

SASAKAWA AFRICA ASSOCIATION



ANNUAL REPORT FOR 2001-2002

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* Left during 2001

PRESIDENT'S REPORT

INSTITUTIONAL DEVELOPMENT

During 2001, two important institutional developments occurred within SAA, which stand to strengthen the SG 2000 organization in the coming years. One was the appointment by the SAA Board of Directors of Dr. Marco Quiñones to be the Regional Director for Africa. Quiñones has worked in Africa since 1986 when he joined the Global 2000 project in Sudan as a senior agronomist. He was responsible for initiating wheat demonstration work in the irrigated Gezira region. In 1989, Quiñones established the SG 2000 project in Tanzania, which eventually spread to seven regions of the country. In 1993, he set up the SG 2000 project in Ethiopia. One of Quiñones' new responsibilities is to strengthen the networking among the SG 2000 country projects, governments, and key development assistance organizations.

The second important development was the commissioning of a comprehensive external review of SG 2000 country projects and several special SAA programs. This is the first such review after 16 years of operation. It is being undertaken by the International Cooperation Center for Agricultural Education at the University of Nagoya. The external review began in Ghana in September 2001, and will continue through 2002. All active SG 2000 country projects will be reviewed. The results will be an important input to the SAA Board of Directors.

UNLEASHING AFRICA'S AGRICULTURAL POTENTIAL

Sub-Saharan Africa—with its vast untapped land areas, abundant sunlight, and numerous days each year when crops can be grown—has enormous potential for gains in agricultural productivity. To achieve this potential, however, agriculture and rural economies deserve much greater priority in African economic development plans and strategies than is currently the case.

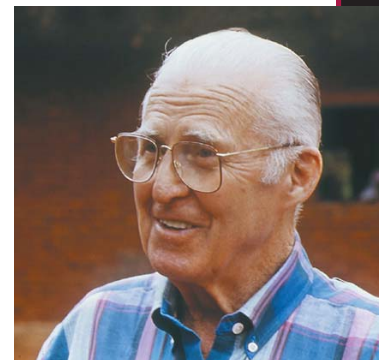
History should have taught us that no nation has been able to reduce poverty substantially and bring about broad-based economic development without first markedly increasing the productivity of its agricultural and food systems. This lesson must not be forgotten by African nations, where 60 to 80 percent of the population is engaged in agriculture. Unfortunately, over the past 40 years, agricultural growth in Africa has been highly uneven. Between 1960 and 1975, agricultural growth—at 3 percent per year—more or less kept pace with population growth. Then, between 1975 and 1985, African

agriculture stagnated, increasing at less than 2 percent per year, which resulted in worsening hunger, malnutrition, and suffering. This situation provoked increased attention to agriculture, both in the donor community and in national governments. As a result, since 1985—which coincides with the launching of the SG 2000 projects—African agricultural growth has reverted to about 3 percent per year, roughly equal to population growth. Unfortunately, national priorities on agriculture and donor support began to slacken again in the late 1990s.

The declining trend of investments in agricultural development must be reversed. Most experts agree that African agriculture must grow at 5 to 6 percent per year if it is to be a major force in reducing poverty. To achieve these higher growth rates, important policy changes and significantly more investments will be needed. In particular, two serious underlying problems must be solved. One is reversing the growing environmental degradation associated with widespread soil nutrient mining. The other is to bring down marketing costs in Africa, which are the highest in the world.

Africa's pervasive soil fertility problem—Many tropical environments in Africa—especially in forest and transition areas—are fragile ecological systems, where deeply weathered soils of inherently low fertility rapidly become infertile under continuous cultivation. In an earlier day, traditional systems of shifting cultivation and complex cropping patterns permitted low-yielding, but relatively stable, food production systems. However, expanding populations and food requirements shortened the bush/fallow periods previously used to restore soil fertility and pushed farmers onto increasingly marginal lands. In consequence African soils are being depleted of nutrients at a frightening rate. This is having disastrous environmental consequences.

While farmers should endeavor to use as much organic nutrients as is economically feasible—not only to replenish nutrients but to improve overall soil structure and health—there simply are not enough organic manures and crop residues available to replenish and maintain the soil fertility. Thus, increased consumption of chemical fertilizer is essential in most smallholder



agricultural systems in sub-Saharan Africa. At present African farmers use about 9 kilograms of nutrients per hectare of arable land—with probably less than half of this paltry amount actually destined for food production. Fertilizer application rates are 20 to 40 times higher in most developing countries of Asia and Latin America, as well as in the industrialized nations.

The SG 2000 field program has been grappling with this soil fertility problem for 16 years. Various strategies have been pursued. One is to focus on maximizing efficiency of fertilizer use—emphasizing application of moderate amounts of the right types of fertilizer and timely weeding. Another is to introduce nitrogen-fixing green manure crops and grain legumes into rotations and to build up organic material in the soil profile through improved fallows, composting, and mulch management under systems of conservation tillage. All of these integrated soil fertility restoration and management approaches can certainly help to improve soil fertility and to reduce the outlays for purchased fertilizers. However, many of the “organic” approaches remain too labor-intensive for farmers to apply on a larger scale to their main field crops.

After nearly two decades of structural adjustment programs and of African governments getting out of the business of supplying fertilizers and other agricultural inputs at subsidized prices, regional fertilizer consumption has hardly improved at all. Thus, the privatization model, in its current form, has failed. We must consider other strategies as well.

There is no avoiding the need to triple or quadruple average consumption of inorganic fertilizers in Africa over the next two decades. There are only two ways this can happen. The best long-term solution is to improve fertilizer supply systems—the private sector has much to contribute here. While somewhat higher prices are inevitable in Africa because of poor transport infrastructures and relatively low trade volumes, better policies and more competition could do much to reduce fertilizer costs in Africa, which typically run two to three times higher than world market prices.

But we must go beyond efforts solely focused on improving the efficiency of supply. Because some smallholder farmers face such serious soil degradation problems and are so poor, I now believe that national governments and international development agencies should consider ways to target subsidies to those farmers who need price relief the most. The danger with subsidies is that the allocation process becomes politically driven, rather than market-driven, increasing the risk of corruption and bias. Thus, if subsidies are re-instituted in Africa, these classical problems must be overcome.

Improving rural transport—Efforts to modernize African agriculture have been stymied by high marketing costs. Per capita, Africa has the fewest kilometers of paved and all-weather roads in the world, helping make transport costs the highest in the world.

Efficient transport is the life-blood of economic modernization. It is essential to improve agricultural productivity and enable farmers to bring their products to markets. Unfortunately, most agricultural production in Africa still is generated along a vast network of footpaths, tracks, and community roads, where the most common mode of transport is the legs, heads, and backs of women. Indeed, the largest part of a household’s time expenditure is for domestic transport.

Finding ways to provide effective and efficient infrastructure (roads, potable water, and electricity) in sub-Saharan Africa underpins all other efforts to reduce poverty, to improve health and education, and to secure peace and prosperity. Not only will improved rural infrastructure increase agricultural productivity and spur economic development, it will reduce rural isolation, thus helping to break down ethnic animosities and allowing the establishment of rural schools and clinics in areas where teachers and healthcare workers have heretofore been unwilling to venture.

Domestic food crops productivity—Domestic food production is the most important agricultural activity in a nation. Traditionally, as populations have grown in Africa, food production has been increased by expanding the area under cultivation. Relatively little progress has been made in increasing average yields in Africa, especially in comparison to Asia and Latin America, where yield increases have been driving forces in production growth over the past 30 years. The critical importance of improving food crop yields in Africa is not given sufficient weight in national development plans.

Few agricultural transformations have as pervasive an effect on poverty reduction and on the environment as yield increases, since they help keep marginal lands free from cultivation and can increase farmer incomes, which have broad economic multiplier effects, especially in African nations where a large proportion of the population is engaged in agriculture. In addition, expanded and more efficiently produced food supplies also lead to a reduction in real prices, which is the equivalent of increasing the real wages of consumers, an especially important contribution to the poor.

In Africa, many improved varieties and food production technologies are already available, or well-advanced in the research pipeline, that can double, triple, and even quadruple traditional yields. Earlier-maturing, disease-resistant, and high-yielding varieties of maize, rice, sorghum, cassava, and grain legumes offer exciting possibilities for multiple cropping in the future (including the introduction of green manure crops and improved fallows). Minimum-tillage systems offer great hope for checking soil erosion, conserving moisture, and reducing the drudgery of hand weeding and land preparation. Nutritionally superior maize varieties are being enthusiastically adopted by substantial numbers of farmers. These varieties not only improve health directly, as human foods, but indirectly through more efficient poultry and swine production.

