Africa's Growing Dependence on Imported Wheat

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Abstract: Food production in many African countries has in recent years not expanded fast enough to keep up with population growth. Diminishing self-sufficiency and food security and the consequent increase in food imports of many African countries are causing great concern. Amongst all food items, wheat stands out as the one commodity whose influence in consumption seems to be growing rapidly This paper highlights the results of a detailed study investigating the underlying causes of past trends, estimating the ecological and economically viable potential of rainfed wheat production in Africa, and outlining some aspects and possible consequences of different levels of international wheat prices and food aid on the agricultural sector as well as the nutritional level of African countries.

Introduction

Food production in many African countries has in recent years not expanded fast enough to keep up with population growth. In even more African countries, the increase in production has fallen behind that in total demand, stemming from rising incomes as well as population. Diminishing self-sufficiency and food security of many African countries and the consequent increase in their food imports are topics of considerable concern.

Wide variations in climatic and ecological conditions as well as population density and level of development exist across the continent of Africa. The climatic patterns and soil conditions strongly influence what can be grown and consequently what is eaten. In the winter rainfall areas in northern Africa, wheat and barley have traditionally been the main crops in terms of production and consumption. Moving south of the Sahara, sorghum and millet predominate in the low summer rainfall areas, whereas maize and cassava are the major crops produced and consumed in good summer rainfall areas. In the very high rainfall humid areas, root crops are important.

Among all food items, wheat stands out as the one commodity whose influence in consumption seems to be growing rapidly. What are the underlying causes of the increasingly important role of wheat in Africa? What is the ecological and economic potential and the comparative advantage of wheat production in Africa? What might be the impact of different levels of future world market prices of wheat and wheat aid on African countries?

This paper presents the highlights of a detailed study (Shah *et al.*, 1984) where the above questions were been investigated in detail.

Past Trends in Consumption, Production, and Trade

A few outstanding observations from analysis of historical trends for the period 1966-68 to 1978-80 are presented in this section, aimed at understanding the underlying causes of the growing dependence of African countries on imported wheat.

Between 1966-68 and 1978-80 (3-year averages), consumption of wheat in almost all African countries went up in absolute as well as in relative terms. However, the share of wheat in total calories is fairly low for most of the countries in Africa. The northern African countries are the major wheat consumers, obtaining 35-55 percent of their calories from wheat. In these countries, the share of wheat calories remained more or less unchanged between 1966-68 and 1978-80. In sub-Saharan Africa, wheat accounted for 10-25 percent of total calorie intake in 12 countries with a total population of 63 million people in 1978-80. The remaining countries, with a total population of 276 million people, had an average wheat consumption level amounting to about 4 percent of total calorie consumption. Of the 49 countries considered in this study, average per capita calorie intake increased in 30 countries (1978-80 total population of 250 million) and declined in 19 countries (1978-80 total population of 177 million) between 1966-68 and 1978-80. In the former group of countries, the increase in calories from wheat provided the main (more than a third) source of improvement in food intake.

Between 1966-68 and 1978-80, the self-sufficiency ratio for wheat declined for both northern Africa and sub-Saharan Africa, as it did for rice and coarse grains.

The area under coarse grains in sub-Saharan Africa in 1978-80 was about 77.3 million ha compared to only 1.1 million ha for wheat and 4.2 million ha for rice. The area under coarse grains increased faster than that under wheat. Wheat production has thus not displaced coarse grain

production, nor does wheat seem to have diverted significant amounts of inputs in sub-Saharan Africa.

Out of the 13 African wheat growing countries, only in Egypt was the producer price lower for wheat than for coarse grains. In all other countries, it was higher, and, in many countries, significantly higher, the differences being much larger than on the world market. Production of wheat does not seem, therefore, to have been hampered by relatively poor prices. If price incentives were inadequate for wheat, they must have been even less adequate for coarse grains.

Net imports of all three cereal groups increased at average annual rates of between 7 and 10 percent between 1966-68 and 1978-80. In 1978-80, African countries together imported 18.8 Mt of grains, of which 16.2 Mt were commercial imports and only 2.6 Mt were aid imports (grants and concessional rate imports). Five countries in northern Africa accounted for 11.5 Mt of imports, 9.6 Mt of commercial imports and 1.9 Mt of aid imports. The extent of grain aid for sub-Saharan Africa was very low in 1978-80, and even lower in the past. Only for northern Africa could one perhaps say that past wheat aid may have created a market for wheat. However, these countries were wheat consuming countries to begin with, and the share of calories consumed from wheat in 1966-68 was comparable or even higher than in 1978-80.

