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FOOD SECURITY RESEARCH PRIORITIES IN SUB-SAHARAN AFRICA *

BY

CARL K. EICHER **

(Michigan state university. Dept of agricultural economics)

I. INTRODUCTION

Africa's recent agrarian history has been dominated by one overarching statistic - food production grew at roughly half the population growth rate from 1970 to 1984. But the bountiful harvests of the past two years provide a breathing spell to assess what has been learned about Africa's agrarian crisis and steps to meet it. A major issue is whether recent harvests are temporary or the beginning of an upward trend in the rate of growth of food production, a prequisite for closing the food-population gap.

Increasing food production is a central part of the food security challenge in Africa. But food security has two interrelated components: availability of food through production, storage and imports and (2) ability of all people in a nation to acquire a calorie-adequate diet. Since food production is only one dimension of the food security equation, it follows that increased food production cannot ensure regional, national or even household food security. In a nutshell, this explains why an essay on

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** Visiting Profesor of Agricultural Economics, University of Zimbabwe, Harare; Professor of Agricultural Economics, Michigan State University, East Lansing, Michigan.

food security research priorities in Africa[1]/ must go beyond making a plea to step up food production research.

Part II defines and clarifies several basic concepts: food first, food self-sufficiency, food self-reliance, food strategy and food security. Part III lays out three long run problems that shape the food security research agenda: (1) the food production-population race, (2) the poverty, hunger and food insecurity battle, and (3) the employment problem. Part IV advances four caveats about research on food security. Part V, the core of the paper, lays out a food security research agenda for social and technical scientists.

Food security research requires the combined inputs from many disciplines such as economics, agricultural economics, nutrition, geography, crop science, animal science and food technology. But it also requires a major shift in the allocation of time of agricultural economists from micro to macro problems such as nutrition policy, food subsidies, grain storage and international trade. I conclude by noting that farming systems research in Africa is in decline and suggest that the reasons for this decline should be closely studied by food security researchers.

II. CLARIFICATION OF CONCEPTS

The core concepts in food policy/food security analysis are confusing and in need of clarification.

1. Food First: This populist expression was advanced by Francis Lappe and Joseph Collins in the early 1970s as an utopian appeal for all people on

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1/ Africa is used throughout the paper to include the 45 countries in Sub-Saharan Africa.

the planet to share resources and help the poor meet their basic needs, including food. In Food First (1977) Lappe and Collins, recommended a reorientation of national development strategies to give higher priority to food production, reduce the reliance on export crops and develop food distribution schemes to ensure that the poor have access to an adequate diet. Food first lost popular support in the late 1970s and the early 1980s as food production expanded in Asia and world grain prices fell. But the authors' concern over access to food is an enduring contribution.

2. Food Self-Sufficiency: This concept dominated the global food policy debates in India, China and other Asian countries in the 1970s; it is understandably popular in Africa today as a response to recurring drought and the great Ethiopian famine of 1985. Food self-sufficiency can be narrowly defined as the ability of a village, district, nation or a region to meet 100 percent of its staple food needs from domestic production and/or storage under all weather probabilities. A more popular definition of self-sufficiency is the ability of a nation to meet all of its staple food needs through local production and/or storage except during periods of extreme drought or natural disaster when commercial food imports and/or food aid are required. However, because the weather probability distribution is rarely defined by the author, it is hard to pin down what food self-sufficiency means in operational terms.

   In the Sahelian region of West Africa, the concept of regional food self-sufficiency was endorsed by the heads of State following the 1968-74 drought. A Secretariat was established in Ouagadougou to mobilize donor support to enable the Sahel to achieve regional food self-sufficiency by

the year 2000.[1]/ But regional self-sufficiency was never rigorously defined and it has become a moving target.

3. Food Self-Reliance: This concept emerged in the Third World in the 1970s to indicate a process of increasing domestic food production and reducing the reliance on food imports over time. Since the degree of food self-reliance is usually not specified, it remains a fuzzy concept in practice. But the concept has a powerful political appeal and it continues to be used in Africa.

4. Food Strategy: The concept of a national food strategy was endorsed by the Governing Council of the World Food Council in 1979 and followed by an aggressive campaign to encourage African states to prepare food strategies. The World Food Council recently boasted that 30 Africa countries have adopted or are seeking to implement national food strategies (Williams, 1985).

In 1980 the European Parliament held a special debate on world food issues. Following the debate, Commissioner Pisani advanced an "Action Plan to Combat World Hunger", also referred to as the Pisani Plan (Pisani, 1982). Pisani argued that project aid was not buying badly needed policy reform in Third World countries and that the concept of a food strategy could facilitate policy dialogue and lead to mutually beneficial policy reforms (Tollens, 1986). Since 1982, the Community has been active in supporting the implementation of food strategies (Strategic Alimentaire) in Zambia, Rwanda, Kenya and Mali (Lipton and Heald 1984; Davies and Lipton, 1985; and Commission, 1986).

1/ Intra-regional trade is implicit in the concept of regional food self-sufficiency. For a history of the Sahel recovery program see (De Lattre and Fell, 1984).

