

**GLOBAL 2000
AGRICULTURE PROGRAM
BACKGROUND**

African Agriculture in Crisis

There is a large and growing dependence in sub-Saharan Africa on cereal imports and food aid, often just to maintain already inadequate diets (Table 1). In 1974, the region imported 4.2 million tons of cereals and received 0.9 million tons in food aid. In 1990, cereal imports had grown to 7.8 million tons and food aid to 2.8 million tons. With the devastating droughts in southern and eastern Africa in 1991-1992, sub-Saharan African cereal imports and food aid may swell to 18 million tons during 1992-1993.

Table 1. Sub-Saharan Countries Highly Dependent Upon Cereal Imports and Food Aid, 1990

	Cereal Imports (000 metric tons)	Food AID	Average Index of Food Production Per Capita, 1988-90 (1979-81 = 100)
Mozambique	416	493	81
Ethiopia	687	538	84
Somalia	194	90	94
Malawi	115	175	83
Zaire	336	107	97
Madagascar	183	31	88
Sierra Leone	146	37	89
Mali	61	38	97
Nigeria	502	---	106
Niger	86	35	71
Burkina Faso	145	44	114
Benin	126	13	112
Kenya	188	62	106
Ghana	377	73	97
Togo	111	11	88
Zambia	100	3	103
Guinea	210	2	87
Mauritania	205	72	85
Lesotho	97	30	86
Liberia	70	28	84
Sudan	586	335	71
Zimbabwe	83	13	94
Senegal	534	61	102
Cote D'Ivoire	502	26	101
Cameroon	398	---	89
Congo	94	7	94

Source: 1991 World Development Report, World Bank

Low-income African countries with declining per capita food production are increasingly reliant on food aid, unable either to produce enough food or purchase it from outside. Although seemingly paradoxical, as the data in Table 1 support, there is a strong correlation between those developing countries that have the highest agricultural growth rates and those that have increased their grain imports from the United States and other grain-exporting countries the most. Food imports have grown in these countries, not because domestic production has failed, but because rising rural (and national) incomes have sparked stronger demand for more agricultural products, some of which has been met through importation.

There are compelling environmental reasons for modernizing African agriculture as well. In sharp contrast to the developed countries, where environmental problems are urban, industrial, and a consequence of high incomes, the critical environmental problems in sub-Saharan Africa are rural, agricultural, and poverty based. An essential step in solving these environmental problems is to increase the intensity of agricultural production in those ecological conditions which lend themselves to intensification while decreasing the intensity of production in the more fragile ecologies. The more-favored environments must use modern research and higher input levels to produce a radically increased volume of food production and to provide rising incomes that will generate rapid growth in nonagricultural employment opportunities, particularly in rural areas.

MODULE 1

TRANSFER OF IMPROVED CROP TECHNOLOGY IN AFRICA

Introduction

The Sasakawa-Global 2000 agricultural program led by Nobel Peace Prize Laureate, Dr. Norman E. Borlaug, began operations in sub-Saharan Africa in 1986 with three basic premises: 1) improved technology exists for the staple food crops to double and triple the yields of average small-scale farmers, 2) resource-poor farmers are able and eager to adopt these improved technologies, and 3) given the right technology transfer methodology and the operating funds to put this methodology into action, national extension services can greatly improve their success in transferring improved technical knowledge to small-scale farmers.

Each of the SG 2000 projects is quite small in staffing and annual budgets (model budget provided later). Two or three internationally-recruited scientists are assigned to each project, where they work with hundreds of extension officers who provide most of the human resources needed to carry out project objectives. Priority has been given to production environments with more favorable moisture availability, e.g., those with more than 700 mm of rainfall or irrigation. These relatively more-favored agricultural environments have been selected for two primary reasons: 1) because these environments are where most people live and 2) because proven technology developed by national and international research institutions is available to produce dramatic yield improvements within acceptable margins of risk for small-scale farmers.

Over the past seven years, SG 2000 cooperative projects with African ministries of agriculture have worked directly with more than 150,000 small-scale farmers to demonstrate the value and proper use of improved seeds, fertilizers, and associated farmers--on their own land and with

their own hands--have produced yields averaging 2.5 times higher these yields previously obtained with traditional technology.

