

Agricultural Growth in Sub-Saharan African Countries and China

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Agricultural Growth in Sub-Saharan African Countries and China

by

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Abstract

Agriculture remains the dominant sector in the economies of most Sub-Saharan African countries. However, the experience of agricultural growth in the region stands in sharp contrast to the robust performance of agriculture in many Asian countries, particularly China. In a number of African countries, labor productivity has fallen and land productivity has not risen significantly. In China, on the other hand, land and labor productivities have increased steadily over the past two decades. An examination of factors underlying the contrasting experiences of China and countries in Sub-Saharan Africa reveals important differences in the institutional and policy environments affecting the use of new and profitable technologies to raise land and labor productivities.

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I. Introduction

Agriculture today remains the dominant sector in the economies of most African countries. ^{1/} The key to economic growth in these countries thus lies in the rapid expansion of agriculture, which can then form the base for industrialization and balanced growth. The generally poor performance of agriculture in Africa, however, stands in sharp contrast to the robust agricultural growth in many Asian countries. In this regard, the experience of China is perhaps quite relevant to many countries in Sub-Saharan Africa. A general observation is that productivities of land and labor have to rise through intensive agriculture, given the limited area of arable land (in China and Africa) and the high rates of growth of population (as in Africa, and China until recently). In a number of African countries, labor productivity has fallen and land productivity has not risen significantly, whereas in China, productivities of both land and labor have increased significantly.

Agricultural output can be increased in three ways: (i) better utilization of the existing capacity; (ii) use of increased quantities of inputs; and (iii) use of new techniques to raise the productivity of each input or to raise the total product curve. All of these may require changes in tenurial arrangements, levels of investment in infrastructure and support services, and of policies that affect the prices of outputs and inputs. The economic reform programs under way in many African economies since the mid-1980s have attempted to put these changes in place, albeit with varying

^{1/} The terms Africa or African countries refer to the Sub-Saharan African countries.

degrees of success. But no African country has been able to come close to, let alone match, China's agricultural performance. An examination of the factors underlying the contrasting experiences in China and countries in Sub-Saharan Africa reveals important differences in the institutional and policy environments affecting the adoption and use of new and profitable technologies to raise land and labor productivities. For agriculture to become an engine of growth in Africa, as it has in China, raising these productivities would appear to be imperative.

While there is a fairly substantial body of literature on the subject of agricultural performance in China and in Africa, their respective experiences have not been directly compared. The purpose of this paper is to use the available literature to address the question of why agriculture has boomed in China but not in Africa. After a brief look at the stylized facts, the paper focuses on four possible explanations: structural characteristics; the evolution of institutions; the nature of markets and pricing systems; and the provision of infrastructure and support services.

II. Macroeconomic Structure and Agricultural Performance

A review and comparison of the stylized facts of the performance indicators of Sub-Saharan Africa and China is provided in this section. Tables 1 and 2 contain the supporting data.

1. Per capita income and population growth

In 1992 income per capita in China was \$470 and in Africa it was \$530. However, using purchasing power parity calculations, the average Chinese

Table 1. Macroeconomic and Agricultural Indicators in Sub-Saharan African Countries and China

| Indicator | Sub-Saharan Africa | | | | | | China | | | | | |
|---|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1970 | 1975 | 1980 | 1985 | 1990 | 1992 | 1970 | 1975 | 1980 | 1985 | 1990 | 1992 |
| Population (million) | 270 | 310 | 359 | 417 | 487 | 518 | 830 | 924 | 987 | 1,059 | 1,143 | 1,162 |
| GNP per capita (US\$) | 250 | 400 | 660 | 600 | 520 | 530 | | 200 | 270 | 380 | 410 | 470 |
| Share of agriculture (%): | | | | | | | | | | | | |
| GDP | 35 | 31 | 30 | 33 | 32 | 33 | 38 | 36 | 35 | 33 | 28 | 27 |
| Labor force | 78 | 75 | 73 | 70 | 67 | 66 | 78 | 76 | 74 | 71 | 67 | 66 |
| Trade | 63 | | 57 | 52 | 49 | 48 | 35 | | 72 | 44 | 33 | 28 |
| Agriculture value added (US\$): <u>1/</u> | | | | | | | | | | | | |
| Per worker | 456 | 454 | 458 | 476 | 534 | 540 | 206 | 213 | 228 | 318 | 358 | 385 |
| Per hectare | 346 | 365 | 391 | 432 | 542 | 566 | 706 | 800 | 949 | 1,477 | 1,758 | 1,906 |
| Indices of output <u>2/</u> (1979-81 = 100): | | | | | | | | | | | | |
| Agriculture | | 93.9 | 100.5 | 111.0 | 127.9 | 135.0 | | 84.7 | 98.8 | 130.2 | 159.2 | 175.4 |
| Food | | 93.1 | 100.4 | 111.1 | 129.0 | 136.7 | | 84.6 | 98.8 | 127.4 | 157.6 | 175.8 |
| Crop | | 97.9 | 100.6 | 111.4 | 129.4 | 137.2 | | 85.7 | 98.4 | 125.1 | 144.9 | 149.8 |
| Food per capita | | 108.0 | 100.4 | 96.1 | 96.2 | 93.4 | | 90.8 | 98.7 | 118.6 | 136.1 | 145.2 |
| Cereal output: <u>2/</u> | | | | | | | | | | | | |
| Per capita (kg.) | 169 | 165 | 152 | 151 | 135 | 140 | 251 | 258 | 283 | 321 | 340 | 350 |
| Per hectare (kg.) | 837 | 896 | 883 | 1,026 | 1,049 | 1,110 | 1,875 | 2,074 | 2,923 | 3,837 | 4,199 | 4,587 |
| Cereal availability per capita <u>3/</u> (kg.) | 175 | 166 | 163 | 175 | 146 | 150 | 257 | 261 | 299 | 323 | 354 | 350 |
| Arable land per capita (hectare) | 0.488 | 0.440 | 0.393 | 0.345 | 0.279 | | 0.118 | 0.106 | 0.099 | 0.089 | 0.081 | |
| Irrigated area as percent of arable | 2.9 | 3.1 | 3.9 | 4.5 | 4.7 | | 38.9 | 43.7 | 46.4 | 47.1 | 51.4 | |
| Fertilizer use per hectare (kg.) | 6.7 | 10.0 | 12.1 | 13.7 | 14.7 | | 36.1 | 58.9 | 134.0 | 209.1 | 290.3 | |