Increasing imports of wheat by African countries are more likely to be the outcome of poor growth of agricultural production in general rather than wheat being forced on the African market by wheat exporters through attractive aid offers and availability on the world market.

Wheat Production Potential in African Countries

The ecological and economic rationality of growing wheat *vis-à-vis* other food crops was estimated on the basis of the soil and climate resources using the methodology of the FAO agroecological zone project (Higgins *et al.*, 1982). The computerized land resource (climate and soil) data comprise a mosaic of unique land units (10,000 ha) with particular combinations of soil and climatic conditions by location in each African country. The maximum area agroclimatically suitable for growing wheat under rainfed conditions in each country was identified. All this land is, however, not likely to be devoted to wheat cultivation. Monocropping with wheat of such large areas would not be technically feasible. However, the maximum suitable area gives an idea of the maximum rainfed wheat production potential in Africa.

Economically viable production depends on relative prices and on the potential for growing alternative crops on the same land. World prices for food crops and inputs in 1975 were used to determine potential wheat production under revenue maximization ("Income Strategy"). In assessing the comparative advantage of growing wheat, maximum production in terms of calories was considered a meaningful criterion for crop choice ("Food Strategy").

In Table 1, the first column ("1978-80 Average") contains historical data including irrigated wheat production. About 15 and 25 percent of the acreage shown were under irrigation in northern and sub-Saharan Africa, respectively. Similarly, acreage figures from the "Reference Scenario" of

Table 1—Potential Rainfed Wheat Production at an Intermediate Level of Technology

	1978-80 Average	BLS 2000	Wheat Only	Income Strategy	Food Strategy
			Area (1,000 ha)		
Northern Africa	5,430	6,123	10,639	7,009	5,364
Sub-Saharan Africa	1,069	2,047	17,704	1,040	2,546
Total Africa	6,499	8,170	28,343	8,049	7,910
			Production (1,000 t)		
Northern Africa	5,767	8,803	17,931	14,573	11,119
Sub-Saharan Africa	1,279	3,031	28,700	3,027	5,150
Total Africa	7,046	11,834	46,631	17,600	16,269

IIASA's Basic Linked System in column two ("BLS 2000") include about 15 percent (northern Africa) and 30 percent (sub-Saharan Africa) of irrigated area for those two regions.

For northern Africa, about two-thirds of the land potentially suitable for wheat production should be devoted to growing wheat under revenue maximization ("Income Strategy"), yielding about 80 percent of the potential wheat production. Soil and climatic conditions are generally suitable for wheat production; the only competing crop being barley (important competing crops in northern Africa, namely citrus and olives, were not considered in this study).

The agroclimatic suitability for wheat is much poorer in sub-Saharan Africa. Under intermediate technology, less than 6 percent of potentially suitable land gets allocated to wheat under the "Income Strategy," resulting in an economically viable production of 3 Mt; i.e., about 11 percent of potential production.

Although Africa could theoretically produce 46.6 Mt of rainfed wheat with intermediate technology and be self-sufficient in wheat, the opportunity costs would be substantial. Economically viable rainfed wheat potential under the "Income Strategy" is only 17.6 Mt using intermediate technology (24.4 Mt under high technology). Trying to push production above these levels would cause a loss of potential income to African economies.

When relative price structures are modified and a "Food Strategy" is pursued to further food security through calorie maximization, rainfed wheat output falls to 16.3 Mt, but with a 70 percent increase in rainfed wheat production in sub-Saharan Africa to 5.1 Mt. Here again, self-sufficiency in wheat (in the year 2000) would be expensive for Africa. If wheat production is pushed beyond the "Food Strategy" levels, imports of other foods would have to be increased.

Implications of Changes in World Market Prices of Wheat and Wheat Aid in Africa

Though wheat self-sufficiency is not viable for most African countries, the growing imports are an outcome of inadequate development of domestic food grain production and infrastructure. The extent to which wheat imports continue depends on the development of the whole economy, in particular the agricultural sector, as well as on world market prices at which wheat and other agricultural products may be traded. Also, the consequences of wheat aid and continued reliance on it raise some questions: how wheat aid affects domestic production and consumption; what the consequences would be of a sudden discontinuation of wheat aid; and how countries would adjust to such a shock.

