Impacts of Agricultural Policy Reform on Low-Income Countries

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This article considers how global trade liberalization affects the food security of 67 low-income, food-deficit countries. In the baseline scenario, food gaps based on recent per capita availability levels are projected to reach 12.73 million tons. The first trade liberalization scenario isolates the impact of rising food prices and the second scenario examines the additional effect of an increase in foreign exchange. The overall results show a slight decline in food gaps of about 0.74 million tons. Regionally, Sub-Saharan Africa will gain the most because of its low food-import dependency and high share of agriculture in total exports.

Introduction

Despite improvements in global food availability over time, many developing countries remain vulnerable to food insecurity. Food security is defined as access by all people at all times to enough food for an active and healthy life. Three conditions must be fulfilled to ensure food security: food must be available, each person must have access to food, and the food must fulfill consumption requirements. Many factors affect a country's food security position, including the natural resource endowment of the country, the level and variability of food production, population growth, income distribution, and foreign exchange availability to import food. Performance of these factors, in turn, is affected by adoption of agricultural technology, environmental degradation, domestic policies, employment, barriers to trade, export earnings, import prices, political environment, and the state of the world economy.

This article highlights briefly how trade liberalization may affect food security of low-income developing countries. The global trade modeling results in Chapter 1 of this report are used as input to USDA's *Food Security Assessment* model to show how such outcomes affect baseline food supply projections for these countries (USDA, 1999). The projections of food gaps, which exclude food aid, show that the food gaps are reduced in varying degrees, depending on the trade liberalization scenario considered.

Background

The developing countries account for the majority of the world's population (about 80 to 90 percent, depending on definitions) as well as the majority of the world's countries. Characterizing these many different countries and economies is difficult. This article focuses on 67 developing countries monitored in the USDA's *Food Security Assessment* report.[1] These countries account for about 40 percent of the global population. Almost all are net food importers and historically have received food aid. Forty-eight of the 67 countries are considered "least developed countries" by the United Nations classification system. This analysis excludes all high middle-income food-exporting countries, such as Brazil, Argentina and Thailand.[2]

To help classify these developing countries by economic characteristics, macroeconomic, trade partner, and agricultural trade flow data were compiled in separate tables (for additional geographic discussions, see Box). Table 6-1 shows the macroeconomic structures of these countries compared to all countries. In 1996, per capita

[1] The countries are Afghanistan, Algeria, Angola, Armenia, Azerbaijan, Bangladesh, Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Colombia, Congo (Dem. Rep.), Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Ethiopia, Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Haiti, Honduras, India, Indonesia, Jamaica, Kenya, Korea (D.P.R.), Kyrgyzstan, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Morocco, Mozambique, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Somalia, Sri Lanka, Sudan, Swaziland, Tajikistan, Tanzania, Togo, Tunisia, Uganda, Vietnam, Zambia, and Zimbabwe.

[2] This analysis excludes the People's Republic of China.

Table 6-1—Macroeconomic indicators for 67 low-income countries compared to all countries, 1996

Region	Average GNP per cap.	Pop.	Agri.	Indus.	Serv.	Open-ness	Share of global FDI	Aid/ GNP
	U.S. dollars	*Mil.*	*Percent of GNP*			*Ratio*[1]	*Percent*	*Ratio*
67 low-income countries, by region								
North Africa	1,302	124	15.8	36.3	47.9	55.0	0.4	2.0
Sub-Saharan Africa	261	547	32.5	28.1	39.4	72.9	0.9	9.0
Asia	520	1,622	24.2	31.6	44.2	43.3	3.7	0.9
Latin America	1,768	127	12.7	30.8	56.5	43.5	2.3	1.7
NIS	495	27	30.5	25.8	43.8	78.5	0.2	8.9
All countries, by income[2]								
High income	26,527	893	2.0	34.4	63.6	41.4	63.4	0.0
Medium income	2,560	1,550	10.1	34.2	55.7	55.8	22.1	0.5
Low income	444	3,272	24.5	39.2	36.3	45.1	14.5	1.7

[1]Exports plus imports, divided by GNP.
[2]High income: > $10,000/cap.; medium: $700-$10,000/cap.; low income: < $700/cap.
Source: Author calculations, based on World Bank, *World Bank Indicators* 2000 CD-ROM database.

income ranged from $261 in Sub-Saharan Africa to $1,768 in Latin America. The largest population share is in Asia, which includes India and Indonesia. Sub-Saharan Africa and the New Independent States (NIS) of the former Soviet Union are the most dependent on foreign aid. Each geographic region has a low global share of foreign direct investment (FDI), ranging from 0.2 percent in NIS to 3.7 percent in Asia. All low-income countries account for only 14.5 percent of global investment, which is quite low considering China alone accounts for 12 percent. With the exception of the NIS countries, almost all of the countries are members of the World Trade Organization (WTO).