Higher-value commodities—Smallholder farmers also need to go beyond primary crop production. They also need more value-adding activities in their agricultural enterprises. Livestock is an especially neglected area. Increased domestic grain production produces surpluses that can be fed to animals, and thus converted into valuable milk, eggs, and meat.

Another example is food processing activities using primary crops produced on the farm as raw materials. Food processing also offers opportunities to add value through production of flours, sauces, condiments, and other processed foodstuffs for sale in local and even distant markets. Frequently small-scale food processing can be done with relatively simple equipment, either on the farm or by village groups.

Given the rapid rates of urbanization, African nations must give much greater attention to the challenges of developing the commercial food chain—from the farmer to the consumer. This is especially important considering that within 25 to 30 years more Africans will be living in urban areas than in rural areas.

Development of the export sector—Over the past 25 years, sub-Saharan Africa has lost market share in all of its traditional agricultural export markets, except tea. Although domestic markets will continue to dominate agriculture in Africa, increased participation in international and regional markets will be critical for future agricultural development. African nations need to regain competitiveness in traditional export markets, such as coffee, bananas, palm oil, cocoa, and cotton.

In addition, Africa will need to develop new market niches for a wide variety of nontraditional crops. Improving the efficiency and cost-effectiveness of transport systems—roads, ports, and air—will be

critical to success in such endeavors. Possible crops include various fruits, vegetables, spices, and flowers. There may also be niche markets in medicinal plants that could be developed. Much more could also be done in agroforestry to develop commercial tree production. All of these enterprises, while probably not huge markets or sources of employment, are still important to the development of a more diversified agricultural sector.

Regional trade in some of the basic food crops also has much potential. Here again, higher yields and better integration of regional transport systems will be essential.

Expanded off-farm rural employment—Getting agriculture to grow faster is the first important step to rural development. However, agriculture alone cannot provide employment for all those who live in rural areas. Rural off-farm employment must be expanded to help produce poverty and to slow migration to desperately poor urban slums.

Many promising off-farm activities related to agriculture are possible in rural areas, such as production of inputs, manufacturing and processing agricultural products, and small-scale manufacturing. Other opportunities exist in the service sector and in tourism.

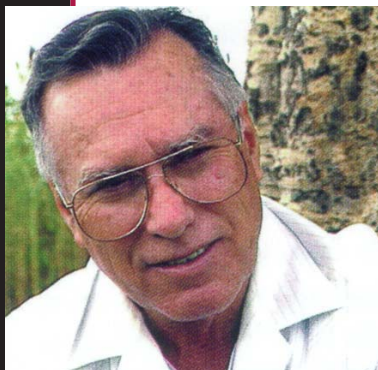
Rural development and off-farm employment generation will not happen without the right policies and investments. Many rural development programs have failed due to overly centralized management that neglected the input and participation of key stakeholders and to excessive focus on the public sector, overlooking the key role that private-sector expertise and capital must also play in the development process.

To develop their rural economies, governments will have to invest more in human resources, especially primary education, primary health care, and adult literacy. In addition, governments and private organizations will need to forge new investment partnerships to mobilize the necessary resources to develop national infrastructure, especially roads, water supply, electricity, and telecommunications. Governments alone will not be able to achieve this task.

We have the knowledge to make agriculture an engine of economic development in Africa. What is needed is the political, financial, and institutional will to ensure that this potential is transformed into reality. It gives us enormous satisfaction that Sasakawa-Global 2000 is able to play a small but constructive role in this great endeavor.

NORMAN E. BORLAUG

REGIONAL DIRECTOR'S REPORT



EXTERNAL PROGRAM REVIEW

In 2001, the SAA Board of Directors commissioned an external evaluation of the entire SG 2000 program. The International Cooperation Center for Agricultural Education (ICCAE) at Nagoya University, Japan, was selected to carry out this task.

The first ICCAE country review was conducted in Ghana in 2001. During 2002 reviews will be done in Malawi, Mozambique, Uganda, Nigeria,

Ethiopia, Guinea, Mali, and Burkina Faso. In 2003, the ICCAE team will review the SAFE and agro-processing programs, which work across SG 2000 project countries.

In each country, the evaluation team is focusing on four areas: 1) SG 2000 contributions to increased crop yields, 2) the government's commitment to taking up SG 2000 technology transfer activities, 3) recommendations for improving ongoing country program activities, and 4) estimating when SG 2000 might phase out its direct involvement in the country.

TECHNOLOGY DEVELOPMENTS

Although SG 2000 projects are not designed from one blueprint, they have similarities, especially in the technology transfer method employed (dynamic field demonstration programs) and the emphasis on improving food crop production. The crop demonstration priorities and programs differ from country to country, being determined by the project, working with national research and extension leaders, and smallholder farmers. In recent years, however, the promotion of two specific crop technologies—quality protein maize and conservation tillage—has been taken up in most SG 2000 project countries.

Quality protein maize—Nearly all maize varieties have significant nutritional shortcomings for humans (and other non-ruminant animals such as swine and poultry) that eat maize-heavy diets. Tryptophan and lysine, two of the amino acids essential for human growth occur in low concentrations in most maize

varieties. Because of the low levels of these amino acids, humans are unable to metabolize all of the protein in maize they eat.

In areas where maize provides most of the calories in daily meals, children, especially weaning infants, may suffer protein deficiency diseases that stunt growth and mental development. Adults can be affected as well, but because adults are past the age of rapid growth and because they tend to eat more diverse diets that may supply some of the missing tryptophan and lysine, protein deficiency is a less severe problem.

Four decades ago, scientists at Purdue University found that the grain of a few rare maize varieties from the Andean highlands of South America contains sufficient tryptophan and lysine for good nutrition. Known as opaque-2 varieties, they were largely genetic curiosities. Their grain was dull and chalky, they gave poor yields, and they were vulnerable to attack from insects and diseases.

Breeding the genes for high protein quality into maize varieties required by farmers was a painstaking effort that took decades. The work was undertaken notably by the International Maize and Wheat Improvement Center (CIMMYT) in Mexico. Because protein quality is not visible in the maize kernel, laboratory procedures had to be developed for testing the amino acid content of thousands of samples at each stage of the breeding process. Unfortunately, just when superior varieties were ready for release to farmers, budget cuts led to a suspension of the CIMMYT program, although a few maize breeders, particularly in Brazil, China and South Africa, continued the work.

Ghana's Crop Research Institute (CRI) played a crucial role in reviving what came to be called quality protein maize, or QPM. Starting in 1990, the SG 2000 country director at the time, Dr. Wayne Haag (a former CIMMYT maize breeder), worked with CRI maize breeders to evaluate advanced QPM experimental varieties from the discontinued CIMMYT program. One experimental variety, which had been improved for resistance to maize streak virus at the International Institute of Tropical Agriculture in Nigeria, was found to yield exceptionally well in multi-location trials in Ghana.

CRI released a selection of this material in 1992. It was called Obatanpa, which means “good nursing mother” in the Ashanti language. Farmers in Ghana now grow this QPM variety on upwards of 200,000 hectares because of its good yield—the better protein quality is a bonus. CRI has since released three QPM hybrids and has shared its QPM genetic materials and expertise with scientists elsewhere in Africa.

The successes of Obatanpa, led the Nippon Foundation in 1997 to give CIMMYT a grant to re-start its QPM research and development program worldwide. In Africa, CIMMYT’s QPM breeding work is based in Zimbabwe, under the direction of Dr. Kevin Pixley. He has developed a number of high-yielding QPM inbred lines and hybrids, which are widely distributed in Eastern and Southern Africa. In South Africa, QPM research has been under way for several decades at the University of Natal under the direction of Dr. Hans Gevers.

What began as a small QPM research effort in Ghana has now spread to a dozen African countries. QPM varieties based on Obatanpa have been released for commercial production in Burkina Faso, Mali, Mozambique, and Uganda. QPM hybrids have been released in Ghana, Guinea, Ethiopia, Tanzania, and Zimbabwe. QPM varieties and hybrids will soon be released in Nigeria and Malawi as well. This Africa-wide QPM movement has tremendous promise.

But ensuring that the benefits of QPM reach smallholder farmers and African consumers will require properly functioning seed production programs, whether public or private. Good seed programs are vital because the opaque-2 gene, which confers the higher nutritional quality, is a recessive gene. Simply stated, this means that normal pollen, i.e., pollen from maize lacking the opaque-2 gene, must be kept from pollinating QPM parent plants. Otherwise the seed will not be QPM. Only carefully managed seed production in isolation can prevent stray pollination. In addition, because modern QPM varieties and hybrids look and taste like normal maize, verifying that the protein quality is being maintained requires laboratory checks. Many national maize research programs are not large enough to justify the necessary laboratory facilities. Instead, several regional laboratories should be established (perhaps managed by CIMMYT and IITA) to provide backstopping to national QPM breeding programs.