The concept of a national food strategy is sound in theory. In practice I have observed that many of the strategies have been prepared by expatriates, most have relied on questionable secondary data and most have concentrated on food availability issues - (increasing food production and expanding grain storage). With the exception of Botswana's National Food Strategy 1/, most food strategies devote little attention to politics, policies and programs that shape access to food.

In sum, the World Food Council's aggressive promotion of national food strategies has been a hollow exercise - i.e. another passing fad.2/

5. Food Security: In 1974 when the World Food Conference was convened in Rome, food security was the dominant theme even though it was never rigorously defined. But the concept of food security had little staying power following the Rome Conference because policy makers and donors gave priority to increasing food production and rebuilding world grain reserves. Food security came of age in the early 1980s. In an influential collection of essays edited by Alberto Valdes Food Security for Developing Countries (1981), food security was defined as "the ability of food deficit countries, or regions within countries, to meet target consumption levels on a _

1/ Botswana is implementing a food security program that is one of the best kept secrets in Africa. Now in the fourth year of drought, Botswana is providing supplementary food during some parts of the year to 60 percent of its total population of around one million. For an excellent synthesis of the evolution of food security planning in Botswana over the past decade see Holm and Morgan (1985).

2/ Since its inception a decade ago, the World Food Council has been unsure of its audience and overshadowed by the FAO, USDA, IFPRI and the World Bank.

year-to-year basis (Valdes and Siamwalla, 1981, p.1), a definition that incorporates the effects of both supply and demand. In early 1986, the World Bank issued a food security policy paper Poverty and Hunger (1986)in which food security was defined as "access by all people at all times to enough food for an active, healthy life". Two essential elements are the availability of food and the ability to acquire it" (World Bank, 1986, p.1).

In Southern Africa the concept of regional food security was embraced at the initial Summit meeting of the Southern Africa Development Coordination Conference (SADCC) held at Lusaka in April, 1980. At the meeting Zimbabwe accepted responsibility to develop a regional food security program for the nine SADCC states and subsequently designated its Ministry of Agriculture to act as the official agency in developing and coordinating SADCC's regional food security program. From 1982 to 1984 SADCC developed ten food security studies and projects that are being implemented by member states.1/ Following the prolonged drought in Southern Africa from 1982 to 1984 2/, SADCC's food security portfolio was expanded to include irrigation and seed multiplication projects in order to step up food production in the region. With good harvests in the SADCC region in 1985 and 1986, SADCC is carrying out studies of triangular grain trade, food aid, and a regional grain reserve.

Two major lessons emerge from this discussion of the five concepts. First, although food first, food self- reliance and food self-sufficiency have powerful emotional and political appeal, they have a built-in food production bias and they cannot help answer the key policy question - what is the most cost effective mix of domestic food production and storage, food imports and

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1/ For a historical review of SADCC's Food Security Program, see Murphy (1982 and 1985), Muchena (1985) and Drane (1985).

2/ The drought is now in its fourth year in Botswana.

food aid to meet national food security needs? Second, food security has emerged as a concept with "staying power". There is a growing consensus that food security should be defined to include both supply factors (e.g., the availability of food) and demand factors (the ability of all members of a society to acquire it).

III. CHALLENGES FACING AFRICAN AGRICULTURE: 1986 TO 2000

Good harvests in many countries in 1985 and 1986 have dramatically changed the short term food outlook for Africa. But beneath this welcome forecast are three long term problems: the food production-population race, the hunger, poverty and food insecurity battle and rural employment problems. Unfortunately, much of the advice that African states are receiving on these three core problems is based on a shallow understanding of the complex nature of the agrarian crisis and a tendency to oversell one or two of the prime movers of agricultural change (e.g., policy reform, new technology). We shall examine each of the three core problems.1/

The Food Production-Population Race

The starting point for understanding the food production- population race is the rate of population growth - not the population density or the total size of a nation's population. The current population growth rates in African countries - 2.5 to 4.1 percent - are extremely high by historical standards and imply a population doubling time of 15 to 25 years. Africa's 3.2 percent annual population growth is growing at roughly triple the rate of population growth in industrial countries at a comparable stage of their economic history. For example, the annual population growth rate was around one percent in numerous European countries from 1850 to 1900 and 1.1 percent in

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1/ This section draws on my "Famine Prevention in Africa: The long View" (1985a).

Japan from 1878 to 1912. Kenya's population growth rate of around 4 percent will require food production to be doubled in 16 to 18 years - a rate unprecedented in the early history of modern economic growth of industrial countries (McCarthy and Mwangi 1982).

In summary, rapid population growth is eating up savings, and putting pressure on food supplies and natural resources such as fuelwood and national parks. If food production fails to keep pace with demand, it could lead to inflation, increased malnutrition and require foreign exchange to be diverted from capital goods to food imports. Presently population growth is generating food needs that will require food output in Africa to grow at 4 to 5 percent per year, an awsome task. Hence the efficient expansion of food production is a cornerstone of food security policy in Africa.

