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A METHODOLOGY FOR RANKING COUNTRIES ACCORDING TO RELATIVE FOOD INSECURITY

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A METHODOLOGY for RANKING COUNTRIES ACCORDING to RELATIVE FOOD INSECURITY

FOOD SECURITY: A DEVELOPMENT PARADIGM FOR THE U.S. FOOD AID PROGRAM

Although the primary rationale for a U.S. Government food aid program is the developing country hunger problem, the current P.L. 480 program does not address that problem with sufficient directness. In fact, much of our food aid does not go to hungry people. Rather, it is provided to achieve macroeconomic stabilization, economic policy reform, market development, U.S. foreign policy objectives, and to satisfy the particular interests of commodity producers, value added food processors and shippers.

Estimates of the world's hungry range from 500 million on up. The world hunger problem is no longer viewed as primarily a supply problem, as it was in the 1950s, 1960s and even the 1970s. For many in developing countries, the problem is lack of economic access to food for many low income households in developing countries around the world. This fundamental reorientation has been captured under the rubric of "food security", a term which marries food supply concerns with economic growth, access and safety net concerns.

Developing country food security is understood to depend on the amount of food available in-country and economic access to the available food by the people living in that country. More people have adequate access to food if incomes are high, if income increases are broadly shared, and if food prices are low and stable. More food will be available in-country if domestic food production is large and the country's capacity to import food (foreign exchange earnings) is strong.

The food security paradigm not only provides a deeper understanding of hunger in the developing world, but it may also reflect a more realistic view of the current constituency for food aid within the United States. Agricultural commodity groups have increasingly lost interest in food aid, seemingly preferring explicit, short-term export promotion programs like the export enhancement (EEP) and GSM credity guarantee programs. To the extent that commodity groups have lost interest in food aid, one of the main sources of political support for food aid will have disappear. That leaves the "hunger lobby". Support for food aid from that quarter could be strengthened if food aid were more effectively focussed on poverty and hunger and it it fostered participation by a broader range of U.S. private voluntary organizations (PVOs). Food aid will find it easier to survive politically with a renewed focus on a compelling issue that sparks the imagination of the American people, yet does not threaten traditional P.L. 480 supporters.

The food security paradigm appeals to diverse groups interested in, or dependant on, food aid. It melds five major concerns of food aid constituents.

- First, a concern for sustainable agriculture (the role of the agricultural technologist and the environmentalist);

- Second, a concern for employment and incomes -- recognizing that access is as important as supply (grist for the economist);

- Third, a concern for the safety net, for those left out of the growth process -- but a sustainable safety net that carefully considers who should be included, at what costs and with what kinds of financing (enter the humanitarian and congressional budget-watchers);

- Fourth, a concern for expanding world trade in agricultural products (welcome U.S. exporters); and

- Fifth, a concern for PVO disenchangment with traditional relief feeding in favor of more developmental efforts.

Melding those five elements -- a concern for sustainable production, for employment and incomes, for the safety net, for trade expansion, and for PVO vitality -- could pull together a sustainable food aid coalition as well as provide the makings of a new development strategy rooted in our ethical and humanitarian concern for the world's hungry, in sound economic approaches to the resolution of hunger, and in the self interest of U.S. agriculture.

What might that new development strategy look like if the food aid program were rooted in food security? Let's start with the country allocations. A first step would be to rank developing countries according to relative food insecurity, where food security depends on the developing country's ability to produce or import food and economic access to the available food on the part of the population.

Ideally, estimates of food need for each developing country should be based on the numbers of undernourished people in the country and by how much they are under nourished. But this data is simply not available for enough countries. In many cases, the survey data that is available is 10-20 years old.

As a second-best, one can use indirect measures of the severity of a nation's hunger or malnutrition problem. As conceived in this study, food security embraces two separate components, one at the country level and the other at the individual or household level. At the country level, food self reliance represents a country's capacity to provide enough food for its citizens. At the household level, the critical issue is economic access to food supplies

available in-country. The operational question, then becomes how to measure these two components. Two readily available indicators were used to measure a country's ability to provide food to its citizens, that is, food self reliance: per capita domestic food production and per capita foreign exchange earnings. Three readily available indicators were used to measure economic access to food: percapita GNP, average daily per capita counsumption of calories and the mortlity rate of infants and children under five years. Why were these indicators chosen?

Food self reliance is conceived as a measure of country level capacity to provide food rather than as the actual amount of food available in-country. Whereas actual in-country food supplies would consist of the sum of domestic food production, commercial imports of food and food aid, food self reliance uses domestic food production and foreign exchange earnings to measure a country's capacity to provide food to its citizens. Again, data are not available for all countries: FAO data on cereal production are available through 1986 for all countries except Cape Verde while World Bank/IMF data on total foreign exchange earnings are unavailable for Afghanistan, Angola, Bhutan, Guinea and Lebanon.

Economic access to food is conceived as a measure of income level and distribution and food price level and stability. Although a cross-country comparision of food prices is not possible because no appropriate data series exist for a large enough cross-section of developing countries, three readily available indicators were chosen to represent average food consumption and income levels and how equitably economic access to food is distributed within the population. Average per capita calorie consumption is conceptually a good measure of the generalized level of malnourishment and data is available for all the 75 countries included in this analysis. However, average per capita calorie consumption does not say anything about the distribution of food consumption; that is, what portion of the population consumes significantly less than the average. By adding per capita GNP, a measure of the average purchasing power of citizens in each country can be introduced. But per capita GNP data are not available for Afghanistan, Lebanon and Angola because of the difficulty of making such estimates under conditions of civil war. Like average calorie consumption, however, per capita GNP says nothing about how income is distributed; that is, what portion of the population lives on significantly less income than this average level. The under five mortality rate was introduced because it was felt that higher mortality rates indicate a more unequal distribution of living standards, be they measured in terms of food consumption, income (GNP) or some other variable. Like average calorie consumption, under five mortality is available for all 75 countries.

A. METHODOLOGICAL APPROACH

1. Purpose and Objectives of the Analysis

The purpose of the analysis is two-fold: to develop criteria for allocating food aid resources by country and to outline a development strategy for using U.S. food aid resources once in country, both based on the principles of food security.

The food aid allocation objectives are threefold: (i) identify those developing countries that are most food insecure and most dependant on concessional food imports; (ii) identify those developing countries in transition to trading partner status (as commercial purchasers of agricultural commodity imports); and (iii) indicate how A.I.D.'s food aid budget might be allocated to these countries, especially the food insecure countries.

As for how to use food aid resources, the objectives are alsl three-fold: (i) categorize developing countries according to the main causes of food insecurity (whether a problem of not enough food, poor access to food, economic stagnation, etc); (ii) provide a coherent focus for the use of food aid resources, centered on reducing world hunger; and (iii) outline a strategy for adapting specific uses of food aid resources to the different development situations faced by individual countries.

2. Measuring Hunger

Objectively, a person is hungry when he does not consume enough food to maintain health and a normal level of activity. At the country level, the degree of hunger conceptually depends on the number of people that consume less than the minimum standard and how far below the standard actual food consumption of that hungry group is. However, no single measure of country-level hunger exists for enough countries to be useful in this analysis. A 1988 study conducted for the FVA Bureau provides direct malnutrition data for only 54 countries, and the dates of the survey data cited range from the mid-1960s to the present.

The most widely used measure of food consumption is daily calorie intake where a minimum standard daily calorie requirement is assumed necessary in order for individuals to remain healthy and able to work. The U.N.'s Food and Agriculture Organization defines this per capita standard at 2300 calories per day, while others argue that it should be lower. Average country-level malnutrition can be estimated by comparing this minimum standard to estimated actual consumption levels -- the larger the gap the hungrier people in that country are assumed to be. However, this estimate of average malnutrition at the country level does not take into account greater

or lesser differences in access to food by the poorest sectors of society, nor does it place enough direct emphasis on the country's productive capacity.