Table 1 (concluded). Macroeconomic and Agricultural Indicators in Sub-Saharan African Countries and China

| Indicators | Sub-Saharan Africa | | | China | | |
|---------------------------------|--------------------|---------|---------|---------|---------|---------|
| | 1965-80 | 1970-80 | 1980-92 | 1965-80 | 1970-80 | 1980-92 |
| Average annual growth rate (%): | | | | | | |
| Population | 2.7 | 2.8 | 3.0 | 2.1 | 1.8 | 1.4 |
| GDP | 5.3 | 3.6 | 1.8 | 6.4 | 5.2 | 9.1 |
| Agriculture value added | 1.9 | 1.6 | 1.7 | 3.0 | 2.6 | 5.4 |

Sources: The data and estimates are from World Bank, World Development Report, various issues; UNDP, Human Development Report, various issues; World Bank, World Tables 1994; FAO, Productions Yearbook, various issues; FAO, Trade Yearbook, various issues; FAO, Fertilizer Yearbook, various issues; African Development Bank, African Development Report, various issues; and People's Republic of China, Statistical Yearbook of China, various issues.

Notes:

- 1/ Agriculture value added is in 1985 U.S. dollars for African countries and 1980 U.S. dollars for China.
- 2/ Indices of total agricultural output, food output, crop output, and cereal output are for all of Africa (including North African countries). The end year for these indices and for the index of cereal output per capita is 1993.
- 3/ Cereal availability is total domestic output plus net imports.

Table 2. Changes in Agricultural Output and Food Production in Selected African Countries and China

| Country | Population (million) 1992 | Average Annual Growth Rate of Agriculture Value Added | | | Average Annual Growth Rate of Food Output Per Capita | Food Production Per Capita Index (1979-81=100) | Calorie Supply as % of Daily Requirement |
|---------------|---------------------------|---|---------|---------|--|--|--|
| | | 1986-89 | 1987-92 | 1989-92 | 1979-92 | 1991 | 1988-90 |
| Nigeria | 101.9 | 3.8 | 6.2 | 4.0 | 2.0 | 123 | 93 |
| Tanzania | 25.9 | 4.7 | 5.3 | 7.8 | -1.2 | 78 | 91 |
| Kenya | 25.7 | 4.5 | 1.0 | 0.1 | 0.1 | 103 | 86 |
| Uganda | 17.5 | 6.1 | 4.5 | 2.6 | 0.1 | 98 | 83 |
| Chad | 6.0 | 3.7 | 12.0 | 11.6 | 0.3 | 102 | 69 |
| Benin | 5.0 | 4.6 | 8.5 | 4.6 | 1.8 | 119 | 101 |
| Botswana | 1.4 | 17.6 | 15.8 | 2.8 | -3.1 | 68 | 100 |
| Guinea-Bissau | 1.0 | 7.3 | -1.0 | -4.3 | 1.1 | | 97 |
| Comoros | 0.5 | 3.6 | 2.2 | 1.4 | | | 90 |
| Cape Verde | 0.4 | 16.7 | 1.8 | 2.2 | | | 125 |
| Total (10) | 185.3 | 7.3 | 4.6 | 3.3 | | | |
| Ghana | 15.8 | 2.3 | 2.0 | 0.6 | 0.3 | 116 | 91 |
| Côte d'Ivoire | 12.9 | 2.3 | -1.1 | -1.9 | 0.1 | 93 | 122 |
| Burkina Faso | 9.5 | 1.5 | 3.8 | 1.2 | 2.8 | 119 | 95 |
| Sierra Leone | 4.4 | 3.6 | -1.0 | -1.6 | -1.2 | 84 | 86 |
| Total (4) | 42.6 | 2.5 | 0.9 | -0.4 | | | |
| China | 1,162 | 3.6 | 4.2 | 4.6 | 2.9 | 138 | 112 |

