

Feeding *the* Future

Uganda—new approaches to agricultural extension



The NAADS programme is designed to make extension advisory services more responsive to farmers' needs.

Great strides have been made in the recovery of Ugandan agriculture over the past 15 years, driven largely by expansion in cultivated areas and liberalisation of the economy. The country has regained its position as the largest coffee producer on the continent, the tea industry has been revitalised, a small export-oriented horticulture industry is emerging, and maize exports to Kenya continue to grow.

Concerned with sources of agricultural growth for the future, the government has developed a new plan based upon two strategic pillars—raising overall agricultural yields and productivity and diversifying smallholder production patterns into a mix of higher-value, export-oriented commodities, along with lower-value food staples.

Developed by a broad constituency of stakeholders—officials and politicians, farmers, NGOs, civil society, and the community of donors—the new plan places a high priority on agricultural research and extension, and especially on improving the process of technology generation and transfer through the decentralisation of activities, greater participation of potential users, and improved utilisation of knowledge found in local communities.

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Pioneering QPM scientists awarded World Food Prize

Two CIMMYT scientists—Drs Evangelina Villegas and Surinder K. Vasal—shared the Millennium World Food Prize on 12 October 2000, in Des Moines, Iowa, USA.

The Laureates were cited “for their unique, two-decade collaboration that led to breakthrough achievements in the development of quality protein maize (QPM)—which stands to greatly improve nutrition for hundreds of millions of people in developing countries.”

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Dr Surinder K Vasal.



Dr Evangelina Villegas.

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Global 2000 update

The Carter Center's Global 2000 healthcare programme to overcome preventable diseases continues to make progress.

Seven nations celebrate Guinea Worm eradication anniversary

In July 2000, The Carter Center honoured seven countries that have been Guinea Worm free for at least one year. Former President Jimmy Carter and Dr. Donald Hopkins, Associate Executive Director of The Carter Center's Health Programmes, were there to congratulate Cameroon, Chad, India, Kenya, Pakistan, Senegal and Yemen on their achievement.

"Those of us who have witnessed first-hand the ravages Guinea Worm inflicts on people, know that having no new cases of the disease for a year is a significant turning point," said Dr. Hopkins.

In 1986, when The Carter Center's

Global 2000 Programme joined the global eradication campaign, the disease was prevalent in more than 20 African and Asian countries, infecting 3.5 million people. Today, the global burden of disease has been reduced by 98 percent.

The Carter Center is now focusing on the 13 African countries still afflicted. Five countries and 10 northern states of Sudan are on the verge of halting transmission of the disease. Uganda reported zero cases of Guinea Worm during the last two months of 2000. Less than 100,000 cases were reported during 2000, with about 73 percent of these occurring in Sudan. Hydro-Polymers donated 9 million pipe filters to assist the Sudan programme's fight against Guinea Worm in 2001. The goal is to stop disease transmission in all countries except Sudan, by the end of 2001.



During his visit to Nigeria in July last year, former US President Jimmy Carter inspected SG 2000 maize management training plots (MTPs) at New Maro in Kaduna State. Here President Carter and Federal Government officials receive a brief from Dr Kasim, programme manager of Kaduna Agricultural Development Programme (ADP) on the SG 2000 soybean MTP, owned by Gorin-Gora Women's Group.

River blindness

In 2000, the Global River Blindness Control Programme (GRBP) assisted in the treatment of almost 7 million people, reaching over 14,000 villages in Africa and Latin America. River blindness can be controlled with a single dose of MectizanR (donated by Merck & Co) given orally once or twice each year. Since its inception in 1996, the GRBP has helped distribute more than 28 million treatments of MectizanR in Africa and Latin America. This year, The Carter Center expanded GRBP into Ethiopia and is preparing to launch a major treatment programme in 2001 targeting 250,000 treatments.

Lymphatic Filariasis

The Lymphatic Filariasis (LF) Eradication Programme recently launched a demonstration programme in partnership with the Nigerian Federal Ministry of Health. The programme will illustrate how the disease can be effectively controlled and eliminated through health education and drug treatment at the community level.

In 2000, over 131,000 people were treated with a combined therapy of MectizanR and Albendazole. A consortium for LF elimination, which includes The Carter Center's LF Programme, was awarded US\$20 million by the Bill & Melinda Gates Foundation to demonstrate levels of LF eradication under epidemiological conditions around the world.

Schistosomiasis (bilharzia)

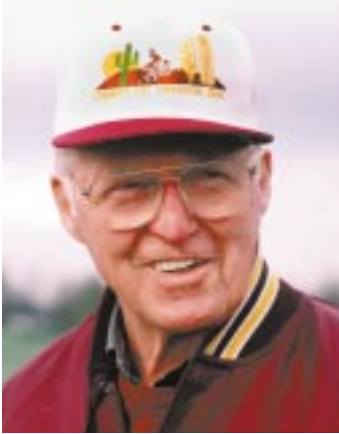
The Carter Center also is assisting Nigeria's Federal Ministry of Health to combat schistosomiasis through health education and drug treatment. Efforts include the integration of this programme with The Carter Center's ongoing community treatment of river blindness and lymphatic filariasis.

The disease can be controlled with a single dose of praziquantel given orally once a year. The Carter Center has received donations of this drug from Medochemie Company, Bayer Pharmaceuticals and Shin Poong Pharmaceutical Company. The first statewide treatments began in October 1999 in two states in central Nigeria. Since then, nearly 53,000 people have been treated, resulting in improved nutrition and cognitive ability, especially in young children. Efforts to encourage and secure additional donations of praziquantel will continue.

Trachoma

Trachoma is the world's leading cause of preventable blindness, and can be avoided by the adoption of simple hygiene techniques such as face and hand washing. Those techniques, known as the SAFE strategy, are the primary weapon in the war against the disease.

In 2000, The Carter Center teamed with Helen Keller International to assist Niger's Ministry of Health to begin education projects in 30 endemic villages. Sudan's Federal Ministry of Health also launched its Trachoma Control Programme (TCP), aided by the Lions-Carter Center Sight First Initiative and a special donation of Zithromax TM from Pfizer Inc. The Center also works with the Ministries of Health in Ethiopia, Ghana, Mali, Nigeria, and Yemen, to establish programmes and increase awareness of trachoma.



Dr Norman E Borlaug,
SAA President.

Technology is available— infrastructure is the obstacle

The availability of technology is not the limiting factor for productivity growth in smallholder agriculture in Africa. With the technology already available, farmers can quite easily double and triple yields in most of their food, feed and fiber crops. They do not adopt this technology because they remain caught in a double cost/price squeeze—on inputs and on output.

The condition of local roads is generally poor and worsening, as the volume and weight of traffic increase

Largely because of high transportation costs, the price of fertiliser at the farm gate in Africa is often double—and sometimes triple—what a farmer in an industrialised country would pay. Similarly, the price at the farm gate for produce is often as low as 50 percent of the market price in urban centres.

For example, it costs about US\$ 25 to ship a tonne of maize from a US farm in the Corn Belt to a US Gulf port, some 1,000 km away. It takes another \$US 45 to ship that tonne all the way to Mombasa—a 16,000 km journey. In contrast, it can cost as much as US\$ 100 to ship the same tonne of maize from Mombasa to Kampala—only a 1,000 km distance, not to mention shipping that same tonne onward beyond the capital city. This points to the particularly high transport costs facing land-locked countries. Efficient transport is needed to

facilitate production and enable farmers to bring their products to markets, and intensive agriculture is particularly dependent on vehicle access. But today, most agricultural production in Africa 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.

The conditions of the main highways in Africa have improved somewhat, even though the densities of paved roads remain among the lowest in the world. Massive donor-funded rehabilitation projects have helped governments to finance rehabilitation. The World Bank alone has 32 projects in the transport sector, with a total commitment of US\$ 2.4 billion. However, the condition of local

About Sasakawa-Global 2000

Agricultural projects of Sasakawa-Global 2000 are operated as joint ventures of two organisations—Sasakawa Africa Association (SAA) and the Global 2000 programme of The Carter Center in Atlanta. SAA, whose president is Dr Norman E Borlaug, serves as the lead management organisation for the SG 2000 projects in Africa. Working through The Carter Center’s Global 2000 programme, former US President Jimmy Carter and his advisers provide policy advice to national political leaders in support of programme objectives. Funding for SG 2000 projects comes from the Nippon Foundation of Japan whose chairperson is Ayako Sono and president is Yohei Sasakawa.

roads—both in rural areas and in urban centres—is generally poor and worsening, as the volume and weight of traffic increase.

Reversing this trend will require new thinking, new partnerships and new institutional arrangements. Even if the public sector could manage transport effectively, the private sector will be increasingly asked to help finance it. Today, experts are calling for new types of public-private sector partnerships to build and maintain integrated transport infrastructure—from farms to cities to ports.