In the absence of an ideal measure of malnourishment with broad enough country coverage, this analysis must adopt more indirect methods. The food security index was developed to indicate the combined impact of country-level capacity to make enough food available on the domestic food market and household access to the available food.

3. Concept and Dimensions of Food Security

The paradigm of food security provides the conceptual framework for this analysis of the macroeconomic causes of hunger and malnutrition. The analysis looks at food security from the national and household levels, similar to the way Brown Unversity's 1989 World Hunger Report conceives of world hunger, save that Brown also identifies a third dimension of hunger at the intra-household level.

This paper argues that income, employment, food prices, food production and food imports are the main determinants of hunger in developing countries. A useful way to define food security at the national level is to think in terms of food self reliance -- can the country make enough food available to its citizens. The concept of food self reliance has become a tenet of A.I.D.'s agricultural development strategy, embracing as it does a country's ability to produce food domestically and its capacity to import commercially the food it cannot or does not want to produce. Food self reliance is juxtaposed against the more simplistic and shortsighted concept of food self sufficiency. Many development economists now argue that a focus on greater food self reliance should be at the heart of country development strategies to attain food security, that is, to eliminate hunger. An equally useful way to look at household level food security is in terms of economic access to enough food through the market. The concept of economic access to food, defined in terms of incomes, employment and food prices, is at the heart of A.I.D.'s increased emphasis on growth through revitalized private sector institutions.

In summary, countries that are more self reliant in their ability to provide domestic populations with adequate supplies of food and where most citizens have adequate economic access to available food supplies are defined as relatively food secure. Countries with severe access problems and that lack the capacity to produce or import adequate food supplies are considered to be the most food insecure. But the methodological question remains: how to develop indicators of national food self reliance and household food access for each country of interest to A.I.D.

4. Food Security and Food Aid Allocations

a) ranking countries according to food security

Countries are ranked according to a statistical index of food security. Operationally, the food security index is conceived as a composite index of two elemental indices, one representing country-level capacity to provide enough food supplies (national food self reliance index) and the other, household economic access to available food supplies (household food access index). Five socio-economic indicators currently make up the food security index, two representing food self reliance and three representing questions of access.

b) allocating food aid on the basis of food security

Since the 75 countries included in the analysis range in size from India, with a population well over 700 million, to Cape Verde, with a population of around 300 thousand, food security is expressed in per capita terms. In general, it is assumed that the most food insecure countries need more economic assistance per capita, and that food aid can be especially useful in helping these countries become more food secure. From a food aid programmatic view, imply that the most food insecure countries need more food aid per capita than the others, but that the larger countries may still need larger volumes of food aid. This preliminary conclusion that the more food insecure countries need more food aid, and that the U.S. Government should provide it, must eventually be checked against a country's economic policy stance and the appropriateness of food aid because of high transport costs or other inefficiencies. A country's total food aid needs would have to take into account the country's degree of food insecurity and its population.

B. DETAILED DESCRIPTION OF THE INDICES

1. National Food Self Reliance Index (NRI)

National food self reliance is defined as a country's capacity to produce food plus its capacity to import food it does not or cannot produce. The NRI is one of three elemental indices that constitute the basis of this analysis. In line with this general definition, the analysis uses per capita food production and gross foreign exchange earnings data to compose the NRI.

Given the debt problems experienced by so many developing countries during the 1980s, some economists argue that gross foreign exchange earnings should be adjusted for debt service. Therefore, two versions of the NRI were calculated, one with gross foreign exchange earnings and another with debt service obligations subtracted from

the gross figure. Table I presents the country rankings for the NRI using gross foreign exchange earnings while Table IA ranks countries using gross earnings adjusted for debt service obligations. As it turns out, adjusting for debt service does not make much difference to the rank ordering of countries in the NRI; only one country changes its rank by more than 10 places.

Other critics might argue that the definition of national food self reliance should be extended to include variability of domestic food production and foreign exchange earnings as well as average levels of these indicators. Future evolution of the analysis will move in that direction.

Specifically, two socio-economic indicators are used to calculate the food access index:

i) FOODPROD, defined as the average annual per capita food production (measured in terms of cereal equivalent) for the period 1984-86 (from the World Bank, based on FAO country-level data and the Bank's population estimates); and

ii) FOREX, defined as the average annual per capita gross foreign exchange earnings for the period 1984-86 (using World Bank balance of payments and population data) or

ii') AFOREX, defined as the averate annual per capit gross foreign exchange earnings for the period 1984-86 <u>adjusted for debt service</u> (incorporating World Bank estimates of debt service obligations)

Gross foreign exchange earnings includes the earnings from exports of merchandise and services (non-factor and factor services) plus the inflow of private unrequited transfers from abroad. Gross figures are available for merchandise exports and non-factor and other services, but the only data available in the World Tables for private unrequited transfers is either partial (worker remittances) or net of transfers to abroad (net current transfers). Data used in the analysis to represent transfers is a mixture of net current transfers and worker remittances. Net current transfers is used unless the figure for worker remittances is larger, in which case, the figure for worker remittances is used. Although this technique still underestimates gross private unrequited transfers, it constitutes the best data available.

Five countries lack adequate data on gross foreign exchange earnings for the period 1984-86: Afghanistan, Angola, Bhutan, Guinea and Lebanon. Although Burma lacks data on non-factor and other services, the numbers are assumed to be small in any case. Therefore, Burma was included in the analysis using the three-year average of merchandise exports and net current transfers. One

additional country, Cape Verde, lacks FAO data on domestic food production. Thus, the food self reliance index can only be calculated for sixty-nine of the 75 countries.

2. Household Food Access Index (HAI)

Economic access to food (food access) is conceptually defined in terms of incomes, employment and food prices. The HAI is one of three elemental indices that constitute the basis of this analysis. Because appropriate and comparable data for food prices and employment are not available, the HAI is operationally defined in terms of average income and food consumption levels and the rate of child mortality, where the latter is a proxy for the distribution of income and food consumption. Future evolution of this analysis should attempt to incorporate food prices.

i) GNP, defined as per capita GNP (from the World Bank's World Development Report);

ii) CALORIE, defined as the average daily calorie consumption per capita (also from the World Development Report); and

iii) INFANTS, defined as the mortality rate per thousand for children under the age of five years (from UNICEF's State of the World's Children).

Although the average daily per capita consumption of food indicates which countries have the most severe hunger problem, the average per capita figure can mask differences among countries due to a more or less unequal distribution of food consumption across population groups. Per capita GNP is a reasonably good measure of average access to food on the demand side, but again, does not provide any indication of the distribution of income. The inability to include a direct measure of the distribution of income or food access is a definite shortcoming because a more unequal distribution means that a larger segment of the population will be hungry for a given average level of income or food cousumption. The under five mortality rate attempts to get at the distribution question. Although mortality rates may be more sensitive to broadly defined health factors than to strictly nutritional causes, they may be a better measure of access to food, income and health services by the poorest groups than any other indicator with data avaliable for a large cross-section of countries.

Data for per capita calorie intake and child mortality rates are available for all 75 countries included in the analysis, around the year 1985. However, per capita GNP data are not available for three important, or potentially important, A.I.D. countries: Afghanistan,

Angola and Lebanon. For the other 72 countries, per capita GNP is available through 1987. Thus, seventy-two of the 75 countries included in the analysis have 1985 data for each of the three variables that make up the food access index.

