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Food Prospects in the Developing Countries: A Qualified Optimistic View

By MALCOLM D. BALE and RONALD C. DUNCAN*

The available evidence indicates that, in aggregate, the growth in world food production over the past two decades has more than kept pace with the growth in population. Improvements in per capita consumption among the developing countries have been widespread. The important exceptions have included many of the countries of Sub-Saharan Africa. Associated with this improvement has been the adoption and success of improved technologies, increased investment in infrastructure vital to increased agricultural production.

We believe it is likely that these improvements in food availability in the developing countries will continue, but that any such improvements would be considerably enhanced by widespread adoption in developing countries of pricing policies which remove the existing distortions under which agricultural production labors. Further it would enhance income distribution.

In this paper we illustrate the changes that have occurred in food consumption in developing countries over the past twenty years and present forecasts of food consumption growth which have recently been assembled in the World Bank. We are not directly concerned with the question of hunger, whether chronic or periodic. We agree with the view that hunger is not directly related to the level of world food availability, but is more a question of income level, or as Amartya Sen puts it, the “entitlement” to sufficient resources to purchase enough food to live. The many studies which the World Bank for one has done on the cost effectiveness of programs to meet chronic hunger among specific groups and periodic hunger due to sharp reductions in food supplies have recently been summarized by Shlomo Reutlinger (1981/1982).

1. Historical Growth of Income and Food Consumption

The last twenty years have been a period of substantial growth for some developing countries. How has this growth (or lack of growth) of the per capita incomes of developing countries affected food consumption in those countries? To obtain a broad picture of the impact, we have plotted elsewhere (1983) the growth in per capita calorie consumption of all food-stuffs against growth in income (PPP) for the developing countries, for two periods, 1960–70 and 1970–79. In using this measure of improvement in food consumption, we recognize the difficulties associated with the measurement of “adequate” diets. All that is being implied in our use is that at these levels of food consumption, growth in calorie consumption does represent an improvement in living standards.

We find that there is a reasonably strong positive correlation between per capita income and food consumption growth, with much less dispersion in the 1960's than in the 1970's. In the 1970's, a large number of developing countries experienced satisfactory per capita income growth (around 3 percent per annum), but little and often negative per

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1Purchasing power parity (PPP) estimates of national income (i.e., estimated in terms of a set of international prices) are preferred to traditional exchange rate adjusted GDP estimates because they better reflect the purchasing power of income in each country. The PPP estimates flow from the United Nations/World Bank project on International Comparisons of Real Product carried out by Irving Kravis et al.

2For a critique of the estimation of basic food needs, see Nick Eberstadt.
capita food consumption growth (on average less than 1 percent per annum). Increased agricultural production instability in the 1970's is a likely cause for part of this behavior. (T. N. Barr shows that the variability of world food production was higher in the 1960's than in the 1950's, and higher again in the 1970's.) Reutlinger (1978) has shown that, in the face of reductions in domestic production, developing countries have been reluctant to compensate for the shortfall by increasing food imports. Moreover, artificially low food prices in developing countries, often aimed at the politically more powerful urban consumers, do not necessarily mean increased consumption. Besides the restrictions on imports, low producer prices mean lower incomes and hence lower consumption in the rural areas, where most of the population and most of the poor often reside.

What are the changes we are likely to see in the next twenty years in terms of the levels of food consumption reached in the developing countries? Further, what will the expected developments in food consumption mean for the future pattern of production and prices of foodstuffs?

II. World Bank Forecasts of Food Consumption by 1995

The World Bank has recently carried out an exercise which in part led to forecasts to the year 1995 of world (and regional) production, consumption, trade and prices of many primary commodities of importance to developing countries. For the most part, these long-term projections were derived using comparative static equilibrium models, disaggregated by region, where prices are used to achieve a unique equilibrium solution. They are described further in our working paper.

The basic position that we take on projections of food consumption is that the amount and composition of food is, in the aggregate and in the long run, determined by aggregate demand. In this we differ from those who take a physical capacity-cum-productivity possibility approach. That is, we believe that the resources allocated to food production, including resources allocated to productivity-enhancing research, are endogenous. We acknowledge that in some countries the food-producing sector is so large a proportion of total national product that it cannot be regarded as not being simultaneously determined with aggregate demand. Further, there are also distortions of prices which disturb food production from the levels that would otherwise be determined by aggregate demand. However, while these influences are important, often extremely important for individual countries, for this exercise we chose to assume that they are captured in the projections of income growth, since it is not possible to estimate their effects directly.

In looking at the level and composition of food consumption, our focus on aggregate demand implies that, both at the world level and at the country level, access to food is not determined by physical constraints on food production either within individual countries (because a country can import whatever food it can pay for) or at a world level (because production will respond to price incentives). Thus, it follows that we do not see the solution of any "food problem" at the world level or within a particular country as a question of overcoming food production problems (in a technical or agronomic sense) on a world basis or within a country, but as a problem of obtaining the maximum economic growth—within the economic constraints.

The long-term forecasts shown in Table 1 are conditional in nature. On the demand side, they rest critically on the assumptions made about the world economy in the 1980's and 1990's. The forecasts, moreover, are positive rather than normative. They are based on the most likely assumptions concerning government policies affecting production and trade, the likely market structures and demand conditions. Given the use of resulting price forecasts in project and balance of payments analyses by the World Bank Group, trying to determine what is most likely to happen, as opposed to what would happen if desirable changes in policies and market structure were to take place, becomes inescapable and appropriate.
TABLE I—FOODSTUFFS—PROJECTIONS OF APPARENT CONSUMPTION, BY ECONOMIC REGIONS

(Million tons)