National governments, inter-regional associations, such as the Economic Community of West African States (ECOWAS) and the Common Market for Eastern and Southern Africa (COMESA), and large international donor organisations have important roles to play in the future planning, financing, and management of

integrated and coordinated systems. However, small- and medium-sized private entrepreneurs and local governments and communities must also be involved in the development and management process.

Not only will improvements in transport systems and other rural infrastructure (especially potable water and electricity) greatly accelerate agricultural production and rural economic growth, they will reduce rural isolation, thus helping to break down inter-ethnic animosities and establish rural schools and clinics in areas where teachers and health practitioners have been unwilling to settle.

Finding the way to provide effective and efficient infrastructure in sub-Saharan Africa underpins all other efforts to reduce poverty, improve health and education, and secure peace and prosperity.

Kilometres of paved roads per million population in selected countries

	Km		Km
USA	20,987	Guinea	637
France	12,673	Ghana	494
Japan	6,584	Nigeria	230
Zimbabwe	1,586	Mozambique	141
South Africa	1,402	Tanzania	114
Brazil	1,064	Uganda	94
India	1,004	Ethiopia	66
China	803		

Source: Encyclopedia Britannica Book of the Year 2000

Uganda—new approaches to agricultural extension

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A central component in this strategy is the new National Agricultural Advisory Services Programme (NAADS), launched in early 2001. The first phase will run for seven years, with an estimated cost of US\$107 million. The World Bank (IDA) and the International Fund for Agricultural Development (IFAD) will finance \$62.5 million and ten other donors will finance \$28.5 million, with the government (national, district and sub-country levels) and farmers financing roughly \$16 million. The programme is to be implemented by a newly created NAADS Secretariat.

Decentralisation

Major reforms of agricultural extension are planned under NAADS. These include further decentralisation of extension responsibilities, from the district to the sub-county level; contracting extension services from a range of providers; involving farmers in programme planning, evaluation, and decisions about extension providers; establishing cost-sharing between national and local governments and farmers; and the creation of more effective operational links between farmers, markets, extension workers, and agricultural researchers.

Approximately 65 percent of the NAADS resources will finance the contracting of extension services. Opportunities will be created for a range of players (including private sector, the National Agricultural Research Organisation (NARO), universities and technical training institutes, NGOs, and farmer associations) to bid for providing such services.

The Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) will ensure that NAADS operates within well-defined

policy guidelines and a regulatory framework. The NAADS Secretariat will help districts and sub-counties develop the capacity to participate in the programme. Farmers (through farmers' forums) together with sub-county administrations will manage the processes of planning, financing and contracting the service providers.

The new approach in Uganda stands in sharp contrast to past extension programmes in a number of ways. It moves away from monolithic and civil service heavy structures by explicitly encouraging plurality in extension providers and methodology. Perhaps most importantly, the NAADS design is an attempt to make extension advisory services much more directly responsive to farmers' self-identified needs.

Private sector role

NAADS is one component of a broader strategy (the Plan for the Modernisation of Agriculture—or the PMA) by the Ugandan government to stimulate development in the agricultural and rural economy. A policy and regulatory environment is being designed to encourage development of private sector marketing and distribution chains for modern inputs (including credit, fertiliser, seeds and equipment) and for farm products. Complementary investments have already been made to give free universal primary education. More specific measures are planned to improve rural and agricultural education. The landmark legislation provides for more secure property rights to land for men and women. Finally the government is reinforcing its commitment to improve rural infrastructure—especially roads, transport, potable water, and electricity systems.

Pioneering QPM scientists awarded World Food Prize

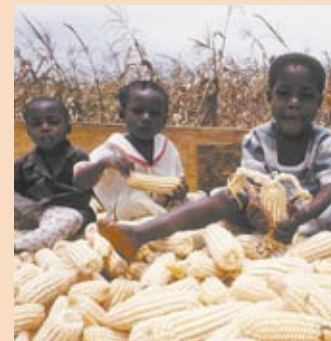
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SG 2000 joins in saluting these two outstanding scientists from the Maize and Wheat Improvement Center (CIMMYT) and the many other colleagues at international and national institutions around the world who have worked tirelessly to bring this nutritionally superior maize to the fields and homes of small-scale farmers.

SAA President, Norman Borlaug, is proud of the role that SG 2000 has played in the QPM renaissance. "SG 2000 staff, led by Dr. Wayne Haag, have been instrumental in QPM introduction in sub-Saharan Africa, beginning with the collaboration in Ghana in 1990 with scientists from the Crops Research Institute.

"Today, high-yielding, disease-resistant QPM varieties and hybrids are being grown commercially in Ghana, Benin, Guinea, Malawi, Burkina Faso, Uganda, and Mali," Borlaug added, "and Ethiopia and Nigeria will soon follow suit."

"This has been a team effort," says Borlaug. "We are very grateful to the Nippon



Foundation, which has not only financed the SG 2000 QPM technology transfer programme, but has also provided support to the QPM research programme at CIMMYT. "Strong backstopping has also come from The Carter Center, with President and Mrs. Carter rarely missing a chance to promote QPM wherever they travel."

The first woman ever to receive the World Food Prize, Evangelina Villegas, said at the awards ceremony, "I am grateful and happy to be co-recipient of this award because it will raise awareness about malnutrition. I know QPM will not solve all the world's nutrition problems, but it can certainly help."



Mucuna – restoring the soil's nutrients

Expanding populations and food requirements in sub-Saharan Africa have pushed farmers onto more marginal lands and led to a shortening in the bush/fallow periods previously used to partially restore soil fertility. With more continuous cropping on the rise, organic material and nitrogen have been rapidly depleted, while phosphorus and other nutrient reserves are being depleted slowly but steadily. This is having disastrous environmental consequences, such as serious erosion and weed invasions. However, some of these alarming trends can be minimised if farmers grow a green manure cover crop.



Starting in 1992, SG 2000 worked closely with Benin extension services to support a dynamic Mucuna promotion programme, to control the noxious weed *Imperata* and to improve soil fertility.

Killing noxious weeds

In a growing number of SG 2000 project countries, the use of Mucuna (*Mucuna pruriens*) is being promoted as a soil nutrient-improving and weed-smothering cover crop. Mucuna can restore up to 120 kg N/ha to the soil and can also shade out and kill noxious weeds, such as spear grass (*Imperata cylindrica*). Mucuna is adapted to ecologies with a broad range of precipitation (1,000-2,500 mm annual rainfall) and can be grown as a sole crop or in association with other crops, such as a relay crop with maize.

Benin was the first SG 2000 project country where the dissemination of Mucuna was actively promoted. This followed a development-oriented research

project of the Ministry of Rural Development (MDR), the International Institute of Tropical Agriculture (IITA), and the Royal Tropical Institute of the Netherlands in 1990-91.

Promoting Mucuna

Starting in 1992, SG 2000 worked closely with MDR extension services to support a dynamic Mucuna promotion programme. In 1993, some 3,000 farmers were testing Mucuna and by 1996, around 10,000 farmers were involved. Suppression of *Imperata* was the first benefit identified by farmers who, in many instances, had abandoned these weed-infested fields. After one cycle of growing Mucuna as a sole crop in these fields, *Imperata* infestation was reduced by 90 percent. After

two or three cycles, it was eliminated. Maize grain yields increased by approximately 1.0 t/ha, due to the additional nitrogen. When phosphorus and potassium were also added, yields increased up to two t/ha over traditional farmer practices.

Increasing yields

Promotion of Mucuna use has also been undertaken in other SG 2000 project countries, especially in Guinea, where over 800 farmer demonstrations and different experimental plots at research stations have been grown between 1996 and 2000. Rice, maize and sorghum yields have been increased by 0.5 to 1.5 t/ha.

SG 2000 Guinea has also been working with women's groups on how to utilise detoxified Mucuna grain in everyday foods, in similar preparations as with cowpeas and soybeans.

One drawback of Mucuna is that it contains a substance known as L-Dopa, which can be poisonous if eaten in quantities above 1,500mg. SG 2000 Guinea has been working with scientists at the World Hunger Research Center at Judson College in Elgin, Illinois, in search of simple and economic methods to detoxify Mucuna.

Animal feed

One such method of detoxifying Mucuna for animal feed purposes is now employed in Guinea. Following a procedure suggested by Ruiz Sesma of Merida, Mexico, Mucuna seeds are detoxified for 24 hours (if cracked) or 48 hours (if whole) in four percent Ca (OH)₂. This method reduces L-Dopa levels to about 0.1 percent. Two studies are underway using Mucuna meal to reduce fishmeal by 30 percent in balanced poultry feed ratios. Weight gains and egg production are equal or better than the standard ration. Higher levels of substitution are planned for future studies.

Unfortunately, the same detoxification method cannot be used for human consumption as the treatment renders the Mucuna a very dark colour. Existing methods involve various combinations of cracking the seed into smaller pieces, soaking and boiling it. However, these techniques are still too laborious if Mucuna is to become an economically viable human food, especially for home processing and utilisation by small-scale farmers. Nonetheless, the 'green manure' Mucuna, as a cover crop, is continuing to make a substantial impact.