3. Performance Index (PI)

A country can improve its food security status by improving that status over time, by "performing" well with regard to the indicators used to calculate food security status. The PI is one of three elemental indices that constitute the basis of this analysis. Ideally, the Performance Index should measure growth or improvement in each of the five variables comprising the NRI and the HAI.

So far, the analysis does not include time series data for average daily calorie intake and child mortality. The PI explicity represents growth in only three of the five variables, growth of per capita domestic food production, foreign exchange earnings and GDP. GDP is used in the growth context, whereas GNP was used in the Household Food Access Index. Future evolution of the analysis will attempt to broaden the scope of the Performance Index. Growth data for average calorie intake and child mortality, or some other appropriate access variables, would allow the analysis to distinguish between performance in making more food avaialble and performance in improving economic access to food.

Specifically, the three variables that comprise the PI include the:

i) FOODINDX, defined as the index of per capita domestic food production, based on average annual food production (in metric tons of cereal equivalent) over the three-year period 1984-86 compared to average production for the three-year period 1979-81, taking account of 1980 and 1985 population estimates;

ii) FOREXIND, defined as the index of per capita foreign exchange earnings, based on average annual earnings over the three-year period 1984-86 compared to average earnings for the three-year period 1979-81; and

iii) GDPGRWTH, defined as the average annual growth rate of per capita GDP over the period 1980-85 (from the World Development Report).

GDP growth rate data are available for the same 72 countries as is per capita GNP. Data on growth in domestic food production (the index of domestic food production) are available for 74 countries, all but Cape Verde. However, data for the index of average per capita foreign exchange earnings, an indicator of the growth in foreign exchange earnings, are unavailable for a total of six

countries. Five countries (Afghanistan, Angola, Bhutan, Guinea and Lebanon) lacked data on foreign exchange earnings for the recent period 1984-86. Those five countries also lack data for the earlier period 1979-81, as does Guinea-Bissau, bringing the total to six contries lacking data on growth in foreign exchange earnings. Thus, only 68 countries are included in the Performance Index.

4. Food Security Index (FSI)

A country is more food insecure to the extent that the country's economic system is unable to provide enough food to feed its people (the country is not food self reliant) and citizens of that country have inadequate economic access to the available food supplies. The FSI is a composite index obtained from the combined effect of two elemental indices representing each of these concepts: the National Food Self Reliance Index (NRI) and the Household Food Access Index (HAI).

The food security index can be calculated from the five variables that make up these two indices in a number of ways; two are considered. The most conceptually neutral method is to weight each component index equally, where the FSI value for each country is calculated as the sum of that country's rank or normalized "Z value" for each component index. Alternatively, one could weight each variable equally, where the FSI value for each country is calculated as the sum of that country's rank or normalized "Z value" for each component index. The implication of the latter approach would be to assert that household economic access to food is 50% more important than national food self reliance when adding up a country's overall food security.

Specifically, one can:

i) Compose a composite FSI by combining the two-variable NRI with the three-variable HAI; that is, weighting each component index equally. The equation for this option would be:

FSI = HAI + NRI.

ii) Compose a five-variable FSI by treating each of the five food access and food self reliance variables separately; weighting each variable equally. The equation for this option would be:

FSI = GNP + CALORIES + INFANTS + FOODPROD + FOREX

Sixty-nine of the 75 countries have data available for all five variables used to calculate the FSI. Eight food aid recipients (Gaza, West Bank, Kampuchea, Laos, St. Kitts, St. Nevis, and Seychelles) are excluded from the analysis altogether.

C. FOOD SECURITY COUNTRY RANKINGS

1. Overview of Statistical Ranking Techniques Used

Multivariate statistical ranking techniques, required when using two or more variables as ranking criteria, are employed to calculate each of the four indices used in this analysis. Five different per capita variables representing status in 1985 (along with growth in three of those status variables) are used to estimate relative food insecurity among countries. Such multivariate techniques cannot use nominal values of these variables in the direct calculation of an index used to rank countries. These nominal values must first be statistically manipulated before being used. Why is this so?

If nominal values of the variables are used to calculate the index, variables with larger absolute values and with wider ranges between largest and smallest values will have more influence on the final country ranking than variables with smaller absolute values and narrower ranges. For example, if the Household Food Access Index were calculated by adding the nominal values of the variables for each country, per capita GNP (ranging from 160 to 2500) would have a stronger influence on the final ranking than would the under five mortality rate (with a range from 40 to 330). It may well be that one variable should be weighted more heavily than another. However, the analyst should be required to explicitly specify the relative weighting, rather than allowing the way a variable is measured implicitly determine, from "behind the scenes," how each variable will be weighted.

After all the data is collected, those countries that lack data for one or more of the five variables used to calculate the food security index are excluded from the analysis. Six countries are excluded from the food security ranking for lack of data, leaving 69 countries included in each of the three related indices: HAI, NRI and FSI. One additional country is excluded from the performance index (leaving 68) because foreign exchange earnings data were not available back far enough to calculate change in foreign exchange earnings since 1980. The included countries are then ranked according to several different combinations of variables, each representing a particular aspect of food security, or combination of aspects.

Two simple multivariate statistical ranking techniques are available that avoid the problems caused by using nominal values of the variables: the normalized value and the sum-of-individual-ranks techniques. Each technique has advantages and disadvantages compared to the other, but <u>each is a statistically valid technique</u> for calculating indices incorporating two or more individual variables.

Three elemental indices are calculated, based on values of the individual variables, using both of the above statistical techniques. The National Food Self Reliance Index is based on per capita measures of domestic food production and gross foreign exchange earnings and the Household Food Access Index is based on per capita GNP, per capita daily calorie intake and child mortality rates while the Performance Index is based on growth in per capita GDP, domestic food production and gross foreign exchange earnings.

2. The Sum-of-individual-ranks Technique

The first step in the sum-of-individual-ranks technique is to rank the countries according to the nominal value of each individual variable that comprise the index. In the case of the Food Access Index, for example, all countries are ranked according to each of three variables: per capita GNP, per capita daily calorie intake and mortality rate per 1000 infants and children under five years of age. This generates three separate rank orderings of the included countries. The next step is to sum the ranks, by country, for each of the three variables that comprise the index. After the ranks on individual variables have been summed for each country, the countries are reranked according to this sum of individual ranks.

The sum-of-individual-ranks technique eliminates the unduly large impact that extreme values have on the eventual ranking and has the added advantage that it is easy to understand. A disadvantage is that the relative difference between the nominal values corresponding to countries ranked above or below a given country, for each of the individual variables, is lost. Instead, the relative difference between the nominal values for two countries, for a given variable, is translated into an integer representing the number of countries with intermediate nominal values for that variable. For example, .

3. The Normalized Value Technique

The normalized value technique assumes that each of the variables comprising the index follows a "normal" distribution. To the extent this assumption is a reasonable approximation of fact, it justifies the calculation of a new set of "normalized" values that replace each of the nominal values, using the following formula:

Xn_i = (X_i - mean of X)/standard deviation of X, where
X_i = the nominal value of variable X for country i and
Xn_i = the normalized value of variable X for country i.

The normalized values corresponding to a given country are then summed for each variable comprising the index and the countries are ranked according to the sum of the normalized values.

The advantage of using normalized values (variable Xn) instead of nominal values (variable X) is that the mean value of Xn is zero and the standard deviation is 1. Thus, the absolute values and the range of values are approximately the same for each normalized variable. At the same time, normalized variables maintain the same relative difference between values for any two countries as exists with the nominal values of the basic data.

