

AFRICAN FOOD SYSTEMS IN CRISIS

Part Two: Contending with Change

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Development Alternatives And The African Food Crisis

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Introduction

Sub-Saharan Africa is the only major geographical area which has experienced a decline in per capita food production during the last quarter of a century¹ (Christensen et al. 1981; USDA 1984). Although the last two years have seen a slight rise in per capita production, the total food deficit is still large (USDA 1986). Billions of dollars in development aid, the introduction of numerous technologies, and a multitude of studies of the social and physical environment have been applied to the food problem in Africa during this period. Why has this effort failed? What are the alternatives?

My objective in this paper is to broaden the discussion of sustainable solutions to the agricultural and food crisis in Africa. The argument has five major parts.

1) Value systems form the basis for different views of the cause of the crisis in the African food system of the best solution. The Western establishment views development as based on the economics of production in a world system which it dominates. It sees the cause of Africa's food crisis within Africa, and the solution in transferring the industrial agriculture model and in greater integration with the world system. Opposing views place greater emphasis on direct benefits of

¹Agricultural statistics for sub-Saharan Africa are undoubtedly quite inaccurate and undue emphasis is given to minor differences in time and place (see Berry 1984). Yet the over-all failure of production to keep up with nutritional need cannot be denied.

development for Africans, see the cause of the problem outside of Africa, and frequently see as the solution the support of traditional African food systems. I use the term development to mean improvement in well-being based on equity, local control, and economic, environmental and social sustainability.

2) As "development", industrial agriculture has had a mixed record even in the U.S. Though it has been remarkably successful in increasing production, it is also associated with social disruption, economic inequity and inefficiencies, and environmental degradation. Its record in Africa is similar, with the exception that it has not had an overall impact on production.

3) Traditional African agriculture has been shown to be socially, economically and environmentally valuable in terms of equity and sustainability, at least in the past. However, there is evidence that under present circumstances it is associated with environmental degradation, social disruption, and hunger.

4) In response to failures of industrial and traditional agriculture, a growing number of people in both the U.S. and Africa are promoting and experimenting with sustainable agriculture based on the best features of industrial and traditional agriculture.

5) An important contribution of anthropologists and other social scientists is to play the role of objective observers, orienting discussion toward underlying values and the structure² of the world food and agricultural system within which a solution to Africa's food crisis must be found.

What Is Development?

The most revealing part of the international debate on hunger and poverty in Africa is the apportioning of the blame. [Ndumbu 1986:10]

There are many different definitions of development. All of them are based on value judgments (de Kadt 1985), including those about the nature of "human nature" itself (Howard 1983:469). While this

²I use the terms structure and structural to refer to relationships of control over resources which determine the observed patterns of resource distribution in the food and agriculture system.

relativistic approach is familiar to anthropologists and other social scientists, its absence from most discussions of African development may jeopardize their usefulness. Here I discuss what I refer to as the "establishment" and the "opposing" viewpoints of African development. For the sake of the argument they will be painted in broad, bold strokes. The definition of development chosen greatly affects the way in which specific problems of development are themselves defined and approached in the context of development programs and projects.

African Development from the Viewpoint of the Western Establishment

The specialized farm represents the final and most advanced stage of individual holding in a mixed market economy. It is the most prevalent type of farming in advanced industrial nations. . . . the provisions of food for the family with some marketable surplus is no longer the basic goal. Instead, pure commercial "profit" becomes the criterion of success, and maximum per hectare yields derived from man-made . . . and natural resources become the object of farm activity. [Todaro 1985:309]

Production and commercial profit are the basic values of industrial agricultural development in the U.S. Emphasis on increasing land and labor productivity, at the expense of decreasing capital and energy productivity, reflects values nurtured by an era of cheap energy and abundant capital in the West. The primacy of production economics as the goal of development does not mean that the establishment denies the importance of "social values" in development, although they are to be considered secondary to increased production, and not to be achieved at the expense of breaking establishment economic rules (Cooper 1981; Pleas and Amoako 1984).

Indeed, U.S. development aid is justified to the taxpayers as leading to greater U.S. exports to the Third World (Avery 1985; Council 1984; OTA 1984:22-24; Todaro 1985:450). It is also used to promote "economic stability . . . democracy . . . access to strategic facilities . . . countering Soviet influence . . . [and] cooperation with the U.S. on international issues" (OTA 1984:24). It is also noted that Africa contains minerals which have "vital industrial and military applications" for the U.S. (ibid.).

