Kuwait, and Qatar.

We are unable to account for much of the difference between this figure and the Bank Staff figure of 8.6 MMT. One apparent difference is that while we forecast Turkey to export 1.5 MMT of wheat, the Bank Staff forecasts Turkey as an importer of 4 MMT of all grains, and presumably some of those imports would be wheat. If Turkey imports 1.5 MMT rather than exports 1.5 MMT this would swing the results by 3.0 MMT, but that still leaves most of the difference of 8.6 MMT unaccounted for. We do think it unlikely that the imports by the thirteen countries could be anything like 8.6 MMT in 1985.

### III. The Determinants of Wheat Imports

The projection model employed in this paper determines wheat imports as the difference between wheat consumption and wheat production. Imports are positively related to consumption and negatively related to production. In the model consumption itself is the product of two determinants: population and per capita consumption. Per capita consumption, or more accurately the growth of per capita consumption, is determined by the growth of per capita consumption expenditures and the income elasticity of demand. When income elasticity is positive, an increase in PCE is positively related to per capita consumption. When income elasticity is negative, an increase in PCE is negatively related to per capita consumption. Thus it can be said that wheat imports are (1) positively related to population, (2) negatively related to production, and (3) related to PCE in a direction determined by the value of income elasticity.

Thus there are three determinants of wheat imports: population, PCE, and wheat production. An increase of population, ceteris paribus, causes an increase in imports. An increase in production, ceteris paribus, causes a decrease in imports. An increase in PCE, ceteris paribus, will increase imports if income elasticity is positive, will decrease imports if income elasticity is negative, and will have no effect on imports if income elasticity is zero.

A projection of wheat imports requires a projection of all three determinants and a knowledge of the value of income elasticity. A projection of any one determinant is insufficient to project wheat imports. Specifically, a projection that per capita income will increase will not by itself support the conclusion that imports will increase.

Our projections for the period 1974 to 1985 can be used to assay the relative importance of the three determinants. We discuss the projections using "Trend" consumption and "Basic" production. Consumption is projected to increase by 58.5 MMT. Part of this increase is accounted for by population growth and part by PCE growth. Our methodology implies that approximately 76.7% of the increase, or 44.9 MMT, is due to population growth, and that 23.3% or 13.6 MMT, is due to PCE growth.\* Production increase is projected to be 57.4 MMT. Thus we can say, in a ceteris paribus sense, that projected population increase will cause imports to increase by 44.9 MMT, that projected PCE increase will cause imports to increase by 13.6 MMT, and that projected production increase will cause imports to decrease by 57.4 MMT. But in reality these three determinants act simultaneously and thus there will be only a small (1.1 MMT) increase in imports ( $44.9 + 13.6 - 57.4 = 1.1$ ). In light of this projection it would be wrong to conclude that the projected increase in PCE from 1974 to 1985 will cause imports to increase. In fact, for the period from 1974 to 1985, the projected change in PCE is the least important of the three major determinants.

For comparison purposes, we can look at the period 1962 to 1974 using the same approach. Over the period consumption increased by 62.2 MMT. Given the population growth in LDCs that occurred in that period it appears that population

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\*Total consumption increases by 40.33%. Population of the included LDCs increases by 29.00%. Thus per capita consumption increases by 8.79% (i.e.,  $1.4033/1.2900 = 1.0879$ ). Population increase thus accounts for 76.7% of the increase in total consumption (i.e.,  $29.00/(29.00 + 8.79) = .767$ ).

increase accounted for 48.5% of the increase in wheat consumption, or 30.2 MMT, and that PCE growth accounted for 51.5% of the increase, or 32.0 MMT. Production increase by 44.6 MMT. These three determinants acted simultaneously to cause imports to increase by 17.6 MMT. Focusing just on PCE increase and import increase would cause us to lose sight of the fact that the two other determinants had big effects on imports. In short, in the period 1962 to 1974, LDC imports increased because consumption increased more than did production, and almost half of the consumption increase was due to population increase.

#### IV. Development Assistance and LDC Imports of Wheat

It has sometimes been argued that the economic development of LDCs will cause LDCs to import more agricultural products. The arguments that we have seen refer not to specific products like wheat but to agricultural products in general. Whatever the validity of the argument when applied to agricultural products in general (and we have doubts about its validity) we want to argue here that it does not apply to wheat.

Let us define economic development as an increase in per capita incomes. Let us assume for LDCs generally that income elasticity is positive, so that, ceteris paribus, an increase in per capita income (and PCE) will lead to an increase in per capita consumption of wheat. But we cannot jump from the conclusion that per capita consumption of wheat will increase to the conclusion that imports of wheat -- total imports or per capita imports -- will increase. Whether or not per capita wheat imports increase depends on what is simultaneously happening to per capita wheat production. Whether or not total wheat imports increase depends on what is simultaneously happening to population and to total wheat production.

In the past few years many, perhaps most, LDCs have experienced economic development as defined above -- per capita incomes have been increasing. And in

the period 1962 to 1974 wheat imports increased. But as we saw earlier, this was due to the simultaneous effect of per capita income increase, population increase, and production increase.