4. Calculating a Composite Index Using Both Techniques

The Food Security Index can be calculated using either statistical technique applied to the five variables separately: per capita GNP, domestic food production, gross foreign exchange earnings, daily calorie intake and child mortality rates. Each individual variable is weighted equally in this calculation. Alternatively, the Food Security Index can be calculated as a composite index using either statistical technique applied to the two elemental indices that comprise it: the National Food Self Reliance Index and the Household Food Access Index. This latter approach is conceptually closer to the original definition of food security, as a combination of national-level food self reliance and household-level access to food; it takes both statistical ranking techniques one step further.

A composite index uses other indices to create a new index, rather than the individual variables that make up both elemental indices. In order to calculate the so called double sum-of-individual-ranks (or "double soir") rank, the NRI and HAI ranks initially obtained by applying the sum-of-individual-ranks method are, in turn, sumed. The new sum-of-individual-sums variable is then used to rank the countries, under the name "double soir" rank. In order to calculate the so called double normalized (or "double norm") rank, the two sums of individual normalized variables used as the basis for calculating each of the elemental indices are themselves normalized. The values of these normalized sums, corresponding to each country, are then added.

In the first case, the sum of two index ranks is used to calculate the "double soir" rank. In the second case, the sum of two normalized sums of normalized variables is used to calculate the "double norm" rank. Each of these "double" ranks weights the elemental indices equally (rather than weighting the individual variables equally) in calculating the composite index.

5. Results of the Statistical Rankings

Country rankings were calculated for each of the three elemental indices: National Food Self Reliance, Household Food Access and Performance. Tables I (and IA), II and III list the countries with adequate data (69 countries in the case of the NRI and HAI and 68 countries in the case of the PI), in rank order according to the normalized statistical rank technique. The sum-of-individual-ranks ranking is indicated in the adjacent column.

Table IV presents the results of the Food Security Index, which was calculated four different methods. Two methods treat the national food self reliance and household food access indices separately: the double normalized sums (the "double norm") ranking technique and the double sum-of-individual-ranks (the "double soir") ranking technique. The other two methods treat the five variables separately (rather than the indices), based on either the sum of normalized values or the sum of individual ranks. Table 4 indicates the country rank ordering according to each of these four techniques, under the heading Composite Food Security Index. Table IV lists the 69 countries with adequate data in rank order according to a weighted sum of the four ranks; the "double norm" method is given double weight while the other three methods are given single weight.

This rank ordering was used to identify a core group of the most food insecure countries and another core group of relatively food secure countries. The core groups were selected from the set of 69 countries. The core group of the 32 most food insecure countries is supplemented with four of the six excluded countries that, by guesstimate, seem to belong with the core group of food insecure countries. Similarly, the core group of relatively food secure countries consists of the 22 countries ranked highest on the food security index. An intermediate group of 15 borderline countries are also identified, to which are added the two remainig excluded countries. Some of these borderline countries may eventually be included among the more food insecure countries when a final decision on food aid eligibility is made. Figure 1 groups all 75 countries according to relative food insecurity. The 69 countries statistically ranked are unmarked. The six countries lacking data on one or more variable are placed in one of the three groups by "guesstimate" and are denoted with an asterisk (*).

D. ALLOCATING the P.L. 480 BUDGET to FOOD INSECURE COUNTRIES

1. The P.L. 480 Budget: Actual and Hypothetical Allocations

Actual FY 1988 P.L. 480 program budget allocations are compared with a hypothetical allocation scheme that directs more food aid resources to the most food insecure countries. The actual P.L. 480 budget was defined to include all Title I and Title II regular commodity and transport costs; but it excludes Title II emergency and all Section 416 program costs. Title I and Title II regular commodity plus transport costs totaled approximately $1.26 billion in FY 1988. By including commodity and transport costs of Title II emergency programs, the FY 1988 total would have reached $1.4 billion.

The hypothetical allocation scheme excludes the relatively food secure country grouping (22 out of 75 countries), allocating the entire $1.26 billion on a per capita basis to the relatively food insecure and the borderline country groupings (a total of 53 countries). The hypothetical allocation scheme allocates twice as much, on a per capita basis, to the 36 most food insecure countries as it does to the 17 borderline countries.

2. Proposed Allocation of the Food Security Fund

For illustrative purposes, assume that the U.S. food aid program has been divided into two funding "pools", a food security fund for food insecure countries and a market development fund for countries in transition from a dependent status as aid recipients to coequal trade partner. A hypothetical $1 billion Food Security Fund, providing mainly grant food aid, would reserve $100 million for worldwide emergencies. Thus, the non-emergency commodity plus transport value of the Food Security Fund budget would be approximately $900 million. Although the hypothetical Food Security Fund would have significanatly less food aid resources at its disposal than does the present P.L 480 program ($1.1 billion in commodity costs plus another $300 million for transport costs in FY 1988), it would be focused on fewer countries (the 53 relatively food insecure and borderline countries). The hypothetical and actual food aid allocation numbers are contained in Figure 2.

The same hypothetical allocation criterion is used to allocate Food Security Fund resources and the resulting allocation is compared to the actual FY 1988 allocation. A fourth column of adjusted hypothetical allocations represents expert judgements by FVA Bureau management that take into account Regional Bureau decisions to exclude food aid from certain countries (e.g. Papua New Guinea, Nepal, Rwanda, Burundi, Central African Republic, Zimbabwe and Cameroon) as well as political realities in Central and South America that require larger food aid allocations than the food security rankings would indicate. As a result of these assumptions, in the aggregate, the relatively food insecure countries would receive slightly more food aid under the hypothetical and adjusted allocations of the Food Security Fund than they actually received in FY 1988.

LISTFIVE
11/8/89

Figure 1
75 DEVELOPING COUNTRIES
GROUPED ACCORDING TO RELATIVE FOOD SECURITY

MOST FOOD INSECURE COUNTRIES

Mozambique	Central African Republic	Burundi
Ethiopia	Yemen Arab Republic	Kenya
Chad	Nepal	India
Sierra Leone	Rwanda	Malawi
Somalia	Ghana	Benin
Mali	Zaire	Gambia
Bangladesh	Pakistan	Liberia
Sudan	Bolivia	Lesotho
Burkina Faso	Afghanistan*	Niger
Haiti	Angola*	Zambia
Mauritania	Bhutan*	Uganda
Guinea Bissau	Guinea*	Togo

BORDERLINE COUNTRIES

Tanzania	Sri Lanka	Honduras
Nigeria	El Salvador	Madagascar
Senegal	Swaziland	Botswana
Peru	Cape Verde*	Ecuador
Cameroon	Lebanon*	Nicaragua
Papua New Guinea		Dominican Republic

RELATIVELY FOOD SECURE COUNTRIES

Burma	Colombia	Jordan
Guatemala	Mauritius	Brazil
Indonesia	Morocco	Thailand
Philippines	Egypt	Costa Rica
Zimbabwe	Jamaica	Paraguay
Ivory Coast	Algeria	Panama
Congo	Tunisia	Mexico
	Guyana	

NOTE: * Six countries lack data for one or more of the five variables used to rank countries according to food security. Therefore, the six countries marked with an (*) could not be included in the statistical ranking.

SOURCE: U.S. Agency for International Development, Bureau for Food for Peace and Private Voluntary Assistance.