QPM is not produced through genetic engineering. It is not a genetically modified organism (GMO). Rather, it has been developed from a rare, but

naturally occurring South American maize type, and improved using conventional plant breeding methods. It offers all non-ruminant animals—humans, poultry, and pigs—significant nutritional benefits compared to normal protein maize.

Conservation tillage—SG 2000’s work with conservation tillage also started in Ghana nearly a decade ago, and the technology is now spreading in most SG 2000 project countries. A recent study by CIMMYT and CRI indicates that some 100,000 hectares, involving 45,000 farmers, are now planted using conservation tillage systems. This work has involved an effective partnership between national research and extension programs, a special smallholder development program of Monsanto, and SG 2000. This partnership model has been extended to Mozambique, Ethiopia, Malawi, Nigeria, and Tanzania.

Compared with conventional tillage, which involves turning the soil repeatedly with a hoe or animal-drawn plow, conservation tillage requires little or no soil disturbance. And it has many other advantages: farmers can sow crops sooner after the first rains, in effect gaining a longer growing season; crop residues left on the ground form a mulch that slows rainwater runoff from the soil surface and reduces erosion; through repeated mulching over time, soil organic matter builds up and water penetration and retention improve; in multiple cropping systems, turnaround between crops is quicker; labor costs are lower because little or no tillage or weeding is needed; and more land can be cropped without significant added investment—an important benefit for capital-starved small-scale farmers.

Conservation tillage methods promoted by SG 2000 involve spraying herbicides for thorough weed control before planting. The dead weeds dry up and become part of the mulch. Farmers can then plant the crop without mechanical tillage. They open a small hole or thin trench through the mulch, deposit the seed and apply fertilizer (usually phosphorus and minimum amount of nitrogen), and cover it. The plant residues remain undisturbed after sowing.

Mulch management is perhaps the most demanding aspect of conservation tillage. Farmers must preserve the mulch by controlling bush fires and keeping livestock from feeding on crop residues. As with conventional tillage, crop rotations play a very important role in breaking potentially damaging disease and pest cycles.

Conservation tillage can succeed in most agricultural situations. However, in locations where soils are compacted, use of a chisel plow may be required to break the hardpan before farmers move to a conservation tillage system. In low-rainfall areas that lack irrigation, agricultural systems produce little biomass, thus the amount of residues remaining after harvest to form a mulch may be inadequate. Moreover, the decomposition of the residues under this environment, usually takes much longer than in more favorable situations. In these areas, the conservation tillage system will benefit if other water retention and erosion-control measures such as terracing or contour ridging are employed. Despite these obstacles, conservation tillage with mulching can significantly improve soil moisture conservation in marginal agricultural areas.

Over time, conservation tillage can raise soil organic matter content and increase carbon dioxide sequestration, improve soil structure, reduce weed and pest problems (in conjunction with crop rotations), and enhance nutrient mobilization.

Smallholder farmers gain significant labor-related and economic benefits. By eliminating traditional land preparation and much of the need to weed, a farm family can save 20 to 25 person-days of labor per hectare of land. This is especially important for the millions of African farmers who do not have draft animals due to endemic livestock diseases such as trypanosomiasis and

East Coast Fever. For women, conservation tillage can provide a substantial reprieve from the back-breaking drudgery of their traditional tasks of hand hoeing and weeding.

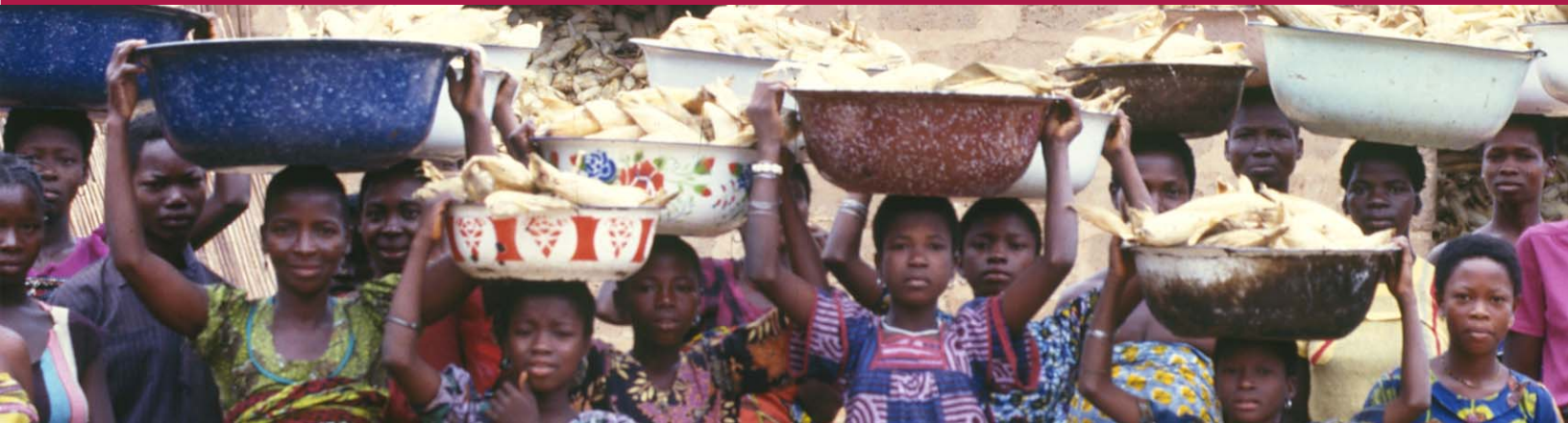
By saving time and reducing labor and drudgery, conservation tillage opens new vistas of income-earning activities for smallholder farmers. Farmers could cultivate more land, even without access to draft animals. When conservation tillage is complemented with rainwater harvesting and storage techniques, the time saved from growing crops can be dedicated to value-adding or high-value activities such as growing of fruit trees and raising livestock or poultry, fattening beef animals, or producing milk, butter, or cheese for the local and city markets.

In addition, the labor-saving feature of conservation tillage can be especially important in countries where endemic diseases like HIV/AIDS and malaria are crippling farm families.

Quality protein maize varieties and conservation tillage have much to offer Africa. SG 2000 is committed to bringing these and other productivity-enhancing food crop technologies to Africa's smallholder farmers. The technology is available. Farmers are eager to adopt it. However, the full benefits of these scientific breakthroughs cannot reach farmers unless a much greater effort by national governments and donor organizations is forthcoming. The major challenges are political and economic, not technical.

MARCO A. QUIÑONES

PROGRAM REVIEW



IN 2001-02, SAA SUPPORTED SASAKAWA-GLOBAL 2000 PROGRAM ACTIVITIES IN BURKINA FASO, ETHIOPIA, GHANA, GUINEA, MALAWI, MALI, MOZAMBIQUE, NIGERIA, TANZANIA, AND UGANDA. IN ADDITION, THROUGH THE SASAKAWA AFRICA FUND FOR EXTENSION EDUCATION, SAA HELPS BROADEN THE KNOWLEDGE AND CREDENTIALS OF EXTENSION WORKERS. SAA ALSO CONTRIBUTES TO A POST-PRODUCTION PROGRAM THAT PROMOTES THE WIDE AVAILABILITY OF AFFORDABLE AGROPROCESSING EQUIPMENT.

BURKINA FASO



The 2001 rainy season was a considerable improvement over the previous year. After a slow start, fairly normal rainfall occurred in July and August. Food, however, was in short supply. Grain prices rose sharply and food aid, supplied mainly by the European Union, was required for over 525,000 vulnerable people in 25 provinces.

DEMONSTRATIONS

The SG 2000/Ministry of Agriculture program in Burkina Faso began in 1996, concentrating initially on soil fertility improvement. Since 1999, there has been a rapid expansion of villages involved in the program. In 2001 nearly 1,500 production test plots (PTPs) were established to demonstrate recommended technological packages for major cereal crops and pulses. The PTPs were supported by demonstrations of dykes, improved fallow, and composting.

In 2001, SG 2000 shifted to additional income-generating activities for farmers. Sweet potato, yams, and cassava were introduced for the first time. In the cotton zone conservation tillage was evaluated.