<table>
<thead>
<tr>
<th></th>
<th>Industrial Countries</th>
<th>Centrally Planned Economies</th>
<th>Developing Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>89.3(1.7)</td>
<td>114.5(1.7)</td>
<td>145.9(3.1)</td>
</tr>
<tr>
<td>Rice</td>
<td>9.5(0.6)</td>
<td>10.5(0.7)</td>
<td>14.5(1.9)</td>
</tr>
<tr>
<td>Coarse Grains</td>
<td>252.6(2.1)</td>
<td>270.4(0.5)</td>
<td>161.7(4.0)</td>
</tr>
<tr>
<td>Sugar</td>
<td>25.1(1.3)</td>
<td>26.8(0.4)</td>
<td>17.7(2.3)</td>
</tr>
<tr>
<td>Beef and Veal</td>
<td>20.6(2.1)</td>
<td>27.0(1.8)</td>
<td>9.5(4.1)</td>
</tr>
<tr>
<td>Fresh Citrus Fruits</td>
<td>26.1(4.5)</td>
<td>34.0(1.8)</td>
<td>1.7(6.9)</td>
</tr>
<tr>
<td>Vegetable Fats and Oils</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybeans (oil equivalent)</td>
<td>6.8(5.7)</td>
<td>9.6(2.3)</td>
<td>0.7(7.9)</td>
</tr>
<tr>
<td>Palm oil</td>
<td>1.0(6.9)</td>
<td>1.3(1.7)</td>
<td>0.1(19.8)</td>
</tr>
<tr>
<td>Coconuts (oil equivalent)</td>
<td>1.0(0.6)</td>
<td>1.3(1.7)</td>
<td>0.1(3.9)</td>
</tr>
</tbody>
</table>


*aWorld Bank Classification of Countries, see World Development Report 1982. Note that China is included.
*bThe numbers in parentheses in this column are the actual growth rates (least squares trend) for the period 1961–80.
*cThe numbers in parentheses in this column are the projected growth rates (end-points) for the period 1980–95.
*dCoarse grains here include maize, barley, oats, rye, grain sorghum and millet.

Observing the growth rates in world consumption for the period 1961–80 (Table I), we see the declining importance of industrial countries in world consumption and the increasing importance of the centrally planned economies and the developing countries. The developing countries are expected to maintain their historical growth in grains consumption. This, together with the expected slower growth in population in developing countries should mean a slightly faster growth in per capita grains consumption than in the past twenty years. Bringing together the consumption growth rates of Table I and the population growth rates, per capita consumption of wheat, rice, and coarse grains by the developing countries was 2.5, 0.8, and 0.6 percent per annum, respectively, over the 1961–80 period. The projected per capita consumption growth rates for these grains in the period 1980–95 are 2.3, 0.9, and 1.3 percent, respectively. The much higher rate of growth of coarse grains is a reflection of the expected increase in the consumption of animal products.

In its major study of future food availability scenarios for developing countries, the FAO made the following projections. If, in the period 1980 to 2000, the GDP of developing countries grows at much the same rate as in the past twenty years, per capita food demand is projected to average 0.44 percent per annum growth. Given higher GDP growth, greater investment in agriculture, and freer trade, FAO projected that per capita food demand could grow by 0.75 percent per annum. The projections of the first FAO scenario appear compatible with our expectations of a slightly faster growth in per capita grains consumption in the next fifteen to twenty years.

III. Price Developments

The cereals price forecasts from this exercise show a continuation of the long-term declining trend in real terms (figures are presented in our earlier paper). Even though incomes are increasing, and the growth of incomes in the developing countries is having a larger impact in terms of total food demand, food demand remains essentially price and income inelastic. Supply will respond to an increase in demand with improvements in technology. The result will be a fall in prices. The events of the past decade seem to bear this out. High prices early in the decade stimulated output which has resulted in low...
prices since then. This is especially true for rice, the staple food of the major proportion of low-income people.

IV. Production and Yields

Grains occupy by far the largest part of land under agricultural production. Continuing increases in area harvested similar to those experienced in the past are unlikely. Reliance on yield increases will probably rise. The potential for such increments exists and past experience, particularly in developing countries, is encouraging. If yields of wheat and coarse grains were to continue to grow at recent rates, projected production increases would be achieved with little increase in area harvested (with the exception of rice, where yields will need to and are expected to increase).

Yields are increasing at a constant or diminishing rate in industrial countries while they are increasing at an increasing rate in developing countries. In other words, in both rice and wheat, developing countries appear to be on the way to catching up to the industrial countries in yields. The exception to this encouraging performance by the developing countries has been in Africa. This is a very favorable indication of the future productive potential of developing countries; especially when the differences between yields in industrial countries and developing countries are considered. Even if developing countries never achieve yields of the same magnitude as industrial countries, merely approaching current yields in industrial countries would represent a substantial improvement and would have a significant effect on production. Since achieving yields similar to those now common in industrial countries involves adopting well-developed technologies, the technical challenge is not difficult. The main difficulty is an organizational one at the government level that involves providing correct incentives and removing obstacles to production increases.

A value greater than 1.0 indicates a subsidy on production and a value less than 1.0 indicates a tax. These estimates have been made at different points of time and now may well be out of date; moreover, the estimates do vary widely from year to year within a country.

V. Other Factors

It is likely that within many developing countries, growth in food consumption has been negatively affected by distorted prices and income distribution which is biased against the rural poor. In Table 2 we present nominal protection coefficients (NPC) for 19 developing countries, calculated in most cases for the most important grain grown in each country. Bearing in mind the qualifications attached to these estimates, it is obvious that food production faces severe implicit or explicit taxes in many developing countries. It is our opinion that this factor has been one of the most important disincentive to the adoption of improved agricultural production performance in Africa, the region.

### Table 2—Nominal Protection Coefficients Calculated for Grains Production in Developing Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Grain</th>
<th>NPC Estimate&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egypt</td>
<td>Maize</td>
<td>0.67</td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>Rice</td>
<td>0.97</td>
</tr>
<tr>
<td>Kenya</td>
<td>Maize</td>
<td>0.91</td>
</tr>
<tr>
<td>Senegal</td>
<td>Rice</td>
<td>0.70</td>
</tr>
<tr>
<td>Sudan</td>
<td>Sorghum</td>
<td>0.50</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Maize</td>
<td>0.13</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Wheat</td>
<td>0.99</td>
</tr>
<tr>
<td>Zambia</td>
<td>Maize</td>
<td>0.62</td>
</tr>
<tr>
<td>Asia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>Rice</td>
<td>0.65</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Wheat</td>
<td>0.76</td>
</tr>
<tr>
<td>Philippines</td>
<td>Rice</td>
<td>0.73</td>
</tr>
<tr>
<td>Thailand</td>
<td>Rice</td>
<td>0.58</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>Wheat</td>
<td>0.94</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>Wheat</td>
<td>0.38</td>
</tr>
<tr>
<td>Latin America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>Wheat</td>
<td>0.64</td>
</tr>
<tr>
<td>Brazil</td>
<td>Rice</td>
<td>0.57</td>
</tr>
<tr>
<td>Colombia</td>
<td>Rice</td>
<td>0.92</td>
</tr>
<tr>
<td>Mexico</td>
<td>Wheat</td>
<td>0.89</td>
</tr>
<tr>
<td>Uruguay</td>
<td>Wheat</td>
<td>1.25</td>
</tr>
</tbody>
</table>

<sup>a</sup>A value greater than 1.0 indicates a subsidy on production and a value less than 1.0 indicates a tax. The estimates have been made at different points of time and now may well be out of date; moreover, the estimates do vary widely from year to year within a country.