FOODFUND
10/21/89

Figure 2
ALLOCATION OF $1 BILLION FOOD FUND
AND
$450 MILLION EXPORT MARKET FUND
Excludes $100 Million Emergency Reserve
$ millions

Countries	Population	Real/Hypothetical Food Aid Allocations: Actual FY 1988	Food ** Security	Expert Opinion
FOOD FUND COUNTRIES (MOST FOOD INSECURE)				
Mozambique	13.8	9	9	15
Ethiopia	42.3	8	28	15
Chad	5	1	3	5
Sierra Leone	3.7	6	2	6
Somalia	5.4	18	4	15
Mali	7.5	14	5	10
Burkina Faso	7.9	7	5	10
Bangladesh	100.6	76	66	110
Mauritania	1.7	6	1	6
Haiti	5.9	10	4	15
Sudan	21.9	40	14	30
Guinea Bissau	0.9	1	1	2
Central African Republic	2.6	1	2	--
Nepal	16.5	3	11	--
Rwanda	6	1	4	4
Yemen Arab Republic	8	10	5	10
Ghana	12.7	18	8	18
Zaire	30.6	23	20	25
Bolivia	6.4	47	4	35
Pakistan	96.2	115	63	85
Burundi	4.7	1	3	2
India	765.1	123	501	155
Gambia	0.7	5	0	4
Kenya	20.4	11	13	15
Malawi	7	1	5	--
Benin	4	2	3	3
Niger	6.4	1	4	--
Liberia	2.2	10	1	8
Zambia	6.7	10	4	10
Lesotho	1.5	7	1	5
Uganda	14.7	5	10	11
Togo	3	4	2	3
Afghanistan*	16.5	0	11	30
Angola*	8.8	0	6	10
Bhutan*	1.2	1	1	1
Guinea*	6.2	13	4	13
Total Most Food Insecure	1264.7	607	828	686

FOODFUND
10/21/89

Figure 2
ALLOCATION OF $1 BILLION FOOD FUND
AND
$450 MILLION EXPORT MARKET FUND
Excludes $100 Million Emergency Reserve
$ millions

Countries	Population	Real/Hypothetical Food Aid Allocations: Actual FY 1988	Food ** Security	Expert Opinion
BORDERLINE COUNTRIES (MODERATELY FOOD INSECURE)				
Senegal	6.6	10	2	8
Nigeria	99.7	0	33	40
Tanzania	22.2	8	7	10
Peru	18.6	40	6	35
Cameroon	10.2	0	3	--
Papua New Guinea	3.5	0	1	--
Sri Lanka	15.8	28	5	22
El Salvador	4.8	56	2	45
Swaziland	0.8	1	0	1
Honduras	4.4	22	1	20
Madagascar	10.2	6	3	6
Botswana	1.1	4	0	3
Ecuador	9.4	2	3	
Dominican Republic	6.4	22	2	20
Nicaragua	3.3	0	1	--
Cape Verde*	0.3	3	0	3
Lebanon*	2.7	1	1	1
Total Moderately Food Insecure	220.0	205	72	214
Total Food Fund Countries	1484.7	813	900	900

FOODFUND
10/21/89

Figure 2
ALLOCATION OF $1 BILLION FOOD FUND
AND
$450 MILLION EXPORT MARKET FUND
Excludes $100 Million Emergency Reserve
$ millions

Countries	Population	Real/Hypothetical Food Aid Allocations: Actual FY 1988	Food ** Security	Expert Opinion
MARKET DEVELOPMENT COUNTRIES (RELATIVELY FOOD SECURE)				
Indonesia	162.2	25	0	30
Philippines	54.7	67	0	70
Burma	36.9	0	0	--
Guatemala	8	24	0	25
Zimbabwe	8.4	0	0	--
Ivory Coast	10.1	0	0	--
Congo	1.9	0	0	1
Morocco	21.9	55	0	60
Colombia	28.4	0	0	1
Egypt	48.5	181	0	155
Mauritius	1	1	0	2
Jamaica	2.2	37	0	40
Tunisia	7.1	32	0	35
Guyana	0.8	7	0	10
Algeria	21.9	0	0	--
Jordan	3.5	0	0	--
Brazil	135.6	0	0	1
Thailand	51.7	0	0	--
Costa Rica	2.6	11	0	15
Paraguay	3.7	0	0	--
Mexico	78.8	4	0	5
Panama	2.2	0	0	--
Total Relatively Food Secure	692.1	444	0	450
Grand Total	2176.8	1257	900	1350

NOTE: * Six countries lack data for one or more of the five variables used to rank countries according to food security. Therefore, the six countries market with an (*) could not be included in the statistical ranking. They are placed by "guesstimate" in the first and second country groupings.

** The column titled Food Security allocates twice the per capita dollar value of food aid from the $1 billion Food Fund to the most food insecure countries as it does to the moderately food insecure. Relatively food secure countries receive no Food Fund allocations.

SOURCE: Bureau for Food for Peace and Private Voluntary Assistance, Office of Program, Policy and Management, October 1989.

RELYI
11/7/89

food production
forex earnings

Table I.
NATIONAL FOOD SELF RELIANCE
Ranking of Selected Developing Countries
from least to most self reliance

COUNTRIES	PERCAPITA FOOD PROD kg/cap 1984-86 9/	PERCAPITA FOREX EARNINGS $/cap 1984-86 4/	NATIONAL FOOD SELF RELIANCE INDEX norma-lized value	sum of indiv ranks
Yemen Arab Republic	67	144	1	7.5
Mauritania	52	232	2	14.5
Somalia	119	34	3	2
Mozambique	125	14	4	1
Ethiopia	149	18	5	3
Lesotho	101	221	6	16.5
Sierra Leone	145	45	7	4.5
Haiti	141	71	8	7.5
Mauritius	15	659	9	29.5
Peru	135	202	10	16.5
Chad	179	27	11	4.5
Kenya	169	88	12	10.5
Sudan	177	56	13	9
Sri Lanka	160	125	14	12.5
Dominican Republic	128	252	15	25
Bangladesh	204	17	16	6
El Salvador	151	234	17	37
Pakistan	195	68	18	20.5
Zambia	178	137	19	23
Colombia	161	212	20	33.5
Papua New Guinea	140	308	21	37
Bolivia	188	121	22	23
Ghana	204	60	23	19
Jamaica	54	660	24	40.5
Mali	213	37	25	12.5
Liberia	170	210	26	33.5
Central African Rep.	209	66	27	23
Nicaragua	200	112	28	26.5
India	224	21	29	10.5
Guatemala	191	157	30	40.5
Zaire	221	86	31	26.5
Guinea Bissau	232	20	32	14.5
Rwanda	229	33	33	20.5
Ecuador	160	316	34	48.5
Botswana	26	858	35	37
Burkina Faso	232	43	36	28
Honduras	190	217	37	52
Nepal	240	21	38	18
Cameroon	181	260	39	53
Swaziland	140	432	40	45
Egypt	183	264	41	54
Nigeria	223	108	42	37
Togo	224	128	43	48.5
Algeria	122	572	44	42.5
Philippines	229	153	45	55.5
Benin	262	63	46	46

RELY1
11/7/89

food production
forex earnings

Table I
NATIONAL FOOD SELF RELIANCE
Ranking of Selected Developing Countries
from least to most self reliance

COUNTRIES	PERCAPITA FOOD PROD kg/cap 1984-86 9/	PERCAPITA FOREX EARNINGS $/cap 1984-86 4/	NATIONAL FOOD SELF RELIANCE INDEX norma-lized value	sum of indiv ranks
Congo	131	590	47	48.5
Tanzania	277	28	48	29.5
Madagascar	281	40	49	42.5
Senegal	255	145	50	57
Indonesia	263	120	51	55.5
Burundi	292	28	52	31
Jordan	22	1112	53	37
Tunisia	194	435	54	58
Niger	296	48	55	51
Malawi	303	43	56	48.5
Uganda	318	32	57	44
Morocco	277	198	58	60
Ivory Coast	257	328	59	65
Gambia	307	128	60	59
Costa Rica	229	531	61	62.5
Burma	380	11	62	32
Zimbabwe	344	167	63	61
Brazil	334	209	64	62.5
Guyana	335	322	65	68
Mexico	340	367	66	69
Paraguay	528	190	67	65
Thailand	525	212	68	67
Panama	222	2881	69	65

NOTES:
4/ World Bank, World Tables, years 1987 & 1988-89.
9/ IFPRI, FAO data from data tape, 1989.