The Poverty, Hunger and Food Insecurity Battle

Hunger and food insecurity basically describes the lack of a calorie-adequate diet on a temporary or chronic basis. About 100 million or roughly one-fourth of the African people were estimated to be hungry and malnourished in 1985. Until the past decade, it was commonly assumed that the lack of protein was the dominant cause of malnutrition. But research has shown that the key to good nutrition is getting enough calories because the protein needs of most people will be met if they consume enough calories from several sources. Pregnant and nursing women, however, usually need additional protein.

Poverty is a major cause of hunger and food insecurity because it prevents people from producing or purchasing a calorie-adequate diet. Research has shown that hunger and malnutrition are primarily caused by one or more of the following;

* a lack of access to land for families to produce adequate food,
* low productivity of family labor on subsistence farms,
* drought-induced instability of food production, and/or
* a lack of income to purchase adequate food on a timely basis.

Experience has shown that expanded food production by itself will neither eliminate hunger nor malnutrition. For example, the United States and India are both self-sufficient in staple food production but because of poverty, neither country has solved its hunger and malnutrition problems. In sum, the reduction of poverty is a central part of a strategy to reduce food insecurity in both low and high income countries. 1/

Rural Employment Problems

Simple mathematics can tell the story. Seven out of ten Africans are living in rural areas. Based on the historical process of the speed of demographic change, the majority of the people in Africa will still be living in rural areas by the year 2000. For example, in the 22 low income countries in Africa, the labor force in agriculture fell by only six percent (84 to 78) over a sixteen year period - 1965 to 1981 (World Bank, 1985a, p.214). Since Africa is the only continent in the world where the rate of growth of population is increasing, a logical question is: What can be done to help school leavers find productive employment in agriculture and rural non farm jobs for a generation or more? In a crude sense, how can people be "parked" in agriculture to produce their subsistence food needs until fertility rates turn downward?

In summary, population pressure will press hard on available food supplies, natural resources and game parks and it will swell the national labor force beyond the number of available jobs in industrial, service and urban sectors. Hence, the generation of jobs in farming and rural non farm

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1/ See the congruence between the major substantive concerns in Valdes (1984) Food Security for Developing Countries and Busch and Lacy (1984) Food Security in the United States.

activities is a crucial part of the food security equation. Unless Africa's growing rural population has access to land to produce their own calories or local opportunities to sell some of their labor to generate income to purchase calories, food insecurity will plague future generations.

IV. FOOD SECURITY RESEARCH: SOME CAVEATS

There are four background issues that should be examined and debated before discussing food security research priorities.

* Definition of food security.
* Projects or policies?
* Level of analysis.
* Political sensitivity.

1. Definition: Unless there is a clear and consistent definition of food security, it could end up like Farming Systems Research after a decade of struggle - "having difficulty in hitting a moving target" (Maxwell, 1986). Likewise, unless research is focused on both food availability issues and the ability to acquire food, food security research will become synonymous with agricultural development, encompassing land tenure, credit, mechanization, marketing etc. The World Bank's definition of food security is clear and concise: "access by all people at all times to enough food for an active, healthy life. Its essential elements are availability of food and ability to acquire it " (1986, p1). In short, coming to an agreement on a definition of food security is the starting point in pursuing research on the topic.
2. Projects or Policies? Pursuant to a pioneering World Bank study of the relationship between poverty and malnutrition (Reutlinger and Selowsky, 1976), the management of the Bank decided to "projectize nutrition" and offer loans for nutrition projects and nutrition components in

multi-purpose projects in the Latin America and Asia and to sponsor in-house and contract research on nutrition.[1]/ However, the record over the past decade has been uneven. Because of the synergistic relationships between nutrition, health and water supplies, it has been difficult to bring about an improvement in the nutrition of a target group solely through nutrition interventions. Moreover, it has been difficult to design simple but cost effective nutrition interventions. The Bank is now assessing its experience with nutrition over the past decade, including how much emphasis to place on nutrition projects and policies in the future and how nutrition issues can be incorporated into its new food security policy work. Whatever the outcome of these deliberations, there is agreement in the Bank that the reduction of poverty is central to the reduction of malnutrition.

The Bank's experience with nutrition should be taken into account as African states and regional organizations such as CILLS and SADCC figure out whether to develop and implement food security projects (- e.g., early warning systems, post harvest losses)[2]/ and or whether policies (food, trade and exchange rates) should be the engine to achieve food security objectives. Food security researchers face the same dilemma as the director of a national or regional food security planning unit. Should researchers assess the performance of individual food security projects (e.g. early warning) or analyze how food subsidy, trade and monetary policies directly and indirectly affect the food security of various groups of society?

1/ Because of weak infrastructure, the Bank has restricted its efforts in Africa to a few nutrition surveys and pilot projects.

2/ SADCC is currently implementing twelve food security studies and projects (Muchena, 1985 and Drane, 1985).

In my judgment, research on food security should give priority to policies (nutrition, health, food grain pricing) rather than projects.