SG200 training in Guinea—food preparations using Mucuna.

The Sasakawa Africa Fund for Extension Education (SAFE) continues to expand its activities. Concentrating its efforts on establishing and partially supporting BSc and Diploma university programmes for career agricultural extension workers primarily from SG 2000 project countries, the SAFE programme now has been involved with 599 students enrolled at five African institutes of learning—and a growing network of institutional partnerships across Africa.

In September 2000, 70 professionals from 13 African countries, including university vice-chancellors, rectors and deans from selected agricultural universities and colleges, senior officials from ministries of agriculture and education, and representatives from private sector organisations, attended Workshop 2000 in Accra and at the University of Cape Coast. The theme of the workshop was “Bringing African universities and colleges more into agricultural development.” For a full report see page 7.

Africa’s political leaders, too, are recognising the importance of the SAFE programme—partly through the achievements of the SAFE

students. The then Vice-President of Ghana, John Atta Mills, opened Workshop 2000. In Uganda, a month later, President Yoweri Museveni presided over the graduation ceremony at Makerere University for 2,000 new graduates. The award for the best overall student went to Annette Ogema, a Kenyan, who enrolled in the SAFE programme in her own capacity.

The occasion marked the graduation of the first group of mid-career extensionists from the Department of Agricultural Extension Education at Makerere. Eleven students passed—four men and seven women. Nine students achieved an upper second class degree, “an unusually good



SAFE students at a conservation tillage demonstration in Kumasi, Ghana.

result,” commented SAFE Director, Deola Naibakelao.

At Alemaya University of Agriculture (AUA) in Ethiopia, the second class of mid-career BSc programmes graduated in 2000. In July, a second batch of 19 students—18 men and one woman—graduated after successfully completing their BSc in agricultural extension education. Two students graduated with distinction, “further confirming that despite many years out of school, these experienced and highly motivated field extension staff are well capable of following academic programmes,” says Jeff Mutimba, the programme joint-coordinator for SAFE’s partner institution, Winrock International.

The SAFE programme facilitated and funded a study tour to Makerere for three faculty members from Alemaya. The objective of the visit for the staff from both universities was to share experiences on the development of their respective programmes including the structure of their curricula and the challenges and sustainability of the programmes.

The two-year BSc agricultural extension course at the University of Cape Coast “continues to grow both in terms of numbers of students and in the quality of the programme,” says Moses Zannah, the programme joint coordinator from Winrock International. A total of 100 students, including 22 women, have graduated since the

programme was launched in November 1993.

The graduates include six Nigerians and one Mozambican. “Fifty-two students are currently conducting their off-campus Supervised Enterprise Projects in rural farming communities, while 25 students are doing course work on the UCC campus,” notes Deola Naibakelao.

The SAFE programme is set to expand to Ahmadu Bello University in Zaria, Kaduna State in Nigeria

At Kwasdaso Agricultural College, 63 students are enrolled in a Diploma course, including 18 women. This new diploma programme, the first under the SAFE initiative, is the first step above the certificate held by most African extension workers.

The SAFE programme is set to expand to Ahmadu Bello University in Zaria, Kaduna State in Nigeria. A workshop held at the university last October examined the curriculum and funding requirements for launching a BSc agricultural extension programme.

SAFE statistics 1993-2000

Mid-career BSc and Diploma Courses	Graduated	Current	Total
University of Cape Coast, Ghana	101	76	177
Alemaya University, Ethiopia	47	95	142
Makerere University, Uganda	11	44	55
Sokoine University, Tanzania	-	100	100
Kwadaso Agricultural College, Ghana	-	63	63
Sub total	159	378	537
Scholarships	Graduated	Current	Total
BSc	15	-	15
MSc	37	7	44
PhD	3	-	3
Sub total	55	7	62
TOTAL	214	385	599

Partnerships

Workshop 2000: capacity building at African universities

Whilst spending hundreds of millions of dollars during the last two decades on strengthening agricultural research and extension, African governments and the international donor community have neglected formal agricultural education institutions, spending only a few million on the capacity building of these institutions.

An international workshop, organised by the Centre for Applied Studies in International Negotiations (CASIN), on ways of bringing African universities and colleges more into the agricultural development process, was held in Ghana, September 4-6, 2000, in Accra and at the University of Cape Coast (UCC). Leaders from more than a dozen African universities and colleges came to interact with decision makers from ministries of agriculture, NGOs, private agribusinesses, and the international donor and technical assistance agencies.

Workshop sessions focused primarily on the challenges of providing continuing education opportunities for experienced mid-career extension workers, the vast majority of whom have not had opportunities to pursue much formal education at university level. They lack critical skills in technical agriculture, farmer communications, identifying farmer problems, and developing and implementing programmes that match the needs of farmers,

agribusinesses and consumers. UCC has been a pioneer in the development of responsive training programmes for mid-career agricultural extension staff in Africa. SAA and its NGO partner, Winrock International, have played key roles in this endeavour.

In his address, UCC Vice Chancellor, Samuel K Adjepong, acknowledged the scepticism as to “whether most African agricultural universities are addressing the actual problems faced by rural dwellers,” noting that “many African universities seem more preoccupied with the need to uphold ‘academic rigor’ at the expense of offering responsive programmes that deal with the real needs of the larger society within which they are supported.”

“Major shifts are occurring in the delivery of agricultural advisory services in sub-Saharan Africa,” said Christopher Dowswell, SAA Director for Programme Coordination. “In the future there will be a range of providers of government-funded extension services to small-scale farmers, including NGOs, farmers’ associations, private agribusinesses, and government organisations.”

Workshop participants took the first steps in outlining a strategic framework—including additional funding—for the development of agricultural education and extension courses in African universities and colleges.

Workshop 2001 in Uganda—sharing good practices

The fifteenth policy conference organised by the Geneva-based CASIN, in Kampala in June, will address the impact of the changing environment on food security in Africa. Funded by the Nippon Foundation and sponsored by SAA, Workshop 2001 will bring together ministers of agriculture and policy makers from SG 2000 countries, senior representatives from the World Bank, bilateral development agencies and agribusiness companies and other specialists on the issues to be covered.

The workshop will be chaired by Dr Borlaug, former US President Jimmy Carter, Nippon Foundation President Yohei Sasakawa and Chairperson Ayako Sono.

Conferment of Honorary Doctorates on Norman Borlaug and Yohei Sasakawa



A distinguished gathering of academics witnessed the ceremony. On the far left is UCC's Vice Chancellor, Samuel K Adjepong.

Norman Borlaug and Yohei Sasakawa were awarded honorary degrees by the University of Cape Coast at a special ceremony held during Workshop 2000. They were the twenty-third and twenty-fourth recipients of this honour since 1972.

Dr Borlaug's citation acknowledged “your distinguished service to this university, the international community of universities and to humanity...”

Yohei Sasakawa's citation referred to his contributions to the development of agriculture throughout Ghana, while “several other African countries have benefited from your concern and generosity through the funding of various projects in agriculture and health.”

Also commended in the citation were the grants SAA has provided to help build and equip the Sasakawa Centre, including computers for the Centre library, and a soft loan to help build 16 chalets. The chalets will be used to generate income from workshop groups using the Sasakawa Centre facilities.



The Sasakawa Centre at the University of Cape Coast, Ghana, was dedicated in 1995. Facilities include accommodation for 75 students, a conference centre and group discussion rooms.

Agroprocessing Programme



The improved donkey cart is used to transport the IITA-designed multicrop thresher to farmers in Ethiopia.

SAA and the International Institute of Tropical Agriculture (IITA), in Ibadan, Nigeria, have been collaborating since 1994 in a project to introduce improved tools and simple machines for small-scale agroprocessing—thereby diminishing the drudgery of manual processing, particularly for women who do most of the processing and marketing of food crops in Africa.

“The main advantage of our equipment lies in its design by IITA,” says Toshiro Mado, the agroprocessing programme leader. “Each piece of equipment is designed to take into consideration the characteristics of crops as well as agricultural and human engineering factors. Some of the postharvest machines are manually operated while others use a small petrol engine as a power source. IITA’s postharvest equipment is portable, easy to handle, has good mobility, and is therefore suitable for women.”

Developing linkages

A further objective of the agroprocessing programme is to develop linkages between agriculture and light industry by promoting equipment that can be fabricated by local manufacturers. Plans are underway to develop formal networks that can represent the interests of agro-industrial equipment manufacturers and clients, and help ensure greater

availability of equipment and spare parts.

IITA’s postharvest equipment is portable, easy to handle, has good mobility, and is therefore suitable for women

The agro-processing programme has also become increasingly involved in promoting the use of improved and high-capacity threshing machinery. Ethiopian farmers, for example, have begun to adopt the IITA multicrop thresher and have purchased some 50 units manufactured locally. The thresher can be used for several different crops such as teff, wheat, maize and barley.