We turn now to the issue of development assistance from a rich country to an LDC. Stated simply, the objective of development assistance is to help increase LDC per capita income -- that is, to help the LDC to achieve economic development as defined earlier. To achieve this objective development assistance will assist the LDC to increase production faster than population. A successful development assistance program will assist the LDC in increasing the rate of growth of production relative to the rate of growth of population. With the increased recognition in recent years of the development-retarding effect of rapid population growth, many development assistance programs now assist LDCs in reducing the rate of growth of population. And in recognition of the fact that most of the poor people in LDCs are in the agriculture sector, many development assistance programs now assist LDCs in increasing agricultural production.

What can we expect will be the effect on wheat imports of a successful development assistance program? In order to determine the effects of a development assistance program on wheat imports we need first to make some assumptions about both the immediate objectives of the program and the level of success of the program in reaching the objectives. Let us assume that the development assistance program stresses (1) reducing the rate of growth of population and (2) increasing food production (including wheat production if the LDC produces wheat). These are not unrealistic assumptions. The development assistance programs of some important developed countries are focused on attempts to limit population growth and to promote rural development (which presumably includes attempts to increase food production) in LDCs.

Let us also assume that the development assistance programs are very successful. In fact, assume they have an immediate impact. Assume as a result of the program that the rate of growth of population is a full one-half percentage point below the rate that would occur in the absence of development assistance. Assume that the rate of growth of wheat production is a full percentage point above the rate that would occur in the absence of development assistance (this last assumption applies only to wheat producing LDCs). (The results of the analysis provided here are not sensitive to the sizes of the above-assumed changes in the rates of growth.)

We can now make a projection of wheat imports over the period 1974-1985 for a "typical" wheat-producing LDC both in the absence of a development assistance program and in the presence of a development assistance program. Let us construct a typical LDC in 1974. Assume in the absence of development assistance that the average annual rate of growth of population in the LDC is 2.3%, and that the average annual rate of growth of total income is 5.3%. In this case the average annual rate of growth of per capita income is 2.93255% (i.e.,  $(1.053/1.023) - 1$ ). Assume that income elasticity is 0.5 during the entire projection period. Thus per capita wheat consumption will increase at 1.466276% per year (i.e.,  $2.93255 \times 0.5$ ), and total wheat consumption will increase at 3.8% (i.e.,  $(1.023 \times 1.01466276) - 1$ ). Assume that in 1974 wheat production accounted for three-fourths of wheat consumption and wheat imports accounted for one-fourth. (For discussion purposes, let 1974 wheat consumption be 100, production be 75, and imports be 25.) Assume that wheat production accounted for one-tenth of total national production (GNP) and that wheat production in the absence of foreign assistance will have an average annual rate of growth of 4%.

It can be shown that with these assumptions wheat imports will grow at 3.2% the first year, with the growth rate very gradually decreasing as wheat production gradually accounts for a larger proportion of wheat consumption. Over the 11 years wheat consumption increases by 50.72% (from 100 to 150.72), wheat production by 53.95% (from 75 to 115.46), and wheat imports by 41.04% (from 25 to 35.26). This happens in the absence of foreign development assistance.

With foreign development assistance we assume that there is an immediate decrease in the rate of growth of population from 2.3% to 1.8% and an immediate increase in the rate of growth of wheat production from 4% to 5%. Since wheat production is one-tenth of GNP, the 1% increase in the rate of growth of wheat production causes a one-tenth of 1% increase in the rate of growth of GNP. Thus the rate of growth of total production (income) increases from 5.3% to 5.4%. The rate of growth of per capita income increases from 2.93255% to 3.53635% (i.e.,  $(1.054/1.018) - 1$ ) because of the increase in the rate of growth of total income and the decrease in the rate of growth of population.

We now can recalculate wheat consumption and wheat production. Wheat consumption per capita will grow at 1.768173% (i.e.,  $3.53635 \times .5$ ). Total wheat consumption will grow at 3.6% (i.e.,  $1.01768173 \times 1.018$ ). With wheat production growing at 5%, wheat imports will decrease at a rate of 0.6% in the first year, with the rate of decrease getting larger over time. Over the 11 years, wheat consumption increases by 47.56% (from 100 to 147.56), wheat production increases by 71.03% (from 75 to 128.27), and as a result wheat imports decrease by 22.88% (from 25 to 19.28).

The successful foreign development assistance program reduced imports to a level below that which would have existed in the absence of the development assistance program. In our example if the development assistance program had been

less successful, it is possible that imports would not have decreased in absolute amount from 1974 to 1985. However, 1985 wheat imports would in all cases be less with development assistance than in the absence of development assistance.