Most of these countries' trade goes to developed countries, often due to historical ties and geographic proximity (table 6-2). For example, the largest share of Latin American countries' trade is with the United States, while both North Africa and Sub-Saharan Africa trade mostly with the European Union (EU). The Asian countries have relatively equal trade shares with the United States, EU, and Japan. An exception is the NIS countries, which are still interdependent on trade with other NIS countries, in particular Russia.

Table 6-3 shows the different agricultural trade structures for these low-income countries. All regions are net food importers, although Sub-Saharan Africa, Asia, and Latin America are net agricultural exporters.[3] All regions are net importers of cereals, meats (except Asia), and dairy products, and all are net exporters of fruits and vegetables. Sub-Saharan Africa, Asia, and Latin America are net exporters of beverage crops (coffee, cocoa, tea, and spices).

A review of the historical export performance and structure of different regions can provide insights to the countries' potential gains from trade liberalization. Export growth data of 61 low-income countries during 1980-90 and 1990-97 show that Sub-Saharan Africa is the only region that experienced a slowdown in export growth between the two periods (from 3.0 percent to 1.6 percent per year). A simple comparison of trends in export growth and commodity composition in different regions demonstrates the likely linkages between these two factors. Sub-Saharan Africa, with a high dependency on primary commodity exports, experienced the lowest export growth of all the regions. About 29 of 41 countries in the region depend on only three primary commodities to provide at least 50 percent of their export revenues. In contrast, low-income countries in Latin America, which have a similar share of agricultural exports, have been successful in recent years in expanding the share of manufactured exports, which tend to have higher demand than agricultural goods.

The low-income Asian countries have the largest and fastest growing markets. These countries have achieved a high level of export diversification (for example, the share of manufacturing grew from 54 percent in 1980 to 74 percent in 1997). Their

[3] Agricultural exports include nonfood commodities such as rubber, fiber crops (including cotton), tobacco, and hides and skins.

Table 6-2—Trade partners for 67 low-income countries by region, 1996

Region	U.S.	Japan	EU15	Other developed	Other	World
Exports, value ($ million):						
North Africa	2,763	488	16,787	871	6,359	26,397
Sub-Saharan Africa	9,734	1,105	18,721	1,180	15,130	44,690
Asia	24,357	21,432	26,948	4,378	54,378	127,115
Latin America	12,011	1,186	6,933	1,359	14,652	34,782
NIS	38	1	423	97	1,934	2,396
Export shares (percent):						
North Africa	10.5	1.8	63.6	3.3	24.1	100.0
Sub-Saharan Africa	21.8	2.5	41.9	2.6	33.9	100.0
Asia	19.2	16.9	21.2	3.4	42.8	100.0
Latin America	34.5	3.4	19.9	3.9	42.1	100.0
NIS	1.6	0.0	17.7	4.0	80.7	100.0

Source: IMF, *Direction of Trade Statistics*, 1999 Yearbook.

Table 6-3—Composition of agricultural trade, 67 countries, 1995-1997 average (US$ billion)

