

29. W. H. Pierre, L. Dumenil, V. D. Jolly, J. R. Webb, W. D. Shrader, *Agron. J.* **69**, 215 (1977).
30. For details on the methods of sampling and analysis, see Lockeretz *et al.* (10).
31. W. Lockeretz, R. Klepper, B. Commoner, M. Gertler, S. Fast, D. O'Leary, R. Blobaum, in *Agriculture and Energy*, W. Lockeretz, Ed. (Academic Press, New York, 1977), p. 85.
32. R. F. Holt, *J. Soil Water Cons.* **34**, 96 (1979).
33. U.S. Department of Agriculture, Soil and Water Resources Conservation Act, "Appraisal 1980, Review Draft Part I" (Washington, D.C., 1980).
34. W. A. Hayes and L. W. Kimberlin, in *Crop Residue Management Systems* (American Society of Agronomy, Crop Science Society of America and Soil Science Society of America, Madison, Wis., 1978), p. 35.
35. W. H. Wischmeier and D. D. Smith, *U.S. Dep. Agric. Agric. Handb. No. 282* (1965).
36. This research was conducted at the Center for the Biology of Natural Systems, Washington University, from 1974 to 1979, under NSF grants AER-74-18438 and AER-77-17031.

Rural Africa: Modernization, Equity, and Long-Term Development

Uma Lele

Within less than a decade Africa is facing a second severe food crisis. The poor crop can yet again be explained as a result of drought. But the continent's growing vulnerability to crop failures is

even to South Asia, which is generally perceived as laggard in development but where substantial productivity gains were experienced in food crop production in the 1970's. Per acre yields of

Summary. Prospects for rural development in sub-Saharan Africa appear to be much poorer than in the rest of the developing world, especially since the oil price increases. If present trends continue, African dependence on food imports will increase. Despite the rhetorical acknowledgment of the importance of the agricultural and rural sector, most African countries are not giving that sector the needed priority in their policies and budgets. Indeed, the rural sector is heavily taxed for the support of urban modernization. Large investments by foreign donors in the rural sector have had little overall effect. Donors need to adopt a longer perspective on development and to make greater efforts to promote indigenous capacities for policy, planning, and administration. Their investments need to be geared more to broad-based higher education and training and to transport and communications.

by no means unexpected. In most African countries it appears to be part of a long-term trend. Data on African countries, especially for subsistence production, are too poor to permit precise estimates, but annual rates of increase of major staple food crops in sub-Saharan Africa in 1960 to 1975 seem to have been only about 2 percent, compared with almost 3 percent in Asia and over 3.5 percent in Latin America (1; 2, p. 33, table 3). Productivity increases in hybrid maize in some selected areas, such as the highlands of Kenya, were impressive. However, on the whole, increase in the production of major cereals and root crops—maize, sorghum, millets, and cassava—came about through increase in the area under cultivation brought about by expanding population, rather than through gains in productivity per unit of input. This is in sharp contrast

many subsistence food crops appear to have stagnated or even declined in many African countries, as for instance in Ghana, Mali, Nigeria, and Sudan.

Because of higher population growth, annual rates of increase in production required to meet consumption needs by 1990 are also estimated to be higher for sub-Saharan Africa, about 4.5 percent, compared with not quite 4 percent for Asia and less than 3 percent for Latin America (2, p. 22, table 1). If present trends continue, Africa will increase its dependence on food imports both over time and relative to other developing continents. Undernourishment is expected to become far more widespread, even though alternatives to cereals and staples, such as bananas and other fruit, fish, and animal products, have been far more important sources of calories in many parts of Africa than in South Asia,

which has similar per capita incomes. Indices of ill health and infant mortality are already among the highest in the developing world and are not expected to decline significantly in the next decade.

Export crop production has been more varied among African countries since independence. Production of cotton, tobacco, cocoa, and coffee rose significantly in some countries until the 1960's (3), but during the 1970's, production of major export crops has either been stagnant or declined in many countries. Nigeria, for instance, became a substantial net importer of edible oils, of which it was previously a net exporter. Groundnuts in Mali, cocoa in Ghana, cotton in Sudan, cotton, sisal, coffee, and cashews in Tanzania all provide examples of stagnancy or decline in production.

Rural-urban income disparities are already high in Africa, the ratios typically ranging between 1:4 and 1:9, compared with many countries in Asia with ratios of 1:2 and 1:2.5. But because agricultural sectors have been stagnant or slow growing even relative to the poorly performing industry and services sectors, these disparities are worsening in many cases. Kenya, Malawi, and the Ivory Coast are the few exceptions where until recently growth has been impressive, but there the distribution of benefits between agriculture and industry, and within agriculture, have been particularly unequal. The World Bank's *World Development Report* of 1979 estimates the annual growth of per capita incomes in low-income African countries—meaning those where annual per capita income is less than \$300—to be only 0.2 percent during the 1970's, compared with 2 percent in low-income Asia. Even the middle-income African countries experienced per capita income growth rates of only 2.8 percent per annum, compared with 5.6 percent in the corresponding countries in East Asia and the Pacific (4).