<sup>3</sup>However, the FAO estimated that there was still considerable potential for area expansion in developing countries.
of most persistent concern about human nutrition.

The creation of a "world food system" that has occurred since World War II has greatly alleviated the possibility of widespread food shortages. Currently, virtually the entire population of the world has access to the world food markets. Vastly improved communications, lower transportation costs, the construction of storage facilities, and the development of infrastructure have all contributed to the creation of this food complex. Food merchants receive worldwide market reports on a daily and sometimes hourly basis such that arbitrage largely equalizes the price of food commodities across the world (net of transportation costs, government intervention activities, quality differences, and the like). Because of these developments it is now possible to eliminate food shortages caused by natural events.\(^4\)

Finally, it is well known that projections of economic behavior are notoriously unreliable (or are notoriously misinterpreted). All we know about the future is what we have observed in the past. We know that the future will be similar to the past because in the past the future has been similar to the past. Given this dictum, we interpret the information we have assembled in our earlier paper of over thirty years of declining agricultural prices and over thirty years of increasing crop yields (now increasing at an increasing rate in developing countries) as prima facie evidence of the robustness of the world food system, and of the likely continuation of such trends. We feel that it is incumbent on those who view the global food situation in a pessimistic way to provide a strong case of why trends that have been in existence for at least thirty-five years will be suddenly reversed. While we are cautiously optimistic about the continued improvement of food consumption and food output throughout the world, there is no room for complacency. As Johnson has observed, "if circumstances are to improve it is because efforts are made to make the improvement occur and at least some of the hindrances that exist, such as trade restrictions, low farm prices due to government constraints, and inadequate provision of farm inputs, are ameliorated" (p. 8).

REFERENCES

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\(^4\)D. Gale Johnson observed this development to one of the authors.

\[^{\text{4}}\]D. Gale Johnson observed this development to one of the authors.
World Agricultural Trade and Food Security: Emerging Patterns and Policy Directions

Malcolm D. Bale and V. Roy Southworth

1. Introduction

World food production is determined, among other things, by prices, weather, the quality of land, human and technological resources, and government policies. Food consumption depends on per capita incomes, prices, population levels, tastes, and other factors. Trade in food products links the production and consumption systems of regions and countries to each other to provide a “market clearing” of global production and consumption, ensuring that the populations of numerous food deficit regions or countries have access to food supplies. Alternatively, the market clearing function may be viewed, as it is in the United States, as ensuring that farmers from countries with agricultural surpluses have access to markets for their produce.

Hence, international agricultural trade and food security is a matter of considerable concern to a large share of the world’s population and certainly

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V. Roy Southworth was appointed in 1979 to a position in the Agricultural and Rural Development Department of the World Bank. In July, 1982 he was appointed Assistant to the President of the World Bank. Dr. Southworth received his Bachelor’s degree from Washington State University in 1971 (economics), and spent three years in the Peace Corps in Ethiopia before joining the Food Research Institute at Stanford, where he earned his Master’s and Ph.D. in agricultural economics. Dr. Southworth has published several articles in, among other publications, The Food Research Institute Bulletin.
a topic worthy of discussion by an audience such as this. It is especially worthy of closer scrutiny because of the confusing and contradictory array of speakers on the subject ranging from prophets of doom to advocates of abundance.

Based on circumstances of the early 1970s when food shortages reached crisis proportions in the world's poorer countries, there are predictions that global food supplies will worsen. The indicators used to support this position are that farm product prices have been irregular while farm input prices have been increasing, that the weather in the last few years has been better than average and thus better than we can expect in the future, that gasohol production is going to reduce supplies available for conventional consumption of both corn and sugar, that farmland is, as Will Rogers noted, "not being made anymore" and is in fact being lost to urbanization, and that increased yield from agricultural technology has run its course and is likely to approach zero since research and development expenditures in industrial countries have been severely reduced. These arguments have been enunciated by Brown, Mellor, and Tanco, among others.

Those who believe that global production will expand to meet global consumption cite factors such as advances in genetic engineering, increased adoption of modern inputs such as irrigation, fertilizer, and plant protection in developing countries, efforts to minimize food losses between harvest and consumption, and the establishment of international agricultural research centers where research findings are applied and extended to developing countries (Paarlberg, Schultz, Wittwer). Thus the issues of agricultural trade and food security are closely intertwined and have been the focus of considerable attention in recent years.

Where does the truth lie? We tend to align ourselves in a cautious and qualified way with the optimists, and while we will not directly address all of the arguments outlined above we will by implication cover them. This paper is organized into three parts. First we will summarize world food trade, and trends that have recently emerged. Second, we will discuss the issue of world food security and the costs and benefits of global food security scheme. Finally, we will examine specific countries' policies toward agriculture and toward food trade to demonstrate how government intervention can either contribute to or inhibit agricultural trade and food security.

2. Patterns and Trends in Agricultural Trade

In order to understand the interrelationships between various groups of countries in food trade we first analyze a matrix of trade flows that includes all bilateral flows between eight major regions of the world. For simplicity we reproduce in Table 1 the share of value of exports and imports to and from each region for two years, 1968 and 1975. Our discussion refers to this table.

Are developing countries becoming more dependent on food trade within their own group and are they becoming less dependent on the markets of
industrial countries? During the period of 1965 to 1978, trade among developing countries increased from 18% to 21% of total developing countries' food exports. Although the experience has been varied among developing country regions, they are clearly trading more with each other. The developing countries' food exports to the industrial countries dropped from 73% to 66%; but, despite the decline, industrial countries remain the prime market for developing nations. This is because the major food exports from developing countries are beverages (coffee, tea, cocoa) which are not produced in industrial countries.

One predictable trend is that all regions have increased the share of their food exports to oil-exporting countries because of the increased purchasing power of these countries. Overall, in terms of their share in total world food trade, the oil exporting developing countries increased their absorption by about 60 percent from 1965 to 1978 and the capital surplus oil exporters by more than 250 percent.