Region	Total merch.	Total agri.	Total food	Cer.	Meats	Dairy	Fruit & veg.	Bev. crops	Oil-seeds	Sugar	Other
Exports:											
North Africa	26.1	1.9	1.5	0.2	0.0	0.0	0.9	0.1	0.0	0.0	0.7
Sub-Saharan Africa	76.2	10.5	4.8	0.2	0.1	0.0	0.7	4.7	0.2	0.4	4.1
Asia	128.5	17.3	9.1	2.6	0.3	0.0	1.9	3.6	0.3	0.5	7.9
Latin America	31.4	9.8	4.5	0.2	0.1	0.0	2.5	4.3	0.1	1.0	1.5
NIS	2.4	0.5	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4
Imports:											
North Africa	38.2	9.1	7.4	3.6	0.3	0.7	0.5	0.5	0.2	0.8	2.6
Sub-Saharan Africa	61.1	7.0	6.0	2.8	0.2	0.6	0.4	0.2	0.0	0.7	2.2
Asia	146.8	16.2	11.7	4.2	0.2	0.9	1.4	0.4	0.6	1.0	7.5
Latin America	45.4	6.3	5.0	2.4	0.2	0.5	0.5	0.1	0.1	0.3	2.1
NIS	3.8	1.2	1.0	0.4	0.1	0.1	0.0	0.0	0.0	0.2	0.2
Net exports:											
North Africa	-12.0	-7.2	-5.9	-3.4	-0.3	-0.7	0.5	-0.4	-0.2	-0.7	-1.9
Sub-Saharan Africa	15.1	3.5	-1.2	-2.6	-0.1	-0.6	0.4	4.6	0.2	-0.3	1.9
Asia	-18.3	1.1	-2.6	-1.6	0.1	-0.9	0.5	3.2	-0.2	-0.4	0.4
Latin America	-13.9	3.5	-0.5	-2.2	-0.1	-0.4	2.0	4.2	0.0	0.6	-0.6
NIS	-1.3	-0.7	-0.9	-0.4	-0.1	-0.1	0.0	-0.0	-0.0	-0.2	0.1

Source: UNFAO, *FAOSTAT* website database, June 2000.

economies are rich in resources, in particular human resources, and their markets are highly protected. As a result, they can achieve significant export gains with increases in global trade. During the last two decades, the average growth rate of export earnings in low-income Asian countries was almost double that of the other developing regions.

Despite the variety of economic and trade structures, low-income developing countries have some common interests in the "three pillar" agricultural trade issues (market access, domestic support, and export subsidies), which affect import prices and market access. These countries are also concerned with the projected food price rises, food price volatility, and donor food aid budgets, which declined throughout most of the 1990s. Many low-income developing countries also are concerned about eroding trade preference arrangements. For example, in Sub-Saharan Africa, there is concern about the erosion of special preferences of the EU's Lomé Treaty, which gives countries in the region preferential access to the EU market. Currently, the

African countries face almost no tariffs for most of their products exported to Europe (but the reverse is not true), so there is not much room for further negotiation.[4] As developed countries have lowered their tariffs to other developing countries (especially Asian countries), however, the relative competitive edge of Sub-Saharan African countries has eroded. Tariff escalation is another area of concern for developing countries, which typically face tariff rates in developed countries that rise for products involving higher levels of value-added processing.

Understanding the Link Between Trade and Food Security

To improve food security by increasing food availability on the national level, countries have two options: accelerate domestic agricultural production or increase imports. The first option is possible for many of the low-income countries that have performed below their potential. In some countries, however, the agricultural sectors have been performing well and yet the countries continue to face food gaps. For these countries, as well as those where potential for agricultural growth is limited, commercial imports have played a major role in improving their food security position.[5]

For developing countries, global agricultural trade liberalization can affect food security through (1) world price levels, which can have a strong influence on domestic producer prices; (2) export earnings (incomes); and (3) availability of food aid. This article focuses on world prices and export earnings.[6]

The most important components of agricultural trade negotiations are the three pillars — domestic support, export subsidies, and market access. These issues are not equally important for all countries. In a scenario in which major exporters would eliminate trade barriers, domestic price support and export subsidies, the expected effect would be a decline in exports of staple foods and an increase in world prices (other market conditions being constant). Those developing countries that have adequate agricultural resources face a higher price incentive to produce. For resource-poor countries, increasing the prices of food means that there would be lower food imports and a reduction in foreign exchange availability for alternative uses. Improvement in market access for exporters of restricted commodities could mean higher foreign exchange earnings due to increases in world prices. Besides financing imports, high rates of export growth can indirectly affect a country's creditworthiness and attract foreign investment. On the other hand, countries that have benefited from nonreciprocal market access preference schemes provided by their trading partners will experience little or no gain.