SOURCE: Agency for International Development, Bureau for Food for Peace and Private Voluntary Assistance.

RELY1A
11/7/89

food production
adjusted ForEx

Table IA
NATIONAL FOOD SELF RELIANCE
Ranking of Selected Developing Countries
from least to most food self reliant

COUNTRIES	PERCAPITA FOOD PROD kg/cap 1984-86 9/	ADJUSTED PERCAPITA FOREX EARNINGS $/cap 1984-86 4/,10/	ADJUSTED NATIONAL FOOD SELF RELIANCE INDEX norma-lized value	sum of indiv ranks
Yemen Arab Republic	67.4	134.0	1	9
Mauritania	51.6	193.5	2	13.5
Mozambique	124.9	9.8	3	1
Somalia	119.3	32.0	4	3
Ethiopia	148.8	15.6	5	2
Sierra Leone	145.1	41.2	6	4
Lesotho	100.5	209.6	7	23
Haiti	141.3	67.9	8	7
Mauritius	14.6	585.7	9	32
Peru	134.9	155.3	10	18.5
Kenya	168.5	61.7	11	10
Chad	179.3	25.5	12	5
Dominican Republic	128.4	214.8	13	32
Jamaica	54.0	487.0	14	38.5
Sri Lanka	160.1	109.6	15	13.5
Sudan	177.1	49.6	16	8
Papua New Guinea	140.5	199.6	17	28.5
Colombia	161.2	153.5	18	28.5
El Salvador	151.1	190.5	19	34.5
Bangladesh	203.7	14.6	20	6
Bolivia	188.2	73.4	21	18.5
Pakistan	195.2	56.9	22	18.5
Zambia	178.4	119.8	23	21
Ghana	204.3	50.7	24	18.5
Algeria	121.7	361.1	25	38.5
Mali	212.6	32.4	26	15
Ecuador	159.9	229.0	27	51.5
Guatemala	191.4	122.4	28	36
Liberia	170.2	199.7	29	48.5
Central African Rep.	209.4	59.7	30	24.5
Nicaragua	199.7	97.9	31	32
India	224.3	17.6	32	11
Guinea Bissau	232.4	13.6	33	12
Zaire	220.8	56.2	34	24.5
Honduras	189.7	172.8	35	51.5
Rwanda	229.3	31.1	36	22
Cameroon	180.5	208.4	37	53.5
Burkina Faso	231.6	39.9	38	28.5
Congo	130.9	405.2	39	48 5
Egypt	182.6	219.9	40	56
Nigeria	223.5	78.1	41	41
Nepal	239.8	20.0	42	16
Togo	224.2	94.2	43	46
Swaziland	139.9	403.3	44	50
Botswana	26.5	821.3	45	38.5

RELY1A
11/7/89

food production
adjusted ForEx

Table IA
NATIONAL FOOD SELF RELIANCE
Ranking of Selected Developing Countries
from least to most food self reliant

COUNTRIES	PERCAPITA FOOD PROD kg/cap 1984-86 9/	ADJUSTED PERCAPITA FOREX EARNINGS $/cap 1984-86 4/,10/	ADJUSTED NATIONAL FOOD SELF RELIANCE INDEX norma-lized value	sum of indiv ranks
Philippines	228.6	121.1	46	53.5
Benin	261.5	51.4	47	47
Tanzania	277.0	25.0	48	[illegible]
Tunisia	193.8	326.7	49	58
Indonesia	263.2	90.4	50	55
Madagascar	280.7	31.6	51	43
Senegal	255.1	125.2	52	57
Burundi	292.4	23.0	53	28.5
Jordan	21.7	1021.1	54	38.5
Niger	296.3	30.7	55	43
Malawi	302.6	30.3	56	43
Ivory Coast	256.5	202.0	57	62
Morocco	276.6	147.4	58	60
Uganda	317.6	27.9	59	45
Costa Rica	228.5	366.3	60	64
Gambia	306.8	120.3	61	59
Brazil	334.5	129.0	62	61
Zimbabwe	344.0	130.4	63	63
Burma	379.7	5.6	64	34.5
Mexico	339.7	186.4	65	67
Guyana	335.1	283.1	66	69
Paraguay	528.1	142.7	67	66
Thailand	525.0	161.2	68	68
Panama	221.6	2666.4	69	65

NOTES:
4/ World Bank, World Tables, years 1987 & 1988-89.
9/ IFPRI, FAO data from data tape, 1989.
10/ World Bank, World Debt Tables, 1989.

SOURCE: Agency for International Development, Bureau for Food for Peace and Private Voluntary Assistance.

ACCESS
11/7/89

Table II
HOUSEHOLD FOOD ACCESS INDEX
Ranking of Selected Developing Countries
from least to most access

COUNTRIES	GNP PER CAPITA $ 2/	CALORIES PER CAPITA per day 3/	UNDER FIVE MORTAL per 1000 5/	HOUSEHOLD FOOD ACCESS INDEX norma-lized value	HOUSEHOLD FOOD ACCESS INDEX sum of indiv ranks
Mali	150	1,788	302	1	2
Chad	130	1,504	232	2	3
Ethiopia	110	1,681	257	3	1
Mozambique	160	1,678	252	4	4
Sierra Leone	350	1,817	302	5	7
Burkina Faso	130	1,924	245	6	5
Gambia	230	2,252	292	7	15
Somalia	280	2,072	257	8	10
Sudan	300	1,737	187	9	13
Bangladesh	150	1,899	196	10	6
Guinea Bissau	180	2,073	232	11	9
Rwanda	280	1,919	214	12	12
Central African Republic	260	2,050	232	13	11
Nepal	160	2,034	206	14	8
Haiti	310	1,855	180	15	18
Malawi	170	2,448	275	16	17
Ghana	380	1,747	153	17	23
Niger	250	2,250	237	18	19
Mauritania	420	2,078	223	19	20
Burundi	230	2,116	200	20	14
Uganda	230	2,083	178	21	16
Benin	260	2,173	193	22	22
Zaire	170	2,154	170	23	21
Senegal	370	2,342	231	24	26
Pakistan	380	2,159	174	25	28
Bolivia	470	2,146	184	26	25
Liberia	470	2,311	215	27	30
India	270	2,189	158	28	27
Yemen Arab Republic	550	2,250	210	29	31
Togo	230	2,236	160	30	24
Tanzania	290	2,335	183	31	29
Zambia	390	2,137	135	32	33
Nigeria	800	2,085	182	33	34
Kenya	290	2,151	121	34	32
Cameroon	810	2,089	162	35	35
Zimbabwe	680	2,089	121	36	36
Lesotho	470	2,358	144	37	37
Swaziland	670	2,556	182	38	42
Honduras	720	2,211	116	39	41
Madagascar	240	2,469	97	40	38
Papua New Guinea	680	2,181	94	41	44
Ivory Coast	660	2,505	157	42	45
Peru	1,010	2,171	133	43	40
Burma	190	2,547	91	44	39
El Salvador	820	2,148	91	45	46
Indonesia	530	2,533	126	46	47

ACCESS
11/7/89

Table II
HOUSEHOLD FOOD ACCESS INDEX
Ranking of Selected Developing Countries
from least to most access