Have the developing countries become more dependent on food imports from the industrial nations? Interestingly, the picture is varied. On average, the share of food exports from industrial to developing countries remained virtually constant over time (at 23%) but different groups have performed differently. In 1965, the low-income oil importers were clearly the most dependent. In that year, 72% of food imports by this group of countries originated from industrial countries. This declined to 61% by 1978, in part because India became much more self-sufficient in food. During the same time the middle-income oil importers' dependence increased from 53% to 62% and that of the oil exporters from 63% to 66%—largely an income effect.

But is it not true that developing countries are dangerously dependent on the North American granary? Cereals are, as expected, the most important commodity group in the imports of developing countries, but they are not of such overwhelming importance as is generally thought. Imports of the major cereals (wheat, rice and maize) amounted to 38% of total food imports in 1965 and declined to 30% by 1978. The origin of cereal imports of developing countries has remained almost constant over time. Cereal imports originating from other developing nations have remained at approximately 23% while cereal imports from industrial countries have remained at 73%.

It is the centrally planned economies that have become increasingly dependent on food exports from industrial countries. This is particularly true for cereals, where they have become major importers and where they have, by erratic purchases, affected international grain prices, both in terms of levels and stability. They now account for a 21% share of world cereal imports compared to 23% for developing countries.

Even so, how is it that developing countries with their satisfactory land base, abundant labor, and lack of industry are food importers? It is commonly thought that developing countries are net food importers, but in fact this is not the case. Their trade balance is only negative in cereals ($3 billion in
1978) whereas the balances for beverages (coffee, cocoa, tea), fruits and vegetables, sugar and oils are positive. Altogether, the food trade balance in 1978 was in surplus by US $3 billion for the low-income oil importers and by $19 billion for the middle-income oil importers. Hence, food trade helped them to finance deficits in trade of fuels and manufactured items.

Is the question of price instability a problem for global agricultural trade? Because most food is consumed in the country where it is produced and only the residual is traded, trade in any one year can fluctuate quite widely and accordingly international prices display a wide degree of variability. As a share of world production only 19% of wheat, 3% of rice, 19% of maize, and 25% of sugar is traded. Prices for these commodities change annually on average by 10% (wheat), 17% (rice), 10% (maize), and 37% (sugar). This is of considerable concern to planners in many developing countries where foreign exchange reserves or receipts for these commodities constitute a large item in their external accounts. But there is little evidence that the level of food output is affected by fluctuating prices.

How will world food trade develop? Several broad trends which have strong policy implications are becoming apparent. Many developing countries which were formerly large food (cereal) importers are approaching self-sufficiency in cereals or are becoming minor exporters. This tendency will strengthen over the coming decade. Countries that fall into this category are India, Philippines, Bangladesh, Indonesia, Korea, Sri Lanka, and Pakistan. At the same time some formerly minor importers in the developing world will become much more significant consumers. Many African countries and several Middle Eastern countries, especially members of OPEC, fall into this category. Likewise, there is little reason to expect the Centrally Planned Economies of Europe (including USSR) to rectify their mediocre performance in food production. Indeed their share of world imports of food products, particularly cereals and sugar, is seen as increasing over the decade from 25% to 37%, and will be limited in the short run only by their ability to obtain credit from Western nations. The implication of these facts is that trade in agricultural products will be occurring between fewer participants. A further implication arises from the fact that numerous countries are approaching self-sufficiency and will be importers in some years and self-sufficient or minor exporters in other years. Unless key countries such as the United States are willing to hold adequate levels of stocks or unless greater use is made of futures markets and forward contracts, trade and prices may exhibit greater instability in future years.

The good news within the food group is that the global demand for coarse grains for use as livestock and poultry feed is increasing. The so-called “Newly Industrializing Countries” (NICs) of the developing world include Taiwan, Singapore, Korea, Yugoslavia, Brazil and Venezuela, and certain OPEC countries such as Iraq, Saudi Arabia and Syria. These nations are consuming increasing quantities of red and white meat as their incomes rise. This is also
true of Eastern Europe. In response to this increase in demand, domestic livestock and poultry industries based on imported feed are being established. This development is still in its infancy. Therefore, the growth of exports of coarse grains to these markets may be expected to increase at a rate of 8% to 10% per year over the decade. The beneficiaries of this development will be those suppliers of feedstuffs whose output can respond to increased demand for their product, namely, the United States, Argentina, Brazil, Australia, and Canada.

3. Global Food Security

Food security is the assurance of reliable supplies of adequate nutrition at acceptable prices to a country’s population. It is a vexing and politically sensitive issue in many developing countries such that maintaining sufficient supplies of affordable food in burgeoning urban areas has become a priority policy concern. Vocal and politically powerful urban groups—civil servants, industrial workers, and the military—are extremely sensitive to disruptions in food supply and fluctuating prices. But the most pervasive food security problem lies in rural areas where most of the world’s poor live. The problem stems not so much from supply shortages but from a lack of purchasing power (sometimes an income distribution problem) and an inadequate food distribution capacity.

Are we losing the race for global food security? Despite claims to the contrary, increases in food production have not been outstripped by population growth. Global food production has increased consistently at a rate faster than population growth for over fifty years. Between 1950 and 1980, world food production doubled and the increase in developing countries actually exceeded that in industrial countries. In the 1970s, the total cereal output rose by almost 3 percent per year, up from 2.6 percent in the 1960s.

On the demand side, the rate of population growth has slowed somewhat, down to 1.8% in the 1970s from 2.4% a decade earlier. But the rate of population growth in industrial countries has been more than twice the rate in developed countries over the past 30 years. Consequently, per capita food production in the industrial countries has increased nearly three times faster than in developing countries.

More profound changes in the level and structure of demand have resulted from the steady, if somewhat uneven, growth in incomes in developing countries. The most dramatic changes have occurred in the demand for highly valued agricultural products such as fruits, vegetables and livestock products, especially in the middle-income developing countries. As a result the amount of grain fed to livestock increased more than 10 percent a year in the 1970s and the total amount of grain used in livestock production currently exceeds 600 million metric tons each year—almost half total world production. Much of this growing demand in the middle income countries has been met through increased trade. Between 1950 and 1980, the trade in grains increased four-fold.
What are the prospects for future food security? Many point to the so-called "global food crisis" of 1972-1974 as evidence of the beginning of an adverse long-run trend that raises the specter of a world unable to feed itself. But it is now obvious that the 1972-74 period was more the result of an unfortunate coincidence of several events. In particular, beginning in the 1970s, the United States changed its stockholding policy and began drawing down government reserves. The decision to reduce stocks was a political decision not related to market considerations. Then in 1971 came unprecedented droughts, and resulting crop failures, in three major regions the USSR, India, and the Sahel. When these countries began massive purchases, the "crisis" precipitated. In fact no breakdown of world markets ever occurred. No country which indicated it needed grain for immediate distribution was unable to get it. The US decision to embargo soybean shipments to Japan in 1973 in order to control domestic inflation stimulated considerable official panic. Many countries purchased supplies that they were unable to receive or distribute due to a lack of infrastructure. Nevertheless, demand adjustments and related supply effects were rapid and the market soon straightened out. One particularly effective adjustment was in the livestock sector. As prices rose, grains were diverted from livestock production to human consumption. In brief, the period 1972-1974 saw a return to the market as the basic determinant of world grain prices. Government-induced surpluses in North America were replaced by a market-oriented policy. The adjustment was in government policy and not in any underlying long-run trends in supply.