Sources: The data and estimates are from World Bank, World Development Report, various issues; UNDP, Human Development Report, various issues; World Bank, World Tables 1994; FAO, Productions Yearbook, various issues; FAO, Trade Yearbook, various issues; FAO, Fertilizer Yearbook, various issues; African Development Bank, African Development Report, various issues; and People's Republic of China, Statistical Yearbook of China, various issues.

enjoyed a standard of living more than twice as high as an average African: \$2,946 versus \$1,250. Nearly 46 percent of the population in Africa and only 9 percent in China are in absolute poverty. Poverty in rural areas-- where about 70 percent of the people of Africa and China reside--is even more widespread in Africa. Over 65 percent of the rural population in Africa (or 237 million people) and about 13 percent in China (or 105 million people) live in poverty. 1/

Africa's population (518 million) in 1992 was just less than one-half that of China. But the population gap has narrowed in the last 25 years: during 1965-92, the population in Africa grew at rates of 2.7-3.0 percent per year, whereas the population growth rate in China fell from 2.1 percent to 1.4 percent per year. The Chinese economy expanded at 6.4 percent per year between 1965-80 and by 9.1 percent per year during 1980-92, which allowed per capita income to rise annually at 3.3 percent and 7.4 percent, respectively, in the two periods. The economies in Africa, on the other hand, grew at decelerating rates. The growth of real GDP averaged 5.3 percent in 1965-80 but fell to 1.8 percent during 1980-92. Given the rising rates of growth of population in African countries, the average income per capita rose annually at 2.6 percent in the first period but fell at the rate of 1.2 percent per year in the second period.

2. Share of agriculture

Agriculture is the single most important sector of the African economies. Its share in GDP has stayed between 30-35 percent in the last 25 years. In China, the share of agriculture in the GDP has fallen from

1/ See Lele and Stone (1989); and UNDP (1994).

around 40 percent to 27 percent in the same period. The direct contribution of agriculture to exports is also more significant in Africa (48-50 percent) than in China (28-30 percent). However, in both Africa and China agriculture employs about two-thirds of the total labor force.

The low growth rate of real GDP in Africa is mirrored by the poor performance of the agriculture sector. The annual growth rate of agricultural output was only 1.9 percent during 1965-80 and 1.7 percent during 1980-92. The indices of total agricultural output, food output and crop output during 1975-92 (1979-81=100) strongly support the differential performance of the agriculture sector in Africa and China. 1/

In terms of food security, the situation in African countries seems to have steadily deteriorated. The index of food output per capita in Africa fell from 108 in 1975 to 93 in 1992, whereas it increased in China from 91 to 145. Cereal production per capita in Africa has likewise consistently declined from 169 kg. in 1970 to 140 kg. in 1992; it rose in China from 251 kg. to 350 kg. in this same period. If net imports are added to the domestic production, availability of cereals in Africa fell from 175 kg. per person in 1970 to 150 kg. in 1992, but rose from 257 kg. to 350 kg. in China. Africa had to import a sizable proportion of its own cereal output to avoid food disasters throughout the 1980s and the early 1990s. The food dependency ratio in China was less than one-half of that in Africa. Between 1970 and 1990, food dependency increased from 6.5 in 1970 to 10.2 in 1990 in Africa and from 1.7 to 4.7 in China.

1/ The indices for Africa include the North African countries: Egypt, Libya, Algeria, Tunisia, and Morocco. If the indices of these countries are excluded from the total, the picture is even worse.

3. Economic reform and food production

In view of the general economic decline in African countries in the late 1970s to the early 1980s, several governments undertook economic reform programs with assistance from the International Monetary Fund, the World Bank and other international donors. 1/ These programs were designed to put the countries on a sustained, high-growth path that would eventually diminish the existing widespread poverty. While there is much controversy about both the short- and long-term effects of these programs on growth and poverty, recent evidence suggests that in some African countries there has been visible economic recovery since the late 1980s. 2/

Looking at some of the major indicators of performance for the agriculture sector in 14 of these African countries--10 of which were designated "success stories" by the World Bank--in recent years, only in Burkina Faso, Nigeria and Benin was the annual growth rate of food output above 2 percent during 1980-92; in 3 countries there was a decline in the growth rate; and in the remainder the rate of growth was less than 0.5 percent. In China, the annual growth of food per capita was 2.9 percent in the same period. While the index of food production per capita (1979-81 = 100) in 1991 was significantly higher in Nigeria, Benin, Burkina Faso, and Ghana than in other African countries, the average for Sub-Saharan Africa was 96 as against the average of 138 in China. The growth rates of the value-added in agriculture during 1986-92 show a disturbing trend in

1/ See World Bank (1994a). For a description of the economic reform program in China, see Bell, Khor, and Kochhar (1993).