To explore those issues, we used some of the national models developed within the framework of the Basic Linked System (BLS) (Fischer and Frohberg, 1982) of the Food and Agriculture Programme at IIASA (Parikh and Rabar, 1981). The BLS consists of 35 national and regional models covering the whole world. Africa is represented in terms of three national models (Egypt, Kenya, and Nigeria) as well as five broader regional models covering most of the rest of Africa. The aggregate regional models were built based on "Scenario B" (moderate economic growth) of FAO's AT2000 study (FAO, 1981).

The BLS distinguishes nine agricultural sectors and one nonagricultural sector. World market prices for wheat, rice, other grains, bovine and ovine meat, dairy products, other animal products and fish, protein feeds, other food commodities, nonfood agricultural commodities, and the nonagricultural sector are calculated annually so as to clear the trade of the ten sectors at the world level.

World market prices for the "Reference Scenario" were calculated assuming a continuation of historical trends in factors underlying production and in agricultural policies. Under these premises, the relative price of wheat declines by about 1.2 percent annually between 1980 and 2000. Africa as a whole shows a growing dependence on wheat and also on other cereal imports in the "Reference Scenario." Projected self-sufficiency levels fall from 74 to 69 percent for all cereals, and from 40 to 35 percent for wheat alone. Estimated wheat imports for the year 2000 reach almost 22 Mt (about 14.5 Mt in northern Africa) out of some 46 Mt total cereal imports compared to about 11 Mt of wheat and 20 Mt of total cereal imports as simulated for 1980.

To test the sensitivity of African wheat demand and supply with respect to world market price of wheat, different world price scenarios were specified. The broad picture that emerges from the analysis is shown in Table 2. Responses of production and imports to price changes are significant. An average price elasticity of 0.8 for supply and -0.7 for imports is indicated. However, demand for wheat is not so price elastic. The implied price elasticity of wheat demand is -0.2 for total Africa.

Table 2—Price Elasticities of Wheat Supply, Imports, and Demand

	Supply	Imports	Demand
Northern Africa	0.9	-0.8	-0.1
Sub-Saharan Africa	0.6	-0.7	-0.3
Total Africa	0.8	-0.7	-0.2

The impact of the world wheat price on average per capita calorie consumption is low, as wheat is of relatively minor importance in consumption in most African countries. Only in northern Africa, where wheat is an important item of consumption, does average per capita calorie consumption go down by about 2 percent when world wheat prices double, compared to about 0.5 percent for sub-Saharan Africa and 0.9 percent for Africa as a whole. Although apparently negligible, the implied calorie gap is equivalent to the minimum consumption of more than 7 million people assuming a minimum calorie requirement of 2,300 per person per day.

Apart from world market prices and domestic price policies, wheat self-reliance policies as well as wheat aid affect domestic agricultural production and consumption. These issues were explored with our national models for Egypt, Kenya, and Nigeria. These countries offer different prototypical situations with respect to the role of wheat in supply and demand.

Self-sufficiency in wheat is feasible for Kenya to attain and it would increase domestic agricultural production, improve income parity for the farmers, and only marginally reduce average calorie intake as a consequence of higher wheat prices. The adverse effect of a self-sufficiency constraint on calorie intake is largest during the transition period when the policy is introduced, implying that such policy changes should be gradually introduced.

In Egypt, wheat aid depresses domestic agricultural production and agricultural incomes. However, with the low food prices due to wheat aid, consumers are better off, and the average total calorie consumption improves. Thus, if appropriate compensation can be given to farmers for lost income, wheat aid is desirable for Egypt. Economically, Egypt should also be able to adjust to a sudden withdrawal of wheat aid if commercial wheat suppliers can be found. However, the development path is altered because of wheat aid (less investment in agriculture), and the effects last for a long period even after wheat aid is withdrawn.

As was to be expected, Nigeria would profit from lower wheat prices on the world market and, of course, from food aid. On the other hand, a forced reduction of wheat imports to 1980 levels of about 1 Mt would create (in the year 2000) a calorie gap equivalent to the basic requirements of 3.7 million people and would therefore probably create political instability. The induced pressure on domestic food production would, however, slightly improve the incomes in the rural areas.

Note

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