The return to market forces has been accompanied by greater risks for those who trade in grain. But, the trade has structurally evolved to handle much of the increased risk. Most important has been the return to the use of futures markets as a means of hedging inventory risks. Futures trading in cereals has increased almost twenty-fold since 1970. Furthermore, the market actions of centrally planned economies have become less erratic than in the early 1970s. Bilateral US-USSR grain agreements have provided needed market information on Soviet intentions: as have the USSR-Argentina grain and meat agreements. And, because these countries have become major importers, they realize the advantages of acting in ways that minimize market impact. Similarly, China has become an important buyer and also is committed to a long-term and more stable import policy.

The proof of the new system’s reliability is in recent events. The 1981 crop year showed some similarities to the situation described above. By late 1980 many international authorities were predicting a re-run of the 1973 crisis. Grain stocks, as a percentage of total consumption, had fallen to their 1973 level. Prices were rising. The United States had recently embargoed grain exports to the USSR which had a dramatic effect on the US futures markets. The USSR had its third poor harvest in a row for the first time in over a century, and poor crops were reported in India and parts of Africa. But the markets were able to weather the problems and prices actually fell as the
The 1981 harvest approached. Even the Polish crackdown failed to unnerve the trade. The Chicago market has become the true world price marker with supply/demand throughout the world reflected in the Chicago Board of Trade fixings. Liquidity has increased five times faster than actual exports, which makes the markets better able to absorb shocks. The Soviet problems were anticipated and offset by good North American harvests, an appreciating dollar, lower feed demand in the United States and Western Europe, and higher interest rates. But these should not cloud the basic point—the new global food trading system worked well under conditions similar to those of the 1973 crisis.

How can we refute the arguments of those who see future demand outstripping the world’s ability to produce food? Arguments often used to support the food “scarcity syndrome” include a land base stretched to its limits and subject to increasing deterioration, urban encroachment, inadequate development of new technology, changing weather patterns, and rising energy costs. But, on closer examination, the facts do not lend conclusive support to the doomsday scenarios currently in vogue.

First, there is no evidence that the world has reached the environmental limits of its agricultural base. In fact, the land still available for cultivation is impressive. In the US, 127 million acres of land currently not utilized could be converted to cropland if prices were attractive (US Government). This represents a potential 30 percent increase in US cropland. True, this land would not be as productive as that currently under cultivation but still it is capable of producing 200 million tons of grain a year. Similar potential exists in Argentina, Australia, Brazil, Canada and elsewhere. In contrast the amount of arable land lost to urbanization is relatively small. The commonly used figure of 3 million acres lost annually in the US includes forests, mountains, desert, and rangeland. Cropland losses are no more than 675,000 acres annually, one-fifth of one percent of US cropland, hardly a threat to US agricultural potential. Further, most cropland is not very intensively cultivated, even in the developing world. This is particularly true in Africa but also in Asia. Even Bangladesh, with a superior climate, currently achieves less than half the cropping intensity of Taiwan.

Second, fears concerning the development of new technology are unfounded. Productivity in the US has increased somewhat unevenly throughout the past century. In the period 1965-79, it increased at an average annual rate of 1.8% per year and continues to grow while productivity in many other sectors declines (Paarlberg). While future innovations might not be as spectacular as hybrid maize or short strawed wheat, a general increase in the potential of main food crops is virtually certain. New technologies might include gene-splicing, textured soy protein, nitrogen fixation for non-leguminous plants, weather modification, salt tolerant crops, hydroponics, or a variety of new techniques that are beyond our conception at this time. Furthermore, significant amounts of currently available technology remain to be
applied, especially in developing countries. For example, high yielding varieties of wheat and rice are currently used on less than 24 percent of the land for which they are suited. There is also considerable potential for expanding irrigation and fertilizer use. At present, farmers in developing countries use only one-tenth of the fertilizer on a per hectare basis that is applied in industrial countries. While US federal expenditures on agricultural research have been stagnant for 15 years, other research has filled the gap. Expanded research efforts have been undertaken by the private sector, other countries and the international research network. Annual expenditures for global agricultural research have increased over five-fold since 1951, and three-fold since the early 1960s (Wittwer).

Third, despite prognostications to the contrary, no one knows what the weather will be like in the years ahead. Some scientists argue that the carbon dioxide build-up due to the continued burning of fossil fuels has created a greenhouse effect that will gradually warm up the earth. Others muster equally convincing arguments that the carbon dioxide build-up will cause a cooling trend. In either case the effects on agriculture are by no means certain.

In general, the prospects for future global food security seem no worse than in the past and possibly better since we now have a better understanding of the factors limiting food production. The increase in food production required to meet projected population growth is no more than 2 percent per year. This is considerably less than what has been achieved consistently over the past half century. Of course, more growth will be required to meet the increased demand related to income and the desire to reduce malnutrition. But this is well within the physical potential of global agriculture, if there exists an appropriate government environment for agriculture. Increased food security will require considerable investments in physical infrastructure and research and, in many developing countries, a radical reorientation in government policy toward agriculture.

How do food security issues affect developing countries? The food security concerns of developing countries fall into two categories. In the middle-income developing countries, the primary concern is that of maintaining adequate supplies of food for growing urban populations. Similar concerns occupy planners in low-income developing countries, but they must also cope with the more pervasive problem of rural food security. Rural food insecurity has both chronic and acute dimensions. Acute problems arise in the context of occasional, but devastating disruptions in rural food supplies resulting from crop failures, natural disasters or (more often) the actions of man. Chronic food insecurity manifests itself in persistent malnutrition and is part of the larger problem of rural poverty and rural development. Uneven distribution of productive resources, and low productivity agriculture due to inappropriate incentive structures are the root causes of these problems.