Each piece of equipment is designed to take into consideration the characteristics of crops as well as agricultural and human engineering factors

“More efficient on-farm grain threshing is important not only to handle larger harvests, but also to reduce postharvest losses,” says Toshiro Mado. “Ethiopian farmers usually arrange for oxen to thresh harvested crops. This is a time-consuming and relatively costly process, which also causes postharvest losses.”

Many small-scale farmers cannot, of course, afford the cost of a thresher—but arrangements can be made to bring its benefits to farmers in the deepest corners of the countryside. Dr J W Jeon, an agricultural engineer who has long been associated with the programme, has provided technical support to a private equipment manufacturer in Awassa who has now constructed an improved donkey cart to carry the thresher and hire it out to farmers.

“In the process it was found that the production cost of the improved donkey cart was less than the conventional cost,” says Mado, “so there are benefits all round.”

Evaluation exercise

After six years, Mado believes that the time has come to evaluate the

effectiveness of the programme—and this exercise will be held during 2001. The focus of the evaluation will be in Benin and Ghana where over 330 agroprocessing machines have now been made by local manufacturers and purchased by local entrepreneurs in order to generate income.

Strengthening capacity

“These entrepreneurs,” notes Mado, “are not only generating their own income but are also providing a service to neighbours in towns and villages. Our programme is therefore aiming to strengthen the capacity of the three different types of beneficiaries—machinery manufacturers, medium-scale agroprocessors and household level agroprocessors. Our strategy is to establish effective linkages between all three through field demonstrations and support for a manufacturers’ network.”

Mado is confident that “project assessment will enable us to collect more basic information that will, in turn, enable us to improve our own performance.”

Sales of selected agroprocessing equipment in Benin and Ghana, 1995–2000

Type of equipment	No. of Units
Cassava grater	223
Double screw press	213
Palm Digester	57
Multicrop thresher	39
Wet grinder	18

SG 2000 country profiles



Benin/Fenacrep

SG 2000 today provides financial support to the *Fédération nationale de caisses rurales d'épargne et de prêt* (FENACREP), an outgrowth of its previous work with participating smallholder farmers.



Benin's CREP movement – mobilising savings and offering credit in rural communities.

Between 1992 and 2000, some 167 individual village-based microfinance associations, called CREPs (*Caisse Rural d'épargne et de prêt*), came into being, with a total of some 35,000 members. At the end of the SG 2000 field programme in 1998, SAA management felt that a national association could help to strengthen the financial viability of individual CREPs and also provide leadership to a joint agricultural extension programme, which would be conducted in collaboration with the Ministry of Rural Development. After consultation with individual CREP leaders, FENACREP was born in 1999 with SG 2000 financial support, under the leadership of Dr Bernadin Glenhouenou, and guided by a Board of Directors. FENACREP has succeeded in affiliating 67 CREPs with approximately 22,000 members and has been able to attract specialised financial and technical support from the UNDP Microstart Programme and Care

International, as well as credit lines from the Financial Bank, a private Beninese banking institution. From 28 November to 5 December 2000, SG 2000 carried out an assessment exercise, comprising of Chris Dowswell and Masa Minagawa from central management, JD von Pischke, a microfinance consultant, Marcel Galiba, former SG 2000 country director in Benin, together with colleagues from Care International and the Ministry of Rural Development.

Various aspects of FENACREP operations were examined:

1. Agricultural extension, production and processing.
2. Services to members (seed, fertilisers, health centre, commercial stores).
3. Financial statements, governance, savings and loans.

It was recommended that FENACREP set up a new, more proactive agricultural programme, based on a participatory diagnostic

exercise, and a market-driven analysis of potentially profitable agricultural activities and enterprises (new crops, livestock production, agroprocessing, etc). FENACREP has been offering input services to its members—fertiliser being the main commodity. It has been able to negotiate lines of credit from SONAPRA, the parastatal cotton company, and HydroChem-Benin, a private concern, to supply fertiliser to its members. In 1999, about 2,400 tonnes and in 2000, about 1,300 tonnes were distributed to members, all on credit. Today, the Federation is confronted with a serious problem recovering these credits, and facing a crisis if it is not successful.

The Assessment Mission recommended that commercial activities, such as input supply, should be handled in the future through a separate, but affiliated entity. Moreover, to reduce associated risks, only partial credit should be offered. CREPs have shown much creativity and responsiveness to local circumstances (changes in interest rates), but savings do not run very high, and outstanding credit outstrips savings in over 50

percent of cases. Although savings and loans have increased, longer-term deposits are still not well understood. Management systems are adequate, but the non-remuneration of some managers should be remedied. Also, greater efforts should be made to federate some of the informal CREPs that have relatively good potential.

The Assessment Mission performed an analysis (income/asset ratio) based on the data it was given. Ten CREPs were classified as having an 'excellent' financial performance, 18 a 'medium' performance, and 31 either a 'poor' performance or as 'non-viable'. Recommendations were made which should enable FENACREP to carry on with its consolidation programme in order to become a profitable co-operative federation, not reliant on external financing.

Three mutual health associations (*Caisse Villageoises de Mutuelles et de Santé Rurale*) have been organised among the 67 federated CREPs, and these are well received by the members. More CREPs wish to be served and FENACREP is looking for NGO public health partners to help establish health clinics as part of the CREP process.



Women's groups benefit from the food processing activities being supported by the CREP movement.

Following poor rainfall last year, Burkina Faso now faces a severe shortage of cereals—a deficit of 442,100 mt and a decrease of 31 percent compared with 1999. Emergency food aid is now being planned.

Soil fertility restoration and improvement: results of 2000 rainy season

Sites	Villages	Dykes (ha)	Improved fallows	Organic matter (compost & rock phosphate)
Centre	24	50	105	85
Centre Est	27	280	375	207
Centre Ouest	9	13	170	75
Centre Sud	36	275	39	43
Comoé	8		50	
Mouhoun	16	15	110	62
Hauts Bassins	27		98	
Sud Ouest	15		32	20
Total	162	633	979	492

“The challenges of the Sahel are immense,” comments country director Marcel Galiba, “The 1997 drought was replaced, in some areas of Burkina, with floods in 1999—and, last year, much drier conditions again. These extremes require a long-term approach, particularly in combating problems such as soil fertility.”

Having started its programme in Burkina in 1996, in partnership with the Ministry of Rural Development, SG 2000 now operates in eight regions of the country. A major thrust of the programme is to improve and maintain soil and nutrient levels. As Marcel Galiba says, “the nutrient balance sheet is red for all nutrients.”

The rising population has also increased pressure on the land, resulting in shortened fallows. Galiba believes that more training is needed to teach farmers the benefits of improved fallow through the promotion of legumes, such as the new *Mucuna*, known as *rajada*, which has a shorter cycle than the more commonly grown variety.

The importance of extension—or, in Galiba’s words, putting extension first—was emphasised

last year by SG 2000 in a “back to basics” programme which stressed the central role of the production test plot (PTP)—supported by dykes, fallow and improved compost at village level. Over 196 villages had been included in this programme up to last year.

But, as in Mali (see page 15), concerns arose over the recovery rates for inputs, which were reaching an average of no more than 50 percent. The overall number of villages in the Burkina programme was therefore reduced to 165—and villages which had graduated from the programme were supported by production plots (PPs) with inputs provided on a cash basis. Some 344 PPs were planted in Burkina last year.

Mamaba, introduced last year in Burkina, is a follow-up to the first open-pollinated Quality Protein Maize (QPM) variety Obatanpa, which was named Ma Songo in Burkina. “Mamaba, being a hybrid variety, should enable progressive farmers to increase their yields,” says Marcel Galiba. “Mamaba has a high yield potential. If it is adopted on a large scale, a training programme on hybrid production should be implemented. So far, all seed



Improving soil fertility, including the use of phosphate-enriched compost, is a major SG 2000 programme component.

has been purchased from Kumasi in Ghana.”

Despite erratic rainfall, maize yields in the programme were not discouraging, ranging between 1.9 and 4.8 t/ha. Mamaba yielded between 1.5 and 6.5 t/ha. Rice yields averaged 3.9, sorghum 1.2 and millet a disappointing 0.8 t/ha. Many farmers still regard the use of fertilisers on sorghum and millet as risky and prefer to invest in maize, particularly QPM, which can provide a better return. A total of 141 villages were involved in planting maize as compared to 37 for sorghum, 23 for rice and 19 for millet.

After five years in Burkina, one of SG 2000’s priorities was to

produce a logical framework for future activities. A workshop was held from 29 January to 2 February in Tenkodogo, 150 km from Ouaga, for this express purpose. The 35 participants included representatives from the World Bank and the International Fund for Agricultural Development (IFAD).

The workshop helped to clarify the mission of SG 2000 Burkina, improve relationships between organisations and individuals involved in the project, set up an agreement basis and ease project management. It also allowed SG 2000’s partners to understand better the programme and its limitations.