Elimination of domestic support and export subsidies and increase in global food prices

Trade liberalization leading to a removal of domestic support in the developed countries can be expected to unambiguously raise world food prices, other policies held constant. This occurs because lower prices induce farmers in the protected developed countries to reduce their variable inputs, which leads to a contraction of global output. Similarly, removing developed countries' export subsidies unambiguously raises the prices to the food-importing countries. In both cases, rising food prices would hurt consumers in developing countries, especially in the short run (assuming no protection in developing countries). Rising prices, however, would send signals to expand output for domestic producers, which may be beneficial in the long run in terms of productivity and rural incomes.[7]

Market access and export earnings of low-income countries

Trade liberalization is expected to accelerate global trade, improve economic efficiency, and increase economic growth. The gain, however, depends on how much trade is enlarged. The gain also will not be uniform among regions and countries. On the import side, some developing countries with high tariff levels will

[4] About 95 percent of agricultural exports from the African, Caribbean and Pacific (ACP) countries enter the EU duty-free (McQueen, 1998). However, trade barriers exist for commodities that are sensitive for the EU's common agricultural policy (CAP) or for commodities that have separate trade protocols.

[5] This has been the case for many countries in North Africa, Latin America, and Asia, which have become more reliant over time on commercial grain imports for their food supplies.

[6] For low-income countries, food aid has been a supplement to commercial imports. Food aid donations, however, are made at the discretion of donor countries and the recipient countries have little impact on the decision-making process regarding allocations. Also, food aid is not likely to grow, given budgetary policies in many donor countries and the expected decline in surplus food production by donor countries. This means that commercial imports will be the key to increasing food supplies in countries where production growth is lagging.

[7] These dynamic gains from liberalization may be substantial, given the importance and size of agriculture in developing economies and the likely multiplier effects (Delgado et al., 1998; Bonilla-Diaz and Reca, 2000).

be forced to compete internationally, which will lower domestic prices. This will reduce costs to consumers and lower returns to producers. If tariff rates are relatively low, however, world prices would be expected to pass through the domestic economy, leading to higher prices (recall that market access liberalization modeling scenarios in chapter 1 raise world prices as the initial lowering of producer prices induces shifts in supply and demand that ultimately lead to higher world prices). On the export side, improved market access to developed country markets should lead to an increase in export earnings for developing countries. This result is tempered, however, by the fact that many low-income, food-importing countries already receive preferential trade treatment through multilateral agreements such as the Lomé Agreement and Caribbean Basis Initiative, not to mention separate bilateral treaties with developed countries.

Currently, industrial countries are the main trading partners of all low-income countries. Most low-income countries' exports to industrial countries fall under nonreciprocal preference schemes. In 1968, the international community adopted the concept of nonreciprocal trade preferences to help developing countries increase their export earnings. This concept served as the basis for different Generalized Systems of Preferences (GSP) schemes supported by the industrial countries. These programs are determined unilaterally by the preference-giving countries, and the programs vary in terms of preference margins, commodity coverage, and beneficiary countries. The GSP schemes provide preferential market access in the form of zero tariffs or tariffs significantly lower than normal rates to exports of low-income countries. The nonreciprocal trade preferences have increased trade ties between developing and industrial countries. Therefore, interregional trade remains limited, with the exception of Latin American countries in the last decade. Poor transportation systems and lack of export complementarity are among factors that impede interregional trade growth.

The results of pre-Uruguay Round Agreement on Agriculture (URAA) studies measuring the benefits from preferential schemes differ, depending on the degree of aggregation and commodity coverage. A study examining the impact of preference erosion in Sub-Saharan Africa concludes that African countries would probably experience net trade losses as a result of URAA tariff cuts (Yeats, 1994). Another study estimates that losses due to the erosion of preferences would be 1.5 percent of the export earnings of all African countries (Weston, 1995). Another study estimates that the total potential value of the main three preference givers (United States, EU, and Japan) was $1.9 billion in 1992. About 33 percent went to Africa, 40 percent to Latin America and the Caribbean, and the rest to countries in the Far East and Oceania (Yamazaki, 1996). For African countries, the estimated value of preferences was about 1.2 percent of their export earnings.

Overall, the loss of low-income countries' preferences, or competitive edge, in the markets of industrial countries relative to other suppliers is significant but not large. The final gain from global liberalization, however, depends on the degree to which trade is enlarged from trade liberalization, in particular how world demand changes for commodities that low-income countries export. Global trade liberalization is projected to increase the demand for developing countries' exports. Countries with more diversified market structures and trading partners are likely to adjust quickly and take advantage of incentive signals, while countries with weak market infrastructures that rely on few export commodities will show limited gains (World Bank, 1987; Shapouri and Rosen, 1989).