3. Level of Analysis: Food security can be studied at various levels: household, village, district, nation and regions such as the Sahel or Southern Africa. I am of the opinion that about 25 percent of the funds for food security research should be allocated to household/village food security, 50 percent to the study of national food security policy options and 25 percent to research on regional food security policies (e.g., food aid, trade, exchange rates and grain storage). Household and village food security studies are complex and fraught with conceptual difficulties as discussed below. National food security research priorities will vary substantially from country to country because of the extraordinary heterogeneity of economic conditions. Because studies of regional food security policies must be closely linked to national economic policies, it follows that research on national and regional food security problems should be conceptualized and implemented as part of a common research design.

4. Sensitivity: Food security policy issues are sensitive research topics. For example, the World Bank's new food security policy paper stresses the need to examine the economics of government grain storage programs and food subsidies (World Bank, 1986). African governments routinely invite the bank and other donors to examine technical questions such as how much grain storage should be constructed. But it is inconceivable that Zambia would invite a donor to examine the $333 million kwacha of subsidies in its 1986 budget (Zambia, 1986, p. 334). In short, the scope of the national food security research agenda - especially research on food subsidies and state grain boards, will be constrained by the ability to gain research clearance and access to data.

V. FOOD SECURITY RESEARCH PRIORITIES

Experience has shown that it is impossible to generalize about the sources of agricultural growth for 45 countries in sub-Saharan Africa since independence in 1960. There are many reasons for this dilemma, including a lack of reliable statistics[1]/ and vast initial differences among countries in terms of the stage of development, population density, the stock of human capital and natural resources and the availability of technology.[2]/ Likewise, because of the extreme heterogeneity in agricultural conditions, political systems and ideologies, an essay on food security research priorities for Sub-Saharan Africa would be a vacuous exercise. The challenge is to develop food security research priorities for each of the five major regions (e.g., Southern Africa), taking into account the agro-ecological conditions, food security problems and ongoing research by regional organizations such as CILSS in the Sahel region and SADCC in Southern Africa. A concurrent step is for local scholars to develop national research priorities within a regional framework.

Food security research topics can be divided into five areas:

1. Efficiency of agricultural production
2. Marketing
3. Food consumption and nutrition
4. Managing grain reserves, trade and food aid
5. Food security policy options: national and regional.

1/ Timmer, Falcon and Pearson's state that the starting point for food policy (security) analysis is the food balance sheet "which most countries now publish at an annual basis", (1983, p.22). However, I am not aware of any African country that publishes a food balance sheet on an annual basis.

Efficiency of Agricultural Production

Food security research will be sterile if it devotes exclusive emphasis to the study of the food system because cash crops, export crops and livestock can generate jobs and income to enable households to purchase food. Hence, the efficiency of agricultural production rather than food production research per se is the legitimate starting point for food security research.

Five research topics fall under the general heading of the efficiency of food and agricultural production:

1. Incorporating food security goals into the priorities of national agricultural research services
2. Food Production Policy
3. Industrial/Export Crop Policy
4. Irrigation Policy
5. Household Food Security

Food Security Goals

The managers of national agricultural research services are under pressure to justify their research priorities in light of Africa's food crisis and the multiple objectives inherent in development planning such as economic growth, food security, employment, foreign exchange, and income redistribution. Currently there is no established process of incorporating food security issues into the priorities of national agricultural research services. For a review of the problems of incorporating nutrition goals into national research planning see the collection of papers edited by Pinstrup-Anderson et al (1984). Longmire and Winkelman (1985) illustrate how domestic resource cost (DRC) analysis can be used to assess the comparative advantage of one commodity such as wheat in the national economy and, by implication, the relative emphasis that a national research service should devote to wheat. But, at present, economists have little to offer national research managers on the ex ante incorporation of food security goals into agricultural research planning for an entire country. Research is urgently needed on the this topic.

Food Production Policy

Since the majority of the poor in Africa are engaged in subsistence food production, one of the most direct ways of increasing the real incomes of smallholders in food deficit countries in the short run is to increase the productivity of their main enterprise, staple food crops.[1] In food deficit countries, increasing the efficiency of producing staple food crops can increase the per capita availability of home-produced foods, raise cash incomes by selling some of the increased output or enable family food needs to be produced with less land and labor, thus freeing these resources for other income-earning activities such as cotton production or off-farm employment. Since off-farm employment can generate income and increase the demand for farm products, the farm/off-farm linkages should be given special attention.[2]

In food surplus producing countries such as Malawi, Zimbabwe, and the Cameroon, etc., the question of how much research emphasis to place on increasing food production is a complex issue that should be examined in a regional trade framework. Zimbabwe is a good illustration of the complexity of the problem because of its inherited dual agrarian structure, its post-independence policy of assisting small producers (communal farmers) increase their marketed surplus (especially maize and cotton) and because its maize policy is based on the premise that it has a long term dynamic comparative advantage in producing and exporting maize. Zimbabwe currently has approximately 800,000 smallholders and 4200 commercial farms. Presently Zimbabwe has a backlog of white maize genetic material for both commercial farmers and smallholders. [3]

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[1] This section draws on Eicher and Staatz (1985).

[2] For a review of the literature on rural non-farm employment see Haggblade, Liedholm and Mead (1986).

[3] Maize yields in Zimbabwe are about 4.5 MT/ha on commercial farms and 1.5 tons on smallholders (communal farms) (Eicher, 1984) and Rohrbach (1985).