Worse yet, prospects for overall economic growth in low-income Africa are seen as much poorer than in the rest of the developing world. The *World Development Report* projects the likely growth rates of per capita income in low-income Africa during the 1980's to be 1 percent,

The author is with the World Bank, 1818 H Street, NW, Washington, D.C. 20433.

compared with 2.8 percent for low-income Asia. To reverse these long-term trends would require a clear understanding of the causes of poor past performance.

This article argues that most African countries are not giving priority to the development of peasant agriculture. There is not even much understanding of what is required to develop it. As a result, what domestic resources are spent on agriculture go largely to pay for the growing wage bill of an inadequately equipped and inadequately operating public sector or to ineffective subsidies. The fragmented donor community has largely focused on project financing, mainly of capital expenditure and technical assistance. Project financing has been rapidly increasing over time, directed mainly toward the rural poor. But the current and past investments are having little impact, not simply in the short run but in laying foundations of long-term development. Projects are overwhelmed by the lack of priority and of the needed strategy. The result is poor policies, shortage of maintenance and operating funds, and shortage of qualified staff, hence often a major depletion of capital.

The Asian experience suggests that agricultural development does require large amounts of resources. But the donors' special capacities should lead to substantially broadening education and supporting not just primary but middle- and high-level training of nationals in technical fields to develop a science-based peasant agriculture. This will not only help to create national policy, planning, and implementing capacity but will support a diverse network of institutions required in addition to those operated by governments. Major investments are also needed in transport and communications, many of which will have to be highly capital-intensive. With such a re-oriented emphasis, and guaranteed long-term assistance tied to concrete indications of national commitment, at least long-term prospects could improve significantly.

Crucial Role of Peasant Agriculture

As in many parts of low-income Asia such as Nepal, Sri Lanka, India, Bangladesh, and Thailand, concern for economic development in Africa primarily means a concern about agricultural and rural development. Between 80 and 90 percent of the nearly 400 million people in sub-Saharan Africa live in rural areas. Most derive their subsistence from meager crop and livestock production and

survive on annual per capita incomes of less than U.S.\$150. Although production is largely geared to subsistence, the rural sector is also the major source of food for urban consumption and of raw materials for exports and for domestic manufacturing. Except in a few mineral-producing countries such as Zaire, Zambia, and Nigeria, agriculture constitutes the largest income-generating sector, contributing up to 40 percent of the gross national product of many African countries. Between 70 and 80 percent of the annual export earnings in many countries is derived from three to six agricultural commodities. Direct and indirect taxes on agriculture are the most important source of government revenues. The estate sector is important in marketed surpluses to a varying degree among crops and countries, but a major share of the total production and marketed surplus nevertheless comes from the small-holder sector. Not only is broad-based agricultural development thus crucial for increasing incomes, employment, and export earnings, but raising the incomes of the rural poor is essential for raising government revenues and creating a domestic market for the goods and services produced in a growing urban manufacturing sector.

Policies and Strategies Since Independence

Rhetoric and plan documents in almost all African countries make reference to the key role of the agricultural and rural sector in Africa's modernization. Since the disastrous drought of 1973-1974, self-sufficiency in food has become a major objective, often supported by donor-financed projects. The need for increasing export earnings is also being recognized more urgently, the balance of payments difficulties having grown with the rising cost of imported energy and manufactured goods. Despite the growing awareness and increased projects, however, unlike in Asia there is not yet the basic conviction among many African policy-makers that the small-holder agricultural sector can and will have to be the engine of broad-based economic development and eventual modernization.

Modernization is taken to mean mainly industrialization and the commercialization of agriculture largely through mechanized, large-scale farming. The fluctuating prices of these primary exports explain the desire to industrialize, as does the relative ease of setting up factories and state farms com-

pared to the organizationally far more demanding development of peasant agriculture. In its broadest sense the objective of modernization is of course shared extensively throughout the developing world. It is the short time perspective of the African expectations that poses a problem, especially given the much poorer institutional and trained manpower base Africa inherited at independence. Goren Hyden aptly contrasts the eloquent Tanzanian President Nyerere's slogan "We must run while others walk" with China's strategy of modernization by the year 2000 (5). The frequently noted perception of peasant agriculture as a "holding sector" is, however, by no means unique to Africa. At an earlier stage, India's first 5-year plan (1951 to 1956) incorporated community development and promotion of cottage and small-scale industry essentially as stop-gap arrangements to ensure rural welfare and employment until industrialization could absorb the growing pool of surplus agricultural labor. The more dynamic development strategy, oriented toward small-farmer productivity, which is now being implemented successfully in many parts of India, came into ascendancy only in the mid-1960's, with technological change made possible by the new high-yield cereals. As is argued below, in Africa the view of agriculture as a holding sector and the "Modernization Now" strategy have had many of the same consequences for the development of peasant agriculture in more free-enterprise, growth-oriented Nigeria and Zambia as in Ethiopia and Tanzania, which show greater concern about income distribution and class formation.