The growth in demand and trade in agricultural products among developing countries will be a critical factor in boosting exports of these commodities, while trade with developed countries is expected to grow at a slower pace. As one study indicates, there are low price and income elasticities of import demand by developed countries for most primary commodities exported by low-income countries (Bond, 1987).[8] Similarly, a study of demand and supply elasticities found that the income responsiveness to agricultural exports from developing countries was lower than that found for minerals and energy (Goldstein and Khan, 1984). Among agricultural commodities, the income responsiveness to exports of beverages, tobacco, and agricultural raw materials was lower than for food. The results also indicate that the price response of export supply generally is lower than corresponding price

[8] An elasticity typically measures the degree of responsiveness to prices or incomes, which is free of particular monetary units. For example, a price elasticity of -0.20 (typical of necessity foods like wheat or sugar) means that if prices were to increase by 10 percent, demand would decrease by only 2 percent.

elasticities of demand in the short run, but is higher over the long term.

Modeling Food Imports and Gaps Under Alternative Scenarios

The Food Security Assessment (FSA) model determined the *direct* impact of changes in the growth paths of food prices and foreign exchange earnings, food imports, and food gaps in 67 low-income countries in 5 regions (Shapouri and Rosen, 1999). Economywide effects are not considered. A baseline scenario was developed for these countries for later comparisons. According to this baseline forecast, long-run food gaps will grow over the next decade. To maintain recent per capita availability levels (status quo), the gaps are estimated at 12.7 million tons; nutrition-based food gaps are 21.9 million tons (table 6-4).[9] In each scenario, Sub-Saharan Africa has the largest food gaps, which are disproportionately large compared to the region's population share.[10]

The first scenario focuses on the price impacts of full agricultural trade liberalization (removing domestic support, export subsidies, and market access). Chapter 1 of this report finds real-world food prices rise by about 12 percent in the long run.[11] The direct implication of higher prices is twofold. On the import side, higher food import prices will reduce the import capacity of the low-income developing countries, thereby reducing imports. On the production side, higher international prices outweigh relatively low protection levels (by the pass-through effects) and increase incentives to producers.[12] Over the long run, higher prices reduce commercial food imports slightly compared with the baseline scenario, but induce a positive supply response. The net result for all countries is a small decline in both status quo (12.63 million tons) and nutritional gaps (21.39 million tons). The results, however, vary by region. Food gaps will increase in regions that are highly dependent on imports for their staple food consumption (e.g., North Africa). This increase occurs because the decline in commercial imports cannot be offset by the increase in domestic production. In contrast, in Sub-Saharan Africa, where import dependency is low, the gains from the production response will lead to lower food gaps. It should be noted that estimates are based on the parameters of price responsiveness used in the model (i.e., any technological changes due to an increase in investment influenced by market liberalization are not included in the estimated results).

In the second scenario, in addition to the price effects listed previously, developing countries' exports increase in nominal terms by about 30 percent.[13] It is important to note that the loss of preferences due to global agricultural trade reform is not taken into account in the model. Again, the results indicate that the impact is small. Total status quo food gaps decline from 12.63 to 11.99 million tons while nutrition needs decline from 21.39 to 20.53 million tons. In each case, this is a slight additional reduction from the baseline scenario.

Three factors account for the relatively small impact on food security of the additional export growth in a full-liberalization scenario. First, in low-income countries, the food production response to the increase in prices is low unless investments are increased to improve agricultural productivity. Second, agriculture's share of total exports in the developing countries is declining (similar to developed countries). In fact, in the base period, agricultural shares of total exports are 13 percent for Asian countries and 7 percent for North African countries. Thus, even with high agricultural export growth (31.3 percent cumulatively), total export earnings increase only by 4 percent (Asia) and 2 percent (North Africa) over the 10-year projected period (assuming no growth in other sectors).

[9] The status quo food gap is calculated by comparing projected availability of per capita food supplies against a recent 3-year average per capita consumption target. The nutritional food gap is calculated by comparing projected per capita food supplies with minimal nutritional requirements.

[10] Food aid generally has not been sufficient to meet food needs around the world. Cereal food aid donations have fluctuated over the years, averaging about 11.2 million tons over the 1980-98 period (FAO, 2000). Food aid has exceeded 15 million tons twice, once in 1987 and again in 1992. However, for the 1996-98 period (before the effects of the Asian and Russian financial crises), food aid donations averaged only 6.8 million tons.