But improving the efficiency of food production is a more complex task than developing improved technology - the main concern of technical scientists and farming systems researchers. Investments in marketing, processing and transportation are also required. These issues can be examined in a food systems framework (Riley and Staatz, 1981). Subsistence farmers are understandably reluctant to try to increase their income through specialization in one or two food and/or export crops if there is not a reliable market to purchase some of their food needs. In the long run, efficient input and output markets are the key in developing the intersectoral linkages that characterize economic development, which by generating increased incomes reduces poverty and food insecurity.

Industrial/Export Crop Policy

The third research topic for food security researchers is the selective study of key industrial crops such as cotton, and export crops such as tea in Kenya, coffee in Rwanda and groundnuts in Senegal. An illustration from Rwanda helps explain why research on an export crop such as coffee may be a higher food security research priority than research on the staple foods - beans and maize. Although coffee currently occupies only 3 percent of the arable land, it generates about 75 percent of Rwanda's export earnings. Smallholder coffee yields in Rwanda have declined 20 percent since independence in 1960 (Tollens, 1986).Coffee sold under the International Coffee Agreement (ICA) or outside ICA arrangements generates substantially higher returns per hectare than food crops such as beans. Moreover, smallholder coffee generates 550 man days of work per hectare per vear. a crucial factor in a country with the highest population density in Africa and a need to expand rural employment opportunities. If smallholder income from coffee production can be increased they will likely purchase additional food from the market and increase family food security. In sum, food security researchers should be praised rather than criticized for pursuing some research on cotton, coffee, tea etc.

Irrigation Policy

Currently less than 5 percent of the arable land in Africa is under irrigation compared with around 30 percent in India. But in the wake of the drought in many parts of Africa, irrigation has emerged as a high priority investment that is being justified for its contribution to increasing the security of food production, rural employment generation and foreign exchange earnings.

Africa's irrigation history is marked with false expectations, cost overruns and a legion of failures (Eicher and Baker, 1982, and FAO, 1985). Following the devastating drought in the Sahel, grandiose plans were advanced to "drought proof" the Sahel by the end of this century. But the same problems that plagued colonial administrators are emerging as significant barriers to irrigation in the Sahel. For example, the number of hectares of new land being brought under irrigation each year in the Sahel - around 5,000 - is about equal to the number abandoned because of unforseen technical problems, and difficulties in developing farmer irrigation associations to maintain the ditches and canals and manage the schemes Eicher, 1986). Nevertheless, new irrigation projects are under construction in many countries with the objective of increasing food production and food security. For example, Senegal is completing two dams on the Senegal river costing around a billion dollars with a capacity to irrigate 300,000 to 400,000 hectares. Botswana, now in the fourth year of a drought, is carrying out feasibility studies of several major irrigation programs that are explicitely designed to increase the level of food self-sufficiency (Botswana, 1985). In Zimbabwe, some 80 smallholder irrigation schemes atrophied during the civil disturbances of the 1965-79 period. Many of these schemes are being reopened but almost all are subsidized (Rukuni, 1984). Over the past four years in Southern Africa, I have noted a surge of interest among policy makers in irrigation coupled with a startling lack of information about the

disappointing experience with irrigation in Nigeria 1/, Mali (Kamuanga, 1985) and the Bara project in Kenya where the cost is running about US$35,000 per smallholder. In summary, irrigated crop production will increase slowly in Africa over the next 25 to 50 years. Research should be an integral part of this evolutionary pathway. In my opinion, research on irrigation is a medium priority topic in the food security research agenda.

Household Food Security

The study of household food security has historically been approached from at least four different and largely independent research traditions. First, anthropologists such as Fleuret (1979), Colson (1984) and others have invested substantial intellectual capital in gaining an understanding of food security strategies of households and villages. Second, geographers (Hunter, 1967 and Watts, 1984) and more recently economists have become interested in seasonal hunger and household food insecurity.1/ Third, the study of resource management and agro-forestry is being revived by donors some two decades after the pioneering research of Charreau and Vidal (1965). For example, the World Bank is encouraging research on agro-forestry and resource management (World Bank, 1985). ICRISAT/Hyderabad in India has recently merged its FSR and Economics units into a new Resource Management Department. The ICRISAT/Sahelian Center in Niger recently reorganized its research program into three departments: Sorghum, Millet and Resource Management. Fourth, over the past decade, farming systems teams have contributed to an improved understanding of how farmers incorporate risk into their farm - and to a lesser extent - their household decisions (Moock, 1986 and Rukuni, 1986).

1/ Nigeria has invested several billion dollars in River Basin Authorities and large scale irrigation projects in northern Nigeria. But most of these initiatives have turned out to be costly mistakes (Ogunbile, 1985).

The above research base should be carefully examined before pushing ahead with new research on household food security in resource poor regions.1/ I predict a repetition of past experience - social scientists producing volume after volume of reconnaissance and baseline reports in splendid isolation from technical scientists who are carrying out on-station trials in more favourable soil and rainfall conditions. In sum, caution is needed in designing a research program on household food security in resource poor regions. Ideally, household food security studies should be pursued by multi-disciplinary teams with financial support covering an initial period of a decade.2/ Two social scientists - Robert Chambers and Janice Jiggins are calling for "a revolution in agricultural research for resource-poor farmers" (1985). Let us recall that FSR proponents made the same appeal about a decade ago.