What has happened? The development assistance does result in an increase of per capita income. And because the income elasticity is positive there will be an increase in per capita wheat consumption. But because income elasticity is less than 1.0, the increase in the rate of growth of per capita consumption due solely to the reduction of the rate of growth of population is unable by itself to offset the total-consumption-reducing impact of the reduction of the population growth rate. (In those cases where income elasticity is larger than 1.0, a reduction of the rate of growth of population will result by itself in an increase in the rate of growth of per capita wheat consumption large enough to offset the total-consumption-reducing impact of the reduction of the population growth rate. But, as a practical matter, income elasticity is less than 1.0 in the typical LDC -- certainly in the important ones in terms of wheat consumption -- and in at least some of the countries where income elasticity estimates show it to be above 1.0 there is some reason to believe -- mentioned earlier -- that the high figure may be the result of erroneous calculations.) Thus, in the usual case, a reduction of the rate of growth of population will result in a reduction of the rate of growth of total consumption because the consumption-reducing effect of the population growth rate decline is bigger than the consumption-increasing effect of the per capita income increase.

An increase in wheat production itself results in some increase in income, but because wheat is not the only thing an economy produces, a given percentage increase in wheat production results in a smaller percentage increase in total GNP. In our illustration, with wheat production assumed to be one-tenth of GNP, the 1% increase in the growth rate of wheat allows a 1/10% increase in the growth

rate of GNP. With a positive income elasticity there will result some increase in wheat consumption. But it is clear that with plausible values for income elasticity and plausible figures for the relative importance of wheat in total production, the increase in consumption due solely to the increase in production will be much smaller than the increase in production. Thus, in the usual case, an increase in wheat production will result in a decrease in wheat imports.\*

We see that both parts of the development assistance program lead to a level of imports lower than would occur in the absence of the development assistance program. Taken by itself, the increase in per capita income would lead to an increase in imports. But the very things that lead to the increase in per capita income -- reduced population growth rate and an increased wheat production growth rate -- lead to a reduction of imports that more than offsets the effect of increased per capita income.

These ideas are not novel. The whole thrust of the "Food Crisis" literature is that if LDCs do not restrain the rate of growth of population and increase the rate of growth of food production, the gap between food consumption and food production -- the import gap -- will get larger over time. These

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\*Some may argue that the 1% increase in wheat production will cause more than a 1/10% increase in national income. We are skeptical of such arguments if they depend upon an "expenditure multiplier" argument of the following sort: the increased income of wheat producers is spent thus causing an increase in demand which stimulates the production of other goods in the economy, in turn generating more income, and so on. This kind of "multiplier" argument may apply in developed countries with unemployed labor and capital but may not apply in LDCs. But even if something like the multiplier is at work it would have to be implausibly high to invalidate our conclusion that an increase in wheat production cannot generate an equal or larger amount of wheat consumption. In our illustration, with income elasticity of 0.5 and wheat accounting for 100/750 of income, the multiplier would have to be 15 for the income increase to be big enough to cause the consumption of wheat to increase by as much as the initial increase in wheat production. Stated another way: an increase in production of one MT of wheat will generate some additional income and -- with income elasticity positive -- some increase in wheat consumption. But the increased consumption will be less than one MT (probably far less). Thus, an increase of wheat production will reduce wheat imports, ceteris paribus.

studies show the importance of efforts to reduce the rate of growth of population and to increase the rate of growth of food production so that the size of the projected import gap can be reduced. This paper has attempted to illustrate the effect of a successful development assistance effort on wheat imports by LDCs. The results of this analysis are in harmony with what the "Food Crisis" literature shows. The results are not in harmony with those who argue that successful development assistance programs will cause LDCs to import more wheat.

TABLE 1. Components of Consumption Projection

AFRICA	Average Annual Rate of Growth of PCE 1974-85		Income Elasticity	Average Annual Rate of Growth of Per Capita Wheat Consumption 1974-85		Ratio of 1985 Per Capita Wheat Consumption to 1974 Per Capita Wheat Consumption		Ratio of 1985 Population to 1974 Population
	Trend	High		Trend	High	Trend	High	
Algeria	2.3	3.0	0.3	0.69	0.90	1.0786	1.1036	1.4444
Angola	1.5	1.8	1.0	1.50	1.80	1.1779	1.2168	1.3181
Benin	1.2	1.4	1.5	1.80	2.1	1.2168	1.2568	1.3607
Burundi	1.1	1.8	1.0	1.10	1.80	1.1279	1.2168	1.3335
Cameroon	2.3	3.8	1.3	3.00	4.94	1.3842	1.6996	1.2718
Central Af. Rep.	0.5	1.9	1.4	0.70	2.66	1.0798	1.3348	1.2987
Chad	-0.4	0.9	1.5	-0.60	1.35	0.9359	1.1589	1.2624
Congo	2.0	2.8	1.0	2.00	2.80	1.2434	1.3550	1.3423
Egypt	3.6	4.3	.06	0.22	0.26	1.0245	1.0290	1.2870
Ethiopia	0.8	2.1	0.7	0.56	1.47	1.0634	1.1741	1.3081
Gabon	4.5	4.8	1.5	6.75	7.20	2.0514	2.1485	1.0904
Gambia	3.0	3.2	1.0	3.00	3.20	1.3842	1.4141	1.2482
Ghana	0.5	1.9	1.0	0.50	1.90	1.0564	1.2300	1.3938
Guinea	1.0	2.4	1.4	1.40	3.36	1.1652	1.4384	1.3262
Ivory Coast	1.7	2.4	1.2	2.04	2.88	1.2487	1.3666	1.3433
Kenya	1.8	2.7	0.8	1.44	2.16	1.1703	1.2650	1.4510
Liberia	0.6	0.8	1.5	0.90	1.20	1.1036	1.1402	1.3177
Libya	5.1	5.1	-0.16	-0.82	-0.82	0.9134	0.9134	1.4110
Madagascar	1.0	1.3	1.0	1.00	1.30	1.1157	1.1527	1.4003
Malawi	1.3	1.9	1.2	1.56	2.28	1.1856	1.2814	1.3264
Mali	2.1	2.4	1.4	2.94	3.36	1.3754	1.4384	1.3260
Mauritania	0.2	1.2	1.2	0.24	1.44	1.0267	1.1703	1.2692
Morocco	1.7	2.4	-0.13	-0.22	-0.31	0.9761	0.9664	1.3996
Mozambique	3.0	3.2	1.0	3.00	3.20	1.3842	1.4141	1.3008
Niger	0.3	1.6	1.5	0.45	2.40	1.0506	1.2981	1.3591