Burkina Faso: Yield of SG 2000 demonstration plots, 2001.

| | Plots (no.) | Area total (ha) | Average yield (t/ha) | Traditional yield (t/ha) |
|-----------|----------------|-----------------------|----------------------------|--------------------------------|
| Maize | 964 | 241 | 2.7 | 1.5 |
| Rice | 92 | 23 | 2.3 | 1.4 |
| Sorghum | 107 | 27 | 1.0 | 0.6 |
| Millet | 60 | 47 | 1.0 | 0.5 |
| Cowpea | 167 | 42 | 0.5 | 0.4 |
| Groundnut | 82 | 20 | 0.8 | 0.5 |

QUALITY PROTEIN MAIZE

During 2001 the nutritional value of the QPM variety Ma Songo (Obatanpa in Ghana) was assessed in different feeding formulations for weaned children. Centres de Récupération et

d'Education Nutritionnelle in six towns participated in this project. Preliminary results confirmed that Ma Songo is nutritionally superior to normal maize. QPM production plots were grown on nearly 1,000 hectares in 2001.

Mamaba, a QPM hybrid introduced from Ghana as a follow-up to Ma Songo, has not performed well. In 2 years of tests germination was poor, and plantings lacked homogeneity. Other QPM hybrids are being tested.

MARKETING AGENCY

SG 2000 has joined forces with Soprofa (Société de Promotion des Filières Agricoles), a new parastatal set up by the government to collect and market agricultural produce. The government owns 25 percent of the Soprofa, and the rest is held by Aiglou, an international organization based in Geneva. In the first phase, Soprofa plans to purchase 125,000 tonnes of rice, 35,000 tonnes of maize, and 20,000 tonnes of sesame from producers, injecting as much as US\$200 million into the national economy.

Farmers hope to supply 20,000 tonnes of QPM grain to Soprofa in 2002. SG 2000 will provide 200 tonnes of QPM seed to producers, and Soprofa will contribute 3,000 tonnes of fertilizer.

WORKSHOPS

In April, SG 2000 took part in a meeting with the Ministry of Agriculture and other organizations to discuss agricultural extension. Participants reviewed participation of farmers in the management of extension services, more efficient coverage of farming areas by extension, and integrating the private sector into the process. Participants agreed that the SG 2000 approach provided a sound method for technology transfer.

In September, the Millet and Sorghum Initiative held a 3-day workshop on the status of millet and sorghum in Burkina Faso. The workshop, which involved most of the organizations involved in agriculture in the country, ended with a food show at which more than 50 ways of preparing millet and sorghum were demonstrated.

ETHIOPIA

Ethiopia launched its second 5-year agricultural development program in 2001. The program calls for 40 percent growth in food crop production by 2005. Under the first 5-year plan, which employed the SG 2000 extension methodology, nearly 4 million farmers participated in the National Extension Intervention Program. The yield impact has been impressive.

The surplus of grain and resulting low selling price of agricultural products have had an impact on the rural incomes. The challenge ahead is to add value by overcoming barriers in grain marketing and agroprocessing.

Last year the SAA Board of Directors extended the SG 2000 program in Ethiopia for 5 years. SG 2000 is now concentrating on providing additional backstopping to targeted agricultural extension and research activities.

REFINING FERTILIZER RECOMMENDATIONS

SG 2000 is working to develop specific fertilizer recommendations for wheat in the Arsi Zone, where farmers use chemical fertilizer intensively. SG 2000 has already published some information from this work, which is continuing. Results indicate that farmers in certain localities should use higher rates of nitrogen fertilizer, instead of the blanket recommendation of 100 kg/ha. The study is sponsored by SG 2000 in collaboration with the Ethiopian Agricultural Research Organization (EARO), CIMMYT, the Ministry of Agriculture, and the Bureau of Agriculture in Arsi Zone.

CONSERVATION TILLAGE

To introduce conservation tillage to small-scale farmers, SG 2000 collaborates with EARO, regional departments of agriculture, Monsanto, and Makobu International, the Monsanto distributor in Ethiopia. In the past 3 years over 700 on-farm demonstrations have shown that farmers can attain higher crop production with less tillage. The conservation tillage demonstrations have been well received, especially by small-scale farmers who cannot afford the ox-drawn plow.

QUALITY PROTEIN MAIZE

SG 2000 has been instrumental in introducing and verifying promising QPM varieties. While on-farm testing was in progress, SG 2000 worked with the livestock research branch of EARO and with the Ethiopian Nutritional Institute to affirm the superior nutritional value of QPM.



EARO is releasing a new QPM hybrid, and SG 2000 will launch an extensive program to promote it among small-scale farmers. The program will concentrate on the major maize-producing areas of the country.

OTHER ACTIVITIES

SG 2000 is helping the Ministry of Agriculture investigate the potential of storing run-off water during the rainy season to use for supplementary irrigation in drought-prone areas. With support from SG 2000, several specialists have been trained by a Chinese engineer. SG 2000 has assisted in the construction of underground water tanks at three sites that will serve future training programs.

DEMONSTRATION PLOTS

In 2000/01, SG 2000 established 658 extension management training plots (EMTPs) to demonstrate the advantages of conservation tillage for various crops. Other EMTPs involved the broadbed and furrow technique for wheat grown in heavy soil, line planting for wheat, and a new sorghum variety that tolerates striga, a parasitic weed that often devastates sorghum fields.

Ethiopia: Yield of SG 2000 demonstration plots, 2000–01.

| Technology | Plots (no.) | Area total (ha) | Yield (t/ha) |
|--------------------------|-------------|-----------------|--------------|
| Conservation tillage | | | |
| Maize | 310 | 155 | 5.6 |
| Wheat | 50 | 26 | 2.6 |
| Teff | 6 | 3 | 1.0 |
| Sorghum | 4 | 2 | 2.3 |
| Fababean | 4 | 2 | 2.2 |
| Broadbed & furrow, wheat | 75 | 37 | 2.4 |
| Line planting, wheat | 34 | 15 | 3.5 |
| Striga-tolerant sorghum | 175 | 88 | 1.6 |

GHANA



Technology dissemination and adoption continues to be SG 2000's core activity in Ghana, but the key objective is transferring management of the program to Ghana and its institutions.

CROP DEMONSTRATION PLOTS

Partnerships with local government and rural institutions are being formed to strengthen the agricultural production support and financial services that farmers receive. In 2001, farmers' production plots (FPP) were introduced with rural bank sponsorship. Four rural banks provided credit, through the FPP system, to 470 farmers growing maize, cowpeas, and groundnuts on 0.7-hectare plots. The banks were pleased with the farmers' yields and the loan recovery percentages.

Over 4,700 extension test plots were established—4,200 in the major season and 510 in the minor season. There was strong support from the Adventist Development and Relief Agency. Nine rural banks, nine district assemblies, and NGOs provided credit. The crops planted included quality protein maize, rice, groundnuts, and cowpeas.

CONSERVATION TILLAGE

Conservation tillage is gaining popularity in Ghana. One innovation has been the training of "agricultural science tutors" before the start of the planting season to set up conservation tillage verification demonstration plots. The agricultural science tutors consisted of 78 individuals from senior secondary schools, 64 agricultural extension agents, and 392 farmers. They established more than 500 0.1-hectare conservation tillage verification demonstration plots.

SG 2000 also collaborated with the Ministry of Food and Agriculture's Conservation Agriculture Pilot Project. SG 2000 regional coordinators from Ashanti, Brong-Ahafo, and Northern regions organized additional farmers' groups that established demonstration plots in three districts in each region. This provided 75 additional verification demonstration plots of 0.2 hectares each—with inputs being supplied by the project.

PROGRAM EVALUATION

In 2001 the Sasakawa Africa Association commissioned an independent evaluation of the SG 2000 program in Ghana since its start in 1988, headed by Professor Tetsuo Matsumoto of the International Cooperation Center for Agricultural Education at Nagoya University, Japan.

The evaluation report noted that SG 2000's Ghana activities had reached a mature stage in some areas such as the transfer of modern technology to farmers through extension workers. It emphasized the need to accelerate the transfer of ownership to Ghanaian counterparts in several areas, notably QPM promotion and utilization, seed production, marketing, farmer group formation, and agroprocessing.

GUINEA

Positive agricultural development policies and programs in Guinea have led to 5 percent average annual growth, higher crop yields and total production, and declining food imports. Notably, rice imports fell from 300,000 tonnes in 1996 to 154,000 tonnes in 2000. And fertilizer use more than tripled to 15,000 product tonnes between 1996 and 2000.

The SG 2000 Guinea project is now consolidating the results of the past 5 years and further integrating program activities within national organizations and other NGOs to ensure continuity once the project ends.