2/ See, for instance, the two volumes on Sub-Saharan Africa: Husain and Faruquee (1994); and the World Bank (1994a).

Africa: the average annual rate of growth during 1986-89 was 7.3 percent in the top 10 countries, but declined to 3.3 percent during 1989-92. In China, on the other hand, the annual growth rate of agriculture went up from 3.6 percent during 1986-89 to 4.6 percent during 1989-92.

Most of the observed difference in the performance of agriculture between Africa and China in the last 25 years can be attributed to changes in the productivity of major agricultural inputs. 1/ For example, the agriculture value-added per hectare in China more than doubled (from \$706 to \$1,906), but in Africa it rose by less than two-thirds (from \$346 to \$566) during 1970-92. The average product per agricultural worker rose by 87 percent (from \$206 to \$385) in China and by only 18 percent (from \$456 to \$540) in Africa in the same period. Finally, the average yields of cereals were 1.1 metric tons per hectare in Africa and 4.3 metric tons per hectare in China in 1992.

III. Some Explanations of the Differences in Agricultural Growth

The conventional wisdom in the 1950s was that China would face long periods of food shortages, if not famines, and the African continent would produce increasing agricultural surpluses for rapid industrial growth. But events have run the other way. A substantial body of literature has recently emerged on both China and African countries about the performance of their economies and the process of agricultural growth in the last

1/ A recent study by Wen (1993) of the total factor productivity in China's agriculture shows that productivity nearly doubled--rising from 70 to 140--between 1978 and 1992. Unfortunately, there is no similar study of changes in total factor productivity in African agriculture.

15-20 years. 1/ It is important first to underscore some of the major differences in the resource endowments and structural conditions that have a strong bearing on the performance of agriculture in China and Africa. This will be followed by a review of the differences in the evolution of institutions, policies related to pricing and markets, investments in infrastructure, and development of support services.

1. Structural characteristics

a. Land and water resources

There is not much potential for additional arable land in China. In fact the land base has been shrinking in the last 20-25 years: it has gone down from 0.12 hectare to 0.08 hectare per capita during 1970-92. Although the arable land base in Africa has expanded somewhat (132 million to 140 million hectares), 2/ it is shrinking more rapidly in per capita terms due to the high rates of population growth and urbanization, and has fallen from 0.49 to 0.28 hectare in this period. While African agriculture is largely rainfed, China has the advantage of irrigation for a substantial proportion of its arable land. It is estimated, however, that Africa has a potential for irrigation in about 20-25 million hectares but less than 20 percent of that potential is presently used. Further, the yield level on irrigated lands in Africa is about 3½ times higher than the level observed on rainfed lands (Cleaver (1993)).

1/ For China, for example, see Harrold (1992); Johnson (1990); and Lin, Cai, and Li (1994). For Africa, see Cleaver (1993); Vyas and Casley (1988); and World Bank (1994a).

2/ Much of the expansion of the land base in Africa has been achieved at the expense of forest and pasture (grazing) lands.

Natural disasters, such as floods and droughts, can severely damage agricultural production in any environment. Droughts are both frequent and severe in many African countries as a result of the variability in rainfall in the arid and semi-arid areas and the poor capacity of soils to retain moisture. Many African countries are particularly vulnerable to the effects of drought because of dependence on rainfed agriculture (crop and livestock production) and its importance to GDP. ^{1/} China has not encountered drought on this scale, although flooding in some years, for example as recent as 1991, has affected agricultural output on a significant scale in some regions.

b. Traditional technologies

Until recently, because of the relative abundance of land in relation to population in many African countries, "shifting" and "slash and burn" agriculture has been practiced over large areas. Long rotations and a mix of pastoral and crop husbandry have adequately met the needs of people. However, with increasing population, soil degradation, and generally low productivity, intensification of agriculture has become a necessity. A transition from shifting to settled agriculture--involving shorter rotations of crops--is now indeed under way, creating pressure on the natural resource base and on the traditional linkages between animal and crop husbandry. The traditional technologies and the customary land systems are unable to accommodate the needs of a rapidly growing population. China, on the other hand, has practiced settled and intensive agriculture for centuries. In

^{1/} For an interesting study of the impact of drought in Africa, see Benson and Clay (1994).

recent decades, the intensification of agriculture in China has progressed due mainly to productivity increases. The development of rural infrastructure, including irrigation, and the adoption of new labor-intensive (land-augmenting) technologies in the 1960s and 1970s have made a major contribution to this process.