[11] For the modeling purposes here, the 12-percent price increase is treated as a 1.2-percent increase per year over a 10-year horizon. The FSA model uses the USDA baseline food price forecasts, which are projected to decline for the next decade, so an increase in the growth rate of prices still implies that prices are declining.

[12] Chapter 1 of this report shows that tariff rates are relatively low in developing countries, so this result should not be too surprising. However, it needs to be emphasized that much of the tariff data are unavailable for many of the 67 low-income food-importing countries analyzed here. This model assumes that protection levels are similar to those that are available for the other developing countries in chapter 1.

[13] Like the first scenario, this additional real export growth is phased in over a 10-year period as an increase over the trend forecast of real export growth.

Table 6-4—Summary of food gaps in 67 low-income countries under different modeling scenarios (million tons)

Region	Baseline	Scenario 1	Scenario 2
North Africa			
Production	32.01	32.35	32.33
Commercial imports	24.04	23.10	23.30
Status quo food gap	0.72	1.12	1.03
Nutritional food gap	0.91	1.31	1.22
Sub-Saharan Africa			
Production	145.51	148.15	148.06
Commercial imports	12.06	11.63	12.49
Status quo food gap	8.30	7.79	7.38
Nutritional food gap	16.57	15.63	15.07
Asia			
Production	405.69	409.24	409.21
Commercial imports	22.70	21.05	21.56
Status quo food gap	3.22	3.16	3.14
Nutritional food gap	3.45	3.44	3.42
Latin America			
Production	16.19	16.61	16.53
Commercial imports	16.17	15.39	16.85
Status quo food gap	0.47	0.51	0.44
Nutritional food gap	0.89	0.91	0.82
NIS			
Production	5.96	6.04	6.03
Commercial imports	1.93	1.82	1.87
Status quo food gap	0.02	0.05	0.00
Nutritional food gap	0.07	0.10	0.00
Total, 67 countries			
Production	605.36	612.39	612.16
Commercial imports	76.89	72.99	76.07
Status quo food gap	12.73	12.63	11.99
Nutritional food gap	21.89	21.39	20.53

[1] This scenario considers only the price effects of agricultural trade liberalization.
[2] In addition to the price effects in the first scenario, this scenario also considers changes in exchange earnings.

Third, total food imports are a small component of overall food availability in many low-income countries. Therefore, even a relatively high growth rate in agricultural exports that leads to an increase in commercial imports has a small impact on overall food availability. In these countries, many in Sub-Saharan Africa but also in other regions, food aid comprises a large share of total imports (about 20 percent on average in Sub-Sahara Africa in recent years). It is also important to note that the regional results of agricultural market liberalization mask the differences at the country level. For example, countries such as Ethiopia and Nicaragua, which have a large share of agricultural exports (94 percent and 50 percent during 1995-97) and a low level of food imports, will gain the most from market liberalization. Nutritional gaps are projected to decline by 25 percent (Ethiopia) and 50 percent (Nicaragua) over the projected period. In contrast, for a country like Algeria, which has no agricultural exports and high food import dependency, the nutritional gap is projected to increase by 44 percent.

In sum, agricultural trade liberalization will slightly reduce the food insecurity of low-income, food-deficit countries on average, but the impact will vary depending on the country. For most food-insecure countries, however, domestic food production is the most important factor influencing food security position. Domestic food production contributes to about 90 percent of availability in food-insecure countries. In these countries, an increase in investment to expedite the adoption of new technologies, in addition to market liberalization, is the key to improving food security.

Improved market access leading to higher export earnings also falls short of solving the food security prob-

Regional economic structures and concerns

Sub-Saharan Africa
- Very low per capita income; high dependency on foreign and food aid
- Exports mostly primary commodities, imports grains and dairy products
- EU is the largest trade partner; intra-regional trade is very low
- Low productivity growth
- Nonreciprocal preferences are important (GSP, Lomé)
- Weak infrastructure inhibits trade

North Africa
- Mostly middle-income countries
- Arable land and water resources are very limited, leading to highly volatile production
- Share of food imports is increasing
- EU is the largest trade partner; recently signed EU trade preference agreement

Low-Income Latin American Countries
- Relatively high per capita incomes
- Exports beverage crops and fruits and vegetables; imports grains and dairy products
- United States is the largest trade partner; intra-regional trade is very high and growing
- Trade protection has been substantially reduced in last decade
- Nonreciprocal preferences important for most countries (GSP, Lomé, CBI)