2. Marketing

Marketing research flourished in the 1950s and 1960s because of the proliferation of state marketing boards.3/ But research on marketing was dormant in the 1970's because agricultural economists concentrated on integrated rural development in the first half of the decade and FSR starting with Collinson's work in Kenya in 1976. Since 1980 marketing research has been growing in popularity for several reasons:

1/ David Sahn, IFPRI, is editing a collection of papers on Seasonal Household Food Security.

2/ Most scientists admit that it takes a decade , on the average, to develop and farmer-test a new plant variety for release to extension workers. Why shouldn't social scientists adopt a similar time frame when laying out research programs on household food security in resource poor regions?

3/ For a summary of marketing research in the 1950s and 1960s see Eicher and Baker (1982).

1. There is pervasive empirical evidence that many state marketing boards have turned against the interests of farmers.[1]/

2. In some African countries farmers are receiving a smaller share of the consumer price of basic grains relative to Asia (Ahmed and Rustagi, 1985).

3. The emergence of grain surpluses in southern Africa in 1985 and 1986. In April, 1986 the FAO estimates that seven African countries had 2.7 million tons of exportable surplus of grain.

4. The decision of some donors - especially the World Bank - to reduce project assistance and increase the allocation of assistance to Structural Adjustment Loans (SALs) (Reutlinger, 1986). The restructuring of government grain boards has been included in some of the SALs. Hence, research on how to restructure grain marketing systems is being encouraged by the Bank.

The marketing priorities for food security researchers over the coming decade include the following: (1) conceptual (2) market liberalization and (3) empirical studies. At the conceptual level neither the paradigm of political scientists Robert Bates (1981) nor the neoclassical economics paradigm can answer Elliot Berg's question: why don't LDC governments liberalize agricultural markets? (Berg, 1985a). Research on market liberalization is a high priority topic (Abbott, 1986). Presently, there is virtually no research base on the difficult art of helping manage the transition from state grain boards to cooperatives and private marketing firms in Senegal, Mali, Zambia and other states.[2]/ For example, in early 1986 the Government of Zambia announced that the monopoly of Namboard (the state grain and marketing board) would be terminated. Under the new system cooperative societies and private firms will

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[1]/ Arhin et al (1985); Bates (1981); Berg (1985 and 1985a); and Schmidt (1979).

[2]/ Studies of market liberalizaion are underway in Senegal by ISRA (see Morris, 1985) and in Mali by the Institute of Rural Economy, Food Security Technical Secretarial and Michigan State University. See Child, Muir and Blackie (1985) for suggestions on organizing research on alternative maize marketing systems.

be able to compete with Namboard in buying and selling maize and fetilizer while allowing Namboard to remain the buyer of last resort and maintain the national buffer stock of maize (Zambia, 1986a). But the Government of Zambia does not have a transition plan to move from state to cooperative and/or private marketing. Moreoever, most private millers have storage capacity for only two to four days supply of grain because they have ready access to Namboard silos and Namboard bears the cost and risks of maintaining the national grain reserve. Several millers in Lusaka recently posed the question: because of the uncertainty of government policy why should we lease or buy grain storage from Namboard or construct private grain silos? Why should we take on added risk during the transition phase?

Another important research topic is collecting descriptive information on marketing margins for the major staple food crops. Similar footslogging research has been done by farm management researchers for four decades in Africa.1/ But marketing debates on food crops are largely based on heresay evidence and artificial comparisons . For example, critics of government grain boards usually fail to bring evidence from alternative marketing institutions (e.g., private marketing) because government policy has restricted the role of private marketing agencies for decades. So its back to the basics for marketing research. Marketing studies needed include studies of food systems (Riley and Staatz, 1981); grain boards (Dodge, 1977), (Schmidt, 1979), Muir (1984), Child, Muir and Blackie (1985), Blackie (forthcoming) and (Berg, 1985); parallel markets (Morris, 1985); fertilizer marketing and distribution studies (Crawford et al, 1985); and studies of household production, consumption, storage and marketing decisions (see Stanning, 1985 and Singh, Squire and Strauss, 1986).

1/ See the pioneering studies in the 1960s by Mike Collinson, David Pudsey, John Cleave etc cited in Eicher and Baker (1982).

3. Food Consumption and Nutrition

Half of the food security equation is concerned with the ability of people to acquire food. Urban consumption surveys were a popular research topic in the 1960s, but the field has been dormant for two decades with the exception of a few countries such as Sierra Leone 1/ and Rwanda.2/ Consumption research is high on the priority list because it can answer two basic questions. First, have the changes in consumption in recent years (for example, from millet, sorghum and tubers to wheat and rice in West Africa and from sorghum and millet to white maize in Eastern and Southern Africa) been a response to a change in tastes or to relative prices? If the latter, they are reversible and subject to change through price policy. If the former, then it may prove difficult to "turn back the clock" to sorghum, millet, cassava, yam etc. Second, how do consumption patterns vary by income group? The answer to this question would enable the analyst to move beyond information on "average diets" to knowledge about diets of the malnourished. This information will be of strategic value in designing food intervention programs to reach targeted groups. Since there is a dearth of studies on consumption and nutrition, it follows that this type of research should be given increased priority by researchers in Africa.