TABLE 1. Components of Consumption Projection (cont.)

## AFRICA

Nigeria	4.5	4.9	1.5	6.75	7.35	2.0514	2.1818	1.3774
Rhodesia	1.1	1.5	0.8	0.88	1.20	1.1012	1.1402	1.4807
Rwanda	1.0	2.1	1.3	1.30	2.73	1.1527	1.3448	1.3826
Senegal	-0.8	1.6	1.5	-1.20	2.40	0.8756	1.2981	1.3076
Sierra Loone	3.0	3.2	1.3	3.90	4.16	1.5232	1.5657	1.3292
Somalia	-0.6	0.4	1.2	-0.72	0.48	0.9236	1.0541	1.3711
Sudan	0.6	1.2	1.0	0.60	1.20	1.0680	1.1402	1.4189
Tanzania	1.6	3.2	1.0	1.60	3.20	1.1908	1.4141	1.4116
Togo	2.0	2.7	1.3	2.60	3.51	1.3262	1.4615	1.3756
Tunisia	0.9	1.8	0.75	0.68	1.22	1.0768	1.1421	1.3411
Uganda	0.8	2.0	1.0	0.80	2.00	1.0916	1.2434	1.3991
Upper Volta	0.5	1.9	1.3	0.65	2.47	1.0739	1.3079	1.2952
Zaire	0.6	0.9	1.3	0.78	1.17	1.0892	1.1365	1.3454
Zambia	1.1	2.5	1.0	1.10	2.50	1.1279	1.3121	1.4216

TABLE 1. Components of Consumption Projection (cont.)

ASIA								
Afghanistan	0.2	1.8	0.29	0.06	0.52	1.0066	1.0587	1.3410
Bangladesh	-0.3	1.0	0.67	-0.20	0.67	0.9782	1.0762	1.3513
Burma	0.9	2.3	0.50	0.45	1.15	1.0506	1.1340	1.3004
Cambodia	0.4	1.1	1.00	0.40	1.10	1.0449	1.1279	1.3829
China	2.4	3.2	0.5	1.20	1.60	1.1402	1.1908	1.1795
Cyprus	4.9	5.4	-0.11	-0.54	-0.59	0.9422	0.9370	1.1358
Hong Kong	7.1	8.4	0.31	2.20	2.60	1.2705	1.3262	1.1617
India	1.5	3.1	0.67	1.01	2.08	1.1169	1.2541	1.3077
Indonesia	1.7	2.3	1.0	1.70	2.30	1.2037	1.2842	1.3238
Iran	7.4	7.8	-0.07	-0.52	-0.55	0.9443	0.9411	1.4054
Iraq	3.6	4.7	0.15	0.54	0.71	1.0610	1.0809	1.4559
Jordan	0.0	1.4	0.0	0.00	0.00	1.0000	1.0000	1.4418
Korea DPR	2.5	3.6	0.43	1.08	1.55	1.1254	1.1844	1.3072
Korea Rep.	5.6	5.6	0.38	2.13	2.13	1.2609	1.2609	1.2361
Lebanon	1.9	3.1	0.01	0.02	0.03	1.0022	1.0033	1.4205
Malaysia	1.7	2.7	0.39	0.66	1.05	1.0750	1.1218	1.3688
Mongolia	0.6	2.0	-0.08	-0.05	-0.16	0.9945	0.9825	1.3634
Pakistan	0.9	2.1	0.35	0.32	0.74	1.0358	1.0845	1.4232
Philippines	-0.5	1.3	0.50	-0.25	0.65	0.9728	1.0739	1.4154
Saudi Arabia	8.2	9.0	0.00	0.00	0.00	1.0000	1.0000	1.3936
Singapore	5.5	5.5	0.25	1.38	1.38	1.1627	1.1627	1.1914
Sri Lanka	1.7	3.1	0.36	0.61	1.12	1.0692	1.1303	1.2420
Syria	1.9	2.9	0.07	0.13	0.20	1.0144	1.0222	1.4312
Thailand	4.6	5.1	0.5	2.30	2.55	1.2842	1.3191	1.4186
Turkey	4.0	4.3	-0.22	-0.88	-0.95	0.9073	0.9003	1.3288
Vietnam S.	1.9	2.9	1.00	1.90	2.90	1.2300	1.3695	1.2512
Vietnam N.	1.5	3.1	1.50	2.25	4.65	1.2773	1.6487	1.3101
Yemen AR	0.8	1.5	1.20	0.96	1.80	1.1108	1.2168	1.3896
Yemen PDR	-0.5	1.0	0.76	-0.38	0.76	0.9590	1.0869	1.3896