Low-Income Asian countries
- Most populous region
- Relatively low, but growing, per capita incomes
- Exports beverage crops and fruits and vegetables; imports grains and oilseeds
- EU, United States, Japan equally large trade partners; intra-regional trade is very limited
- Trade protection has been substantially reduced in last decade, but is still high
- Nonreciprocal preferences important for most countries (GSP)
- Multifiber Arrangement (MFA) very important to region

lems in low-income countries. In many cases, the export growth needed to boost the import capacity to the level necessary to close the food gaps is simply unrealistic. For example, in Sub-Saharan Africa, commercial food imports must grow nearly 10 percent annually to close the average nutritional gap by 2010. The parameters used in the model assume that the response of food imports to changes in foreign exchange availability is not one-to-one. Thus, in order to achieve a 1-percent growth in commercial food imports, foreign exchange availability must grow by 1.2 percent to 1.4 percent, depending on the country. Consequently, the export growth requirement would be more than 12 percent to 14 percent per year to achieve the 10-percent growth requirement. Clearly, achieving such high growth in total export earnings based on agricultural reforms is unlikely. Eradicating food insecurity in poor countries is a complicated task that requires a comprehensive strategy to increase export earnings in both the agricultural and nonagricultural sectors, as well as increase domestic food production.

Conclusion

This article considers how global trade liberalization affects the food security of 67 low-income, food-deficit countries. In the baseline scenario, food gaps based on recent per capita availability levels are projected to reach 12.73 million tons, while nutrition-based food gaps are 21.89 million tons in the next decade. Two scenarios were used to assess the impact of the global market liberalization. The first scenario focused on the impact of rising food prices, and the second scenario studied the impact of full agricultural trade liberalization on foreign exchange earnings. The results indicate that the impacts are positive but relatively small in both scenarios. Several factors explain this relatively modest result, including low production response, small food import or export shares, and low initial export growth rates.

To put these food gaps in perspective, it is helpful to compare these projections with recent food aid volumes. Global food aid donations twice have reached a peak of 15 million tons, once in 1987 and again in 1992 (UNFAO, 2000). Based on this historical experience, it is possible that the status quo food gaps could

be met with food aid donations. It should be noted, however, that food aid volumes have not exceeded 10 million tons since 1994, partly due to donors' budget pressures. In addition, food aid is not necessarily allocated based on needs, which means that an increase in quantities may not reduce food insecurity in these 67 low-income, food-importing countries.

Although international agriculture market liberalization is an important factor affecting food security, reform is not sufficient to alter the situation significantly. Most studies show much larger gains in developing countries resulting from economywide market liberalization. The experience of developing countries, in particular Latin American countries, shows that market liberalization and implementation of structural adjustment policies improves the performance of the agricultural sector, including both food and export crops. Improving export performance has enhanced the financial condition and creditworthiness of these countries and thereby has attracted foreign investment. For the low-income, net food-importing countries, increasing export earnings will increase the capacity to import not only food products, but also capital goods that are essential for long-term growth.

The baseline projection of food availability indicates a decline in per capita food availability for Sub-Saharan Africa and some Latin American and Asian countries. For these countries, accepting a decline in per capita availability from already low levels could have severe nutritional consequences. Increased food aid alone, however, will not solve the problem. Further global market liberalization aimed at diversifying exports will help stimulate earnings growth. Commodity diversification would improve export performance because a decline in the price or the volume of one commodity would have a less disruptive impact on a country's overall receipts. For the resource-poor countries where poverty and agricultural resource degradation are growing, such as Haiti, Bangladesh, and many countries in Sub-Saharan Africa, the situation is expected to deteriorate unless external investment and assistance are provided.

Agricultural market liberalization can improve another important dimension of food security in low-income countries — the disparity in purchasing power within countries. In low-income countries, most of the food-insecure people live in rural areas. Any increase in the prices of agricultural commodities because of increases in world prices or increases in earnings resulting from improvement in market access can reduce income disparity between rural and urban population. In countries such as India, Pakistan, Dominican Republic, El Salvador, Sudan, Cote d'Ivoire, and Nigeria, if available food were distributed equally, everyone would meet nutritional requirements. Unfortunately, the insufficient incomes of the poorest segment of these populations do not allow them to gain access to available food.

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