In the view of many development and relief agencies, most influentially the World Bank and the United States Agency for International Development (USAID), the African food crisis is the result of environmental, technical, agronomic, managerial, and economic problems *within* Africa (Avery 1985; Brady 1985; McPherson 1985; USDA 1981; Wisner and Nourbakhsh 1985; World Bank 1981, 1983, 1984).

What is good for the Western-dominated world economic system³ is usually *good* for the hungry African. This establishment interpretation of the problem has dominated efforts at improving the food situation in Africa, through increasing productivity on the Western model, for some time. Examples include projects that try to target the most "progressive" farmers in a community, increase farm size and commercialization, promote export crops because of so-called "comparative advantage", develop hybrid crop varieties dependent on high inputs of water, chemicals (often imported) and efficient, centralized infrastructure, and build large dams and irrigation systems.

While Western-centric economics has remained the underpinning of the establishment definition of development and the analysis of the problems and the solution to them have remained essentially the same, they change slightly through time in response to changing world economic conditions, new information about Africa, and changing political ideologies.

For example, the evolution over the last several decades of the African farmer from a hide-bound traditionalist into an economically rational actor in the eyes of the Western development establishment is no doubt an improvement over the ethnocentric notion of irrationality that prevailed before. However, when farmers do not respond in ways which can be interpreted as the economically rational pursuit of profit maximization, it is seen as the fault of market imperfections, inadequate infrastructure, or African government meddling, and not that

³Space does not permit consideration of the "communist" approach to development, though not so dissimilar perhaps to that of the "capitalists" both in form and content. While the capitalists insist on economic determinism for all while supporting a system where a few, the state and big business, control more and more of the productive resources, the centrist Marxist states promote development which eulogizes participation by all while the state reserves the total power of coercion and mobilization (de Kadt 1985).

African farmers might have different "values", different "rationality", or different "economics" (see Berry, S. 1984:71-72; Levi and Havinden 1982; Nair 1983:116).

The discovery of economic man in Africa, along with the worsening world economic situation (Hart 1982:155), the failure of large scale projects, and the realization that the small scale farmer was not going to disappear into an industrial work force in the near future, led in the 1970s to an establishment position more directly involving the poor, small-scale farmer in development to meet "basic needs" (Hoben 1980; Richards 1985:37-38).

Whether in fact such policies were ever able to overcome bureaucratic inertia to affect any change (see e.g. Hoben 1980:357-363), or whether any real change was intended by those in charge (see e.g. Reyna 1985) seems doubtful. In addition, drought and famine struck in the 1970s and per capita food production continued to decrease. The world economic situation also began a decline toward the end of the decade and a politically conservative administration moved into the U.S. White House. There has been a turning away from "New Directions", basic needs, and small farmer involvement, and supply side economics now rules at the World Bank and USAID (Derman 1984; Schultheis 1984), with government bureaucrats "scurrying for projects which promote private sector initiative" (Gellar 1985:26). While the small-scale farmer cannot now be ignored, actions in this area are to be "selective", "targeting" those areas which provide "for rapid payoff from additional investment", while also emphasizing large private farms, and multinational "agro-industrial enterprises" (World Bank 1981:52). No consistent or objective analysis is offered to explain these changes in the establishment position.

Opposing Views of African Development

"Does the white man understand our custom about land?"

"How can he when he does not even speak our tongue? But he says that our customs are bad; and our own brothers who have taken up his religion also say that our customs are bad. The whiteman. . . has put a knife on the things that held us together and we have fallen apart." [Achebe 1959:162]

Definitions of development in opposition to the establishment have in common a value system based on control of African development

by Africans. Of course, the question arises as to *which* Africans should be in charge, and exactly what form should this kind of development take.

Opposing views generally agree that the food crisis has its roots outside of Africa, in exploitation and destruction by European colonialists, and that it is perpetuated by the current state of affairs in which many African states are hostage to the technical and economic policies of the industrial countries. Proposed solutions flowing from this analysis of the problem range from a total reordering of the world economic system, placing control of Western style industrial agricultural development in the hands of Africans, to the primacy of indigenous forms of agricultural development with emphasis on local community control and self-reliance.

I will discuss the indigenous agricultural development approach, since it is popular in Africa and among some Western intellectuals, and because it contrasts most with the establishment view. It is an approach based on supporting and strengthening traditional systems that have provided a successful way of life for centuries, until destroyed from the outside.