TABLE 1. Components of Consumption Projection (cont.)

## CENTRAL AMERICA

Barbados	2.2	3.7	0.14	0.31	0.52	1.0346	1.0587	1.1589
Belize	1.7	3.0	0.60	1.02	1.80	1.1181	1.2168	1.3795
Costa Rica	3.9	5.3	0.35	1.37	1.86	1.1615	1.2247	1.3459
Cuba	1.5	2.9	0.20	0.30	0.58	1.0335	1.0657	1.2546
Dominican R.	2.4	3.4	0.70	1.68	2.38	1.2011	1.2953	1.4474
El Salvador	1.2	2.5	0.70	0.84	1.75	1.0964	1.2103	1.4164
Guadeloupe	2.2	3.7	0.14	0.31	0.52	1.0346	1.0587	1.1589
Guatemala	1.7	3.0	0.60	1.02	1.80	1.1181	1.2168	1.3795
Haiti	1.6	1.8	0.70	1.12	1.26	1.1303	1.1477	1.2123
Honduras	1.5	2.8	0.70	1.05	1.96	1.1218	1.2380	1.4460
Jamaica	2.2	3.7	0.14	0.31	0.52	1.0346	1.0587	1.1589
Martinique	2.2	3.7	0.14	0.31	0.52	1.0346	1.0587	1.1589
Mexico	3.1	3.9	0.40	1.24	1.56	1.1452	1.1856	1.4448
Neth Antilles	2.2	3.7	0.14	0.31	0.52	1.0346	1.0587	1.1589
Nicaragua	1.9	3.4	0.70	1.33	2.38	1.1564	1.2953	1.4342
Panama	3.1	3.3	0.35	1.09	1.16	1.1267	1.1352	1.3587
Trinidad-Tob.	1.6	2.6	-0.08	-0.13	-0.21	0.9858	0.9771	1.1190

TABLE 1. Components of Consumption Projection (cont.)

## SOUTH AMERICA

Bolivia	2.5	3.8	0.50	1.25	1.90	1.1464	1.2300	1.3288
Brazil	5.7	6.4	0.34	1.94	2.18	1.2354	1.2677	1.3606
Chile	2.5	4.1	-0.09	-0.23	-0.37	0.9750	0.9600	1.2220
Colombia	2.4	3.5	0.53	1.27	1.86	1.1489	1.2247	1.3978
Ecuador	2.5	3.1	0.55	1.38	1.71	1.1627	1.2050	1.4118
Fr. Guiana	0.7	2.3	0.47	0.33	1.08	1.0369	1.1254	1.4201
Guyana	1.5	2.8	0.52	0.78	1.46	1.0892	1.1729	1.2709
Paraguay	1.2	2.5	0.38	0.46	0.95	1.0518	1.1096	1.3751
Peru	2.6	4.0	0.47	1.22	1.88	1.1427	1.2274	1.3718
Surinam	0.7	2.3	0.47	0.33	1.08	1.0369	1.1254	1.4201
Uruguay	0.9	1.9	-0.10	-0.09	-0.19	0.9901	0.9793	1.1130
Venezuela	2.8	3.5	0.28	0.78	0.98	1.0892	1.1132	1.3759