QUALITY PROTEIN MAIZE

In 1997, 180 kilograms of seed of the QPM variety Obatanpa was imported from Ghana. Now over 500 hectares are in cultivation in Guinea, with an average yield of 3 t/ha. Guinean mothers have started feeding infants gruel made from QPM. A preliminary study of 60 mothers with infants, carried out by national extension and Ministry of Health officials, has shown promising health benefits for infants. QPM is also being promoted as feed for poultry and pigs. A yellow-seeded QPM (CMS-475) selected from lines introduced from Brazil in 1998 is under multiplication.

NEW RICE VARIETIES

The West Africa Rice Development Association is developing new rices (called Nericas—new rices for Africa) from interspecific crosses between African and Asian species. In 2001, SG 2000 distributed over 17 tonnes of seed of these varieties to farmers. These varieties were, for the first time, tested in the Fouta Djallon, a zone with acid soils that are considered unsuitable for rice and that produce yields of only 0.2 to 0.3 t/ha of the local cereal, fonio. But Nericas grown with appropriate fertilizers yielded 2 to 3 t/ha. Guinea has supplied Nerica seed to Uganda, Malawi, Nigeria, and Mali.

The early maturity of the Nericas permits a second crop of rice or legumes such as cowpeas or soybeans to be grown, especially when farmers use conservation tillage, which eliminates time-consuming land preparation. IITA is providing elite lines of cowpea and soybean varieties for farmers to evaluate in their cropping systems.

SOIL PRODUCTIVITY

In the Fouta Djallon area, over 100,000 hectares have been abandoned for crop production due to high levels of acidity, aluminum toxicity, and phosphorus deficiency. SG 2000 is supporting an assessment of corrective measures such as liming, application of rock phosphates from Senegal and Mali, and the use of legumes. Initial trials raised pH and increased nitrogen levels in the upper 10 centimeters of soil. Trials with the legume mucuna grown with phosphate rock application have been promising. Irish potato yields of up to 14 t/ha were obtained after the corrective measures. Good crops of soybeans, fonio, maize, and rice have been harvested.



POSTHARVEST

Postharvest activities aim at reducing losses, improving quality, and adding value to farm products. Six women's groups were financed to promote their products in a national agricultural fair. More than 100 women, including three from SG 2000 projects in Mali and Burkina Faso, were trained in the processing, QPM, soybean, cassava, and mucuna. Three model narrow cribs were constructed in strategic locations.

PARTNERSHIP WORKSHOP

A 2-day Partnership Strengthening Workshop was held October in Labé. National and international organizations participated. The workshop was preceded by a field day featuring demonstrations related to soil fertility restoration, management of the new rice varieties, and postharvest and agroprocessing equipment. In addition, participants were able to taste locally prepared foods made from QPM, soybeans, cassava, and mucuna.

Guinea: Yield of demonstration plots, 2001.

| | Plots (no.) | Area total (ha) | Avg yield (t/ha) |
|--------------|-------------|-----------------|------------------|
| Lowland rice | 655 | 164 | 3.4 |
| Upland rice | 419 | 105 | 2.5 |
| Maize | 180 | 76 | 2.6 |
| Cowpeas | 122 | 30 | 0.7 |
| Soybeans | 59 | 15 | 0.9 |

MALAWI



Malawi has moved from being a maize exporter to an importer in a single year. The 2000/01 season was characterized by flooding and disease problems (primarily gray leaf spot) in the maize crop. As a result, Malawi expected a deficit of around 400,000 tonnes and serious malnutrition problems in parts of the country. In mid-2001, Malawi imported 150,000 tonnes of maize, and further imports were expected.

The SG 2000 program in Malawi, established in 1998, operates in partnership with the regional agricultural development divisions of the Ministry of Agriculture and Irrigation and the National Research Institute for Agriculture (NRIA). The focus is disseminating improved maize production technology.

In the 2000/01 season, participating farmers grew over 3,000 maize management training plots (MTPs). The recommended package included the use of locally available hybrids and applying 120 kg/ha of N and 60 kg/ha of P. The overall yield was 4.8 t/ha. In addition, conservation tillage technology was demonstrated on 47 MTPs, in collaboration with Monsanto. The average yield was 4.7 t/ha, with farmers reporting significant savings in labor.

The low grain yields obtained by most of Malawi's small-scale farmers remain a serious concern. The reasons are low and improper use of fertilizer and improved seed, the failure of extension to effectively deliver technological messages to farmers, the lack of rural infrastructure to market inputs and outputs at affordable prices, and poor market information systems. As a consequence, the SG 2000 program has not yet achieved the impact on adoption that it could and should.

Starting in the 2001/02 season, SG 2000 is becoming more active in postharvest technology issues. For example, farmers are losing up to 30 percent of the grain harvested, in large part due to the larger grain borer. In collaboration with NRIA, national extension, other NGOs, and GTZ, SG 2000 is promoting crop protection measures to control this devastating insect pest.

Crop diversification is needed in Malawi, and SG 2000 is helping to offer new production alternatives to farmers. Farmer participation in the selection of improved upland rice varieties, in partnership with the national rice-breeding program, has proved successful. In 2001, SG 2000 and NRIA multiplied 350 kilograms of seed of six new upland rice varieties. The seed will be used in MTPs and farmer seed plots in various parts of the country. SG 2000 has also initiated seed multiplications of improved varieties of soybean (1.5 t), cowpea (600 kg), and pigeon pea (200 kg) in conjunction with the national legume research program. Finally, SG 2000 is working with IITA to provide new high-yielding cassava cultivars to farmers and with SAA, IITA, and GTZ to introduce improved cassava processing equipment at the household level.

SG 2000 and the Ministry of Agriculture and Irrigation organized two technical review seminars involving CIMMYT and Chitedze researchers. As a result of the meetings, wheat varieties from Zimbabwe will be tested in the next winter season under irrigation, and CIMMYT will send QPM materials for testing in farmers' fields.

MALI

The SG 2000/Ministry of Rural Development field program focuses on soil fertility, crop intensification, collective action, and partnership. During 2001, improved cassava and sesame were introduced to offer farmers more options for income generation. In addition, to reduce the drudgery of hand weeding, farmers and extension officers are being trained in conservation tillage methods.

DEMONSTRATIONS

Adequate and fairly well-distributed rainfall in the 2001 season allowed yields from SG 2000 PTPs (production test plots) to return to normal, compared with the drought-affected results of 2000. The 2001 field program focused on soil fertility, and crop intensification.

Mali: Yield of demonstration plots, 2001.

| Crop or technology | Plots (no.) | Area total (ha) | Avg yield (t/ha) |
|-------------------------------|-------------|-----------------|------------------|
| Maize | 193 | 48 | 3.0 |
| Sorghum | 48 | 12 | 0.9 |
| Millet | 123 | 31 | 1.1 |
| Rice | 10 | 2.5 | 4.2 |
| Intercropping (millet/cowpea) | 17 | 4.2 | 0.9 |
| Improved fallow* | | | |
| Groundnut | 33 | 8.2 | 0.8 |
| Cowpea | 19 | 4.8 | 0.5 |
| Conservation tillage | | | |
| Cowpea | 8 | 2.0 | 0.8 |
| Maize | 10 | 2.5 | 1.9 |

*Rock phosphate applied.

SOIL CONSERVATION

Encouraging collective action to combat soil erosion is a central goal of the program. Whole villages are involved in building dykes or rock bunds that are planted with live hedges to break the momentum of runoff water after cloudbursts and retain more moisture in the soil.

QUALITY PROTEIN MAIZE

SG 2000 has formed a partnership with the Compagnie Malienne des Textiles (CMDT), which supports farmers growing over 1 million hectares of cotton in southern Mali. Production of maize, the main cereal in the area, tripled between 1990 and 2000. Last

season, SG 2000 carried out a joint operation with CMDT to demonstrate the QPM variety Denbanyuman. SG 2000 provided 22 tonnes of seed and CMDT supplied the fertilizer. Over 1,200 farmers planted Denbanyuman on 907 ha. Strong demand from the farmers led to a shortage of seed. During the irrigated off season SG 2000 is producing enough seed for 10,000 farmers.



As a result of the popularity of Denbanyuman, Générale Alimentaire Malienne (GAM), a factory making milk products and baked items, has begun producing biscuits with a high QPM content. SG 2000 has also collaborated with GAM, the National Research Institute, and the sorghum network, Rocars, to produce biscuits using wheat and sorghum. Farmers from the SG 2000/Ministry of Rural Development program are expected to enter into a contractual program to supply GAM with QPM and sorghum.

CREDIT

In partnership with ICRISAT, FAO, and the National Research Institute, SG 2000 is involved in an inventory credit scheme in three villages. Each village is required to have a cereal bank to store grain, and part of the grain serves to guarantee the input credits. The scheme is closely linked to the local savings and loans associations.