From this point of view, indigenous systems that balanced food, population, and environment and insured a relatively egalitarian distribution of resources were destroyed by the slave trade, and by military, political, economic, and cultural subjugation (see Berry, L. 1984:106–108; Goody 1980:139; Wangari and Koivukari 1986). Sometimes included are public health measures which decreased mortality and, in the context of weakened traditional social demographic regulators and the absence of any substitute, led to rapid rates of population growth (e.g. Cleveland 1986).

Establishment “solutions” are seen as part of the problem. They promote dependence on the West, discourage community self-reliance, and devalue African culture. Organizations like USAID are perceived not simply to “promote” stability and “democracy” in the greater interest of all, but to actively coerce African governments to adopt policies which maintain and extend U.S. control over African economic and political processes to maintain and promote U.S. hegemony in Africa (see Cokorinos and Mittelman 1985; Morand 1986; Ndumbu 1986). These policies also reduce communal decision-making in favor of individualized decision-making within the parameters of an externally controlled economy. What is good for the

Western-dominated world economic system is usually *bad* for the hungry African.

While free markets and comparative advantage are the basis of establishment agricultural development for Africa, it is asserted that they are not applicable to Africa because, just as in the U.S., the basic assumption of perfect competition is quite unjustified (see Berry 1984:65–66). The market responds not to needs (nutritional, social or physiological), but to money (economic power, or “effective” demand), and the poor can never win in a system controlled by the rich for their own ends (Cokorinos and Mittelman 1985; de Kadt 1985; George 1984; Lappé 1985; Latham 1984).

A Working Definition

I will use the term development here to refer to the process of improving the subjective and objective well-being of the poor majority through economically, environmentally, and socially sustainable means which are equitable, and in which the poor farmers themselves have freedom of participation and power of decision-making (see de Kadt 1985:551; Gellar 1985; Howard 1983; Lappé and Collins 1978; Latham 1984; Perelman 1977). This is not to deny the necessity for profit, production which makes efficient use of resources, of the usefulness of markets. It is simply to say that they are not the highest goals of the food system, and indeed that they should serve higher goals. In the following sections I will examine industrial agriculture and traditional African agriculture in terms of their promise for solving the African food crisis and promoting development.

Industrial Agriculture For African Development: The U.S. Model

... when our country became independent in 1961, our ambition was to “modernize” our economy. We did not work this out very thoroughly; but it appeared to us that if you wanted a productive agriculture, you had a mechanized agriculture, and you used chemical fertilizers, chemicals insecticides, and—to be completely up to date—even herbicides. That, at least, was our vision of American and Canadian agriculture—and we were often told that America is the most productive agricultural country. [Nyerere 1983]

U.S. agriculture is often held up as a model for agricultural development in Africa, and Land Grant University (LGU) agriculturalists are in demand by USAID and other development agencies as experts. Agriculture in the dry, western U.S. is seen as especially relevant for the dry savanna areas of Africa, which include much of the region hardest hit by drought and famine. Yet the negative effects of industrial agriculture in the industrialized countries is seldom discussed when this model is urged on Africa. So, before assessing the applicability of this model to Africa we first have to examine its economic, environmental and social record at home.

Industrial Agriculture at Home

U.S. agriculture in the four decades since WW II has experienced a "dramatic transformation" characterized by increasing production per unit of land and labor and decreasing production per unit of capital input, decreasing number and increasing size of farms, increasing concentration of production and assets among the biggest farms, substitution of capital goods (chemicals and machinery) for human and animal labor, increasing use of water (about 80% of all water used in the U.S. in 1977), and increasing importance of farm exports to the U.S. and world economy (see Schertz 1979).

While these trends are often interpreted by the establishment as the inevitable or natural result of economic progress, and the necessity to feed a larger and larger population, they may in fact be the result of particular environmental, social and cultural circumstances. The predominance of large farms in U.S. agriculture, for example, is primarily the result of factors other than increased technical efficiency (Miller et al. 1981). Large size has been nurtured by the "past focus of public research on such things as large scale equipment and technology based on inexpensive energy and inexpensive capital" (USDA 1981:67). The capital resources and backing of large farms make them financially capable of adopting expensive cost-reducing technology, thus increasing minimum efficient operating size even further. Tax and other laws in the U.S. also work to the advantage of the large-scale farm (Davenport et al. 1982). Abundant fossil energy has made an energy-intensive agriculture seem economical only when its replacement costs or environmental impacts are not considered (Pimentel and Pimentel 1979; Steinhart and Steinhart 1974).