Increased and more reliable domestic food production provides the best solution for rural poverty and malnutrition. Increases in domestic production
require strategies that focus on augmenting the productivity of small farmers who constitute the majority of the rural poor. In addition to further extension efforts, the development of new farming techniques for fragile areas, and the development of infrastructure, it is government policy itself, which provides incentives to agriculture, that is most important. While development assistance has a crucial role to play by providing technical assistance for extension, research and infrastructure, the most important actions are those of the developing countries themselves. Policy-makers in any country are greatly influenced by the politically powerful. In the developing world, large landowners, the military and urban dwellers hold the power. Their interests often do not coincide with the interests of the small rural producer. Cheap food for the military or civil service often results in low and non-remunerative prices for farmers. Ways must be found to provide for the legitimate food needs of consumers, particularly poor consumers, while still providing farmers with prices that encourage production.

In addition to efforts to increase domestic production, trade-oriented strategies can help to improve food security, particularly with respect to meeting urban requirements and handling acute food emergencies. But, because of a deep-seated mistrust of international markets and as a consequence of their varied experience in the grain markets over the past decade, developing countries have grave concerns about excessive dependence on external food supplies. In the place of trade, many have proposed enormous publicly-controlled buffer stocks to meet food security requirements. Analysis has shown that public sector buffer stocks are extremely expensive, especially in the tropics. The costs, including depreciation on plant, interest on capital tied up in the inventory, physical losses and handling expenses, range from about $80 per ton per year in parts of South Asia to over $150 per ton per year in landlocked African countries. This compares to a yearly storage fee of about $10 per ton per year offered to contracting buyers by the Canadian Wheat Board. Also, because grain is perishable, it must be recycled. In countries where food aid is used to fill the reserves (as in Bangladesh or the Sahelian countries) open market sales to turn the stock over can disrupt local markets. In extreme cases stocks would either have to be discarded or re-exported at a cost that would probably exceed the value of the grain. These factors mean that it costs roughly $500 to use a ton of grain originating from a buffer stock (based on African and South Asian experience).

Imports are clearly less expensive even under the most extreme market conditions. But many developing country officials remain to be convinced that trade-oriented strategies offer a reliable and economical means to ensure food security. Their concerns are based on three specific fears: they will not receive adequate and timely supplies from world markets; they will be priced out of the market; and food will be used as a political weapon.

Even though it is easy to see why these concerns are important, there is reason to believe that they are greatly overstated. First there is little risk
that any particular country would not be able to obtain adequate supplies from world markets. While production shortfalls in North America would tighten markets considerably, the adjustment mechanism is robust. In addition to the conventional grain stocks held in producing countries, the 600 million tons of grain fed annually to livestock in the US provides an immense buffer stock. Grains are diverted from livestock production to human consumption when supplies become tight and prices rise.

Second, there is no evidence that food imports cripple developing countries financially. On average, food grain import bills account for approximately four percent of the export earnings of developing countries. For the poorest countries the burden is higher, but even they can pay for their purchases with less than 10 percent of their exports. Note that at the height of the 1972-1974 “crisis” grain purchases accounted for less than 15 percent of the poorest nations’ earnings. Basic food imports have steadily declined as a proportion of GNP in nearly every developing country. Furthermore, the possibility of adjusting the import mix should not be overstated. A recent World Bank review indicated that the poorest African nations spend more for military equipment than for basic food imports (World Bank, 1981b).

Third, the risk of running out of needed foreign exchange can be managed through various market devices such as holding foreign exchange reserves, anticipatory hedging or holding option contracts for grains. There is also the International Monetary Fund’s compensatory financing facility which provides financing to meet a balance of payment gap caused by higher-than-normal food bills.

Finally, emergency sources of food aid are ensured by the new food aid convention of the International Wheat Agreement. The parties include fifty-two importing and exporting countries including all the major ones except the Peoples Republic of China. The agreement guarantees a minimum 7.6 million metric tons and actual contributions are running at about 9.5 million metric tons. These amounts actually exceed the total yearly imports of low income countries.

4. Agricultural Policy and Its Impact on Trade

Agricultural policies in both industrial nations and developing countries have evolved in response to changing conditions in the agricultural sector both in domestic economies and in the international environment. Oft-stated objectives of agricultural policies are: to insure equitable incomes for farmers; to maintain a certain degree of self-sufficiency in order to minimize the risk of embargos or other interruptions of imports; to maintain the “family farm” structure; to protect the environment; to maintain a certain balance between rural and urban population; to raise government revenues; and to stabilize or reduce food prices in urban areas. Some of the policies, particularly those which are protectionist in nature, are developed in response to foreign competition, while others are implemented with primarily domestic goals in mind while still having implications for foreign trade.
Ideally, policies should be designed that will lead to the use of agricultural resources such that the costs of providing food and fiber are minimized. But agricultural policies in industrial countries frequently support farm prices and restrict imports thereby driving a wedge between domestic and world prices. These policies result in underconsumption and overproduction of agricultural goods. In developing countries agricultural policies often undervalue agricultural output by imposing export taxes, price controls and mandatory storage requirements. These actions result in overconsumption and underproduction of agricultural output. Often the budget costs and the costs to domestic consumers of such policies are disguised and usually they are not even estimated. Certainly they are never clearly laid out. As a result, society is denied the option of making a “yes or no” choice on the issue.

Could it be that these national policies produce a world situation where food is in surplus in industrial countries and food shortages exist in many developing countries? There is considerable evidence to support this view (Bale and Lutz, Peterson, Schultz). In this section the agricultural policies of a few countries are explained in terms of their effects on national and international welfare.

Perhaps the most glaring example of a system of conflicting policies is the Common Agricultural Policy (CAP) of the European Community (EC). The CAP is an elaborate mechanism which supports EC domestic prices well above world levels by a complex system of tariffs and variable levies. The politically determined internal price is maintained for each agricultural product by imposing variable levies on imports of an amount equal to the difference between the “threshold price” and the world price. By this mechanism, price competition by foreign suppliers is prevented. As a result EC consumers pay five times the world price for milk powder, four times the world price for butter, two and one-half times the world price for beef and one and one-half the world price for grains.11

Further, the CAP causes a massive redistribution of income from consumers to agricultural producers within the EC. The budgetary transfers appropriated on behalf of EC agricultural producers give an estimate of the extent of income redistribution within the Community. As is always the case with such redistributions, large social (welfare) losses arise because of the resource misallocation involved. Estimates of the welfare loss to consumers (the internal transfer of income from consumers to producers) that results from market intervention under the CAP for the major commodities in the EC amounted to $11 billion in 1976 (Bale and Lutz).