Examples of PTP yields and traditional yields, 2000 rainy season (kg/ha)

Sites	QPM		Rice		Sorghum		Millet	
	PTP	Trad.	PTP	Trad.	PTP	Trad.	PTP	Trad.
Centre	960	435			481	245	201	167
Centre Est	2110		2207		1570		333	
Centre Ouest	1820	960	950	500	700	500	590	400
Centre Sud	1484							
Comoé	3800	1642	3650	1764		1764		
Mouhoun	1884	1488	1710	1300	1075	800		
Hauts Bassins	3181							
Sud Ouest	2531		780					
Average	2221	1131	1859	1188	956	515	375	283

While a considerable segment of the Ethiopian population remains food insecure, the severe threat of famine in the drought-prone areas of the country has subsided over the past few months. “Although there has been surplus food production in the highlands,” comments country director Marco Quiñones, “poverty and transportation bottlenecks have kept it from reaching many needy people, especially in the lowland areas.”

In 2000/01, the rains were steady and close to normal across most of the country. Government figures show that 12.6 million tonnes of cereals were produced, 43 percent more than the previous year, making the 2000/01 harvest the best in Ethiopia's recorded history—but the bottleneck problems remain. Meanwhile, the Government remains committed to financing its national extension intensification programme (NEIP) based on the SG 2000 technology transfer model. Nearly four million farmers participated in NEIP during the 2000/01 cropping seasons and six million are targeted for participation in 2001/02.

During 2000, SAA conducted an assessment mission to take stock of the progress made in Ethiopian

agriculture since the SG 2000 programme began in 1993. The SAA Board approved an extension of the SG 2000 programme for another five years, and endorsed the proposed SG 2000 Ethiopia programme to focus more on new strategic interventions both in the high-potential highlands and in the more marginal production areas.

Strategic interventions

In 2000/01, 658 extension management training plots (EMTPs) were established, of which 375 concentrated on conservation tillage practices. Other demonstration plots were implemented in wheat, to promote the use of the broad bed maker (BBM) to improve the drainage of excess water from the heavy clay vertisols, and show the advantages

of line planting to improve weed control and increase seed rate and fertiliser-use efficiency. SG 2000 has also been promoting the use of improved sorghum varieties with genetic resistance to the parasitic weed, *Striga*, in lower-elevation areas with less moisture. Results from this work have been promising.

SG 2000 began its conservation tillage demonstration programme in 1998 with an initial focus on maize, adding wheat in 1999 and teff and sorghum in 2000. Conservation tillage saves labour in land preparation and weed control, helps to combat soil degradation and conserve moisture, and has consistently shown that yields are equal to, or better than, the best practices with conventional tillage.

Promising QPM results

During the last three years, SG 2000, in collaboration with the Ethiopian Agricultural Research Organisation (EARO), has been promoting the testing of quality protein maize (QPM). During the first two years, tests were limited to on-station research sites. However, in 2000/01, the most promising QPM experimental materials were tested extensively on farmers' fields, with the aim of identifying one or two hybrids that could be released by the government for commercial production. A final ruling has yet to be made, but promising results were obtained.

SG 2000 has continued to provide strong training support to frontline extension staff. During 2000, theoretical and hands-on field

training in conservation tillage was given to over 300 field extension staff and supervisors in the Oromiya and Southern regions. SG 2000 also assisted in the general in-service training of 600 field staff from the main agricultural regions.

In 2000/01, Ethiopia produced the best harvest of cereals and pulses in the nation's history

SG 2000's agroprocessing programme, in collaboration with the IITA post-harvest engineering unit, has been training Ethiopian blacksmiths in the manufacture of the IITA-designed multi-crop threshing machine. In 2000, technicians from four new manufacturers were trained at EARO's Melkassa Research Centre. Some 50 machines have now been built.

Wheat fertilisation

SG 2000, in collaboration with EARO, the Maize and Wheat Improvement Centre (CIMMYT) the Ministry of Agriculture Extension Services, and the Oromiya Bureau of Agriculture, published the results of a study that developed more precise area-specific recommendations for wheat fertilisation in the Arsi Zone of Oromiya. Similar studies are also planned for other crop and production areas.



An SG 2000 assessment mission (from left to right): Dr Marco Quiñones, SG 2000 country director, a farmer from Jimma Zone, mission team leader Dr Ernie Sprague from Global 2000 and Dr Tadesse Tekle Medhiu, a member of the assessment mission.

SG 2000 has been promoting the use of improved sorghum varieties with genetic resistance to the parasitic weed, *Striga*, in lower-elevation areas with less moisture. Results from this work have been promising

The victory of the New Patriotic Party (NPP) at the polls and the election of President Kufuor in January has ushered in a new era for Ghana. Major Courage Quarshigah has been appointed Minister of Agriculture in the new government.



Mothers participating in a baby nutrition study. The study, using QPM-based gruel, has been ongoing for four years in the Ejura district of the Ashanti region, in collaboration with the Ministry of Food and Agriculture (MOFA), the Crops Research Institute and SG 2000. Babies weaned on QPM have better growth and health than those weaned on gruel made with normal maize flour.

In July 2000, SAA conducted an assessment mission of the SG 2000 programme, which has been in operation in Ghana since 1986. The mission findings were discussed with the SAA Board of Directors, which approved a three-year extension of the project. During this period, it is expected that SG 2000 will change its mode of operation, in keeping with the decentralisation of government services to the district level, including agricultural extension. Because SG 2000 budgetary resources are more limited than in earlier years, the Board urged SG 2000 Ghana management to

concentrate SG 2000 efforts in a relatively few number of districts, integrating various programme offerings—crop production, post-harvest, agro-processing, training and institutional capacity-building—so that these districts could serve as demonstration locations for other areas.

Improved partnerships

For SG 2000, the last year has seen the development of strengthening partnerships with local government and rural institutions. “District assemblies and rural banks fully appreciate that our programme enhances the effective and productive use of the district assembly common funds and other rural resources,” says SG 2000 National Co-ordinator, Benedicta Appiah-Asante. “Furthermore 100 percent recovery of past loans made to participating farmers has been achieved.”

During the year 2000, seven rural banks provided financing to

For SG 2000, the last year has seen the development of strengthening partnerships with local government and rural institutions

QPM contribution

“Ghana is a key research player in the development and dissemination of QPM,” comments Appiah-Asante. “Eleven sub-Saharan African countries—Mali, Burkina Faso, Nigeria, Côte d’Ivoire, Guinea, Mozambique, Uganda, Malawi, South Africa, Zimbabwe and Ethiopia—have received QPM varieties and germplasm produced in Ghana.”

Conservation tillage technology continues to be transferred to small-scale farmers in the Brong-Ahafo and Ashanti regions, where it is received with enthusiasm. In this work, SG 2000 is collaborating with CRI, MOFA, Monsanto and its local distributor, Dizengoff, and a project supported by the development agency, GTZ. The World Bank and FAO have also pledged to support conservation tillage in Ghana. Some 440 conservation tillage verification/demonstration plots were grown by participating farmers last year.

farmers to grow extension test plots (ETPs) in their districts. During the annual National Farmers’ Day celebrations, SG 2000 presented one district assembly—Nzema East—with an award for collaborating effectively with the programme in improving the lives of Ghanaian farmers.

Of the 1,600 ETPs grown in 2000, maize accounted for nearly 80 percent of crop coverage, with rice, legumes and other crops—such as sweet potato and chilli peppers—making up the rest.

The quality protein maize (QPM) programme continues to expand, with 1,271 demonstration plots being planted—three fourths with the QPM hybrid, Mamaba, and one-fourth with the open-pollinated QPM variety, Obatanpa. “The hybrid variety recorded a 20 per cent higher yield over the open-pollinated variety,” says Benedicta Appiah-Asante.

Developing new varieties

The QPM programme is undertaken in collaboration with the Grains and Legumes Development Board (GLDB), the Crops Research Institute (CRI), and the Ghana Seed Inspection Division (GSID). Some 400 farmers and 100 extension staff were trained in “hybrid production” during this period. New QPM varieties and hybrids continue to be developed and tested by CRI. Three ‘extra-early’ and ‘early-maturing’ QPM experimental varieties, along with nine normal maize varieties, were evaluated at ten locations. Considerably more Obatanpa breeder seed was produced in 2000 compared with 1999.



The QPM variety Obatanpa is now being grown on 200,000 ha.

The mission findings were discussed with the SAA Board of Directors, which approved a three-year extension of the project

There was a further sharp decrease in rice imports—Guinea’s major food crop—last year, with a 26 percent reduction compared to the previous year. This downward trend in rice imports, which has been evident for the past four to five years, is the result of the concerted effort of the Ministry of Agriculture to raise domestic rice production. SG 2000 has played a role in supporting the national rice production campaign.