Because recovering input loans from farmers is a problem, the use of farm produce as a down payment is becoming a more common practice. In the Ségou region, 17 villages have such an agreement with an input dealer who has provided fertilizer for nearly 900 hectares of millet and sorghum.

NATIONAL FORUM

SG 2000 Mali hosted a national forum in October to review the status of millet and sorghum in the country. The market-driven Millet and Sorghum Initiative in West Africa is financed by FIDA and French Cooperation.

MOZAMBIQUE



In Mozambique market instability remains a barrier to wide adoption of the technologies being promoted by the Ministry of Agriculture and Rural Development, the National Directorate for Rural Extension (DNER), the National Institute for Agricultural Research (INIA), and SG 2000. Strengthening of the entire input supply system and achieving reasonable output prices are the major agricultural intensification challenges. Toward these ends, reforming Japan's KR-2 program of fertilizer donations or creating other mechanisms to support the development of the private input sector will be critical steps. The Japan International Cooperation Agency has placed a staff member with the National Directorate of Agriculture to study the effectiveness of the KR-2 system and to explore alternatives.

Grain prices improved in 2001 due to export opportunities in the grain-deficit neighboring countries of Zimbabwe and Malawi.

DEMONSTRATIONS

DNER's capabilities in data gathering and reporting are growing, though much still needs to be done to improve timeliness. Also, the INIA staff are becoming increasingly involved in taking yield data and training extension staff.

Well-monitored trials in Manica province, where 11 plots of 0.5 hectares were maintained under conservation tillage for two consecutive seasons are evidence of the improvements. The mean yield from these plots was 4.2 t/ha in 2000/01, with a range of 2.7 to 6.2 t/ha, compared with a mean yield of 3.9 t/ha in 1999/2000. Overall, provincial mean yields for the maize demonstrations in 2001 ranged from 2.9 t/ha for 259 plots in Nampula to 3.4 t/ha for 200 plots in Manica to 3.7 t/ha for 49 plots in Sofala.

Conservation tillage rice yields were lower than expected. Plots were planted late because the supply of inputs was delayed. Most plots lacked the initial fertilizer application, receiving only a top dressing of urea.

For the 2001/02 season, over 8,500 demonstration plots were planted, involving all 10 provinces and 14 crops. Maize constitutes nearly 40 percent of the plots. Almost all the maize demonstration plots are being planted with the quality protein maize variety Sussuma (developed from Obatanpa). Inputs are being purchased with funds from Proagri (the public sector agricultural investment program) and the Ministry of Agriculture and Rural Development. SG 2000 is assisting with some transport costs and is participating in the technical training of extension staff.

Mozambique: Yield of demonstration plots, 2000/01.

| Crop | Plots (no.) | Avg yield (t/ha) | Traditional yield (t/ha) |
|-----------|-------------|------------------|--------------------------|
| Maize | 508 | 3.2 | 0.9 |
| Rice | 281 | 2.3 | 0.9 |
| Cowpea | 94 | 1.1 | 0.6 |
| Paprika | 48 | 0.8 | 0.3 |
| Sunflower | 14 | 1.0 | 0.3 |
| Sesame | 28 | 0.6 | 0.3 |

QUALITY PROTEIN MAIZE

INIA's maize research program is increasing efforts to develop and promote quality protein maize (QPM). To launch QPM in Mozambique, 350 tonnes of Sussuma seed were produced in Zimbabwe during the 2000/01 season. SEMOC/SeedCo and Pannar are supplying and marketing the seed. Relief programs will distribute some of this seed in districts damaged by flooding. SEMOC/SeedCo is using about 3 tonnes of Sussuma foundation seed produced by INIA to plant 100 to 150 hectares of certified seed during the 2001/02 season. An open-pollinated, early flint QPM variety, resistant to maize streak virus and downy mildew, is being developed.

SOIL FERTILITY

SG 2000 continues to support the work of INIA in soil fertility. Simple fertilizer-response trials will be conducted with maize, cowpea, beans, sunflower, soybean, sesame, and paprika. The green manure crop mucuna continues to be introduced, particularly in the northern sector.

NIGERIA

SG 2000 has received many requests to extend its crop-based technology transfer approach to all the 36 states of the Federation. In 2001, SG 2000 conducted training in Borno, Cross-River, Nassarawa, and Ogun states in addition to the nine states in which it formally operates.

In 2001, most of the rain fell between late June and mid-September, resulting in floods especially in Jigawa, Kano, and Sokoto states. Despite these setbacks, farmers recorded good yields of maize, millet, sorghum, soybean, and rice. A total of 3,751 management training plots (MTPs) was established, of which 2,113 were devoted to hybrid maize. MTPs were also established for sorghum, millet, cowpea, soybean, rice, sesame, cassava, wheat, and cotton.



Already, the Federal Ministry of Agriculture is implementing a Japanese-sponsored rice program using SG 2000's technology-transfer approach.

SG 2000 has continued to extend its partnerships with Dangote and LCRI in promoting durum wheat, with IITA in promoting technologies for groundnut oil extraction, with CIMMYT and SeedCo in promoting QPM, and with Candel/Monsanto in conservation tillage. SG2000 has aided Women-in-Export by linking them to good sources of sesame, soybean, and groundnut for export to West African countries.

Nigeria: Yield of demonstration plots, 2001

| Crop | Plots (no.) | Area total (ha) | Avg yield (t/ha) |
|--------------|-------------|-----------------|------------------|
| Hybrid maize | 2,501 | 791 | 5.0 |
| Rice | 339 | 110 | 4.4 |
| Soybean | 123 | 35 | 1.8 |
| Millet | 217 | 65 | 1.8 |
| Sorghum | 34 | 9 | 2.9 |
| Cowpea | 170 | 51 | 1.5 |
| Sesame | 90 | 32 | 0.8 |
| Cotton | 88 | 25 | 1.7 |
| Wheat | 355 | 89 | 4.5 |

WORKSHOP

In September, SG 2000, in collaboration with Ahmadu Bello University, organized a 2-day National Maize Workshop at Zaria with the theme "Maize for Better Nutrition." Prominent maize scientists from the International Maize and Wheat Improvement Center (CIMMYT) and SeedCo (Zimbabwe), IITA Ibadan, NRI (UK), Monsanto (South Africa), and IAR/ABU (Nigeria) presented papers with an emphasis on quality protein maize (QPM). At the workshop, Nigeria's Minister of Agriculture announced the formation of an Inter-Ministerial Committee to coordinate a national QPM program. The minister also observed that farmers have rapidly embraced SG 2000 technologies. Crop yields in farmers' fields are double or triple the national averages, resulting in a marked improvement in income and living standards.

NEW SAFE PROGRAM

A team of three experts from the Sasakawa Africa Fund for Extension Education visited Nigeria in November to discuss the planned SAFE program at Ahmadu Bello University. The program is expected to start in the 2002/03 academic year.

YOUNG FARMERS

The Enugu State Agricultural Development Program is using SG 2000 publications and videos as part of its Youth in Agriculture Program. The program helps pupils in 100 secondary schools establish 0.5- to 1.0-hectare maize plantings. These fields are then used as demonstration plots for school children and local farmers. The videos are screened in a media van, throughout the state.

SG 2000 has also helped train young farmers undergoing a 1-year sponsored course at the Leventis Foundation Agricultural Schools in Kano and Kaduna States. Using SG 2000's technology transfer approach, the trainees are improving the practices of farmers and also encouraging youth to go into farming.

TANZANIA



Since 2000, SG 2000 has been working closely with the government and the World Bank to develop a major project to restore degraded soils and boost agricultural growth through intensified production.

The Soil Fertility Recapitalisation and Agricultural Intensification Project (SOFRAIP) aims to promote improved land husbandry and agricultural intensification practices. This project will include, through strengthened producer organizations, the development of private markets for inputs and outputs, as well as policy and regulatory changes.

SG 2000's return to Tanzania comes in a follow-up to 10 years of field collaboration with the extension services of the Ministry of Agriculture (1988-98). During that time, participating small-scale farmers grew around 40,000 half-hectare maize management training plots (MTPs), primarily in the southern and northern highlands. Average yields of these maize MTPs ranged from 4.5 to 5.5 t/ha—three times higher than the national average.

Improved sorghum varieties and production packages were promoted in the drier areas. Various legumes were also grown, including a very productive intercrop involving pigeon peas and maize. Finally, considerable effort was undertaken to introduce improved grain storage systems at the farm level.

Unfortunately, SG 2000's previous efforts to help establish a more permanent system of input delivery and commercial output marketing for basic foods were not successful. SOFRAIP, whose budget is expected to exceed \$50 million over 4 years, reflects a new determination by the Government of Tanzania to overcome food insecurity and reduce poverty.