Research on nutritional aspects of food security is in its infancy in Africa relative to research on food availability (production and storage) issues. Economists interested in nutrition have had great difficulty in

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1/ The results of an integrated national study of farm production, marketing, migration, rural small scale industry, consumption and nutrition in Sierra Leone are reported in Byerlee, et al (1982), and in Singh, Squire and Strauss (1986).

2/ The Agricultural Survey and Statistical Services (SESA) of the Ministry of Agriculture in Kigali is analyzing the results of a nation-wide consumption survey. For more information contact Serge Rwamasirabo, SESA, Ministry of Agriculture, Kigali.

making inroads into nutrition policy debates and even in lending agencies because nutrition policy is usually dominated by nutritionists and medical personnel.1/

4. Managing Grain Reserves, International Trade and Food Aid

Since food security involves not only increasing the available supply of food but also ensuring that the poor have access to that supply, there is a need to develop an appropriate mix of domestic production, trade, price, marketing and other policies to supply food in a cost effective manner while increasing the real incomes of the poor. Developing such a policy mix requires a detailed understanding of how international trade and food aid (Reutlinger, 1984) can be used to help achieve food security goals. The use of trade and grain reserves to stablize domestic grain supplies has been a major focus of work by the U.S. Department of Agriculture, FAO, IFPRI, and the World Bank (1986).2/ Research on grain reserves has examined (1) appropriate design of storage facilities, (2) the management of stocks, (3) the relative efficacy of food reserves versus insurance approaches such as the IMF's compensatory financing facility to ensure stable food supplies, and (4) the role of commercial imports and food aid in achieving food security goals. This research has demonstrated the high cost of stabilizing grain supplies solely through a system of grain reserves compared with grain reserves and trade. (Huddleston, 1984).

1/ For a discussion of research priorities on consumption and nutrition see Pinstrup - Andersen (1983), Pinstrup-Andersen et al (1984); ISRA/IFPRI (1985) Reutlinger (1984 and 1986) and Singh et al (1986).

2/ For a brief summary of the state of the art on grain reserves see the World Bank, (1986).

Research on agricultural trade has attracted only a handful of African agricultural economists over the past twenty-five years. This is a puzzle in light of Africa's heavy dependence on primary products (Wheeler, 1984). Despite the success of some export oriented economies such as Taiwan, South Korea, Hong Kong, and Brazil over the post two decades[1/], there is considerable skepticism in Africa in relying on food imports and export-oriented agricultural development strategies. There are valid reasons for such reluctance because of the awareness that food insecurity can originate in both international price movements and in fluctuations in the domestic yields of staple food crops. For example, wheat prices in international markets rose from $US 60 to $220 per ton in just 18 months in the early 1970s. More recently, the dramatic fall in the world price of cotton, Mali's main export, has imposed a severe fiscal crisis on the Malian economy. The cotton parastatal announced a 1985 producer price based on 1984 world market conditions but it turned out to be well above the 1985 world price.[2/] On the other hand, trade can bring some unexpected positive benefits. For example, the current coffee boom and the abrupt decline in oil prices over the past year, have contributed to the improved economic outlook in Kenya, and other coffee producing nations.Trade policy research should focus on cereal grains with emphasis on identifying the policy blocks - price and non-price barriers - to expanded grain trade within sub-regions such as West Africa and Southern Africa. A study of the economics of the proposed SADCC regional grain reserve is being carried out by Fidelis Mangwiro and Mudziviri Nziramasanga under the University of Zimbabwe/Michigan State University Food Security Research Program.

1/ For an excellent summary of trade policies of various countries since 1960, see Krueger (1984).

2/ The world price of cotton in domestic currency terms in Mali fell by 50 percent between 1984 and 1985.

5. Food Security Policy Options: National and Regional

The "priorities of priorities" in my proposed agenda is research on policy options at the national and regional levels in order to generate information on the cost and trade offs in achieving food security objectives. Because of intra-regional trade linkages, it follows that the national and regional research programs should be developed as a unified package and undertaken through a regional research network. Because African economies are integrated into the world economy through trade linkages, a logical question is whether the computable general equilibrium models (CGE) used by researchers Egypt, India and South Korea have a role to play in Africa? DeJanvry reports that:

> The trade-offs implied between growth of different sectors, security of food entitlements for different social groups, and short-run versus long-run effects are far from obvious and were partially captured in the results we presented from multi-sector, multiclass economic models for India and Egypt. In this new context, Third World countries must, consequently, design their agricultural policies and their strategies of security of food entitlements with a clear understanding and an explicit quantification of these trade-offs (De Janvry, 1986, p.37).

But the number of trained analysts in African countries is small relative to the number available in countries such as India and Egypt to carry out general equilibrum studies. Moreover, the data base is extremely inadequate for CGE modeling in Africa.