2. Evolution of institutions

There is a general agreement that property rights in natural resources--agricultural land, pastures and forests--should be well defined, understood and enforced to use the resources efficiently for the common good. "Open-access" represents absence of property rights, which often results in wastage and degradation of resources, and may even perpetuate poverty. Private property rights in agricultural land imply exclusivity, security and transferability of ownership. There is, however, much disagreement in the literature about the exact form of property rights (private, customary and state), how these forms have evolved, and which one is "best" for the economy and the society. ^{1/}

The traditional Chinese land system, before the establishment of the People's Republic in 1949, can be described as essentially "feudal". Much of the land was owned by landlords who leased it in small (fragmented) parcels to the landless peasants. A land reform program was completed during 1949-52, under which land was taken away from landlords without compensation and distributed free to the poor and landless peasants. The

^{1/} Some of this literature is reviewed in Platteau (1992). There is considerable debate about the effects of farm size (economies or diseconomies of scale) and tenancy (sharecropping, fixed rent, and wage labor), on agricultural productivity and rural income distribution. This debate goes back to the nineteenth century.

Communist party experimented with various forms of cooperatives, while retaining private property rights in land. The "people's communes" were established in 1958 as large-scale collectives of peasants who lost the ownership of land and with it the freedom to make decisions. The commune system, in which the state owned the land, made the decisions about crops, prices, and inputs and rewarded the peasants with "work points", remained intact until 1978.

A series of major reforms were introduced in 1979-83 to improve the performance of Chinese agriculture. It was acknowledged that the key to farmers' incentives was to solve the managerial problems in the commune system. Rewards to individuals were not tied directly to their effort--because of the difficulties and high cost of monitoring the agricultural work, which is sequential and spatial--so the incentives for work were low and undercontribution to effort was pervasive. 1/ The government initially considered subdivision of the collectively-owned land into individual household parcels to be contrary to socialist principles. However, by 1983 almost all rural households in China had adopted the household responsibility system (HRS). Initially the households were given short-term leases of one to three years, but in 1984 the lease period was increased to 15 years. At the same time, subleasing of land and use of hired labor were permitted. The contracting households have to meet the quota obligations (as rent to the state) and pay the local taxes. 2/

1/ A formal explanation of the underlying theory and test of some hypotheses about collective farms in China is given in Lin (1988).

2/ A detailed account of institutional changes in China since 1949 and the government's shifting policy on HRS in recent years is given in Ash (1993); Lardy (1990); and Stone (1993).

Recent studies on the impact of economic reform in China have argued, based on good evidence, that the institutional change from the commune system to HRS contributed about one-half of the increase in total factor productivity during 1979-89. The rest was due to increased levels of inputs, resulting from price incentives. 1/

The land system in Africa is in a state of flux, creating much uncertainty about the property rights in agricultural land, pastures and forests. It is hard to properly describe the land tenure system of Africa, both because of its diversity and the changes under way with or without government action. The customary African land system, before the entry of Europeans into Africa in the nineteenth century, was based on the relative abundance of land to population. The right of landownership did not extend to the individual or household: individuals enjoyed secure and transferable rights to the use of land within the tribe or kinship group. Communal ownership of pastures, forests and agricultural land was the common pattern. The technology used in agriculture--slash and burn and shifting cultivation with long fallow periods--was consistent with the resource endowment and the institutional capacity of tribes and kinship groups. Land parcels, distributed to individual households on the basis of need and the size of household, were rotated among the households.

1/ This general conclusion is reached in several studies, but a rigorous analysis is provided in Lin (1988) and Wen (1993). According to the second of these studies, the "commune system was detrimental to, and the HRS has been conducive to an increase in total factor productivity, and there was an outward shift of the production frontier following the dismantlement of the commune system" (Wen (1993), p. 34). However, while the productivity effects of HRS have been generally recognized, there is still debate about its consequences on the distribution of rural income; see Khan, Griffith, Riskin, and Renwei (1992), and Lin (1994).

Europeans introduced the ownership rights of individuals to agricultural land--taken away from Africans usually by force--for settlers in Africa (e.g., Côte d'Ivoire, Kenya, Malawi, Zambia, and Zimbabwe) to grow commercial crops for exports. Africans were generally allowed to maintain the customary land system and produce mainly subsistence crops. In many areas, they were forced to provide labor to European farmers and commercial plantations. In several African countries, a dual land system had emerged by the early 1950s when the African states started to gain independence (Platteau (1992)).