In 2001, the World Bank and the government agreed to begin pilot activities using US\$1.8 million left from the previous agricultural extension project and the project planning facility for SOFRAIP. At a workshop in September, district extension and planning officers developed a work plan and established methods for implementing pilot activities in agricultural intensification, soil fertility recapitalization, and smallholder credit in 16 districts of the country.

SOFRAIP, with support from SG 2000, has produced a memorandum of cooperation with Monsanto for promoting conservation tillage. New maize hybrids developed by Monsanto Seed (formerly Cargill), as well as other private seed companies, will also be demonstrated. Integrated soil fertility recapitalization strategies will involve the use of inorganic and organic fertilizers. In the acid soils of the southern highlands, the direct application of rock phosphate from indigenous sources will be employed.

SG 2000 is also collaborating with the government in promoting quality protein maize (QPM) varieties and hybrids. Tanzania's Directorate of Research and Development released three open-pollinated QPM varieties in 2001. SG 2000 will support further QPM research leading to the release of suitable hybrids.

NEW STAFFMEMBER IN TANZANIA

Jiro Aikawa, a new SG 2000 agronomist, has been seconded to the Soil Fertility Recapitalisation and Agricultural Intensification Project in Tanzania and is based at the SG 2000 office in Dar es Salaam. In the early 1990s, Aikawa served as a Japanese Overseas Cooperation volunteer in Mbeya region of Tanzania. Aikawa returned to Japan to complete a Ph.D. in agriculture at Ehime University. His major was in pomology and soil microorganisms. He worked as a trainee at the Association for International Cooperation of Agriculture and Forestry before joining SG 2000. Prior to moving to Tanzania, Aikawa spent 4 months familiarizing himself with the SG 2000 field program in Ethiopia.

UGANDA

Maize grain prices collapsed to an all-time low of U Sh 30,000/t (US\$17/t) during 2001 as a result of bumper harvests of maize and other food staples during the previous two crop seasons. However growing food deficits in neighboring countries began to raise demand for maize and strengthen grain prices in Uganda. Efforts to encourage more on-farm storage are being made.

DEMONSTRATION PROGRAM

Over 14,000 small-scale farmers in 23 districts are participating in the agricultural intensification program of SG 2000 and the Ministry of Agriculture, Animal Industries, and Fisheries. In 2001, 159 extension workers supervised over 2,000 crop demonstrations on farmers' fields in 135 sub-counties. Productivity levels for maize, sorghum, groundnuts, beans and pigeon pea demonstration plots were far higher than those obtained by farmers who still follow traditional methods.

Uganda: Yield of demonstration plots, 2001.

| Crop | Plots (no.) | Area total (ha) | Avg yield (t/ha) | Traditional yield (t/ha) |
|------------|-------------|-----------------|------------------|--------------------------|
| Maize | 461 | 46.1 | 4.6 | 2.3 |
| Groundnuts | 173 | 17.3 | 1.6 | 0.7 |
| Rice | 24 | 2.4 | 4.4 | 2.2 |

QUALITY PROTEIN MAIZE

Farmers have responded enthusiastically to the QPM maize variety Nalongo—the local name given Obatanpa, originally developed in Ghana. Nalongo was released in November 2000. Since then, the planted area has expanded as rapidly as availability of certified seed will allow.

The Naseco Seed Company and the East African Seed Company intend to produce 100 tonnes of Nalongo seed for planting in 2002. The Naseco Seed Company is in a second production cycle for certified QPM seed. It has over 120 hectares of QPM maize seed planted and aims to have 500 tonnes of certified seed available for planting in 2003. The East African Seed Company has substantial orders to supply QPM seed to farmers in northern Uganda.

Targets for seed increases were met with groundnuts and pigeon pea. SG 2000 is promoting a higher productivity strategy in which risk is moderated by intercropping legumes with maize. Farmers are also rotating cereals with legumes to build soil organic matter.



INPUT AND SERVICE SUPPLIERS

The fledgling private network of agricultural input dealers is gaining experience. Farmers benefited from a steady supply of seed and fertilizer in rural areas. Many dealers were well-stocked for 2002.

Growing competition in the local marketplace has continued to reduce fertilizer prices as sales have increased. Even so, fertilizer price levels remain high enough to limit adoption, especially for low-value food crops.

Small-scale farmers are cooperating actively with SG 2000 to build mechanisms and educational systems that will sustain the application of productivity-enhancing technologies. SG 2000 has supported the efforts of two rural communities that are building one-stop service centers. These centers will provide a variety of services for farmers at cost. Agricultural advisory and marketing services initially form the core of operations. Other services will be added as the communities increase their asset bases and develop a broader coalition of partners.

In the long term, the one-stop centers should help to spawn strong farmers' associations and gain the capacity to carry on program activities previously supported exclusively by SG 2000.

WORKSHOP

In June 2001, Uganda's Plan to Modernize Agriculture received exposure at the CASIN/SAA/Global 2000 Workshop 2001, held in Kampala and opened by President Yoweri Museveni.

THE SASAKAWA AFRICA FUND FOR EXTENSION EDUCATION



The Sasakawa Africa Fund for Extension Education (SAFE) continues to create career education opportunities for frontline extension staff in Uganda, Tanzania, Ethiopia, and Ghana. New SAFE programs are being planned at Ahmadu Bello University in Zaria, Nigeria, the National University of Benin, and the University of Mali.

UGANDA

In Uganda the mid-career program at Makerere University is making a significant impact. During 2001, the second group of extensionists graduated with B.Sc. degrees in agricultural extension. Forty-two students were enrolled for the 2001 academic year—more than double the intake of previous years. The government, for the first time, is funding 20 places, and Winrock International is funding 5 of the 17 female students admitted.

TANZANIA

In Tanzania, the first 12 students graduated from the SAFE-assisted B.Sc. program at Sokoine University of Agriculture. SAFE funded and facilitated a workshop at the university in July, which brought together personnel from government ministries, the district councils, and the university. The purpose was to encourage them to make the mid-career program part of their staff development plans. Impressed by the program design, representatives of the district councils expressed a desire to begin. They suggested strategies for formalizing the partnership with Sokoine University. The Ministry of Agriculture and Food Security and the university were asked to lead follow-up on the resolutions made.

ETHIOPIA

The mid-career B.Sc. program at Alemaya University, Ethiopia, completed its third cycle with the graduation of all of the 25 students who originally started the course. Four students, including one woman, graduated with distinction. Since the program's inception, 72 students have graduated.

GHANA

At the University of Cape Coast (UCC) in Ghana, 52 students, including 10 women, completed their B.Sc. in agricultural extension in June, bringing the total number of graduates to 153. During 2001, 55 students were enrolled in the SAFE-supported program at UCC, including individuals from Burkina Faso, Malawi, Mozambique, and Nigeria.

At Kwadaso Agricultural College (KAC), the first batch of 29 frontline extensionists completed their diploma course in agricultural extension. Sixty-seven students were enrolled during 2001, including one student from Malawi. The KAC diploma course is affiliated with UCC and receives back-up support from experienced UCC academic staff. After the KAC graduates complete another tour of duty in the field, they will be eligible to apply for the B.Sc. course at UCC. SAFE has assisted the diploma program at KAC by renovating a dormitory for the students and other basic facilities. The facilities were officially inaugurated in October in the presence of the Minister of Food and Agriculture.

WORKSHOP

A strategic planning national workshop was held at UCC in July. Participants included representatives from 25 SAFE/Ghana shareholder organizations, the Ministry of Food and Agriculture, graduates, current students, farmers, World Vision, UCC, SAA, SG 2000, and Winrock. The objectives of the workshop were to clarify and develop a common understanding of the SAFE/Ghana programs, to assess progress, and to develop future strategies. The workshop stressed the need for better working relationships among shareholders, increased domestic funding, and regular participatory curricula reviews in order to keep the SAFE programs relevant to Ghana's rapidly changing agricultural sector.

AGROPROCESSING PROGRAM

For 8 years, SAA and the International Institute of Tropical Agriculture (IITA) in Nigeria have collaborated in introducing agroprocessing equipment designed for small-scale farmers.

LINKING INDUSTRY AND AGRICULTURE

One aim of the agroprocessing program is to strengthen the link between agriculture and light industry, which is weak in many countries. In Africa, industrial development tends to be regarded as an area for heavy and capital-intensive industry or large private factories. However, agricultural commodities are the main source of raw materials for major industries such as food oil, starch, and processed food. Opportunities exist in these areas for small- and medium-scale agroprocessing entrepreneurs, but they first need to increase their productivity through more efficient crop production, crop processing with improved equipment, and better marketing.