Researchers in Africa should concentrate on partial equilibrium and sub-sector studies with initial emphasis on the one or two most important staple foods in the national economy. For example, because maize accounts for roughly half of the calories consumed by the average Zimbabwean, the University of Zimbabwe - Michigan State University UZ/MSU) food security research team is carrying out a comprehensive study of the maize sub-sector. Steve Buccola and Crispen Sukume have developed an econometric supply and demand model for the maize industry to assess ex ante the aggregate impact of pursuing alternative grain pricing, storage and trade decisions (Buccola,

1985). Godswill Makombe is carrying out a pilot study of the groundnut subsector in Zimbabwe with initial emphasis on the technolgical package available to communal farmers (smallholders). The UZ/MSU team in cooperation with Jim Longmire of CIMMYT is using the subsector framework to examine policy options facing the wheat industry in Southern Africa. After a year of experience with subsector studies the UZ/MSU research team concurs with Shaffer's observation that "the subsector represents a meaningful and manageable division of the economy for comprehensive investigation" (Shaffer, 1970). The UZ/MSU team will synthesize its experience with three subsector studies and develop methodological modules for researchers in the SADCC region. But much conceptual work remains to be done on developing approaches to the study of food security policy options in national and regional economies.1/

VI. SYNTHESIS

It is time to stop treating each of the 45 countries in sub-Saharan Africa as if they were the same. Because of seven colonial histories, 1000 ethnic groups and extra-ordinary heterogeneity in agricultural conditions and stages of development,it would not be fruitful to prepare broad food security research priorities for sub-Saharan Africa. Instead, I recommend the development of food security research priorities on a national basis within a regional framework (e.g., Sahel, Eastern Africa, Southern Africa etc).

Food security research is in its infancy. It is at a comparable point to where Farming Systems Research (FSR) was a decade ago. Food security and FSR are both multi-disciplinary enterprises. Food security researchers should

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1/ Studies on national food security policy options include the following: Aboyade (1985); Byerlee (1985); (1985a); Berg (1985a); Buccola (1985); Ellis (1982) and Ellis etal (1985); Jabara (1985); De Janvry (1986); D'Silva (1985); Timmer (1984); Eicher and Staatz (1985); Pervis and Nyondo (1985) and Gerrard and Roe, (1983).

devote substantial attention to some of the theoretical and conceptual issues before plunging into empirical studies across Africa.

FSR is now in decline in Africa. The reasons for the decline of FSR should be carefully studied by food security researchers. FSR is indecline because it has been oversold, it has often been divisive,[1] it has been overfunded relative to the state of art of the field, it is often carried out by expatriate-dominated teams independently of national agricultural research services,[2] and there are some difficult statistical problems in comparing on-farm with on-station trials. Finally, I have observed that FSR has often been carried out in splendid isolation from the national food and agricultural policy debates.[3]

The decline of FSR in Africa is healthy is my judgment because there is a need for FSR to step to the rear and become a handmaiden to commodity research teams -not an equal partner with separate FSR departments. The challenge is to retain the core of FSR (on-farm research) as an integral part of national agricultural research services. On-farm and on-station research are complementary activities and should be conceptualized, financed and implemented by national research services.

Food security researchers can gain valuable insights from the rise and decline of FSR. First, is the need to clarify the definition of food security and the objectives of food security research. Second, is the need to restrict research to a limited range of topics so that food security research does not become synonymous with agricultural development.

1/ For example, see the note "FSR Gains a Foothold in the Gambia" (Russo and Patrick, 1984).

2/ Some donors are now wisely incorporating FSR into comprehensive projects to strengthen national agricultural research services.

3/ Senegal is a rare exception because a small macroeconomic research group (BAME) in the national agricultural research service (ISRA) works closely with the FSR teams in ISRA (Eicher, 1982a).

Third, is to avoid financing independent teams that have little probability of being financed and sustained after donor funding is exhausted. Fourth, just as FSR generally lacks a strong macro policy orientation, it is important for food security research to have a strong micro foundation. Studies of the efficiency of agricultural production are the legitimate starting in food security research.

In sum, food security research is a legitimate and growing research area that encompasses two main elements - food availability (food production, storage and trade) and the ability of people to acquire food through home production, the market or food relief. The challenge now is to enlist the cooperation of scholars in a wide range of disciplines to carry out studies over the next deecade. The institutionalization of food security research in African institutions should be dealt with today rather than five to ten years down the road.

Since agricultural economists have played an important role in justifying research on food security,[1]/ what are the implications of this essay for the discipline of agricultural economics in Africa? Agricultural economics research is at a profound turning point from micro to macro. The surge of interest in food security research is a manifestation of the growing maturity of the discipline. The question now is; What is the proper balance between micro and macroeconomic research? The present 80-20 micro/macro ratio is unsatisfactory in my judgment. A ratio of around 50-50 is desireable and it can probably be achieved by the mid-nineties.

1/ See REutlinger and Selowsky (1976); Reutlinger (1984 and (1986); Sen (1981) and Valdes (1976).

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