SG2000 considers that soil infertility is the single most serious limiting factor restricting increased crop yields in sub-Saharan Africa. Unless something is done first about improving soil fertility, all other efforts to increase crop yields may prove ineffective. While we recognize that little fertilizer is used at present on food crops in most of sub-Saharan Africa, we believe that extension programs should provide farmers with a compelling reason to change the status quo, not perpetuate it. The best way to do so is to let farmers see for themselves the biological potential of their own fields when the soil fertility is restored. After the demonstration is over, resource constraints and risk considerations will likely compel farmers to use lower doses of this input, but hopefully at higher levels and more judiciously than before.

Initially, field demonstrations in each country have concentrated on introducing improved technology for two or three of the major food crops. In rainfed areas, the emphasis has been mostly on maize and sorghum; in irrigated areas, such as Sudan or northern Nigeria, the emphasis has been on wheat production during the winter season. Over time, other crops have been added to the field programs in West Africa, such as cowpeas, soybeans, cassava, groundnuts, and rice. In Benin, a green manure crop, commonly called velvet bean (Mucuna utilis) is being demonstrated to MTP farmers as means to improve soil fertility and control severe weed invasions.

Technology Transfer Approach--Over time, working with national counterparts, a modus operandi has emerged which now can be classified as the SG 2000 approach. The heart of this approach is a dynamic field testing and demonstration program carried out by national extension workers--and backstopped by agricultural researchers--in cooperation with tens of thousands of small-scale farmers. The centerpiece of the SG 2000 technology transfer approach is the farmer-managed Management Training Plot (MTP). Each participating MTP farmer receives the necessary inputs and technical training to employ the recommended technology. To make it economically realistic, we believe that the farmer should pay the bill for the recommended inputs used in the test plot. When the money for these items comes out of the farmers' own pockets, it will not take long to assess the opportunities for gain from using these inputs. We also think that the MTP should be at least 0.25 ha in size and preferably around 0.4 to 0.5 ha. This plot size allows the cooperating farmer to assess the labor and cost requirements associated with technology adoption and to realize an immediate benefit, usually an additional ton or more of grain.

The provision by the extension service of the key inputs needed by the farmer to grow the MTP has been a controversial and often misunderstood aspect of our approach. In doing so, we are not advocating that the extension service become a commercial input distributor nor a credit agency. Rather, we justify the supply of inputs to MTP cooperators on two primary grounds. First, we want the farmer to employ the full package as recommended, since the timing of operations for several of technological components, such as fertilizer application and weed control, is critical to obtain maximum benefit. Second, in being responsible for "loaning" the inputs to MTP farmers, the extension worker assumes some of the risk associated with the recommended technology. For unless farmers attain the predicted yield gains, it is unlikely that they will repay the MTP input loan.

Hands-on Practical Training--While farmers may know in general about the benefits of improved seed and fertilizer they often do not know how to use these inputs to best advantage. This is why the training by extension officers is so crucial. It is their job to teach farmers the appropriate crop management practices so that they can obtain optimum benefit from the package. Training for extension workers is carried out over six or seven sessions, each usually lasting one day. Although some of the training includes classroom instruction, most of the activity occurs in the field, with extension officers carrying out the same cultural practices they will be recommending to farmers. Extension officers then impart crop management training to participating farmers, using different MTPs grown in the vicinity as the teaching sites. In addition, rural primary schools are also included in the MTP program; training is given to teachers who, in turn, supervise students to grow plots on the school grounds.

SG 2000 Program Impact

SG 2000 has achieved a surprising impact on national technology transfer activities--and even on food production itself--for an organization with such modest budgets and staff numbers. In Ghana, national maize production has increased by about 40 percent (from 550,000 to 760,000 t) and average yields have increased by about 20 percent. In Sudan, national wheat production yields have increased about 50 percent. Farm-level production impacts are also becoming more evident in Tanzania and Benin.