Planning the use of government finances for agricultural development is of course not easy for most African countries because of the great fluctuations in their export earnings. Their bureaucracies are less experienced than those of their Asian counterparts which experience similar fluctuations in earnings. Lately their ability to plan has been further eroded, as it has in other developing countries, by the declining purchasing power of their export earnings, as import prices of oil and industrial goods have soared. The composite index of terms of trade between export and import prices, with 1977 as the base, declined from about 170 in 1966 to 94 in 1979 in the 17 countries that constitute the Eastern Africa Region in the World Bank (6).

Even within these all too obvious constraints, however, far fewer resources are ploughed back into agriculture by most African countries than would seem justified. Inter-country comparisons are

exceedingly difficult owing to definitional, data, and other measurement problems, but orders of magnitudes indicate that in the 1970's around 10 percent or less of the planned development expenditure was allocated to the agricultural sectors in Kenya and Mali, compared with 31 percent in India during its first 5-year plan in 1951 and 20 percent of the much larger absolute investment in the subsequent three plans. In Zambia the total agricultural budget may have decreased in real terms by an annual average of slightly over 9 percent from 1975 to 1979, reflecting general budgetary cuts. Malawi is one of the few exceptions in Africa; it appears to have allocated close to 30 percent of the known planned public expenditures to agriculture. However, even there, because of more favorable tax, wage, and pricing policies toward the estate sector, large-scale production has grown at an annual rate close to 17 percent since 1968, with 70 percent of the share in exports. The corresponding production increase in the smallholder sector has been only 3 percent a year, even though services to peasant agriculture generally operate far more effectively in Malawi than in several neighboring African countries.

Large-scale farming per se is far less important a portion of total production or exports in Tanzania. However, government policies of "villagization" of peasant producers, combined with pronouncements of the need for cooperative cultivation or actual haphazard attempts to introduce it, have had an adverse effect on smallholder incentives and production. Several other seemingly well-motivated government initiatives to raise peasant productivity have ended up being poorly implemented, leading, for instance, to unrealistically high production and input-use targets, the consequent indiscriminate promotion of fertilizer use, or discouragement of interplanting of crops (which is traditionally done by peasants to reduce risks of crop failure) as not being "modern." These government initiatives combined with unreliable provision of agricultural extension, credit, and output marketing have resulted in producers' responding mainly to changing relative prices of food and export crops rather than in enabling them to raise overall agricultural productivity. The failed government initiatives have in turn led to an increased official tendency to look toward large-scale mechanized and irrigated production to guarantee food and export surpluses. Like Tanzania, many other countries have already invested or have plans to invest substantial resources in large-

scale state farms, but the record of public sector farming is very poor throughout Africa, and large subsidies are required for these operations.

Irrigation will of course have to be important ultimately, as the vast, less costly possibilities of increasing production under rain-fed conditions begin to be exhausted. For the short run, however, in most of Africa there is not the complex institutional and managerial capacity to operate irrigation systems indigenously. The frequently costly rehabilitation (at \$5,000 to \$15,000 per hectare) being undertaken in many of the existing schemes illustrates the problem.

Peasant agriculture is highly taxed by fixing low prices for its products and overvaluing the national currencies vis-à-vis those of importing countries. Agricultural taxation helps keep urban food prices low and finances modernization through the many capital-intensive investments such as construction of new capital cities, stadiums, manufacturing and processing plants, and airports. Agriculture is, of course, the most important sector and hence has to be the major source of revenue. However, traditionally it was taxed because peasants were perceived as irrational, lazy, and unresponsive to price incentives. The resulting tax practices were inherited by independent governments from colonial administrations. Evidence of producer response has mounted, however. In turn, relative official producer prices of food and export crops have been changed in many countries in the last decade, first in order to achieve food self-sufficiency and more recently to promote exports. Relative prices have in fact been easier for governments to influence than technology or quality of services. Thus, while composition of food and export crops has changed, the overall productivity has stagnated, as the producer's share in the total net market value of the output is frequently very low. In the Sudan, rate of taxation on cotton farmers during 1974 to 1978 was 35 percent; in Mali it ranged from 36 to 69 percent on cotton, 52 to 65 percent on groundnuts, and 23 to 63 percent on sorghum and millets. Even after allowance is made for the subsidies received by farmers on fertilizer and credit, the effective rate of taxation amounted to 24 to 61 percent for cotton and 48 to 65 percent for groundnuts in Mali.