Another form of subsidy for agriculture is the sizeable proportion of research done at LGUs which supports large scale, energy-intensive agriculture more beneficial to large corporate rather than small, family farms, farm workers, or consumers (Friedland 1982; Hightower 1978; Johnson and Jesse 1979; Vogeler 1981). The development and adoption of the mechanical harvester and electronic sorting unit in the California process tomato industry is a case in point (Johnson and Jesse 1979:370; Price 1983). The public has also subsidized agriculture through the government-financed development of irrigation systems in the Western U.S. (Hope and Sheehan 1983).

Another way of evaluating the equity and social sustainability of industrial U.S. food production is in the use of hired labor. Especially in the West, agriculture has been founded to a great extent on "non-competitive labor either in the form of labor surplus, or highly mobile, unsophisticated immigrant populations" (Padfield and Martin 1965:253). When domestic surplus labor did not exist, the U.S. government supplied "other noncompetitive labor resources—e.g. prisoners of war, Puerto Ricans, Mexican immigrants, and . . . Mexican Nationals. This peculiar system has contributed immeasurably to a cost-efficient agriculture" (Padfield and Martin 1965:253).

Today, agribusiness in the Western U.S. strives to maintain its control over non-competitive labor. Even though they can legally hire Mexican nationals under the H-2 or "green card" program, most growers have not because it is more expensive for them. Instead, most of the workers have been illegal. Agribusiness giants such as Tenneco and Sun Maid actively support immigration "reform" in the U.S. Congress which would preserve their special labor advantage. They favor an amendment to new immigration legislation authorizing as many as 350,000 foreign "guestworkers" which would allow them to continue control over a labor force unprotected by citizenship rights (Rural Coalition 1986). Social responsibility and equity, in this case in the form of fair wages, living and working conditions, appear not to be important considerations in U.S. agriculture. Indeed, the goal of short term production profits seems in many ways to be structurally opposed to these social goals.

Industrial agriculture has been based on an "abundant environment" approach. For example, crop selection assumes abundant supplies of water, fertilizer, pesticides and machinery (Boyer 1982). As it turns out, however, the environment may not be as abundant. Since

the Great Depression of the 1930s, agricultural technology developed and adopted in the U.S. "has effectively separated fertility depletion from soil deterioration" (USDA 1981:87). The export push of the 1970s, encouraged by the government to finance the skyrocketing cost of imported oil, increased environmental and economic damage (Wessel 1983). Water shortages, groundwater overdraft and soil erosion, exacerbated by increasing energy costs, unstable and shrinking markets and increasing control by agribusiness multinationals are major problems in U.S. agriculture. In the West, heavily dependent on the use of water for irrigation, desertification⁴ is a major problem. In southeast Arizona, for example, desertification is directly traceable to agricultural practices such as overgrazing and overdraft of groundwater (but also including climatic variation) (Dewhurst 1981; Sheridan 1981:60-64). As depth to water and the price for energy to pump it increase, cost of production increases (ACLRS 1981:128), and is a prime factor in abandonment of 191,000 to 237,000 acres of irrigated, harvested cropland in southeast Arizona (less Santa Cruz County) in the last 10-15 years (Meitl et al. 1983). Abandoned farmland is subject to increased wind and water erosion (Sheridan 1981; also Meitl et al. 1983). The environmental costs of industrial agriculture are usually not considered when assessing its economic sustainability.

The global dominance of industrial agriculture may affect African food systems in several ways. Food aid, which is supported by the industrial exporting countries as easing their domestic food surpluses while maintaining current world markets, may actually be a disincentive to increased production in Africa (OTA 1984:63-66). Over the longer term, food aid may be used to increase consumer preference for imported food. In Africa a major example is wheat used in bread (Dinham and Hines 1983: 141-143). While these indirect effects of the industrial agriculture model are important for an understanding of the African food system, I will focus in the following section on the direct effects of the promotion of this model for production in Africa itself.

⁴Desertification can be defined as occurring when one or more of the following symptoms are present: declining groundwater tables, salinization of topsoil and water, reduction of surface waters, unnaturally high soil erosion, and desolation of native vegetation (Sheridan 1981:1).

Another Green Revolution for Africa?

Agricultural development in Africa has been dominated by the idea that the technology of industrial agriculture could be transferred. The assumption has been that "any increase in productivity implies a heavier use of fertilizer, pesticides, and other purchased inputs" (Christensen et al. 1981:257).