There also have been important institutional benefits. Extension officers have been infused with new enthusiasm and have strengthened their ties with small-scale farmers. The MTP program, with its emphasis on working with organized groups, has also made a contribution to the development of farmers' associations in most project countries. Finally, the SG 2000 program has helped to focus the attention of government leaders and officials from development assistance agencies about the need to invest more in agricultural development. By seeing what is possible through the application of modern technology, it is hoped that government leaders will become more convinced that it is far wiser to give encouragement to these developments than to ignore them.

According to Olusegun Obasanjo, Nigeria's former head of state, "SG 2000's role has been to spearhead pilot small-scale farmer development efforts so that other organizations get involved. Its role has been to break the ground, show what is possible, and to help light the way. The technology to feed Africa is there. Packaging and delivering the inputs and building up the political will is what is needed to transfer this experiment into a sustainable development strategy."

The countries of sub-Saharan Africa still confront major development challenges to build a modern agricultural sector. Commercial input delivery and grain marketing systems remain undeveloped and ineffective. National research and extension organizations are under-funded and their links to farmers are still too weak. Finally, the efforts of small-scale farmers to modernize agricultural production continue to be frustrated by unfavorable input:output price relationships.

Accelerating the Transfer of Improved Crop Technology in Africa

SG 2000 is searching for institutional partners to allow it to work with a larger number of African governments to strengthen their technology delivery systems. At present, we are working in five countries (Ghana, Togo, Benin, Nigeria, Tanzania), and hope to establish a program in a sixth country (Ethiopia) in 1993. However, there are another 10-15 countries chronically dependent on food aid where technology exists to accelerate the agricultural modernization process.

The SG 2000 technology transfer approach calls for more operational funds for frontline extension staff than have traditionally been allocated by ministries of agriculture. However, with a proper system of financial control and good recovery of MTP loans, supplying inputs to participating farmers need not be a large recurring cost. Despite these management challenges, we are convinced that unless ministries of agriculture implement more active and effective field demonstration programs, crop technology transfer activities in sub-Saharan Africa will achieve little success.

A model SG 2000 project budget of US\$ 7.75 million is provided in Table 2. It assumes that the cooperating Ministry of Agriculture will supply the necessary supervisory and frontline extension staff for MTP implementation. This budget will support two expatriate advisors; inputs for 25,000 MTPs in various crops; a substantial crop production training effort; provision of pick-ups, motorcycles, and bicycles; and strategic operating funds needed to help run the field program. Because of the MTP input "loan repayment" feature, a significant "revolving fund" can be built up over the seven-year project period which can be left with the government to help the MOA institutionalize the SG 2000 approach into its ongoing extension program.

Table 2. Model Budget for SG 2000 Crop Technology Transfer Project, US\$ 000

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Human Resources							
Int'l	240	250	375	390	410	300	320
Local	50	65	70	75	80	80	80
Consult.	40	40	50	50	50	50	50
Office							
Rent	30	30	30	30	30	30	30
Equip.	20	10	10	10	10	--	--
Oper.	20	25	30	30	30	25	25
Vehicles							
Staff	70	20	50	20	30	--	--
MOA	70	80	90	60	45	45	--
Oper.	50	60	80	80	70	60	50
Field							
Supplies	100	150	250	250	200	200	100
Training	50	75	125	125	100	100	50
Central							
Admin.	100	110	120	135	150	120	115
Monitoring	25	80	80	50	50	100	100
Totals	865	965	1,330	1,305	1,255	1,110	920

GRAND TOTAL=US\$ 7,750*

*Of the grand total of expenditures, a potential of US\$ 1 million (plus accrued interest) can be accumulated over the seven years in a bank account "revolving fund".