Again, the inadequate recognition of producer incentives is by no means confined to Africa. Theodore W. Schultz's work *Transforming Traditional Agriculture*, which included examination of the peasant irrationality hypothesis, was prompted by similar observations in de-

veloping Asia in the early post-independence period (7). In Asia these attitudes, trends, and perceptions have been muted, however. In fact, an articulate proagriculture lobby has been created within most governments in Asia. What accounts for these differences? In comparison with Africa (with a few exceptions, such as Kenya), in most of Asia there has been greater overt discussion of policy issues, both domestically and between domestic and outside scholars. More widespread formal education and training of policy-makers and administrators in Asia has been helpful, as has their greater exposure to the farming communities through longer practical work experience (8). New technological possibilities and increased use of purchased inputs have also changed the perspective on price incentives. Now several rural development projects in Africa have gradually begun to produce a similar cadre of knowledgeable Africans in several countries, but their numbers are small because of government and donor policies to be described later.

A large part of the agricultural budget in many countries is spent on subsidies—over 70 percent in Zambia. But contrary to the general opinion, many of the subsidies provided in the agricultural sectors in the hope of increasing overall peasant production do not compensate effectively for high rates of taxation. For instance, fertilizer subsidies frequently only help alleviate the high cost of production of inefficient domestic fertilizer plants or the high cost of their local distribution. General subsidies on interest rates and inputs largely benefit the already better-off commercial farmers (9). A policy followed in many African countries of uniform pricing of output involving complex cross subsidies of transport and other handling costs across regions has achieved regional equity, especially where few attractive enterprises exist, but has discouraged crop specialization to exploit different natural resources among regions.

Input and output marketing and processing facilities are almost always operated by semiautonomous government or parastatal agencies, or by largely government-initiated cooperatives, on a monopoly basis. Public marketing agencies tend to be high-cost operations because of overstaffing, poor financial control and accountability, and inexperienced management. If an informal traditional market operates, it is only tolerated rather than helped to improve (10). Frequently it is actively discouraged. The eviction of largely Asian-dominated trade through Operation Maduka in Tan-

zania and the massive expulsion of Asians in Uganda illustrate the point (10). A strong desire to abolish exploitation of nationals by other races is understandable, even if such exploitation is imputed rather than real. But even Nigeria, which has had a bouyant, largely indigenous, small-scale traditional trading sector, adopted a policy of public sector monopoly of the distribution of fertilizer. Tanzania has similarly discouraged its own enterprising tribes from trading, among other things by instituting 300 or so parastatals and 8000 village cooperatives which are expected to provide most of the public services.

Some of these same policies are followed for almost the same political and bureaucratic reasons in most Asian countries, but the consequences there are far less severe. The degree of government control is more limited, there is greater administrative capacity to exercise it, and there has been more development of private institutions and transport and communication networks. In Africa inputs are more frequently late, inadequately labeled and packaged, and in wrong combinations. Marketed surpluses are often not picked up on time, first payments to farmers are inordinately late, promised second payments rarely materialize, and damages to crops in storage and handling are more extensive. Discouragement of private retail trade has affected rural supply of even the most basic day-to-day necessities in some countries, thus further reducing incentives for producers to consume, save, or invest. Institutional pluralism needs to be given major consideration as an element of development strategy in Africa.

Whereas there is indiscriminate government intervention in some areas of policy, unlike in many Asian countries today, there is neglect of others, as for instance agricultural research, extension, and development of trained manpower. Part of the reason for this neglect is the inadequate recognition of the importance of these services and of the time required to establish effective institutions and delivery systems, and simply preoccupation with the politically more expeditious short-run objectives. The role of donors in this regard should not be underrated and is discussed later. The diversion of scarce financial and manpower resources to purposes that the private sector could well be allowed to serve is also a handicap. Because of the inadequate provision of recurrent resources, what research, extension, and training facilities exist are frequently underfinanced and poorly maintained. As

President Nyerere observed in his famous speech, "The Arusha Declaration: Ten Years After," the pressure to maintain and even expand public sector employment through the available limited resources is so high that the wage bill is difficult to control (11, 12). Consequently there are not enough public funds for travel and transport allowances for field staff to carry out research trials and extension demonstrations, and for spare parts, maintenance and operation of stores, processing facilities, research stations, vehicles, and roads. The general situation is one of ill-trained, unmotivated, unsupervised, and demoralized field services in many sectors. Of course there are notable exceptions such as the Kenya Tea Development Authority and the Agricultural Marketing Corporation in Malawi. Inadequacy and depletion over time of capital and government services are far more severe in areas where donor projects do not exist, inasmuch as these areas do not benefit from priority budgetary allocations. But the implementation of budgets also needs to be improved, as frequently even the resources allocated are not spent.