TABLE 2. Consumption Projection

AFRICA	Ratio of 1985 Total Wheat Con- sumption to 1974 Total Wheat Con- sumption		1974 Total Wheat Consump- tion (000 MT)	1985 Total Wheat Consumption (000 MT)	
	Trend	High		Trend	High
Algeria	1.5579	1.5940	2,722	4,241	4,339
Angola	1.5526	1.6039	126	196	202
Benin	1.6557	1.7102	14	23	24
Burundi	1.5040	1.6226	15	21	23
Cameroon	1.7605	2.1616	70	123	151
Central Af. Rep.	1.4023	1.7335	14	20	24
Chad	1.1815	1.4630	15	18	22
Congo	1.6690	1.8188	29	48	53
Egypt	1.3184	1.3243	4,524	5,964	5,991
Ethiopia	1.3910	1.5359	743	1,034	1,141
Gabon	2.2368	2.3428			
Gambia	1.7278	1.7651	5	9	9
Ghana	1.4724	1.7144	126	186	216
Guinea	1.5453	1.9076	26	40	50
Ivory Coast	1.6774	1.8358	107	179	196
Kenya	1.6981	1.8355	205	348	376
Liberia	1.4542	1.5025	7	10	11
Libya	1.2888	1.2888	672	866	866
Madagascar	1.5623	1.6141	33	52	53
Malawi	1.5726	1.6997	21	33	36
Mali	1.8238	1.9073	31	57	59
Mauritania	1.3031	1.4854	16	21	24
Morocco	1.3661	1.3526	2,735	3,736	3,699
Mozambique	1.8006	1.8394	90	162	165
Niger	1.4279	1.7642	9	13	16

TABLE 2. Consumption Projection (cont.)

AFRICA					
Nigeria	2.8256	3.0053	401	1,133	1,205
Rhodesia	1.6305	1.6883	123	201	208
Rwanda	1.5937	1.8594	7	11	13
Senegal	1.1450	1.6974	110	126	187
Sierra Loone	2.0247	2.0811	32	65	67
Somalia	1.2663	1.4453	24	30	35
Sudan	1.5154	1.6178	363	550	587
Tanzania	1.6809	1.9961	148	249	295
Togo	1.8244	2.0105	10	18	20
Tunisia	1.4441	1.5316	1,074	1,551	1,645
Uganda	1.5273	1.7396	25	38	43
Upper Volta	1.3909	1.6940	16	22	27
Zaire	1.4654	1.5290	153	224	234
Zambia	1.6034	1.8653	116	186	216
Total Africa			14,957	21,804	22,528

TABLE 2. Consumption Projection (cont.)

## ASIA

Afghanistan	1.3499	1.4197	2,851	3,849	4,048
Bangladesh	1.3218	1.4543	2,191	2,896	3,186
Burma	1.3662	1.4747	59	81	87
Cambodia	1.4450	1.5597	19	27	30
China	1.3449	1.4045	43,316	58,256	60,837
Cyprus	1.0701	1.0642	97	104	103
Hong Kong	1.4759	1.5407	155	229	239
India	1.4605	1.6400	28,210	41,201	46,264
Indonesia	1.5935	1.7000	798	1,272	1,357
Iran	1.3271	1.3227	6,189	8,213	8,186
Iraq	1.5448	1.5737	1,493	2,306	2,350
Jordan	1.4418	1.4418	263	379	379
Korea DPR	1.4712	1.5482	893	1,314	1,383
Korea Rep.	1.5586	1.5586	1,729	2,695	2,695
Lebanon	1.4236	1.4252	466	663	664
Malaysia	1.4715	1.5355	445	665	683
Mongolia	1.3559	1.3396	353	479	473
Pakistan	1.4741	1.5434	8,897	13,115	13,732
Philippines	1.3770	1.5200	530	730	806
Saudi Arabia	1.3936	1.3936	542	755	755
Singapore	1.3853	1.3853	212	294	294
Sri Lanka	1.3279	1.4039	664	882	932
Syria	1.4518	1.4630	1,464	2,125	2,142
Thailand	1.8218	1.8713	97	177	182
Turkey	1.2057	1.1963	12,516	15,091	14,973
Vietnam S.	1.5390	1.7135	167	257	286
Vietnam N.	1.6734	2.1599	452	756	976
Yemen AR	1.5436	1.6909	218	337	369
Yemen PDR	1.3326	1.5103	112	149	169
Total Asia			115,402	159,293	168,586

TABLE 2. Consumption Projection (cont.)

CENTRAL AMERICA					
Barbados	1.1990	1.2269	20	24	25
Belize	1.5424	1.6786	8	12	13
Costa Rica	1.5632	1.6484	79	123	130
Cuba	1.2966	1.3370	936	1,214	1,251
Dominican R.	1.7385	1.8748	108	188	202
El Salvador	1.5529	1.7142	63	98	108
Guadeloupe	1.1990	1.2269	51	61	63
Guatemala	1.5424	1.6786	114	176	191
Haiti	1.3703	1.3913	83	114	115
Honduras	1.6221	1.7902	45	73	81
Jamaica	1.1990	1.2269	202	242	248
Martinique	1.1990	1.2269	33	40	40
Mexico	1.6546	1.7130	3,091	5,114	5,295
Neth Antilles	1.1990	1.2269	15	18	18
Nicaragua	1.6585	1.8577	43	71	80
Panama	1.5308	1.5425	42	64	65
Trinidad-Tob.	1.1031	1.0934	103	114	113
Total C. America			5,036	7,746	8,038

TABLE 2. Consumption Projection (cont.)