GRAND TOTAL=US\$ 7,750*

MODULE 2

THE DEVELOPMENT OF POLICY, PLANNING AND IMPLEMENTATION CAPACITY IN SUPPORT OF THE SG2000 PROGRAM FOR ACCELERATED FOOD AND AGRICULTURAL PRODUCTION IN AFRICA

Introduction

Broadbased and rapid increase in the food and agricultural production is crucial for alleviating hunger and poverty and ensuring the overall economic development of Africa. Yet African governments have been notorious for neglecting their smallholder agriculture. As a result, a variety of food production programs developed with financial, planning and implementation support from aid agencies (e.g. the World Bank, USAID or IFAD) have failed in Africa. SG 2000 is based on a number of paradigms which its designers and implementers have argued are different from traditional food production programs. These include the following:

1. a grass roots approach focused on working with small farmers and demonstrating to them the profitability of technology at the farm level is critical to get them interested in adopting modern technology;
2. agricultural extension focusing on improved practices is not enough;
3. there is need for modern inputs and finance to go with the use of improved practices;
4. there is technology on the shelf which is profitable at the farm level at the input and output prices farmers face; and
5. getting farm households interested in modern technical packages will generate demand for sound policies and institutions which enable a sustainable increase in farm production

Despite the positive physical response to new technology of seed and fertilizer that SG 2000 has demonstrated, a number of questions have been raised including in recent evaluations of the program in Ghana and Tanzania, about the financial profitability of the packages at the farm level under the diverse conditions which face farm households.

Despite nearly twenty years of rural development experience in Africa, scientifically validated facts at the farm level are very limited, although there are many opinions on these questions based on casual empiricism. There are also questions as to whether the policy and institutional response which is expected, once farm households have been shown the importance of the adoption of modern technology, will emerge without strong input from Africans at all levels, as well as questions regarding the detailed content of these policies and institutional responses in terms of the lack of factual information. For example, is there need for modern fertilizers? Do farmers have their own savings or is institutional finance necessary? What input and output prices do farmers face and what are their effects on financial profitability? What are the physical responses of grains to modern inputs under diverse conditions? Is the lack of

knowledge of those inputs the real constraint on the part of farmers or the lack of supply of the right inputs at right prices in the right places? How limiting is the market, transport, storage and processing for these products?

Given that SG 2000 focuses mainly on the dissemination of technology at the farm level, a question is often asked as to why a small scale nongovernmental program such as SG 2000 would succeed in increasing food production on a sustained basis under these circumstances when many others have failed.

By the same token, in recent years since the process of structural adjustment began in the early 1980s, donors have imposed conditions with regard to policies, investments, infrastructural or institutional development and tied those to disbursements of their assistance. But often those conditions too have been based on few facts. Either those conditions have been ignored by governments or carried out too slowly and in a piecemeal manner to have any long term impact. This is in part because African policymakers have not been able to see the precise steps they are expected to take to undertake the complex task of developing smallholder agriculture. Moreover, the role of the government has been questioned on a direct basis and even indirectly the facilitating role the governments need to adopt to increase private and community level actions in the provision of services has not been precisely clear in part due to the lack of knowledge at the field level.

Capacity Development

The first and the foremost task, therefore, is to collect quantifiable, objective information through representative sample surveys on a large enough scale where SG 2000 is operating to develop the information base with which to address the issues of the design of appropriate policies and institutions.

Secondly, African analysts and institutions should be actively involved in the process with a view to developing their capacity. This effort should bring the best international expertise to bear on this fact finding exercise by developing long term collaborative task forces, networks and institutional collaborations for the design and implementation of policy, investment and institutional responses.

This fact finding is important to undertake the considerable education and training of every senior African policymaker needed on the importance and the details of agricultural development, as an essential way of mobilizing support for sustainable agricultural growth at the highest levels of government.

It is also needed because different donors have had different approaches to addressing the same problems, e.g. the content of agricultural research, extension and credit, etc. Ideological preoccupations have resulted in optimistic projections as to how soon the private sector will replace public activity and with how little thoughtful input by governments. Consequently there is a lack of cohesion in the strategy for the development of agriculture. Donor coordination on the substance of an agricultural strategy is urgently needed.

Involvement of African institutions is needed in such fact finding because there is often little capacity in the African governments, universities and the private sector to plan and implement

the details of an agricultural policy or strategy based on the specific realities of individual countries and locations. To fine tune responses requires location-specific knowledge. On the other hand, since some of these conditions apply across several locations, strictly comparable qualitative fact finding is needed across regions within same countries and even among different countries in which SG 2000 is operating so that a network of analysts and policymakers can eventually be developed with a view to learn from each others' experiences.