Social services suffer from many of the same problems. They also effectively illustrate the wasted potential and the failed promise of the early 1970's for resource mobilization and constructive involvement of rural people in planning and implementation. Lack or poor quality of water supply in many rural areas of Africa leads to ill health. Time spent in fetching water reduces time available for agricultural activities. Lack of health facilities similarly reduces labor and productivity in agriculture. Absence of primary education results in limited access to services and employment opportunities in towns. Demand for social services is therefore widespread throughout Africa. On the other hand, public resources of a recurrent nature needed for the provision of social services are generally too limited to permit blanket coverage. Either a high degree of selectivity or greater direct cost recovery is therefore required in the provision of such services. As many "harambee" (self-help) schemes in Kenya illustrate, the rural people are glad to contribute their own resources provided the services are responsive to their precise local demands and reliable, low-cost delivery is assured. Tanzania's example indicates, however, that for a combination of welfare and political reasons governments refrain from cost recovery and genuine local involvement in planning and implementation. Tanzania's policy of universal provision of services through central

financing has undoubtedly achieved results in some areas. According to official data, the proportion of the eligible population enrolled in primary schools went up from 28 percent in 1960 to 93 percent in 1978. Access to safe water has gone up from 13 to 39 percent since 1970. To a lesser extent, most African countries have expanded coverage of social services in a similar way, but the overall result is still inadequately financed services with substantial demands on government resources.

Government objectives of modernization also exacerbate manpower shortages in the traditional sector. The low status of the traditional rural sector and the unattractive living conditions and facilities in contrast to the urban or the large-scale agricultural sector often deter qualified nationals from serving the needs of peasant agriculture. On the other hand, demand for education in Africa is one of the strongest in the developing world. The governments have allocated substantial portions of their own resources to education, with different emphases on primary or higher education depending on their ideology. Because Tanzania has largely emphasized primary education, the enrollment ratio in secondary schools in Tanzania went up from 2 percent at independence to only 3 percent by the late 1970's, and from nearly zero to 0.3 percent in higher education. The shortage of middle and higher level technical and administrative manpower is consequently extremely severe. In Kenya budgetary allocations to secondary and higher education have been expanding more rapidly, and private sector expansion is permitted more liberally, with ratios of 16 percent and 1 percent of the eligible population enrolled in secondary and higher education, respectively. Even then, middle and higher level manpower shortages are considerable, especially in technical fields such as accountancy, financial and physical resources management, agronomy, plant breeding, and mechanical and civil engineering. On a unit basis skilled labor in African countries typically costs between three and ten times as much as in many Asian countries. The average annual salary of a research scientist in the 1970's was below \$10,000 in Asia compared to \$34,000 in East Africa (13). And, of course, not nearly enough scientists are available even to rehabilitate, let alone to expand, the national research systems in Africa.

To summarize, the "Modernization Now" objective and the consequent national policies, investment priorities, and attitudes toward the smallholder agricul-

tural sector explain the poor performance of the agricultural and rural sectors in many African countries. In contrast, the Asian and to a very limited extent the African experience indicates that greater trained manpower, combined with longer developmental experience by nationals, leads to a better time perspective on modernization and more support of peasant agriculture.

Africa's Special Challenges

The frequent comparisons with low-income Asia in the previous discussion should not lead one to overlook the problems peculiar to Africa. Low rainfall, poor soils, and the highly diverse ecological conditions within individual countries make raising agricultural productivity much more difficult in many parts of sub-Saharan Africa than in Asia, with its extensive scope for small- and medium-scale irrigation and its more fertile soils.

Several seemingly favorable natural features of Africa, such as the low density of population, pose difficult rural development problems in the short run. In 1977 population densities ranged from 6 persons per square kilometer in Sudan and Somalia to a high of 85 in Nigeria. This is in contrast to the density of 148 in the Philippines, 192 in India, and 560 in Bangladesh. Farms are considerably larger and landlessness less prevalent in Africa than in most Asian countries. However, extensive land use is itself a result of the unreliable and low rainfall and poor soil conditions referred to above, which lead to shifting cultivation and widespread nomadism in many parts of Africa. Low density also makes for much greater per capita costs of providing roads, schools, and agricultural services in Africa than in Asia.

There are also apparent contradictions. Seasonal labor shortages are a far more limiting factor in increasing productivity of the African farming system than in Asia, especially in view of the low level of African agricultural technology. Thus selective use of mechanization in the private sector may be economically justifiable. And yet unemployment and underemployment of rural labor are also increasing, particularly where population pressure on land is rising rapidly. And with rising cost of fuel, mechanization—now often operated through the public sector—is frequently highly uneconomical. The more intermediate forms of technology that are used extensively in Asia, such as the ox plough, would be far more efficient, where tsetse has been controlled.

Cattle are an important element of Africa's agriculture. The tradition of individual ownership of cattle combined with communal grazing rights has resulted in overgrazing and declining productivity. For decades technicians have stressed the need for destocking and pasture improvement, but these have proved elusive because of the complex sociocultural and environmental factors that operate in nomadic social systems and the absence of more profitable and less risky ways of investing the surplus resources of cattle owners.

Low population density also explains the extreme inadequacy of roads, railways, and waterways, although even in this respect there is considerable diversity. Small countries with greater population density such as Kenya and Malawi are less hampered by these lacks than are large countries such as Sudan, Somalia, Ethiopia, and Tanzania. And yet investments in the road system have also been greater in Kenya and Malawi than in many others. Road mileage per square mile of land area is only 0.02 in Sudan, 0.1 in Zambia, and 0.15 in Zaire, compared to 0.23 in Kenya and 0.31 in Malawi.