The "Green Revolution", first developed in Mexico and Asia in the 1950s and 1960s, has at its center newly developed crop varieties with high response to and dependency on manufactured chemical fertilizers and pesticides, machinery and irrigation. Although introduced into Africa, the Green Revolution has not been widely adopted or "successful" there, partly because conditions are much different than in Mexico or Asia (Christensen et al. 1981:105-107). It may be that the very nature of the "biological" packages were inappropriate for the small-scale African farmer (see Richards 1985:39).

Many of the same problems created by industrial agriculture in the U.S. accompany its transfer to Africa. The structure of agriculture encouraged by the adoption of this industrial model may often work to the disadvantage of the limited resource, small-scale farmer, as well as the consumer (see Alverson 1984; Todaro 1985:312). For example, the industrial establishment has shown a pervasive neglect of traditional, locally-adapted crop varieties (FAO 1985; Okigbo 1977), referring to them disparagingly (and ignorantly) as "the horticultural equivalent of Indian corn" (Avery 1985:409). The Green Revolution in Africa is associated with land registration to establish ownership in the Western sense, which is "an invitation to create economic inequality", displacing traditional, egalitarian land tenure systems (Goody 1980:146; see also Reyna 1985). There is also evidence that some basic assumptions of this approach, such as large returns to inputs like manufactured chemical fertilizers, may not be valid (Diwan and Kallianpur 1985). Other basic components may have negative impacts, as with pesticides, which have caused great health and environmental problems (Bull 1982), and soil degradation caused by mechanization, chemical fertilizers and irrigation (Goody 1980; Berry, L. 1984:57,60).

Now USAID and others in the development establishment are calling for "another green revolution for Africa" (Brady 1985; McPherson 1985). The emphasis, at least publicly, now seems to be away

from a resource abundance approach and on breeding for disease, pest and drought resistance, and a diversified environment. I have not, however, seen goals of the new Green Revolution for Africa concretely discussed in terms of social equity or environmental sustainability. Will the "new" Green Revolution reduce genetic variability and increase dependency and long term environmental and economic fragility? Genetic engineering is creating a "biorevolution" in the development of new crop varieties and is under the control of private multinational companies to a much greater extent than was the Green Revolution (Buttel et al. 1985). Many of these are chemical companies which have recently acquired seed companies, and a priority is to breed crops with increased herbicide resistance, making increased application, and thus sales, of herbicides possible (Sun 1986). To choose this route instead of increasing disease and pest resistance and weed competitiveness in food crops seems to be economically and not socially motivated. There is a need for a more detailed examination of the decision making processes, scientific theories, development goals, and probable long-term effects of any "Green Revolution" for Africa.

Traditional African Agriculture

Although the farmer is equipped with nothing more than a hoe, cutlass, fire and his own limited muscle power, there is probably little arable land in the [West African] . . . savannas that has not been cultivated at one time or another. . . . The process of degradation begins with the settlement of virgin land and ends. . . . [in] the final stage of degradation: . . . trees succumb to lopping and felling, the soil to exhaustion and erosion. . . . [Rose Innes 1977:20]

As we have seen, the small-scale African farmer is now considered to be "economically rational". Examples of many types of behavior have become available which support this assertion: cultivation practices like mixed cropping (Legemann 1977), selection of adapted crop varieties (Kassan 1976), the allocation of production resources in terms of marginal returns (Levi and Havinden 1982), pregnancy rates and spacing of children (Cleveland 1986), the organization of the household (Netting 1969), and not participating in development schemes (Alverson 1984).

Production per unit of energy and capital is high in traditional compared to industrial agriculture, because little fossil fuel, manufactured inputs, or machinery are used. On the other hand, production per unit

of labor and often per unit of land is frequently much lower. However, there is evidence that small-scale, labor-intensive production can be as productive of land as large-scale production (Bremen and deWit 1983; Cornia 1985). Household gardens, often neglected by agronomists, economists and anthropologists alike, can be as or more productive of land as traditional field production, and even large-scale industrial agriculture, and may even be more productive of labor than more extensive traditional field production (Cleveland and Soleri 1987; Legemann 1977:55-56,94).

In addition, comparisons made with large-scale industrial agriculture in Africa are often unfair because they do not consider the greater government support, inputs, and often (as, for example, in southern Africa) the better soil and rain-fall resulting from the forced removal of small-scale subsistence farmers from the best land which was then developed into large-scale industrial farms (Weiner et al. 1985:277-282).