In very few countries of Africa, with Kenya being perhaps the best example, the post-independence governments have introduced and enlarged on a systematic basis the private (individual) right of landownership. A debate has often followed about the increasing concentration of land and landlessness. In some countries, agricultural land was taken away by the state from the tribal (communal) system and private landowners, as in Ethiopia, Nigeria, and Tanzania. There is evidence that this customary land system--which is still predominant in many African countries--has lost much of its structure due to: (i) increasing pressure of population on arable land; (ii) increased mobility of labor; (iii) expansion of markets; (iv) emergence of de facto tenancies in various forms within and outside the tribal and kinship groups; and (v) lack of interest and inadequate institutional capacity of governments to restructure the customary land system. 1/

1/ Burkina Faso is one of the few countries in which the government has started providing land titles to the traditional communities.

The uncertainty and insecurity of tenure in land throughout Africa adversely affects the incentives to make long-term investments and adopt new technologies where they have become available. It is this state of insecurity of tenure, and not necessarily the incapacity of the customary land system to adapt to changing circumstances, that inhibits agricultural growth in African countries. 1/ The transition from the communal to private property in land requires policies that can first arrest the decay of the customary land rights into an open access regime--as is clearly evident in pastures and forests--and provide a legal framework for property rights that are well defined, secure and transferable. Restrictions on rights by custom or law, in the face of rapid population growth and continuous cultivation, can have serious implications for investment in land and technological innovations in agriculture. 2/

3. Prices and markets

Until 1979 the Chinese leadership maintained a policy of food self-sufficiency, which has been called "food fundamentalism", particularly in grain production irrespective of the differences in regional comparative advantages. Also, it kept the producer prices of agricultural goods at levels that were far below the border prices to provide cheap food to industrial workers and urban consumers. Prices were administratively determined. Producers' sales quotas were fixed. State purchase prices and state selling prices bore little relationship to each other. Prices were irrelevant to distribution, since commodities were allocated in a planned

1/ See Migot-Adholla, Hazell, Blarel, and Place (1993); Platteau (1992); and Smith, Baran, Goldman, and Mareck (1994).

2/ Migot-Adholla, Hazell, Blarel, and Place (1993).

way through the administrative system. Finally, prices did not affect consumer behavior, since supplies of key commodities were sold by allocated rations.

The most important policy change in China began in 1979, when prices were increased for producers to improve agricultural profitability and raise peasant incomes. Initially, the average increase for the quota prices was 17 percent and 41 percent for the above-quota prices. By 1981 procurement prices were an average of 42 percent above those in 1977. The government also liberalized the procurement system by progressively reducing the base targets for unified sales, restoring the system of negotiated sales, and allowing greater freedom to farmers to sell the surplus production at negotiated prices or on the free market. In response, producers began to sell a greater proportion of their output in the higher-priced categories or on the free market. The trend towards liberalization of the state procurement and pricing system led to a situation by 1991 where about 50 percent of all agricultural products purchases took place at market prices, 20 percent were subject to state guidance prices--where maximum and minimum prices were set--and the remaining 30 percent were sold at state-determined prices. ^{1/}

The price and procurement reforms in China, combined with the institutional reforms, have had several important effects on the

^{1/} See Findlay, Martin and Watson (1993). Initially the government did not pass on to consumers the price increases of basic (rationed) commodities (grains in particular). However, in 1991 the retail prices of grains and other farm products were increased significantly. It may also be noted that the compulsory procurement quotas were replaced by purchasing contracts between the state and farmers (Ash (1993); and Lin (1994)).

agricultural sector and the rural economy: production and productivity of crops and livestock products have been rising substantially; regional comparative advantages are being exploited more fully; inter-regional markets (network of markets) are developing rapidly; and rural incomes, savings and investment have increased significantly. 1/ The indirect effect of the economic reform program in rural areas has been the rapid growth of nonagricultural enterprises, commonly known as township enterprises. Labor freed from agriculture was available to develop new types of production, spurred on by the higher returns from such investments. The phenomenal growth of these enterprises, owned by individuals and townships (local governments), is reflected in the fact that in 1990 they accounted for 54 percent of the value of rural production and 25 percent of the value of national output. 2/ Rural enterprises represent a key element in China's rural development strategy, providing inputs in agriculture, absorbing rural labor, producing for the market, and helping to raise rural incomes.

It is fair to say that a significant share of the blame for the deterioration of African agriculture can be placed squarely on government policies, which have shifted the internal terms of trade strongly against agriculture and created market distortions that reduced efficiency. Until the mid-1980s, farmers in Africa have faced probably the highest burden of taxation in the world through explicit taxes (low producer prices, export taxes and taxes on agricultural inputs) and implicit taxes (overvalued

1/ See Findlay, Martin, and Watson (1993); Khan, Griffin, Riskin, and Renwei (1992); Lardy (1990); and Lin (1994).