Limited growth of sedentary cultivation has also meant relatively limited evolution of indigenous technology and skills in blacksmithing, carpentry, crafts, manufacturing, and trading than is typical of most Asian countries, though there are distinct differences between the more developed West African societies and East Africa. The range of farm implements, ox ploughs, and animal-driven modes of transport used extensively in other parts of the developing world are not prevalent even today in much of traditional rural Africa. On the contrary, with the advent of colonialism there was a "technological leap" toward tractors, combine harvesters, and modern means of transport, so that at independence Africa was left with greater technological dualism than was prevalent in most of colonial Asia.

For these various reasons, the challenges to agricultural research systems in Africa are by far the greatest in the world, combining constraints posed by ecological, demographic, technical, and institutional factors (14). International agricultural research institutes such as the International Institute of Tropical Agriculture in Nigeria and several others, financed by the Consultative Group on International Agricultural Research, have already begun to address some of these problems. However, substantial additional investment is required in scientific research at the national and re-

gional levels to develop profitable technological packages to suit the highly diverse conditions and to reduce the risks now encountered in their adoption by low-income farmers. In some extremely marginal areas, such as parts of the Sahel in the north and Lesotho in the south, it may not be possible to increase productivity in present subsistence crops enough to make them a primary source of livelihood. Alternatives, including migration to more productive areas or production of labor-intensive, high-value horticultural crops, may have to be examined as sources of employment. These are costly options demanding considerable organization.

The situation with respect to trained manpower can be best appreciated by some comparisons with Asia at the time of independence. In 1960 even the educationally most advanced African countries, Ghana and Nigeria, had only 3 percent of the population of secondary-school age enrolled in school, compared with 8 percent in Bangladesh, 10 percent in Burma, 20 percent in India, and 26 percent in the Philippines. By 1976 the percentage in Nigeria had gone up to 10; by then it was 23 for Bangladesh, 22 for Burma, 28 for India, and 56 for the Philippines.

However, as may be seen in Ghana, Uganda, and Ethiopia, which have been better endowed with trained manpower than other African countries, without a conducive political environment little development is possible even with trained manpower. Many African countries have not yet fully achieved national unity or gained domestic political stability, the colonial powers having established national borders without regard to traditional land rights and tribal cohesion. Resources and attention sorely needed for rural development have often been diverted to internal conflicts, border wars, and maintenance of domestic political control.

Development of administrative capability will also take a long time. At independence, often there was virtual absence of a strong national, regional, and local government administration of the type that existed in South Asia. Colonial agricultural development policies were geared almost exclusively to the expansion of export crop production for the metropolitan countries. Research was largely concentrated on export crops. Agricultural extension, input supply, credit, and marketing and processing facilities were also highly fragmented. Recent efforts, for example in Tanzania and Kenya, to decentralize administrative systems to make them more responsive

to rural people's needs, while justified in the long run, have only exacerbated administrative weaknesses in the short run because the existing administrative manpower has had to be spread thinly between the central ministries of agriculture and transport and the provincial administrations.

Africa thus starts with considerable odds against development. And yet there is immense potential for productivity increases, not simply in the Sudan and the highlands of eastern and southern Africa, where it is commonly recognized, but in much of the rest of Africa, in the humid and semihumid tropics and the parts of the savanna areas that receive adequate rainfall.

The Donor's Role

The experience of Asian countries indicates that in addition to providing direct financial support, international assistance can play an important role in the long run by increasing national consciousness about peasant agricultural development, by improving the rationale for policies and making the effect of alternative policy options on different sectors or income groups more explicit, and by gradually strengthening those national forces that can lobby for policy changes in the desirable direction. Changing the distribution of basic assets or political power so that, for instance, cooperatives will effectively include the poor or subsidies will not go to the rich is far more difficult to achieve from outside. National will and capacity are needed to this end.

Concern and debate about the equity issue in the international donor community have been extensive since the "green revolution" and the perceived failure of the trickle-down approach to reach the poor. Since the world food crisis of 1973-1974 the objective of national self-sufficiency in food, and subsequently a broader set of issues such as assurance of basic needs, environmental protection, and women's rights, have begun to receive international attention. The seemingly long time required to achieve the green revolution in Asia has created impatience in the donor community to achieve results, and with the widening scope of the debate the areas for achieving results have broadened.

Aid in the form of grants or low-interest loans has increased substantially over time in Africa. During 1976 to 1978 it ranged between \$10 and \$20 a year per capita in Sudan, Kenya, Tanzania, Burundi, Ivory Coast, Mali, Cameroon,

Zambia, and Malawi and to as high as \$30 to \$70 in the smaller countries of Botswana, Lesotho, and Swaziland. In many countries it constitutes a quarter or more of total annual investment and over half the investment in agriculture and rural development. Even Bangladesh, which is one of the largest recipients of aid in Asia, received only \$9 of concessional aid a year per capita during 1976 to 1978.