Traditional, small-scale agriculture can make use of labor and other productive local resources available in small increments, while minimizing risk and supporting social, religious and other important non-economic activities (Levi and Havinden 1982:54-71, 96-98). This characteristic is particularly important for the poor, for whom large investments of any resource may not be possible.

Traditional agriculture also appears to have incorporated a number of measures to conserve productive resources of soil, water and vegetation (Berry, L. 1984:106-107; Richards 1985:55ff.). For a live-stock system in East Africa, for example, a low ratio of production to biomass ensures maintenance and stability without producing discernible environmental degradation (Coughenour et al. 1985). These researchers feel that to try to move a system evolved for maintenance and ecological stability toward one with a goal of production of surplus could mean ecological instability and environmental degradation, i.e. that industrial agriculture is basically incompatible with African ecology and traditional production systems.

However, it may not be valid to assume that because traditional systems, or parts of them, have survived through many generations, they are therefore adapted in the sense of being sustainable. It may also be invalid to assume that development is a matter of widespread support for traditional systems. Although it is difficult to measure change in potential productivity of traditional African production

systems in the past, it may be that for most of Africa traditional agricultural systems were never "adapted". Rather, pressure on the environment was increasing so slowly, partially because of ample room for migration and a slowly growing population, prior to colonialism, that the imbalance never had a chance to manifest itself. In the East African example just cited, there is extensive human outmigration from the study area.

In spite of all the positive characteristics of traditional African agriculture, and its success in supporting the population for generations, it seems unable to cope with greatly increased population densities and changing social and economic conditions. Therefore, as practiced in much of Africa today, it has caused widespread environmental degradation and is associated with major social disruptions, such as male outmigration, and marginalization of women farmers (Cleveland 1986; Berry, L. 1984:50-65; NAS 1983:30-37; Rose Innes 1977). Certainly, traditional systems have been violently disrupted by the slave trade, colonial forced labor, economic exploitation, rapid population growth, expulsion from prime agricultural lands, and cultural imperialism (Berry, L. 1984:107-108). There is also no denying, however, that conditions have changed radically and irrevocably. It is likely, therefore, that even if traditional systems were formerly sustainable, they would not be appropriate without modification for the present, greatly changed and increasingly unstable conditions.

For example, decisions made by individuals in the context of viable social systems dependent on local ecosystems for survival may have balanced population and productive resources in the past. Yet in many cases these have been undermined by changes in the social and physical contexts of decision-making, due to increasing integration within a larger, money economy under colonial and post-independence governments. Seasonal wage labor migration by single young men was not formerly possible, thus they had to wait for their lineage to provide bride wealth, whereas now they can marry on their own. Under conditions of high mortality and severe social sanctions, fertility in Africa is controlled by postpartum abstinence. Decreasing mortality and changing social conditions lead to decisions by couples to shorten birth intervals to provide more household agricultural labor. In both of these situations decisions by individuals may be in their best interests, but work against their community by increasing fertility and thus population pressure of the land beyond the point of sustainability

(Cleveland 1986). Similarly, large herd size in the Sahel increases production for individual herders, but leads to an overall degradation of the range (Bremen and deWit 1983:1346).

However, a "tragedy of the commons" analysis of this phenomenon, leading to suggestions for either privatization of land tenure or government control (e.g. Frankenberger 1986), may be faulted for omitting both the possibility that past communal resource management systems could be adapted for the future, and the abundant evidence of private tenure system's capacity for resource destruction, not only in the U.S. and other industrial countries, but in Africa as well.

It may be, however, that many of the *elements* necessary for intensification and a sustainable increase in food production in Africa are already present and do not require the introduction of foreign models (see Alverson 1984; Nair 1983; Netting et al. 1980; Richards 1985). Indeed, the past introduction of such models and their attendant cultural and political baggage may have actually thwarted the development of traditional African agriculture (Alverson 1984), as in the neglect of the advantages of mixed cropping. One of the most important potential contributions to the future of the African food supply may be the investigation of past, present and changing systems of group resource use and population regulation.

Environmentally and Socially Sustainable Agriculture

It is hard to overestimate the importance of applying the correct standard to agricultural performance. I do not see how a stable, abundant, long-term agriculture can be built up and maintained by any standard less comprehensive than that of the perfect health of individual human bodies, of the community, and of the community's sources and supports in the natural world. [Berry, W. 1977:204]

The revolutionary changes of the last four decades in U.S. agriculture and their effect on society and the environment have led to fundamentally different approaches to food production, variously referred to as organic, alternative, ecological, biological or sustainable agriculture. While a growing number of LGUs and other establishment institutions are becoming more open to these alternatives, it appears to be primarily the economic, secondarily the environmental, and rarely the social aspects which are discussed.