The variable levies are the “Maginot Line” for agriculture in the European Community since it is not possible for would-be exporters to lower prices in order to get under the variable levy. Foreign competition is stopped at the border. But since domestic production is not limited to the amounts that EC consumers will buy at the administered prices, surpluses arise. The most obvious example of this is in the case of sugar, a commodity produced at
least cost in the tropics, where the EC has emerged as the world’s leading exporter (after Cuba).

Yet like the Maginot Line, the CAP is often breached or bypassed. The Community reflex in such cases, in accordance with an established tradition aimed at inhibiting short-term changes without addressing longer term structural adjustment, has been to plug the breach. Piece-meal policy shores up the agricultural Maginot Line.\textsuperscript{12} Still, such policy is not tenable: when one breach has been plugged another opens up due to the excessive difference between world and Community prices. Thus, for example, the protection given to EC grain producers has given rise to imports of non-regulated substitute products—cassava pellets, citrus pulp, and corn gluten.

Apparently permanent monuments to the wastefulness of the CAP are the “mountains” of surplus produce that arise when farm prices are supported without production controls. The surpluses of wheat, barley, sugar and dairy products must be heavily subsidized in most years in order to dispose of them on world markets. Alternatively, their domestic (EC) use in inferior end-uses is subsidized. A dramatically convoluted example is the subsidized use of surplus dried milk in animal feeds, part of which is fed to the Community dairy herd to produce more surplus dried milk!

In addition to the internal effects of the fiscal costs and the erratic nature of this policy, are the equally undesirable external implications. The CAP exports price instability to the rest of the world and its surplus food disposal mechanism distorts international markets and production patterns. The argument that the resulting surpluses are beneficially used for food aid, frequently raised in order to defend the present CAP, appears to be particularly fallacious since those asserting the claim implicitly assume a food dependence by the third world in the long term. They do not consider the effect of lower prices on third world countries’ production, and ignore the global destabilizing effects of widely fluctuating prices that arise when the EC intermittently dumps its surpluses. Agricultural exporting countries can suffer in several ways, losing markets within the EC due to the expansion of production in the EC or by the expansion of membership in the EC and losing markets in third countries as EC production and exports expand under the encouragement of CAP. In this respect the CAP violates Article 110 of the EC treaty which deals with the harmonious development of world trade.

It is tempting to argue that the CAP is the adolescent offspring of a mixed multiple marriage, and that political exigencies prevent its rehabilitation. This has clearly been the attitude within the halls of EC decision-making in the past. However, the financial cost of CAP is forcing the Community to re-examine this position. They may well conclude, as have numerous European scholars, that the CAP no longer serves the interests of European agriculture. In the final analysis, rather than being a unifying institution within the EC, the CAP in its present form threatens the political equilibrium of the Community.
Another country that receives considerable publicity over its import policies is Japan. Because of its vulnerability to commodity price changes and its fear of trade interdictions, achieving certain levels of self-sufficiency has been a basic tenet of Japanese agricultural policy. Japan's agricultural output is maintained at its high level by a series of product price supports, input subsidies, and controlled foreign trade such that the domestic prices of certain food items in Japan are double or in some cases treble those prevailing in world markets.

The Japanese government is pervasively involved in planning and regulating the agricultural sector. Beef production is protected by an annual import quota and a 25% ad valorem tariff. Pork prices are stabilized by government purchases and sales of stocks and by a variable duty on imports. Poultry, eggs, and dairy product imports have a 20-35% tariff imposed on them. An agency of the Ministry of Agriculture, Forestry and Fisheries is the sole buyer and seller of domestic and imported food grains, and it sets both farm purchase prices and resale prices that differ markedly from world levels.

Wheat and rice prices are interesting examples. Wheat consumption has increased dramatically in Japan since World War II, as a result of the trend toward a bread-based Western diet, from 41 kg per capita in 1955/1956 to 50 kg in 1975/1976. The government purchases wheat from domestic producers at approximately twice the price that it pays for imported wheat. The resale price of domestic and imported wheat (to millers) has typically been 50% above the world price, resulting in revenue for the Japanese treasury.

Support prices paid by the government to farmers (for rice, the traditional staple in Japan and the mainstay of Japanese agriculture) are equivalent to approximately twice the level of world prices. To maintain consumption, which has declined on a per capita basis over the last two decades, a subsidy is paid to consumers, but even so the domestic price is above the price at which imported rice could be sold. The effects of these market distortions produce a net social loss in rice production and consumption, as well as overproduction and underconsumption of rice. As a result of the administered prices, rice production in Japan exceeds consumption, forcing the government to dispose of surplus rice by stockpiling, diverting to livestock feed, or exporting it at subsidized rates to rice-importing countries. Approximately one-half of one million tons of rice have been dumped by Japan in each of the last two years. While this may seem to be a small quantity, it is significant for a product for which world demand is inelastic and total free-world trade amounts to less than 8 million tons. In addition, it has caused political friction between Japan and commercial rice-exporting countries, particularly the United States.

Estimates of the net social loss to Japan in 1976 of its pricing policies on wheat, barley, sugar, beef and rice amount to over $3 billion. Production, because it is overvalued, is well in excess of what it would be at world prices.
Rice output, for example, would drop dramatically (by approximately 80%) if free trade were allowed. Likewise, world price levels would stimulate consumption (by approximately 6% for rice and 31% for beef).

Lest it be thought that the United States is without fault in terms of its agricultural policies and their effect on international trade, we note in passing that parts of the US farm sector receive a substantial degree of protection. This topic is covered by another speaker in the case of beef and dairy products, but sugar and tobacco are two other products, important as cash export crops to the developing world, where the US protects its producers and sometimes subsidizes exports.

How do the policies of developing countries compare with those of industrial countries? As we have suggested earlier they are equally damaging because they encourage underproduction by undervaluing agricultural output. For examples of developing countries, we will examine the policies in Thailand, Egypt, Argentina and Pakistan. Price controls on domestic sales, export taxes, selective distribution systems, and mandatory set-aside of a proportion of exports in government storage are commonly used policies in these and other developing countries. An export tax is often used as this is one of the easiest means to obtain tax revenue. Price controls are thought to decrease price instability. But the real reason for price controls appears to be to keep food prices low for urban consumers (the most politically powerful group). As a result of these policies food is typically undervalued in developing countries with the net result that there is underproduction of food.