Large numbers of aid agencies are involved in assistance to Africa, with relatively little coordination as to objectives, strategy, degree of continuity, or areas of assistance. Coping with the complex and differing procedures and large flows of aid is exceedingly difficult for the inadequately staffed bureaucracies of most African countries.

Apart from targeting more donor-financed projects toward the rural poor, there has been much evolution in the concept of project assistance in recent years (12). Projects do not pertain solely to export crops as before but are substantially concerned with development of food crops for domestic consumption. They are more strongly geared to institution building such as strengthening the project planning and implementing capacity of the national ministries of agriculture, and of provincial-regional, district, and local administrations and financing and marketing entities to provide field services. This is in contrast to the earlier approach of "enclave" projects, which were implemented mainly through separate autonomous entities created for the purpose. The projects also show greater concern for employment, training of local staff, and the use of local materials and techniques, and more explicitly anticipate need for recurrent financing and for financing of several time phases. They are also more likely to include support for policy units and monitoring and evaluation to ensure greater flexibility and learning by doing than before.

Despite these major improvements and especially in comparison with the resources expended, donor-financed projects are having a very limited impact. This holds irrespective of whether their achievements are judged by inputs such as numbers of local and expatriate staff recruited, research trials carried out; amounts of fertilizer and other inputs distributed, vehicles purchased, buildings and roads constructed or maintained, or amount of data collected or analyzed by evaluation units, or by the end results such as increases in yields, numbers of staff trained, or administrative and financial procedures instituted.

What explains the limited impact? The gulf between the donor's largely equity-oriented objectives and the national governments' goal of modernization has remained wide in Africa. Instead of examining the actual policies, strategies, and institutional framework of national governments and assessing the extent to which they are conducive to rural development, donors have largely taken government rhetoric and plan documents as indications of national commitment and priorities and have concentrated mainly on project aid as a way of influencing these priorities, frequently only exacerbating the problems of Africa's rural development in a variety of ways.

First, simultaneous shift by much of the international community to the alleviation of rural poverty in the wake of obvious shortages of national manpower, resources, and institutional capacity has led to underutilization and poor maintenance of donor investments. Even in these projects, for a variety of reasons, donors have generally preferred to finance mainly capital expenditures, that is, equipment and civil works, rather than recurrent expenditures required to maintain or operate these and other related investments.

Second, despite much evolution in the right direction, not only has the need for assistance in increasing national capacity for policy development been underrated, but a number of questionable showpiece investments by governments have been made possible largely by generous financial support from the donor community. There are a number of reasons for such assistance—a wish to respond to national desires, expectation of quick visible results, promotion of exports from donor countries, vying among donor agencies to finance a type of project likely to appeal to their own domestic constituencies, meeting their own quota of assistance, and some understandable errors in judgment. However, there are other factors: The first relates to the provision of technical assistance in the short run, the second to the expansion of secondary and higher level education to help broaden the capacities of nationals over the long run.

According to some estimates, as much as 75 percent of the technical assistance used in the developing world is used in Africa. In the short run, technical assistance has helped the planning and implementation of development projects on a scale that would not be possible otherwise. However, expatriates are becoming less acceptable in sensitive managerial or policy-making positions in most African countries. Their numbers have

been growing for more than a decade after independence, mainly in technical and advisory positions. Their high salaries and benefits create resentment among nationals. Also, even when highly qualified in their specialties, they are not generally effective in working in an alien environment. The supply of qualified personnel has, of course, been a major problem, as is the lack of continuity. A temporary sag in policy-making and implementation would be inevitable with nationalization, but frequent changes of nationals posted in charge and the consequent deterioration in the overall economic management have been far from temporary. Thus in many cases there is not the stable domestic environment needed for a dialogue on the strategy and policy issues.

Increasing high-level education and training of nationals is critical for augmenting Africa's capacity, even though the results would take a long time to achieve. Expansion of basic, primary, vocational, and adult education has been supported strongly by donors as a way of increasing the supply of field staff, meeting the basic-needs objective, and increasing the receptivity of rural populations to agricultural and other innovations. Some high-level technical training of Africans is also being undertaken by several bilateral donors such as the U.S. Agency for International Development and the British Overseas Development Ministry, which have traditionally supported this activity. But on the whole, expansion of secondary and higher education has not received the priority it requires from donors. Frequently the shortage of people with the necessary educational qualifications is so great that even those funds that are provided by donors for higher level on-the-job training remain unused.