2/ See Findlay, Martin, and Watson (1993).

exchange rates and high levels of industrial protection). 1/ The result was a shift of resources, especially labor, out of the sector, and a decline in both public and private investment. The decline in Africa's agricultural exports coincided with substantial and widespread macroeconomic distortions and the deteriorating real prices paid to farmers. 2/

Governments in Africa have intervened heavily in the production and marketing of export crops, such as cashew, cocoa, coffee, cotton, groundnuts, palm oil, tea, and tobacco, through marketing boards and parastatals. Most agricultural parastatals have enjoyed monopoly power in purchasing and exporting at prices usually not linked to the world market prices. In spite of the economic reforms undertaken in recent years, there are still serious barriers to private competition. Often the marketing boards retain a de facto monopoly through control over processing of agricultural products and privileged access to bank financing. Similarly, these boards can squeeze out private agents by setting unprofitably low price margins and relying on the government to subsidize their losses. Even when competition in the domestic purchasing has been allowed, the government maintains control on the export of major crops (e.g., cocoa and coffee in Côte d'Ivoire). The World Bank has concluded that overall the operations of the parastatals and marketing boards have been very costly and inefficient. 3/

The intervention of governments in the pricing and distribution of food crops is less pervasive but still substantial; in about 15 African

1/ See World Bank (1994a).

2/ See Jaeger (1992); and World Bank (1994a).

3/ See World Bank (1994a).

countries the intervention is heavy. In some countries, government intervention was restricted to marketing of imported foods, mainly wheat and rice to urban consumers, having indirect effects on domestic producers. Evidence suggests that government controls on distribution and prices have not been very effective and evasion through parallel markets is substantial. 1/ Food prices have been affected less than the prices of export crops by government policies due to ineffective policy interventions and limited imports of cheap food. Trends in consumer food prices show that relative to border prices, at official exchange rates, domestically-produced food crops were more expensive relative to imported wheat and rice in the 1970s. As distortions in real exchange rates have declined and food markets have been liberalized in the last few years, prices of traded food crops have increased while the prices of nontraded crops (tubers and roots) have fallen. Policy reform in the pricing and distribution of food crops has been rapid in those countries that intervened heavily, mainly because of the disastrous financial position of food crop marketing boards. 2/

Governments in a large number of African countries have recently embarked upon major economic reform programs, including corrections in the exchange rates and producer prices of both export and food crops, reducing

1/ See Jaeger (1992); and World Bank (1994a).

2/ Prices and distribution of agricultural inputs, chemical fertilizers in particular, have also been subject to heavy government intervention. Most of the inputs have been subsidized partly to compensate farmers for the excessive taxation of agricultural products and partly to give incentives to farmers to adopt new and profitable technologies. There is much debate about the subsidies for fertilizers in relation to the fertilizer use and the efficiency of the public distribution systems. Governments in Africa, as in other parts of the world (including China) have started to reduce gradually the levels of fertilizer subsidy and increase the participation of the private sector in the distribution system (World Bank (1994a)).

the role of marketing boards and increasing participation by the private sector in the production and distribution systems. The results so far are quite mixed in terms of the impact of these changes on the performance of the agriculture sector. 1/ One main reason is that the reforms are quite recent and have not had time to take full effect. The other reason is that the response of farmers also depends on a variety of nonprice factors, for example land tenure, physical and social infrastructure in rural areas, and support services.

4. Infrastructure and support services

The development of agriculture requires investment in physical and social infrastructure and in support services of agricultural research and extension. The returns on physical infrastructure, such as canals for irrigation, roads and railways for transport, are usually high, since they increase the net returns on the production and marketing of agricultural products. The multiplier (secondary) effects of a well-developed and maintained transport and communications system are also substantial. 2/ Similarly, investment in rural education and health care has been shown to have high returns. Effective agricultural research and extension services, provided by both the public and private sectors, also have a significant impact since they introduce new production technologies that increase productivity and incomes.

The contrast between China and African countries with regard to the development of rural infrastructure and agricultural support services is

1/ See Husain and Faruqee (1994); and World Bank (1994a).

2/ See World Bank (1994b).

quite revealing. For one thing, a much higher proportion of GDP in China than in countries in Africa has been saved and invested for decades and the trend has been rising for the former and declining in the latter. 1/ The data on public and private investment in building the rural physical and social infrastructure are either scanty or unavailable. 2/ However, a general impression is that in Africa the levels of investment and returns on these investments have been significantly lower than in Asian countries, including China. 3/ It is also acknowledged that the density of roads and railways and quality of the transport infrastructure are lower in most African countries than in China. 4/

The development of the irrigation infrastructure and supply of new technologies, based on agricultural research and transmitted through extension services, are normally undertaken by the public sector in most developing countries. Governments in many countries also spend substantial parts of their budgets on subsidies for credit and agricultural inputs as incentives for farmers. A consistent set of data for government spending on these activities are not available for many countries. However, the best estimates of the share of agriculture (including water development) in total government spending in Sub-Saharan Africa and China in the last two decades show significant disparities. These estimates indicate that agriculture has received about 7 percent of the total government spending in Africa as against 10-12 percent in China.