SG 2000, in collaboration with the *Service National de Promotion Rural et Vulgarisation* (SNPRV), increased its production test plot (PTP) programme to 3,906 PTPs in 2000—of which over half were rice. The number of maize PTPs was also increased, reflecting the growing popularity of quality protein maize (QPM) in Guinea. Soybean has also been increasing in importance, with 141 PTPs last year as opposed to only a handful in 1999. Promotion of the ‘green

manure’ legume, *Mucuna*, continued with training in the detoxification procedures to render the grains safe for human consumption and for poultry feed (see page 5).

Overall, some 10,000 farmers participated in the PTP demonstration programme in 2000, which covered an area of 1,175 ha. Some 227 tonnes of fertiliser were used and 50 tonnes of improved seed. Additional inputs included mold-board

PTP results in 2000

Crop	Region	No. of PTPs	Yield range (t/ha)	Average yield (t/ha)
Rice	Kindia	264	1.4-4.0	3.3
	Mamou	93	1.8-3.5	2.5
	Labe	170	0.6-3.8	2.6
	Faranah	451	1.4 - 5.0	3.2
	Kankan	302	1.2-5.3	2.4
	Macenta	168	2.1-3.8	2.5
	Boke	476	1.5-3.7	2.5
	Nzerekoure	165	1.2-4.3	2.7
Rice	All regions	2,089	0.6-5.3	2.8
Maize	Kindia	5	1.5-2.5	2.2
	Mamou	92	0.9-4.3	2.4
	Labe	400	0.4-6.0	2.6
	Faranah	211	1.2-4.6	2.9
	Kankan	178	1.2-3.4	1.8
	Macenta	40	0.6-3.0	1.7
	Boke	168	1.8-3.9	3.1
Maize	All regions	1,094	0.4-6.0	2.4
Other crops	All regions			
Groundnuts		340	1.9-3.5	2.3
Soybeans		141	0.8-1.9	1.2
Mucuna		213	0.4-0.9	0.8



Dr Borlaug and Guinea’s First Lady, Mrs Henriette Conte, with babies weaned on Obatanpa at a QPM village in Boké Region.

ploughs, multi-crop threshers, motor pumps, sprayers, small agricultural tools, and plant protection chemicals.

The rice intensification programme to raise yields and cultivate two or three crops in the same year in the waterlogged lowland areas produced 9 t/ha of rice in two harvests, followed by a third harvest of legumes.

About three quarters of Guinea’s rice area is found in upland regions, where it is grown under rainfed conditions. “Intensification of upland rice production involves the choice of a good, early rice variety, moderate amounts of fertiliser and the planting of a legume under conservation tillage immediately after the rice is harvested,” comments country director Tareke Berhe.

He observes that the new varieties, produced by the West African Rice Development Association (WARDA), “mature in 90 to 100 days, making it possible for a second crop to be cultivated during the 6 to 8 month rainy season.”

Strengthening institutional and human capacity are important objectives of the SNPRV/SG 2000 programme in Guinea. Working with the *Institut de recherche agronomique de Guinée* (IRAG) and the SNPRV, over 800 farmers were trained in QPM, soybean and

Mucuna food processing and 119 farmers participated in narrow-crib construction, as part of the post-harvest programme. Eight Guineans spent two weeks on a study tour in Uganda and Ethiopia, examining mechanisms for input sales and distribution.

SG 2000 Guinea supports 12 women’s groups and two agricultural youth clubs. Three post-graduate students finished one year of practical training at the end of 2000. There are cost-sharing programmes with the six national research centres, the Agricultural University of Faranah, two intermediate colleges of agriculture, WARDA, the National Extension Service and the Regional Ministry of Health in Mamou.

Last November, SG 2000 helped to finance the first Guinean Soil Fertility Researchers Workshop, held in Labé, to exchange information and create an information network for researchers. Meanwhile, a national soil fertility action plan—under the World Bank’s Soil Fertility Initiative—is in its final stages of implementation.

During 2001, says Tareke Berhe, “more emphasis is being given to post-harvest activities, soil fertility restoration, agroprocessing, and the training of seed producers and input dealers.”

Maize is the major food staple in Malawi, which has one of the highest per capita consumption rates in the world. During 1999 and 2000, Malawi had the largest maize harvests in its history, averaging nearly 2.4 million tonnes—almost double the level of 1996/99—and even exported some 67,000 tonnes in 2000. However, the surplus production seriously depressed maize prices, which, at the farm gate, dropped as low as \$45 per tonne in 1999/2000, compared with \$111 per tonne in 1998/99. “At such low grain prices, it will not be profitable to employ high-yielding production practices,” says country director José Antonio Valencia.



One of the graduated MTP farmers stands in front of his irrigated production plot at Chingale Zomba, part of the Machinga ADD. The one hectare plot is expected to yield around 79,500 green cobs.

Increased maize production in the 1998/99 and 1999/2000 seasons was due to a big jump in national yield levels, which have increased from 994 kg/ha in 1996/97 to 1,714 kg/ha in 1999/2000. This increase has been due to intensification campaigns—such as the massive “starter pack” programme of improved seed and fertiliser for 1,000 m², supported by the European Union and the SG 2000 programme—and good and uniform rainfall in the majority of the maize-growing areas.

“SG 2000 has clearly demonstrated that maize grain yields of eight t/ha tonnes are possible,” says Valencia. While improved yields are necessary and important, Valencia notes, “the collapse in prices also points to the need to diversify production and add new

crops to the farming systems.”

He remains concerned about the effectiveness of extension advice, especially in pest control.

“Although field assistants have received training in pest control, this knowledge is not being applied to help farmers control insect pests in their fields and in grain storage.”

During 1999/2000, 2,003 maize management training plots (MTPs) were established in four regional Agricultural Development Divisions (ADDs)—Blantyre, Machinga, Lilongwe and Mzuzu. Average MTP yields ranged from 5.2 t/ha in Machinga to 7.3 t/ha in Mzuzu.

Some 3,366 MTPs—almost all of them in maize—are being established during the current maize season in five ADDs.

Rainfall began early in most parts of the country “and prospects for the MTPs look excellent,” comments Valencia.

The season started last September with in-service training courses for farmers, SG 2000/ADD co-ordinators, SG 2000/Rural Development Project (RDP) co-ordinators and field assistants from the ADDs. Two block demonstrations per RDP have been established with the objective of showing farmers and field assistants the new hybrid seed available in the country from three private seed companies—the National Seed Company of Malawi, Pannar Seed Company, and the Seed Co-op Company from Zimbabwe.

Conservation tillage technology—to reduce soil erosion, conserve

moisture, and reduce labour requirements—is also a priority. Conservation tillage training is conducted in each of the RDPs of the five ADDs participating in the SG 2000/Ministry of Agriculture and Irrigation programme.

Seventy plots have already been established with minimum tillage across the country. Collaborators include the National Seed Company of Malawi, Monsanto, SG 2000 Nigeria, and SG 2000 Mozambique.

During the winter season last year, SG 2000 supported rice seed multiplication of five new varieties selected by scientists from the national research system. These new varieties will be tested with farmers on upland rice next season.

Maize MTP yields, 1999-2000 season

ADD	Rural Development Project (RDP)	No. of hectares	No. of farmers	Range per ADD (t/ha)	Average grain yield per hectare (t/ha)
Blantyre	Average				5.6
	Chiradzulu/shire	28.0	284	1.8-9.0	5.3
	Thyolo	10.0	95	3.1-5.5	4.5
	Mwanza	6.0	64	5.6-7.6	7.0
	Phalombe	14.0	139	1.6-8.1	4.2
	Mulanje	7.0	70	3.7-5.5	4.7
Machinga	Average				5.2
	Balaka	4.0	40.0	2.5-5.7	3.7
	Kawinga	3.0	30.0	3.7-5.1	4.4
	Mangochi	5.0	50.0	3.6-7.1	5.7
	Namwera	38.0	381.0	3.2-7.8	5.4
Lilongwe	Average				5.6
	T/Lifidzi	18.9	189.0	3.3-8.5	5.7
	Dedza Hill	6.0	60.0	2.7-5.8	4.6
	Ntchew	6.0	60.0	2.6-7.4	5.3
	Lilongwe east	7.0	69.0	5.3-8.8	7.3
	Lilongwe west	13.0	131.0	3.3-6.6	5.3
Mzuzu	Average				7.3
	Rumphi	8.9	89.0	4.2-15.0	7.0
	Central Mzimba	8.8	88.0	4.9-10.4	6.5
	South Mzimba	8.0	80.0	6.1-9.6	8.4
	Average for all ADDs				5.6
Totals		199.2	2,003.0		

Erratic rainfall—a recurring problem in the Sahel—caused a serious cereal deficit in Mali in the year 2000. Rainfall in both 1998 and 1999 “was extremely good”, comments country director Marcel Galiba, “but poor rains last year led to a decrease in cereal production of 18 percent—and an overall deficit of 147,000 tonnes.” Maize production especially suffered. Production test plot (PTP) yields averaged 1.8 t/ha in 2000, compared to 3.1 t/ha in 1999. Sorghum yields were less affected, with the PTP average of 1.4 t/ha, only slightly below 1999. The average millet PTP yield, at 1 t/ha, was 30 percent below 1999.