SOUTH AMERICA					
Bolivia	1.5234	1.6345	246	375	402
Brazil	1.6808	1.7249	4,735	7,959	8,167
Chile	1.1914	1.1732	1,730	2,061	2,030
Colombia	1.6060	1.8119	442	710	757
Ecuador	1.6415	1.7013	211	346	359
Fr. Guiana	1.4725	1.5982	4	6	6
Guyana	1.3843	1.4906	52	72	78
Paraguay	1.4463	1.5258	79	114	121
Peru	1.5675	1.6837	858	1,345	1,445
Surinam	1.4725	1.5982	17	25	27
Uruguay	1.1020	1.0900	523	576	570
Venezuela	1.4987	1.5317	556	833	852
Total S. America			9,453	14,422	14,814
Total LDC			144,848	203,265	213,966

TABLE 3. Production Projection

AFRICA	Wheat Production (000 MT)			Average Annual Rate of Growth of Wheat Production		Assumed Average Annual Rate of Growth	Wheat Production (000 MT) 1985
	1962	1968	1974	1962-74	1968-74	1974-85	
Algeria	1,261	1,362	908	-2.7	-6.5	0.0	908
Angola	20	26	10	-5.6	-14.7	0.0	10
Benin							
Burundi	6	7	9	3.4	4.3	3.0	12
Cameroon							
Central Af. Rep.							
Chad	3	7	3	0.0	-13.2	0.0	3
Congo							
Egypt	1,507	1,367	1,918	2.0	5.8	2.0	2,385
Ethiopia	655	760	739	1.0	-0.5	1.0	825
Gabon							
Gambia							
Ghana							
Guinea							
Ivory Coast							
Kenya	101	210	147	3.2	-5.8	3.0	203
Liberia							
Libya	33	64	62	5.4	-0.5	3.0	86
Madagascar							
Malawi							
Mali	4	4	4	0.0	0.0	0.0	4
Mauritania							
Morocco	1,220	1,880	1,667	2.6	-2.0	2.0	2,073
Mozambique	10	7	6	-4.2	-2.5	0.0	6
Niger	1	1	2	5.9	12.2	6.0	4

TABLE 3. Production Projection (cont.)

## AFRICA

Nigeria	16	10	5	-9.2	-10.9	0.0	5
Rhodesia	1	20	80	-	26.0	0.0	80
Rwanda	1	1	3	9.6	20.0	3.0	4
Senegal							
Sierra Loone							
Somalia							
Sudan	29	96	220	18.4	14.8	10.0	628
Tanzania	16	38	56	11.0	6.8	7.0	118
Togo							
Tunisia	429	350	827	5.6	15.4	5.0	1,414
Uganda			9				9
Upper Volta							
Zaire	3	3	1	-8.7	-16.7	0.0	1
Zambia							
Total Africa	5,316	6,213	6,676				8,778

TABLE 3. Production Projection (cont.)

ASIA							
Afghanistan	2,168	2,363	2,840	2.3	3.1	3.0	3,931
Bangladesh	39	70	106	8.7	7.2	6.0	201
Burma	21	48	42	5.9	-2.2	5.0	72
Cambodia							
China	19,868	27,850	38,000	5.5	5.3	4.0	58,501
Cyprus	59	81	53	-0.9	-6.8	0.0	53
Hong Kong							
India	11,282	15,528	23,583	6.3	7.2	5.0	40,335
Indonesia							
Iran	2,697	4,226	4,928	5.2	2.6	3.0	6,822
Iraq	810	1,193	1,047	2.2	-2.2	2.0	1,302
Jordan	109	150	118	0.7	-3.9	0.0	118
Korea DPR	85	89	136	4.0	7.3	4.0	209
Korea Rep.	259	340	145	-4.7	-13.2	0.0	145
Lebanon	68	50	65	-0.4	4.5	0.0	65
Malaysia							
Mongolia	226	197	297	2.3	7.1	2.0	369
Pakistan	4,003	5,790	7,582	5.5	4.6	4.0	11,672
Philippines							
Saudi Arabia	128	143	152	1.4	1.0	1.0	170
Singapore							
Sri Lanka							
Syria	1,107	884	1,258	1.1	6.1	2.0	1,564
Thailand							
Turkey	8,618	10,102	11,970	2.8	2.9	3.0	16,569
Vietnam S.							
Vietnam N.							
Yemen AR	20	27	66	10.5	16.1	8.0	154
Yemen PDR	12	15	17	2.9	2.1	2.0	21
Total Asia	51,579	69,146	92,405				142,273

TABLE 3. Production Projection (cont.)

## CENTRAL AMERICA

Barbados							
Belize							
Costa Rica							
Cuba							
Dominican R.							
El Salvador							
Guadeloupe							
Guatemala	31	33	48	3.7	6.4	4.0	74
Haiti							
Honduras							
Jamaica							
Martinique							
Mexico	1,520	2,068	2,498	4.2	3.2	4.0	3,846
Neth Antilles.							
Nicaragua							
Panama							
Trinidad-Tob.							
Total C. America	1,551	2,101	2,546				3,920

TABLE 3. Production Projection (cont.)