COUNTRIES	GNP PER CAPITA $ 2/	CALORIES PER CAPITA per day 3/	UNDER FIVE MORTAL per 1000 5/	HOUSEHOLD FOOD ACCESS INDEX norma- lized value	sum of indiv ranks
Botswana	840	2,219	99	47	48
Philippines	580	2,341	78	48	51
Ecuador	1,160	2,054	92	49	43
Sri Lanka	380	2,385	48	50	49
Morocco	560	2,678	130	51	50
Nicaragua	770	2,425	104	52	52
Dominican Republic	790	2,461	88	53	56
Guyana	500	2,451	41	54	55
Guatemala	1,250	2,294	109	55	54
Congo	1,100	2,549	122	56	57
Thailand	800	2,462	55	57	58
Egypt	610	3,263	136	58	53
Jamaica	940	2,585	25	59	64
Tunisia	1,190	2,836	110	60	59
Colombia	1,320	2,574	72	61	63
Paraguay	860	2,873	64	62	65
Mauritius	1,090	2,740	32	63	66
Brazil	1,640	2,657	91	64	62
Costa Rica	1,300	2,803	23	65	69
Panama	2,100	2,419	35	66	61
Jordan	1,560	2,947	65	67	67
Algeria	2,550	2,799	117	68	60
Mexico	2,080	3,126	73	69	68

NOTES:
Data for 1985. Pulled together by Resources for the Future in "Malnutrition: Opportunities and Challengse for A.I.D.," 1988.
2/ World Bank, World Development Report, years 1987 & 1988.
3/ World Bank, Social Indicators of Development, 1987
5/ UNICEF, The State of the World's Children, 1987

SOURCE: Agency for International Development, Bureau for Food for Peace and Private Voluntary Assistance.

GROWTH
11/7/89

Table III
PERFORMANCE INDEX
Ranking of 68 Developing Countries
from slowest to fastest growth

GDP rowth rate
foodprod index
forex index

COUNTRIES	ANNUAL PERCAPITA GDP GROWTH rate 1980-85 2/ & 4/	PERCAPITA FOOD PROD INDEX 1984-86 1979-81=100 4/	PERCAPITA FOREX REVENUE INDEX 1984-86 1979-81=100 4/	PERFORMANCE INDEX statistical rank	PERFORMANCE INDEX sum of indiv ranks
Mozambique	-13.6	85.3	38.2	1	1
Niger	-6.7	85.0	44.3	2	2
Nicaragua	-3.1	76.1	48.9	3	4
Guyana	-7.3	81.0	88.5	4	3
Nigeria	-7.3	103.2	41.9	5	10
Bolivia	-7.0	93.1	68.3	6	6
Togo	-5.6	90.9	66.8	7	5
Zambia	-4.1	95.9	55.2	8	7
Liberia	-6.4	98.6	70.2	9	12
Guatemala	-4.3	97.0	65.6	10	8
Madagascar	-6.1	98.1	74.2	11	13
Tanzania	-3.1	91.8	71.8	12	9
Kenya	-1.7	87.3	74.3	13	11
Honduras	-2.6	85.7	87.4	14	15
El Salvador	-3.1	89.7	85.5	15	14
Rwanda	-1.5	87.3	87.1	16	16
Somalia	0.6	98.5	52.9	17	24
Peru	-4.2	99.9	80.1	18	19
Sierra Leone	-0.2	97.1	62.5	19	17
Malawi	-0.6	90.1	84.6	20	20
Central African Rep.	-1.5	93.6	83.6	21	18
Ethiopia	-2.0	87.4	101.3	22	26
Philippines	-3.4	94.3	94.9	23	21
Ghana	-3.9	108.7	65.3	24	22
Zimbabwe	0.0	92.4	79.6	25	23
Ivory Coast	-5.2	104.8	83.0	26	27
Costa Rica	-2.7	91.8	99.2	27	25
Lesotho	3.4	82.4	83.6	28	32
Zaire	-3.8	99.6	91.7	29	30
Sudan	-4.2	96.2	102.5	30	28
Panama	-0.2	97.9	76.9	31	29
Ecuador	-2.4	99.5	90.2	32	33
Haiti	-2.5	96.3	98.3	33	31
Papua New Guinea	-1.6	98.9	89.9	34	34
Mali	-3.0	100.9	94.2	35	35
Swaziland	2.4	103.7	62.4	36	41
Dominican Republic	-0.8	100.4	90.0	37	39
Jamaica	-3.1	103.0	98.6	38	37
Senegal	0.0	102.0	86.7	39	43
Colombia	-0.5	95.8	104.8	40	38
Yemen Arab Republic	0.9	109.4	67.0	41	44
Mauritania	-0.7	87.7	126.9	42	36
Burkina Faso	-1.3	111.7	76.8	43	40
Burundi	-0.8	97.5	108.6	44	42
Benin	0.1	113.5	70.8	45	45

GROWTH
11/7/89

Table III
PERFORMANCE INDEX
Ranking of 68 Developing Countries
from slowest to fastest growth

GDP rowth rate
foodprod index
forex index

COUNTRIES	ANNUAL PERCAPITA GDP GROWTH rate 1980-85 2/ & 4/	PERCAPITA FOOD PROD INDEX 1984-86 1979-81=100 4/	PERCAPITA FOREX REVENUE INDEX 1984-86 1979-81=100 4/	PERFORMANCE INDEX statis- tical rank	PERFORMANCE INDEX sum of indiv ranks
Mexico	0.8	96.6	107.6	46	46
Paraguay	1.4	106.1	84.6	47	52
Tunisia	1.4	107.6	83.2	48	49
Algeria	4.9	100.6	78.9	49	47
Botswana	7.4	76.2	120.3	50	48
Sri Lanka	3.2	85.3	127.6	51	50
Nepal	0.8	102.0	104.7	52	53
Congo	4.9	92.9	102.3	53	51
Morocco	0.1	108.6	99.1	54	54
Mauritius	2.3	99.7	110.8	55	59
Jordan	1.5	109.1	95.7	56	60
Cameroon	4.5	94.4	113.2	57	57
Egypt	1.3	104.8	108.9	58	61
Bangladesh	0.9	97.7	129.1	59	55
Brazil	1.3	106.4	108.9	60	62
Indonesia	2.3	117.2	84.4	61	58
Pakistan	2.8	103.6	117.8	62	64
Burma	3.3	124.0	70.7	63	56
India	3.1	111.7	101.1	64	65
Chad	1.8	99.8	143.1	65	63
Uganda	2.2	110.5	120.0	67	66
Thailand	2.6	109.0	121.5	66	67
Gambia	4.9	120.2	109.0	68	68

NOTES:
Columns A, B and C provide data for 1985.
2/ World Bank, World Development Report, 1982, 1986, 1987, 1988.
4/ World Bank, World Tables, 1988-89.

SOURCE: Agency for International Development, Bureau for Food for Peace and Private Voluntary Assistance.