Proud farmer with a fine crop of sorghum nearing maturity.

SG 2000 maize efforts in Mali, says Galiba, “are concentrated on off-season planting in irrigated areas.” In 2000, the programme added off-season maize production in the Mopti region, while expanding the number of maize plots in Niono, one of the country’s largest irrigation schemes.

QPM expansion

In the *Office de Niger* area—with a potential of one million ha of irrigated land, 1,075 production plots (PPs) of 1 ha, 18 PTPs (2,500 m² each), and 13 village schemes have been planted with the quality protein maize (QPM) variety, Denbanyuman, based on Obatanpa from Ghana. At Baguinéda, 300 PPs, 49 PTPs and six village schemes have been planted with Debanyuman; at Sélingué, 15 PTPs and 11 villages; at Mopti, 314 PPs, eight PTPs and four villages.

Denbanyuman was introduced for the first time in the irrigated perimeter of Baguinéda during the 1997 off-season, with the objective of breaking the cycle of continuous rice-cropping. This QPM variety is proving popular with farmers and average yields of between 2.7 and 3.3 t/ha are being recorded.

Year 2000 results “are currently being evaluated with our partners

in the Ministry of Rural Development,” says Galiba, “and we will be planning the 2001 rainy season programme accordingly.”

Input loan recovery

An important part of the programme review will be the success achieved in the recovery rates of input loans to farmers. Concerns arose last year that average recovery rates had dropped to 50 percent or less, except in Niono, where inputs were on a cash basis and were recovered in full. After a series of meetings with SG 2000’s partners, it was decided to drop those villages which had not adequately repaid their loans—and

concentrate on those villages which had.

“We are shifting our emphasis to the quality of our PTP portfolio rather than quantity, per se,” Galiba commented. “Thus, only 132 villages will be retained in the Malian programme next year.”

Collective action

Improved erosion control is a central theme in the SG 2000/Ministry of Rural Development programme. Caused by wind and water, erosion takes away sand, clay, organic matter and nutrients from the soil. “To control erosion,” Galiba explains, “the whole village must become

Improved erosion control is a central theme in the SG 2000/Ministry of Rural Development programme

involved in anti-erosion activities, including the building of dykes or rock bunds, planted with live hedges, which break water momentum and allow better retention. Collective action is a must.”

Soil fertility restoration and improvement, 2000 rainy season

Sites	Villages	Dykes (ha)	Vegetalisation (ha)	Trees (no. of plants)	Improved fallows	Organic matter (compost & rock phosphate)
Koulikoro	26	0	0	2,600	10	0
ODRS	2				0	0
Segou	16	28	5	2,430	24	24
Mopti	8	102	0	420	24	33
OHVN	4					7
Total	56	130	5	5,450	58	64

Note: The low rate of vegetalisation is due to the difficulty of procuring enough plants to protect and reinforce the dykes. Many potential species have been identified, such as ziziphus and euphorbia. Village nurseries could provide a solution.

Since the end of its civil war in the early 1990s, per capita cereal production in Mozambique has grown by 74 percent, an achievement unparalleled on the continent. National maize production has increased from 452,000 tonnes in 1990 to 1.1 million tonnes in 2000, despite serious flooding in low-lying areas during the past two years. However, the failure to provide reasonable incentives for producers remains a major factor limiting agricultural development in Mozambique.

Maize prices in 2000 were seriously depressed due to a number of factors—including low market absorption capacity, high transport costs, and imported food aid in response to the floods (rather than buying locally). In consequence, farmers were being offered the equivalent of US \$30 per tonne for maize, only about one third of the world market rate. Cotton prices have also been depressed and, more recently, cashew nuts. Finally, increased demand in niche markets, such as pigeon pea, has not materialised as expected.

As a result, input loan recovery from farmers participating in the SG 2000/DNER (National Directorate for Rural Extension) demonstration programme has been low. “Most of the credit was provided by private sector input distributors”, notes Wayne Haag. “Because of the very low producer prices, only about 50 percent of the credit has been repaid and the remainder has been rescheduled.”

The 1999/2000 demonstration season was quite good, especially for maize and rice

Local input supply

Fertiliser has been in short supply recently, partly due to the suspension of the KR2 fertiliser supplies provided by the Government of Japan. “This suspension has created an opportunity for local input supply companies to link up with fertiliser companies in South Africa,” Haag notes. “With the assistance of the Ministry of Agriculture and Rural Development (MADR)/USAID/IFDC fertiliser project, some credit lines have been established leading to small imports of fertiliser, and seed and agrochemical availability at provincial level has actually improved.”

The 1999/2000 demonstration season was quite good, especially for maize and rice. However, sunflower demonstration plots were planted too late and many of them did not reach maturity before the rains stopped, so yields were fairly low.

Favourable comparison

The quality protein maize (QPM) variety from Ghana, Obatanpa, was released under the name of Sussuma by the national maize programme. A maize yield experiment grown at six locations during 1999/2000 reconfirmed data from previous years, with Sussuma yielding 4.6 t/ha, which compared very favourably to the



A farm family in Cabo Delgado display the seed, fertiliser and herbicide inputs used in their demonstration field.

popular improved varieties, Matuba (4.4 t/ha), SEMOC-1 (4.2 t/ha), and Manica SR (4.3 t/ha).

A total of 2,193 demonstration plots are planned for the 2000/2001 season. Maize is still the dominant crop with 1,431 demonstration plots. Plans also call for between 50 and 100 cotton, 30 soybean, 45 groundnut and 10 potato demonstration plots. Around 300 sunflower and 100 field bean demonstration plots

were also planted. Most of the inputs for demonstration plots purchased by SG 2000 are now being purchased by MADR though PROAGRI—the public sector’s agricultural investment programme.

Agroprocessing

Wayne Haag also reports “considerable interest in the IITA/SAA cassava agro-processing equipment, particularly in Nampula and Imhambane provinces.”

Eng Inacio Nhancale, the SAFE student who recently completed his BSc at the University of Cape Coast in Ghana, has returned to Mozambique to head up the conservation tillage programme. Dr Miloje Denic, an former maize breeder with the SEMOC seed company, has moved to INIA, the national agricultural research organisation, as technical adviser to the national maize programme, led by Eng David Maridote.

The availability of seed and agrochemicals at provincial level has improved

Demonstration plots and traditional yields, 1999/2000

Province	Crop	No. of demonstrations	Average yield, kg/ha	Traditional yield kg/ha
Nampula	Maize	720	2,831	974
Cabo Delgado	Maize	170	1,767	444
Manica	Maize	511	3,200	1,171
Sofala	Rice	124	4,315	1,310
Gaza	Rice	225	2,560	1,050
Manica	Sunflower	24	421	205



Maize farmers participate in a national field day in Maska, Katsina State.

It is now nearly eight years since SG 2000 first began operations in northern Nigeria. Since its inception, the programme has been a joint operation between the state Agricultural Development Programmes (ADPs) and the Federal Ministry of Agriculture and Natural Resources.

Initially the main objective was to introduce improved maize and wheat technologies through a large-scale demonstration programme. Over time, considerable diversification into other crops of importance to the farming system of the savanna ecology has taken place. SG 2000's reach, too, has been extended across nine states—Kano, Kaduna, Jigawa, Katsina, Bauchi, Gombe, Kebbi, Sokoto and Zamfara.

Last season, despite below average rainfall, farmers “recorded good yields of millet, sorghum, maize, rice, sesame, soybean and cotton,” comments Dr Ahmed Falaki, SG 2000's national co-ordinator. “In Kaduna and Jigawa states, farmers have increased their hectares of soybean and sesame. SG 2000 linked farmers in Jigawa state with Afri Agric Products, which has purchased over 300 tonnes of sesame from farmers for export.”

A total of 4,724 management training plots (MTPs) were established in the six main SG 2000 states during the year 2000 wet season—of which 3,216 were hybrid maize plots. Some 1,299 wheat plots are being grown in the 2000/2001 winter season, mainly in Jigawa and Kano states, in areas known as fadamas—small-scale irrigation on lands adjacent to the rivers.

National maize day

In August last year, SG 2000, in collaboration with ADPs and the

Federal Ministry of Agriculture, organised a national mass maize field day at Maska town in Katsina State. More than 2,000 farmers, extension workers, scientists, input agencies, government officials and policy makers attended. These included the Minister of State for Agriculture, Dr Chris Ogbogu, the Deputy Governor of Katsina State, commissioners of agriculture and traditional rulers from several states.