SOUTH AMERICA							
Bolivia	43	42	62	3.1	6.7	3.0	86
Brazil	548	953	2,130	12.0	14.3	10.0	6,077
Chile	1,046	1,213	896	-1.3	-4.9	0.0	896
Colombia	131	86	86	-3.4	0.0	0.0	86
Ecuador	66	82	49	-2.5	-8.2	0.0	49
Fr. Guiana							
Guyana							
Paraguay	8	29	34	12.8	2.7	10.0	97
Peru	153	127	127	-1.5	0.0	0.0	127
Surinam							
Uruguay	354	339	426	1.6	3.9	0.0	426
Venezuela							
Total S. America	2,349	2,871	3,810				7,844
Total LDC	60,795	80,331	105,437				162,815

TABLE 4. Import Projection (000 MT)

AFRICA	1962	1974	1985T	1985H
Algeria	451	1,814	3,333	3,341
Angola	34	116	186	192
Benin	5	14	23	24
Burundi	2	6	9	11
Cameroon	23	70	123	151
Central Af. Rep.	5	14	20	24
Chad	3	12	15	19
Congo	14	29	48	53
Egypt	1,645	2,606	3,579	3,606
Ethiopia	5	4	209	316
Gabon	5			
Gambia	2	5	9	9
Ghana	67	126	186	216
Guinea	21	26	40	50
Ivory Coast	49	107	179	196
Kenya	26	58	145	173
Liberia	5	7	10	11
Libya	120	610	780	780
Madagascar	23	33	52	53
Malawi	7	21	33	36
Mali	6	27	53	55
Mauritania	11	16	21	24
Morocco	328	1,068	1,663	1,626
Mozambique	40	84	156	159
Niger	3	7	9	12

TABLE 4. Import Projection (cont.)

## AFRICA

Nigeria	82	396	1,128	1,200
Rhodesia	77	43	121	128
Rwanda	0	4	7	9
Senegal	66	110	126	187
Sierra Leone	16	32	65	67
Somalia	14	24	30	35
Sudan	102	143	-78	-41
Tanzania	40	92	131	177
Togo	4	10	18	20
Tunisia	266	247	137	231
Uganda	21	16	29	34
Upper Volta	6	16	22	27
Zaire	69	152	223	233
Zambia	20	116	186	216
Total Africa	3,683	8,281	13,026	13,750

TABLE 4. Import Projection (cont.)

## ASIA

Afghanistan	39	11	-82	117
Bangladesh	465	2,085	2,695	2,985
Burma	41	17	9	15
Cambodia	19	19	27	30
China	4,381	5,316	-245	2,336
Cyprus	38	44	51	50
Hong Kong	157	155	229	239
India	3,480	4,627	866	5,929
Indonesia	113	798	1,272	1,357
Iran	179	1,261	1,391	1,364
Iraq	157	446	1,004	1,048
Jordan	167	145	261	261
Korea DPR	207	757	1,105	1,174
Korea Rep.	560	1,584	2,550	2,550
Lebanon	218	401	598	599
Malaysia	231	445	655	683
Mongolia	33	56	110	104
Pakistan	826	1,315	1,443	2,060
Philippines	382	530	730	806
Saudi Arabia	148	390	585	585
Singapore	146	212	294	294
Sri Lanka	226	664	882	932
Syria	159	206	561	578
Thailand	38	97	177	182
Turkey	778	546	-1,478	-1,596
Vietnam S.	109	167	257	286
Vietnam N.	21	452	756	976
Yemen AR	0	152	183	215
Yemen PDR	75	95	128	148
Total Asia	13,393	22,993	17,014	26,307

TABLE 4. Import Projection (cont.)

## CENTRAL AMERICA

Barbados	16	20	24	25
Belize	8	8	12	13
Costa Rica	54	79	123	130
Cuba	475	936	1,214	1,251
Dominican R.	52	108	188	202
El Salvador	40	63	98	108
Guadeloupe	22	51	61	63
Guatemala	59	66	102	117
Haiti	51	83	114	115
Honduras	24	45	73	81
Jamaica	129	202	242	248
Martinique	28	33	40	40
Mexico	23	593	1,268	1,449
Neth Antilles	14	15	18	18
Nicaragua	24	43	71	80
Panama	34	42	64	65
Trinidad-Tob.	84	103	114	113
Total C. America	1,137	2,490	3,826	4,118

TABLE 4. Import Projection (cont.)

## SOUTH AMERICA

Bolivia	154	184	289	316
Brazil	2,091	2,605	1,882	2,090
Chile	256	834	1,165	1,134
Colombia	144	356	624	671
Ecuador	42	162	297	310
Fr. Guiana	3	4	6	6
Guyana	40	52	72	78
Paraguay	86	45	17	24
Peru	401	731	1,218	1,318
Surinam	13	17	25	27
Uruguay	1	97	150	144
Venezuela	341	556	833	852
Total S. America	3,572	5,643	6,578	6,970
Total LDC	21,785	39,407	40,444	51,145

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