The gains to be had from basic, adult, and primary education are undoubtedly considerable, as evidence from Asia indicates. It is also clear, however, that in Africa at present the shortage of educated and technically trained cadres of nationals who can devise effective national strategy and policies is a far greater constraint to the alleviation of rural poverty than is the illiteracy or lack of receptivity of the rural population. Once again, the question is one of balance and priorities at a given stage of development. Evidence mainly from Asia and Latin America has also led to anxiety about increasing the ranks of the educated unemployed in developing countries. The perceived indifference of some of the educated urbanites to the largely

rural needs of their own countries has led in the international community to a general disenchantment with higher education. Perhaps implicit in this is the feeling that, in comparison with the need to train lower level staff, expanding the supply of high-level educated personnel is unnecessary or antithetical to the egalitarian objectives of rural poverty alleviation.

Contrary to these perceptions, increase in the supply of educated personnel would not only improve national systems but also reduce salaries of the educated, including those of teachers, thus reducing income inequalities as well as the cost of further investment in education and a range of other development activities. By far the most unquestionable though unquantifiable benefit of education to Africa would be that of learning by doing, which is now lost to the ever growing and changing expatriate technical community. It is ironic that most African countries do not have the capacity to propose alternative plans to those presented by donors for using donor funds to reflect their own long-term needs for higher education.

The need for substantial investment in physical infrastructure in larger countries such as Sudan and Tanzania and in landlocked countries such as Zambia also requires critical examination by donors. Maintenance of past infrastructure has frequently been neglected, and not enough resources have been devoted to development of trunk roads, railways, and waterways by national governments and donors. Feeder road development has received considerably more support, but the lack of an effective national transport network makes investment in feeder roads ineffective. Again, some of the same reasons that apply to education and training explain this neglect, in particular the perception that capital-intensive infrastructure is not so necessary for reaching the poor, especially in the short run. A more appropriate balance between the objectives of immediate alleviation of poverty and the long-term development needs of more resource-intensive investments is required.

Implications for Long-Term Development

The problem of Africa's rural development is not one of not knowing in broad terms what needs to be done to support peasant agriculture. The prospects for turning the present gloomy trends in an opposite direction are considerable. At the national level, the most fundamental

problems are attitudes and vested interests. The subsistence rural sector must be seen as critical for economic development and must be given the priority that it urgently requires. At the international level, it is evident that current donor approaches of project aid, although perhaps far more essential in Africa than in many countries in Asia, are by themselves not enough to deal with its complex developmental needs. A major reconsideration of the balance of assistance, including the donors' role in education, infrastructure, and long-term policy planning and implementation, is required. Only then can there be a useful dialogue on development priorities with nationals. The question of reordering priorities will require a major review by the donor community as a whole, and even if it is resolved adequately its effects will take at least a decade to show. But the prospects for the 1990's will then be considerably better than those for the 1980's. It is also the only way to reduce Africa's growing dependence on outside aid.

References and Notes

1. International Food Policy Research Institute, *A Comparative Study of FAO and USDA Data on Production, Area, and Trade of Major Food Staples* (Research Report No. 19, Washington, D.C., October 1980).
2. —, *Food Needs of Developing Countries: Projections of Production and Consumption to 1990* (Research Report No. 3, Washington, D.C., December 1977).
3. K. Anthony, B. F. Johnston, W. O. Jones, V. Uchendu, *Agricultural Change in Tropical Africa* (Cornell Univ. Press, Ithaca, N.Y., 1979).
4. *World Development Report, 1979* (Oxford Univ. Press, New York, 1979, for the World Bank), p. 13, table 13.
5. G. Hyden, in *Papers on the Political Economy of Tanzania*, K. S. Kim, R. M. Mabele, M. J. Schultheis, Eds. (Heinemann, Nairobi, Kenya, 1979), pp. 5-14.
6. These are Botswana, Burundi, Comoros, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Rwanda, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zaire, and Zambia.
7. T. W. Schultz, *Transforming Traditional Agriculture* (Yale Univ. Press, New Haven, Conn., 1964).
8. Journals such as *The Economic and Political Weekly* have provided an important forum for a vigorous domestic discussion of planned priorities in India, in which innumerable external analysts have participated.
9. U. Lele, *World Devel.*, in press.
10. "There is no official policy towards the unofficial market," a comment of a senior official of one of the African ministries of agriculture, states the problem well.
11. G. Hyden, *Beyond Ujamaa in Tanzania: Underdevelopment and an Uncaptured Peasantry* (Univ. of California Press, Berkeley, 1980), p. 133.
12. U. Lele, *The Design of Rural Development: Lessons from Africa* (Johns Hopkins Press, ed. 2, Baltimore, 1979).
13. P. Oram, *International Food Policy Research Institute Working Paper No. 30* (Washington, D.C., 1978), p. 6.
14. H. Ruthenberg, *Farming Systems in the Tropics* (Clarendon, Oxford, 1976).
15. I thank H. S. Bienen, W. V. Candler, J. M. Cohen, S. D. Eccles, A. O. Falusi, G. Hyden, L. S. Hardin, N. Islam, J. W. Mellor, M. Mensa, W. A. Lewis, T. W. Schultz, and two unknown reviewers for comments on earlier drafts. The views expressed in the article are my own and do not necessarily represent those of the World Bank.