CONTINUOUS EVALUATION

As part of a process to improve the performance of this equipment, agricultural extension workers collect feedback from the farmers and processors, which IITA analyses and uses to modify the designs.

In 2001, a survey was carried out to assess the program in Benin and Ghana. Equipment designed by IITA has become widely used in these countries since 1994. About 100 users in each country were selected to participate in the survey.

The survey found that all IITA-designed equipment in the field is still functioning, even after several years of use, proving its durability and easy maintenance. It also found that the cassava grater and the multicrop thresher are generally owned by groups of farmers. The cassava-processing equipment reduces processing losses by 54 percent and saved as much as 75 percent of the labor required. In contrast, individual entrepreneurs tend to own the wet-type



grinder and the palm oil digester, which can process oilseeds. Demand for oilseed products has encouraged individual entrepreneurs to invest in the machinery.

EXPANSION IN MOZAMBIQUE

In Mozambique, both Agro-Alpha and Kanes are manufacturing cassava chipping and grating units. Efforts continue to be made to promote the manufacturing and sales of the cassava-processing equipment. Prototypes will be produced by Agro-Alpha and Kanes, including multi-purpose threshers, rice dehuskers and polishers, and a manual rice thresher.

The agroprocessing project is a collaborative effort by several partners each taking an active role in the dissemination of agroprocessing technology (see below). The project coordinator plays a crucial role in linking and integrating each partner effectively.

| Stakeholders | Training extensionists | Training manufacturers | Training users | Field demonstration/ product promotion |
|------------------------------------|--|---|---|---|
| Ministry of Agriculture | Support of agroprocessing extension | | Coordination of field activities | Mounting field demonstrations with manufacturers |
| Ministry of Industry | | Support of agro-industry promotions | | Setting quality control guidelines with manufacturers |
| Agro-metal workshops | | Training of own staff Sharing training costs | Basic training of users after delivery of equipment | Promotion of own products |
| Farmers/agroprocessors | | | Active participation Cost sharing | Purchasing equipment Providing feedback |
| IITA and other research institutes | Advice on best use of technology and equipment | Technical support to national training programs | Advice on the best use of technology and equipment | Collecting feedback from users |
| SAA/SG 2000 | Coordination Sharing extension costs | Coordination Sharing costs | Coordination Sharing costs | Coordination Sharing costs |

CASIN/SAA WORKSHOP

Workshop 2001, held in Kampala in June, addressed the impact of the changing world economic environment on food security in Africa. This was the 15th policy conference to be organized by the Centre for Applied Studies in International Negotiations (CASIN) and was attended by ministers of agriculture and policy makers from SG 2000 countries, representatives from the World Bank, bilateral development agencies, and agribusiness companies.

The workshop began with day-long fieldtrips allowing the participants to see such activities as Uganda's extension training efforts, organizations of farmers and women agroprocessors, the rural stockist network, small-scale farmers' agricultural production enterprises, and private feed milling.

To start the formal sessions the next day, President Yoweri Kaguta Museveni called attention to his nation's plan for rapid economic growth in which the transformation of the country's agriculture from predominantly subsistence production to commercial farming is a prominent feature. President Museveni stated that international trade must be a part of sustained food security. He emphasized that African nations have to move toward exporting processed primary goods instead of raw commodities. Otherwise, they will not be able to generate sufficient trade surpluses to make the capital investments needed for further development, he said.

The meeting was organized into five sessions. The session covering decentralization, privatization, urbanization and globalization had addresses by N. D. Soglo, former president of Benin; Wilberforce Kisamba-Mugerwa, minister of agriculture, animal industry, and fisheries, Uganda; Courage Quashigah, minister for food and agriculture, Ghana; and G. Edward Schuh, Regents professor, University of Minnesota. Minister Quashigah contended that Africa's precarious food security is a longstanding problem and should not be blamed on privatization, decentralization, urbanization, or globalization. Instead these recent phenomena should be considered opportunities for growth.

In the session on extension services delivery, new approaches to extension services delivery in Uganda were explained by Silim Nahdy, task force leader, National Agricultural Advisory Services, Uganda. Michael Foster of SG 2000 described SG2000's evolving support to Uganda's technology transfer programs. Henk C. Knipscheer, senior managing director, Winrock International, explored how agricultural extension in sub-Saharan Africa must change in response to the rapidly changing dynamics of agricultural and rural development.

The session on input services delivery comprised papers by Barry McCarter, general manager of Seed Co. Ltd., Zimbabwe, on delivering quality seed to smallholders, by Karl Solberg of NORAD on plans for fertilizer stocking and delivery in Uganda, and by J. D. von Pischke on the current health of microfinance endeavors.

In the session on agricultural intensification, Kaori Izumi, land officer in the FAO Sub-Regional Office for Southern and Eastern Africa, Zimbabwe, reviewed African experiences in land tenure and assessed the current situation. Simon Muro, project coordinator, Ministry of Agriculture and Food Security, Tanzania, explained how the new Soil Fertility Recapitalization and Agricultural Intensification Project aims to improve land and crop husbandry practices, increase access to and utilization of agricultural inputs and support services, and enhance private participation in input and output markets. Steve Collins of Monsanto explored recent developments in conservation tillage.

The session on agroprocessing included an assessment of agroprocessing opportunities in Africa by Ruth Oniang'o, professor of food science and nutrition, Jomo Kenyatta University of Agriculture and Technology, Kenya. Experiences in introducing improved agroprocessing equipment were detailed by L. Halos-Kim, research specialist, International Institute of Tropical Agriculture, Nigeria, and Toshiro Mado of SAA. Susan Bornstein, TechnoServe's acting regional director for Africa, read a paper outlining TechnoServe's work in helping rural producers build sustainable relationships with major commercial enterprises.

In summing up the workshop, G. Edward Schuh, Regents professor, University of Minnesota found four themes had emerged. All relate to the effect that new technology beyond the farm level has on the transformation of the world economy.

Globalization, Mr. Schuh pointed out, has been driven by technological revolutions in transportation, communications, and information technology. These breakthroughs have lowered the costs of economic transactions and expanded the scope of markets to organize economic resources. This trend, Mr. Schuh argued, will most likely become more extensive and more complex. Globalization, he said, is changing where economic policy making and implementation take place and is propelling the drive for privatization and greater dependence on markets.

The second theme was partnerships and self help. Governments will have to strengthen financial institutions to encourage savings and take steps to raise productivity so that individuals have a surplus to save. Mr. Schuh said foreign aid, with its demeaning patron-client overtones, should be replaced by cooperation between countries in which programs are mutually formulated.

Institutions and policy was the third. One aspect, Mr. Schuh said, is that new technology, which theme everyone is counting on to raise productivity, will not fall from the sky; it will require research institutions to generate it. Second, new technology will not be employed unless it is profitable, which will be largely determined by macroeconomic policy making.

The fourth theme was the contribution of international trade to food security. To the extent that a country is willing to specialize and engage in international trade, there is no limit to its economic growth potential, Mr. Schuh said.

PUBLIC INFORMATION

Publications released during the 2001 included *The Food Chain in Sub-Saharan Africa*, proceedings of a workshop held in Mali in 1999; *Extension Education: Reshaping African Universities and Colleges for the 21st Century*, proceedings of a workshop held in Ghana in 2000; Issue 16 of the SAA Newsletter, *Feeding the Future*; and the *SG 2000 Calendar 2002*.



FINANCIAL REPORT 2001

| | | |
|---|------------------------------|--------------------|
| | Approved budget | \$8,695,000 |
| | Actual spending | \$8,202,129 |
| | Actual receipts | \$8,120,769 |
| | Drawn on reserves | \$81,360 |
| Cash balance (as of December 31, 2001) | | \$5,969,906 |
| Details of receipts | | |
| | Grant from Nippon Foundation | \$7,500,000 |
| | Interest | \$311,296 |
| | Loan recovery | \$221,625 |
| | Others | \$87,848 |
| Highlights of expenditures | | |
| SG 2000 country operations | | |
| | Benin | \$12,791 |
| | Burkina Faso | \$471,507 |
| | Ethiopia | \$472,662 |
| | Ghana | \$340,472 |
| | Guinea | \$567,969 |
| | Mali | \$530,358 |
| | Malawi | \$472,783 |
| | Mozambique | \$451,030 |
| | Nigeria | \$256,442 |
| | Tanzania | \$121,073 |
| | Uganda | \$558,028 |
| SAA programs | | |
| | SAFE (Extension Education) | \$846,046 |
| | Agro-Processing | \$310,697 |
| | Quality Protein Maize | \$17,161 |
| | New Project Development | \$46,276 |

SASAKAWA AFRICA ASSOCIATION



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