As defined by the USDA, "organic" agriculture is "a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives" (USDA 1980:9). Most studies show that organic agriculture reduces both production costs and yields per unit land area (Lockeretz et al. 1981a; USDA 1980; CAST 1980), while the net profit is about the same as conventional farms in the U.S. (Lockeretz et al. 1981a). Organic farming can, "given suitable climatic conditions, markets and required inputs to be a productive and efficient farming option and reduce soil erosion" (OTA 1982:111). While successful on large farms as well, improvements in resource-conserving farm technologies could probably improve economic efficiency of small scale farms, and are consistent with the goals of small-scale farmers in the U.S. to achieve greater self-reliance and minimize risk (Young 1982:214). Anti-desertification methods demanding more intensive management for long-term productivity may be more readily put into practice by small-scale farmers (OTA 1982:128, 130). Organic agricultural practices dependent on natural fertility practices that reduce runoff and erosion are also important in maintaining fertility (USDA 1981:86).

While environmentally sustainable agriculture does not necessarily equal socially responsible agriculture, these two aspects are deemed by some to be inseparable. Efforts to improve the well-being of those adversely affected by the food system, such as limited resource, small-scale farmers, farm workers or consumers are usually met with opposition by the industrial agriculture establishment. This is especially true if they abjure incrementalist change in favor of structural change, without which there is "little hope of significantly improving the condition of the oppressed" (LaBelle and da Silva Goncalves 1984:357).

Ideology and values play a large role in the current and increasingly heated debate over alternatives to conventional agriculture in industrial countries (Lockeretz 1981b; Miller 1985). For example, the report on organic agriculture prepared by the USDA (1980) was immediately contested by an industrial agriculture establishment group, the Council for Agricultural Science and Technology (CAST 1980). Efforts for three years by congressional supporters of a farm bill meant to implement some of the recommendations in the USDA report have met with official opposition from the Reagan administration's USDA. Before finally being passed in 1985, the bill's sponsors

changed its name from "organic" to "alternative" agriculture, and, finally, to the Agricultural Productivity Act, in order to appease the opposition.

Sustainable agriculture in Africa as a synthesis of traditional and modern "scientific" methods is in its infancy. Efforts initiated from outside Africa may tend to slight traditional practices, as appears to be the case with a Dutch group promoting "ecological agriculture" at several sites in Ghana (van der Werf 1983, 1984). Some large-scale efforts have also been made, for example in Tanzania, where Nyerere (1983) has advocated organic agricultural practices, especially in composting and soil management. The strategy of starting with existing African production systems, and then adapting the most appropriate of alternative approaches being developed in the U.S. and other areas, offers the best hope for ecologically sustainable agriculture in Africa (see Harwood 1983).

Experiments with statist socialism such as Nyerere's in Tanzania or the State Farms in Ghana are quickly dismissed by the establishment as showing the inappropriateness of socialism for African agriculture (e.g. Eicher 1982). However, these may be more indicative of the inappropriateness of the type of socialist agricultural development in which the farmers have no say, and of the use of industrial agriculture models for Africa (Nyerere 1983; Miracle and Seidman 1968). As in the controversy over resource management, this is an issue which is much influenced by value systems. An example is seeing as the obvious alternative to poorly managed government agricultural programs the support of "private sector suppliers of inputs" (Vengroff and Farah 1985:84), omitting communal systems.

Despite the record of the Green Revolution and the direction taken so far by the new biorevolution, there may be many possible applications of the advancing knowledge of crop improvement which could contribute positively to the African food supply. For example, guidelines have been proposed for crop breeding that reflect the situation of small-scale farmers and women in Africa for a USAID project. Since the project is meant to improve the health and nutrition of local people by increasing the availability of beans and cowpeas, a traditional focus on production is not enough. Important factors to consider are stability of yield, ability to yield without purchased inputs such as chemicals, multipurpose, e.g. leaf as well as seed consumption, ease of storage, processing and cooking, nutritional value, espe-

cially in weaning foods, and the effect on women's and men's workloads (Ferguson and Horn 1985:6-7). Anthropologists' advice to agronomists in a project in Malawi led to change in maize breeding programs, toward characteristics more suited to traditional farming systems (Spring 1985).