However, even when human and scientific capacity exists in the nongovernmental agencies, such as universities and the private or the cooperative sectors, these institutions lack the financial and other resources to undertake such analysis. Moreover, African governments are often reluctant to make use of these valuable resources. This situation can be rectified by developing collaborative arrangements between universities and professionals in developed countries and with those in the African countries. It can also help to forge a long term partnership between the government, the private sector and the universities within African in much the same way that it now exists in the United States.

The presence of the SG 2000 program can enable an effective demonstration of a well working policy and strategy at the field level on a sustainable long term basis. President Carter has considerable access to African policy makers at the highest level. He brings to bear moral authority and credibility of a nature few donors can.

Second, through the participation of Nobel Laureate Norman Borlaug, SG 2000 brings to bear outstanding technical input into the program, whereas donor assisted programs have often faltered in the past due to an unsatisfactory technical input.

Third, the SG 2000 program builds on the existing governmental and nongovernmental institutions which it aims to strengthen instead of creating artificial project entities with little long term viability.

The policy, planning and implementation capacity development program will therefore have the following objectives:

1. to develop scientifically validated information on a representative sample of farm level potential, constraints and responses to new technology on a diverse basis;
2. to use this information for the design of policy, institutional and technological responses;
3. to create support for the development of a conducive, flexible but consistent and predictable policy and institutional framework at the highest levels of the government (through policy seminars aimed at senior policymakers, seminars geared to focus on the specific problems of the country, but also bringing to bear lessons from other SG 2000 and non-SG 2000 countries to demonstrate how the particular constraints have been addressed);
4. to ensure active involvement of Africans in this process;
5. as necessary, to undertake training of farmers, middle and high level government officials, academics and policymakers into the conduct of such evaluations, design of program interventions as well as for their implementation;

6. To monitor the progress of implementation of reformed policies and institutions, e.g. privatization of input supply, mobilization of farm household savings for the purchase of inputs, promotion of small scale equipment for the storage and process of newly produced crops, etc.;
7. To assess the impact of reformed policies on farm level responses; and
8. To regularize and institutionalize the correct policies.

The program, based on task forces and networks of African country nationals and external analysts at the forefront of their progressions, will 1) hold regular seminars and workshops for policymakers, middle level administrators and academics based on concrete empirical results generated by the evaluations of the SG 2000 program, 2) provide short term (1 to 3 months) training in situ and long term training of concerned Africans (from 1 to 3 years) in US universities, CG centers and other developing countries (Africans will be exposed more to the experiences of countries such as China, Taiwan and India) by offering sabbaticals to African analysts to facilitate their policy work, to promote their training and most importantly to assist them with implementation.

Finance small strategic equipment (e.g., computers) to increase the effectiveness of the staff and of their academic colleagues to help generate a debate on major policy issues with a view to create increased awareness about the importance of these policies and their implementation.

The policy capacity initiative will be carried out by The Carter Center jointly with the leadership from the University of Florida and together with other members of ACE¹ (University of Minnesota, IFPRI, University of Michigan, CIMMYT, IITA) affiliations of universities and ministries in the SG 2000 countries in Africa by establishing collaborative arrangements with the concerned local governmental institutions.

The participating US and African universities will provide professional input into the design of policy capacity by releasing the time of their faculty and graduate students to work jointly with selected African countries where SG 2000 is operating.

It is important to recognize that various similar efforts have been made in the past without achieving much success. The distinguishing features of the capacity building program are the following:

1. by facilitating cooperative research as well as by networking, the proposed program would create an environment in which recognition of the analysts would come from scientific research and its translation into policy and implementation;
2. by increasing productivity and agricultural diversification, researchers would demonstrate the impact of their work as well as its relevance which would translate in long term

¹ The Agricultural Council of Experts (ACE) is a small international network of agriculture experts which as a group, or seperately, provide policy advice to President Carter on an as needed basis.

sustainability of Global 2000; and

3. it would augment the resources necessary to increase the productivity of the researchers, e.g., computers, travel allowances for field work, stationery, telephone and fax machines, etc.

On balance, the emphasis on increasing productivity of nationals would be greater than using external assistance.