1/ See World Bank (1994b) and (1994c).

2/ See World Bank (1989).

3/ World Bank (1989).

4/ See World Bank (1989) and (1994b).

The basic indicators of water development in China show rapid progress during the Maoist period. The irrigated area increased rapidly in the 1950s and 1960s, with locally organized small-scale projects and publicly-funded construction of large-scale surface structures. Tubewell development in the late 1960s and 1970s supplemented these investments. Similarly, the flood control and drainage efforts were significant. These incentives contributed to the expansion of high-yielding varieties (HYVs) of wheat, rice and corn. In the post-Maoist period, the growth of irrigated area stagnated for a decade, as did the proportion of pumping facilities. In view of the negative impact of the decline in irrigation and irrigated area on multiple cropping and yield levels, the provincial and local governments started to mobilize funds and people in 1987 to construct, restore and renovate the irrigation system. 1/

Africa has limited irrigation, which tends to act as a major constraint on the introduction of new technologies and inputs. However, there is substantial potential for irrigation, drainage and water storage in countries that have predominantly arid and semi-arid conditions. A number of irrigation schemes in Africa have tended to be extremely expensive by world standards. Often the government agencies maintaining the irrigation systems are underfunded and perform no better than other parastatals. Generally, the large-scale schemes have been more poorly designed, constructed, maintained, and operated than small-scale schemes. Less

1/ See Stone (1993).

complex, small-scale irrigation schemes run by individuals or communities appear more productive and viable. 1/

Most of the modest agricultural growth in African countries has been created by the expansion of cultivated area on which the increasing agricultural population has used traditional methods of production. While there has been some expansion of irrigation, the use of fertilizer has remained remarkably low. The Green Revolution seems to have bypassed Africa. There have been major constraints on the demand for and supply of improved agricultural technologies, e.g., poorly-designed macroeconomic and pricing policies, shifting cultivation, poor soil and water conditions, inadequate financial resources to buy the needed inputs, and poor infrastructure linking farms to markets. Until the 1960s, the primary emphasis of the modest agricultural research systems was on export crops, and in the 1970s, the emphasis shifted to food crops. In recent studies, it has been found that agricultural research institutes, established in the 1980s with donor assistance, are inadequately funded, contain research programs with little relevance to agricultural needs, and do not collaborate. 2/ The agricultural extension services in Africa are run by the public sector, usually as a large but ineffective agricultural bureaucracy. The donor-assisted experiments on agricultural extension in Africa through commodity projects and programs in the 1960s and 1970s were likewise major failures.

1/ See Cleaver (1993).

2/ Smith, Baran, Goldman, and Mareck (1994), and Cleaver (1993).

IV. Conclusions

The question of why countries like China have consistently outperformed African countries in agriculture is of major concern to policymakers in Africa, bilateral donors, and the multilateral institutions. In general, studies on the subject conclude that in China there have been a number of factors favoring rapid agricultural development. These include the prevailing system of property rights, the existence of adequate infrastructure, and the pricing and marketing policies followed by the government. Until around the second half of the 1980s these factors enabled agricultural production in China to expand fairly dramatically. More recently, however, the pace has slowed down for several reasons. First, productivity growth in agriculture has fallen below that of the industrial sector, causing relative declines in incomes in the agricultural sector. Second, there were delays in increases in procurement prices. And third, the rate of investment in agriculture fell as state investment was increasingly directed towards industry and infrastructure. In response to these problems, the government has implemented a series of measures, including raising procurement prices in 1994 closer to international levels, protecting farmland, supplying additional agricultural credits, improving the distribution and marketing systems, and raising the level and quality of technical and support services. In China, developing agriculture remains a high priority for the government, and these measures are likely to lead to renewed rapid growth of the agricultural sector.

In Africa, on the other hand, agricultural performance has not been nearly as favorable. This in turn has had a deleterious effect on the

overall growth rate of the economies of this continent. How then can African countries break out of the low-growth paths of agriculture? Certainly the economic reforms highlighting appropriate pricing and exchange rate policies that the countries have undertaken are bound to have a positive effect. Indeed, in a number of these countries agricultural performance has picked up significantly in the 1990s. Uganda is one good example of where liberalization measures have led to an increase in agricultural profitability and production. But for a majority of countries in Africa the picture has remained bleak. The problems of African agriculture are deep-seated and simply "getting prices right", while undoubtedly important, will not be sufficient. More fundamental changes involving major investments in infrastructure and water resources, changes in the system of property rights, and the widespread application of new technologies will be required if African countries are to be able to count on agriculture as the means to more rapid economic development.

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