If "Africa's current economic crisis is structural, [and] rooted in unequal relations between nations and within divided societies", an effective international response must "foster genuine economic and social development based on principles of equality and democracy within African societies and between African states and the world's industrial nations" (Connell 1985).

Values And Development Alternatives In Africa: A Role For Social Scientists?

An important role for social scientists is to question assumptions about human nature, especially, perhaps, those of their own cultures. To allow the economists to define development "by what they do or study" simply because they are the dominant group among development practitioners (de Kadt 1985:551) is an abdication of responsibility. An awareness of anthropology's history in African colonial "development", may help prevent being drawn into the confining sphere of Western-style production agriculture, and becoming tied to its paradigms as the other agricultural disciplines including agricultural economics and rural sociology have (Friedland 1982). The debate on the future of African food systems would be more productive if there were less hiding behind the safe walls of economic analyses and more focusing instead on the relation of *value systems* to power structures and development goals.

People, especially poor people, make decisions in contexts determined by forces beyond their immediate control. To simply help people adapt to these forces is not a solution to the current crisis in Africa or elsewhere, because it overlooks the real cause of the problems, and thereby increases the difficulty of changing the basic structure of a system that exploits them. Decision-making analysis (Barlett 1980; Gladwin 1982) is an example of a very important way in which anthropologists can contribute to African development. Yet unless it is

set in the context of the power structure which determines parameters of farmers' decision-making it will be of little help in the long run, and it may be that "policies based on decision-making analysis have not succeeded because they do not address the source of power and patronage that shape resource allocation" (Berry 1980:333).

I believe that anthropologists must take a broader role in development than that advocated by currently popular "farming systems" approach. While farming systems proclaims that development must begin with an appreciation of the African farmer *in situ* and from her or his point of view, it may in essence still serve the economic goals of production agriculture. Most farming systems practitioners fail to take a larger view of the system (Altieri 1986; Garrett 1984). While some advocate research to "show how agricultural policies at the macro level affect and are affected by trends occurring at the micro level" (De Walt 1985:109), there is seldom an attempt to analyze the value system and political power structure of the micro-macro link, or environmental sustainability.

When anthropologists are told that their role in agricultural development should be to provide the information needed by biological agricultural scientists so that "their work can commence" and that they should stay out of the technical aspects of development (De Walt 1985:108), with no mention of the possibility of structural and cultural impediments to development in the *developed* world and the development establishment, this sells anthropology short on two scores.

First, it denies a proper role to the biological aspect of anthropology, with its emphasis on nutrition, demography, human biology, ecology, and evolution. For example, it has been suggested that "FSR projects should not be held accountable for nutritional consequences outside of their control" since "FSR projects which bring about improvements in food consumption may not always improve nutrition" because of "confounding influences" (Frankenberger 1985:2,3; see De Walt 1985 for contrary opinion). The same biological principles inform anthropology, nutrition and agriculture, and if development is truly viewed as a system, then the biological interface between different aspects of the system (and their attendant academic disciplines) is as important as the cultural interface. While most anthropologists are not agronomists, some at least are more qualified than agronomists to consider the interface between plant biology and human biology, and between both and culture.

Secondly, such a view limits the cultural aspect of anthropology to considering the poor, not the culture of the power structure that often creates their poverty. An almost complete lack of discussion in farming systems development literature of the possibility of the poor African farmer having control over her or his own development, leaves the development agent firmly in charge (see Gellar 1985). If development agency bureaucrats (Hoben 1980), biological agricultural scientists, and African bureaucrats (Berry 1984) are, like the poor African farmer, considered to be "rational", then their behavior can be fruitfully analyzed in terms of their decision-making environment. "Cultural paradigms" may be important predictors of their behavior, and their study may yield findings critical for promoting development.

My own experiences in Africa and as an administrator in an LGU international agriculture program have taught me that all of this is not easy. Most people in the U.S. agriculture establishment are not used to thinking in terms of value systems. They are, as Thomas Kuhn would put it, in the position of elaborating, and, to an increasing extent, defending the established paradigms of industrialized production agriculture (see George 1984:59-60). What is important is to increase the scope of discussion on development alternatives for Africa to include the tremendous resource of knowledge *within* Africa, the ferment of ideas and methods evolving from a challenging of conventional industrial agriculture in the U.S. and elsewhere, and an awareness of the cultural relativity of *all* approaches to the African food crisis.

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