Some examples of the extent of the undervaluation of food and its effect on agricultural output follow. In Argentina farmers receive one-half of the world price for their wheat and maize, and one-third less than the world price for their beef. In Egypt farmers receive one-half of the world price for wheat and maize, and one-third of the world price for rice and cotton. Pakistan and Thailand are not quite so extreme. Wheat is priced 20% below the world price and rice is priced 40% below the world price in Pakistan, while in Thailand rice is priced 30% below the world price and maize is priced about equal to the world price.

Because of these pricing policies, wheat and maize output in Argentina is estimated to be 2.3 and 1.3 million tons, respectively, below that which would be attained at world prices. In Egypt, production of wheat is decreased by 255,000 tons per year and rice by over one million tons per year, while in Pakistan wheat and rice production are reduced by almost one-half of one million tons each. Rice, a major export of Thailand, is underproduced by 370,000 tons/year (Bale and Lutz, p.13-16). Since these countries either export cereals (Thailand, Pakistan, Argentina) or import them (Egypt), it is clear that their domestic policies influence the magnitude and direction of agricultural trade flows.

The picture is reversed with respect to consumption. Developing countries consume more than they would in the absence of price intervention. Thus
the policies clearly have a beneficial effect in terms of providing more food for the non-agricultural population of the country. However, it is important to understand that this is achieved at the expense of the agricultural sector. It is also important to realize that the “truly needy” poor of developing countries are the rural poor or the former rural poor who have drifted into urban centers because of lack of rural employment opportunities. Rural poverty and migration of rural people to the urban areas results, in part, because the prices of farm products are artificially low. If prices were to be deregulated a strong case can be made that each country’s welfare would improve through improved income distribution, and certainly agricultural output would increase. By insisting on subsidizing food for the urban population, many developing countries are opting for continuing impoverishment.

Conclusions

What emerges from this discussion is the vital role that agricultural prices play in achieving optimum output, growth, trade and food security. When governments intervene in the legitimate functioning of markets, even when their actions are well-intentioned, the ultimate outcome is to reduce national and global welfare since they seldom foresee all the ramifications of their actions.

As citizens of a democracy we are responsible for becoming informed on issues of national and international importance, and on doing our part to influence the course of events such that the world is a better place to live. Agriculture, policies toward agriculture, agricultural trade and food security are good candidates for such action.

Footnotes

1Although we use the terms agriculture and agricultural trade, we are restricting our remarks to food commodities.

2The countries in each region are identified in Appendix I. Food includes all cereals, fruit and vegetables, sugar, beverages, oils, meat, poultry, and dairy products. Table and part of this section draw on Lutz and Kharas.

3Calculated in constant 1977 dollars using annual price data from 1955 to 1978, and averaging the annual percentage change, ignoring negative signs.

4For a useful description of current trade and future prospects of agricultural products to East Asia, particularly with respect to the US, see U.S. Department of Agriculture, Foreign Agriculture: Asia-America: The Agricultural Connection; FAS, USDA, Dec. 1981.


6Population statistics are compiled by the Population and Human Resources Division of the World Bank and are in line with estimates given by the United Nations.


8In 1981 man-made disasters accounted for 75% of the emergency food aid channelled through the UN/FAO World Food Program. It went to Afghan refugees in Pakistan, Kampuchean refugees in Thailand, and displaced persons from the Somalia-Eritrea disturbances.

9Costs of buffer stocks are drawn from World Bank project files, audited accounts of the Food Corporation of India (Annual Reports), work prepared for the Club de Sahel (National and Regional Grain Stocks in the Sahel, FAO, 1980) and the reports of the Food Security Assistance Scheme of FAO.

10It is currently estimated that many countries pay a premium of up to 15 percent on international markets because of poor buying practices. Savings of up to $1 billion are possible if they could effectively utilize existing marketing arrangements.


12The EC is, of course, not the only country or bloc that develops policy in this manner. Indeed there are few countries that design policies to assist structural change in agriculture.

13In making this comparison farmgate prices are adjusted upward by transportation costs and marketing margins to “border price.” This allows direct comparison with the CIF world price.

APPENDIX 1
REGIONAL COUNTRY GROUPINGS

Low-Income Oil-Importing LDCs

Middle Income Oil-Importing LDCs
Botswana, Cameroon, Cape Verde, Equatorial Guinea, Ghana, Guinea Bissau, Ivory Coast, Liberia, Mauritania, Mauritius, Mozambique, Namibia, Sao Tome and Principe, Senegal, Seychelles, Sudan, Swaziland, Togo, Zambia, Zimbabwe, Djibouti, Reunion, S. Africa, American Samoa, Fiji, French Polynesia, Guam, Hong Kong, Kiribati, Republic of Korea, Macao, New Caledonia, New Hebrides, Pacific Islands, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Taiwan, Thailand, Tonga, Belize, Chile, Colombia, Costa Rica, Dominica, Dominican Rep. El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Paraguay, St.
Kitts-Nevis, St. Lucia, St. Vincent, Argentina, Bahamas, Barbados, Bermuda, Brazil, French Guiana, Guadeloupe, Martinique, Netherlands Antilles, Panama, Puerto Rico, Suriname, Uruguay, Virgin Islands, Jordan, Lebanon, Morocco, Yemen AR, Yemen PDR.

of which: Newly Industrializing Economies
Argentina, Brazil, Greece, Israel, Portugal, Spain, Yugoslavia, Hong Kong, Republic of Korea, Singapore, Taiwan (China).

All Oil-Importing LDCs
All countries in above two categories.

Oil-Exporting LDCs
Algeria, Angola, Bahrain, Bolivia, Brunei, Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Malaysia, Mexico, Nigeria, Oman, Peru, Syrian Arab Republic, Trinidad & Tobago, Tunisia, Venezuela.

All Developing Countries
All countries in the above two categories.

Capital-Surplus Oil-Exporting Countries
Iraq, Kuwait, Libya, Qatar, Saudi Arabia, United Arab Emirates.

Centrally Planned Economies
Albania, Bulgaria, China, Cuba, Czechoslovakia, German Democratic Republic, Hungary, Democratic Republic of Korea, Laos, Mongolia, Poland, Romania, USSR, Vietnam.

Industrial Countries
Australia, Austria, Belgium, Canada, Denmark, Finland, France, Federal Republic of Germany, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, United States.

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