SECURES
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Table IV

F O O D S E C U R I T Y I N D E X

Ranking of 69 Developing Countries
from least to most food secure

COUNTRIES	GNP PER CAPITA $ 1985 2/	CALORIES PER CAPITA per day 1985 3/	UNDER FIVE MORTAL per 1000 1985 5/	HOUSEHOLD FOOD ACCESS INDEX normalized value	HOUSEHOLD FOOD ACCESS INDEX sum of indiv ranks	PERCAPITA FOOD PROD kg/cap 1984-86 9/	PERCAPITA FOREX EARNINGS $/cap 1984-86 4/	NATIONAL FOOD SELF RELIANCE INDEX normalized value	NATIONAL FOOD SELF RELIANCE INDEX sum of indiv ranks	COMPOSITE FOOD SECURITY INDEX weight indices equal double norm	COMPOSITE FOOD SECURITY INDEX weight indices equal sum of sums	COMPOSITE FOOD SECURITY INDEX weight variables equal normalized	COMPOSITE FOOD SECURITY INDEX weight variables equal sum of indiv
Mozambique	160	1678	252	4	4	125	14	4	1	1	1	1	1
Ethiopia	110	1681	257	3	1	149	18	5	3	2	2	2	2
Chad	130	1504	232	2	3	179	27	11	5	4	3	3	3
Sierra Leone	350	1817	302	5	7	145	45	7	4	3	5	4	6
Somalia	280	2072	257	8	10	119	34	3	2	5	4	6	4
Mali	150	1788	302	1	2	213	37	25	12	6	6	5	5
Bangladesh	150	1899	196	10	6	204	17	16	6	11	7	11	7
Sudan	300	1737	187	9	13	177	56	13	9	10	9	9	11
Burkina Faso	150	1924	245	6	5	232	43	36	28	12	10	8	8
Haiti	310	1855	180	15	18	141	71	8	8	8	12	10	12
Mauritania	420	2078	223	19	20	52	232	2	15	7	15	7	15
Guinea Bissau	180	2073	232	11	9	232	20	32	14	14	8	13	9
Central African Rep.	260	2050	232	13	11	209	66	27	22	13	13	12	13
Yemen Arab Republic	550	2250	210	29	31	67	144	1	7	9	17	15	20
Nepal	160	2034	206	14	8	240	21	38	18	17	11	16	10
Rwanda	280	1919	214	12	12	229	33	33	20	15	14	14	14
Ghana	380	1747	153	17	23	204	60	23	19	16	18	17	17
Zaire	170	2154	170	23	21	221	66	31	26	22	20	19	18
Pakistan	380	2159	174	25	28	195	68	18	21	19	25	20	27
Bolivia	470	2146	184	26	25	188	121	22	24	21	23	21	25
Burundi	230	2116	200	20	14	292	28	52	31	29	16	23	16
Kenya	290	2151	121	34	32	169	88	12	10	20	21	28	24
India	270	2189	158	28	27	224	21	29	11	24	19	27	21
Malawi	170	2448	275	16	17	303	43	56	49	30	24	22	22
Benin	260	2173	193	22	22	262	63	46	46	26	27	26	26
Gambia	230	2252	292	7	15	307	128	60	59	27	32	18	28
Liberia	470	2311	215	27	30	170	210	26	33	23	30	25	32
Lesotho	470	2358	144	37	37	101	221	6	16	18	33	32	34
Niger	250	2250	237	18	19	296	48	55	51	31	26	24	23
Zambia	390	2137	135	32	33	178	137	19	23	25	28	29	29
Uganda	230	2083	178	21	16	318	32	57	44	37	22	33	19
Togo	230	2236	160	30	24	224	128	43	47	28	31	31	31
Tanzania	290	2335	183	31	29	277	28	48	30	36	29	35	30
Nigeria	800	2085	182	33	34	223	108	42	36	33	34	34	33
Senegal	370	2342	231	24	26	255	145	50	57	34	36	30	35
Peru	1010	2171	133	43	40	135	202	10	17	32	35	37	36
Cameroon	810	2089	162	35	35	181	260	39	53	35	39	36	37
Papua New Guinea	680	2181	94	41	44	140	308	21	37	38	41	38	41
Sri Lanka	380	2385	48	50	49	160	125	14	13	40	37	42	40
El Salvador	820	2148	91	45	46	151	234	17	39	39	43	40	44
Swaziland	670	2556	182	38	42	140	432	40	45	42	42	41	42
Honduras	720	2211	116	39	41	190	217	37	52	41	47	39	45
Madagascar	240	2469	97	40	38	281	40	49	42	47	40	44	39
Botswana	840	2219	99	47	48	26	858	35	35	44	46	43	46
Ecuador	1160	2054	92	49	43	160	316	34	50	46	45	45	43
Nicaragua	770	2425	104	52	52	200	112	28	27	45	44	47	47

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Table IV

F O O D S E C U R I T Y I N D E X

Ranking of 69 Developing Countries
from least to most food secure

COUNTRIES	GNP PER CAPITA $ 1985 2/	CALORIES PER CAPITA per day 1985 3/	UNDER FIVE MORTAL per 1000 1985 5/	HOUSEHOLD FOOD ACCESS INDEX normalized value	HOUSEHOLD FOOD ACCESS INDEX sum of indiv ranks	PERCAPITA FOOD PROD kg/cap 1984-86 9/	PERCAPITA FOREX EARNINGS $/cap 1984-86 4/	NATIONAL FOOD SELF RELIANCE INDEX normalized value	NATIONAL FOOD SELF RELIANCE INDEX sum of indiv ranks	COMPOSITE FOOD SECURITY INDEX weight indices double norm	COMPOSITE FOOD SECURITY INDEX weight indices equal sum of sums	COMPOSITE FOOD SECURITY INDEX weight variables normalized	COMPOSITE FOOD SECURITY INDEX weight variables equal sum of indiv
Dominican Republic	790	2461	88	53	56	128	252	15	25	43	48	46	50
Burma	190	2547	91	44	39	380	11	62	32	59	38	54	38
Guatemala	1250	2294	109	55	54	191	157	30	41	48	49	52	51
Indonesia	530	2533	126	46	47	263	120	51	56	50	50	49	49
Philippines	580	2341	78	48	51	229	153	45	55	49	51	48	52
Zimbabwe	680	2089	121	36	36	344	167	63	61	56	52	50	48
Ivory Coast	660	2505	157	42	45	257	328	59	64	52	60	51	56
Congo	1100	2549	122	56	57	131	590	47	48	55	53	55	54
Colombia	1320	2574	72	61	63	161	212	20	34	53	56	57	58
Mauritius	1090	2740	32	63	66	15	659	9	29	51	57	59	59
Morocco	560	2678	130	51	50	277	198	58	60	57	58	53	55
Egypt	610	3263	136	58	53	183	264	41	54	58	54	58	53
Jamaica	940	2585	25	59	64	54	660	24	40	54	59	56	60
Algeria	2550	2799	117	68	60	122	572	44	43	63	55	66	57
Tunisia	1190	2836	110	60	59	194	435	54	58	60	62	61	62
Guyana	500	2451	41	5[illegible]	55	335	322	65	68	61	63	60	63
Jordan	1560	2947	65	67	67	22	1112	53	38	62	61	63	61
Brazil	1640	2657	91	64	62	334	209	64	62	64	65	62	65
Thailand	800	2462	55	57	58	525	212	68	67	66	64	64	64
Costa Rica	1300	2803	23	65	69	229	531	61	63	65	68	65	68
Paraguay	860	2873	64	62	65	528	190	67	65	68	67	67	67
Panama	2100	2419	35	66	61	222	2881	69	66	69	66	69	66
Mexico	2080	3126	73	69	68	340	367	66	69	67	69	68	69

NOTES:
Data for 1985. Pulled together in Resources for the Future in "Malnutrition: Opportunities and Challenges for A.I.D.," 1988.
2/ World Bank, World Development Report, years 1987 & 1988.
3/ World Bank, Social Indicators of Development, 1987
4/ World Bank, World Tables, 1988-89.
5/ UNICEF, The State of the World's Children, 1987
9/ IFPRI, FAO data from data tape, 1989.

SOURCE: Agency for International Development, Bureau for Food for Peace and Private Voluntary Assistance.