A national quality protein maize (QPM) programme for Nigeria is being established, following the holding of a one-day seminar on QPM organised by SG 2000 at Ahmadu Bello University, Zaria, last December. Among the speakers was Dr Ernest Sprague, a maize breeder and Senior Consultant for Food Security at The Carter Center.

SG 2000 staff have evaluated a range of QPM materials under various growing conditions. These materials have come from the Crops Research Institute in Ghana and the International Maize and Wheat Improvement Center (CIMMYT) in Mexico. The broadly-adapted QPM variety from Ghana, Obatanpa, has yielded well in Nigeria but is not competitive with hybrids. However, several QPM hybrids—from the Ghana and CIMMYT programmes—are competitive and show considerable promise.

“A national QPM programme will co-ordinate all implementing agencies and will also be involved in varietal development, seed

multiplication, quality control, promotion and utilisation of the various classes of seed,” says Dr Falaki.

Last season, despite below average rainfall, farmers recorded good yields of millet, sorghum, maize, rice, sesame, soybean and cotton

Expanding partnerships

SG 2000 has continued to expand its partnerships with other organisations. Among the collaborative activities are: promotion of the fungicide seed dressing, Apron Star, to control downy mildew in millet, with Novartis; fertiliser demonstration in cotton and cowpea with Dan-Hydro; and the demonstration of new maize hybrids with Premier Seeds. SG 2000 is also involved with state ministries of agriculture in promoting input marketing; demonstrations of new wheat varieties with the Lake Chad Research Institute (LCRI); and postharvest training for extension agents and farmers with the National Stored Products Research Institute (NSPRI). Work also continues on integrated pest management with IITA.

SG 2000 linked farmers in Jigawa state with Afri Agric Products, which has purchased over 300 tonnes of sesame from farmers for export

Results, wheat MTPs, 1999-2000 season

State	Hectares	No. of farmers	Average yield (t/ha)
Bauchi	9.8	35	4.7
Gombe	2.5	10	3.7
Jigawa	66.9	266	4.1
Kano	38	164	4.1
Totals	117.2	475	4.2



Tanzania

Tanzania has suffered from a major food shortage affecting 11 regions as a consequence of the drought, which afflicted much of East Africa last year. Near total failure of the vuli (short) rains was experienced in the Arusha and Kilimanjaro regions, followed by equally bad masika (long rains) in those regions. The result was a shortfall in the national production of cereals of over 300,000 tonnes in the year 2000, leaving 2.7 million people in need of food aid.

While the drought was certainly a problem, Tanzanian agriculture over the past decade has not performed up to expectations, and certainly not up to its potential. Fertiliser consumption and the use of improved seeds have declined, cereal imports have increased, and the export-oriented agricultural sector has suffered from recent price declines. FAO reports that, since 1990, per capita food production has declined by more than 20 percent and per capita cereal production by 36 percent.

Redirecting efforts

In 1998, after ten years of field collaboration with the Ministry of Agriculture extension services, SG 2000 ceased its direct field activities in Tanzania. By that time, participating small-scale farmers had grown around 40,000 maize management training plots (MTPs), with annual average yields ranging from 4.5 to 5.1 t/ha—compared to a national average yield of around 1.3 t/ha. In addition, several thousand MTPs of sorghum, pigeon pea, and other legumes were grown, again producing

yields significantly higher than those obtained with traditional farming methods.

Since that time, SG 2000 has redirected its efforts to the policy level. During the past 12 months, country director Dr Marco Quinoñes has been actively engaged with government and World Bank officials in developing a project to assist smallholder farmers in restoring degraded soil resources and achieving greater growth in agricultural productivity.

“Continuous cropping without replenishing soil nutrients had degraded soil resources and accelerated wind and water erosion. All these factors have held back the green revolution in Tanzania,” says Quinoñes.

The government’s response has been the Soil Fertility Recapitalisation and Agricultural Intensification Project (SOFRAIP). “The core of the technical side of SOFRAIP was developed by SG 2000 staff, at the request of the Tanzanian government and with the approval of the World Bank,” says Quinoñes.

Policy changes

The project’s objectives are intended to restore and enhance soil fertility by promoting improved land husbandry and agricultural intensification practices through strengthened producer organisations—while contributing to the development of private markets for inputs and outputs. “This will be achieved by policy and regulatory changes, support for the private sector and producer organisations, and capacity-building of institutions and people,” says Marco Quinoñes.



Maize farmer, Babati.

The SAA Board of Directors has approved a re-establishment of selected SG 2000 activities in Tanzania

Because HIV/AIDS is a major threat to the welfare of smallholder farmers, the project will pay particular attention to HIV/AIDS awareness and coping mechanisms, such as labour-saving technologies for affected householders. The project’s focus will be mainly at the local level—village, ward, and district.

The SOFRAIP document has now been submitted to the Bank and the formal project appraisal process began in February 2001. Country director Marco Quinoñes has been invited by the government to participate on its behalf in the appraisal of the project document. It is anticipated that the legal negotiations should be completed before July. Once the legal approval is obtained,

funds hopefully will be made available to the government by the end of 2001. This multi-million dollar project will be spread over a three-year period, with the provision of a second phase contingent upon a successful implementation of the first phase.

Office re-opened

The SAA Board of Directors has approved a re-establishment of selected SG 2000 activities in Tanzania. An office has been re-opened and Dr. Quinoñes plans to spend several months per year in the country, working with Tanzanian and World Bank colleagues to implement SOFRAIP. SAA is also adding new professional staff to backstop SG 2000 efforts. In addition, the SAFE programme, in collaboration with Winrock International, continues to support the BSc course for mid-career extension workers at Sokoine University.

The SAFE programme, in collaboration with Winrock International, continues to support the BSc course for mid-career extension workers at Sokoine University

Agricultural intensification—the central policy theme for agricultural modernisation in Uganda—continues to produce encouraging results. Uganda produced a bumper maize harvest last year—contributing to the nation’s growing levels of maize exports. Cassava production reached a new high of 3.5 million tonnes in 2000, 56 percent above the 1996 harvest.

Country director Abu Michael Foster sees growing evidence that “partnerships between public and private sector concerns are generating a growing momentum for change.” One of the best examples of such collaboration has been the government’s efforts to strengthen agricultural advisory services, concurrent with private sector efforts to develop an efficient rural network of stockists for agricultural inputs.

Only four years after the initiation of SG 2000’s collaboration with the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF), more than 4,600 farmers are self-financing their crop demonstrations annually. “These farmer-demonstrators,” notes Foster, “purchase all the required inputs on a cash basis from a network of private rural stockists.”

In the first growing season last year, 300 extension workers and farmer-demonstrators assisted some 12,000 farmers in emulating the practices learnt at demonstration and training events. “It will be a major challenge for

extension workers to maintain an advisory service that meets the precision and variety of input applications demanded by farmers in increasingly large numbers,” says Foster.

In 2000, SG 2000 intensified its activities to link up more than 700 parishes within the 18 districts where SG 2000 operates. An additional two districts, Mukono and Jinja, also have substantive programmes through collaboration with independent farmers’ associations. Of 237 stockists trained during the year, 126 now service more than one million farming families within the 20 districts participating in the programme. These numbers are reflected in the growth of fertiliser imports through the private sector reaching around 15,000 tonnes during the year.

Rebuilding and maintaining soil fertility is an integral part of the MAAIF/SG 2000 programme. Through collaboration with the National Agricultural Research Organisation (NARO), ICRISAT, the International Centre for Research in Agroforestry



Uganda’s Minister of Agriculture, Animal Industries and Fisheries, Dr Wilberforce Kisamba Mugerwa (left), during a field tour of SG 2000 supported projects in Iganda district, eastern Uganda, with SG 2000 country director, Dr Michael Foster (right). During the tour, the minister emphasised to farmers the importance of using improved seeds for better yields.

(ICRAF), and participating farmers, SG 2000 has been assessing various opportunities for multiple cropping patterns where cereals, roots and tubers, and various leguminous crops are integrated. Recently, with the ICRISAT regional programme based in Nairobi, Kenya, SG 2000 has been promoting the introduction of pigeon peas into cereal-based farming systems to diversify farmers’ income earning opportunities and improve soil fertility. SG 2000 Uganda also co-hosted a travelling seminar in eastern Uganda and western Kenya in June 2000, with ICRAF, NARO, and KARI and KEFRI from Kenya, which was attended by most senior SG 2000 staff.

Pigeon pea, groundnuts, common beans and velvet bean (*Mucuna*) have been multiplied over the last three years in farmer-to-farmer distribution schemes. So far 557 tonnes of legume seed have been multiplied on farmers’ fields. Next season 425 ha will be planted using legume seed produced from the multiplication scheme.

Some 108 new animal traction tool kits and ten ox carts were placed with farmers in 2000 and 1,350 ha has been brought under oxen cultivation. Nakasongola

Only four years after the initiation of the SG 2000 programme, more than 4,600 farmers are self-financing their crop demonstrations annually

and Luwero districts are particularly committed to this technology transfer approach from SG 2000.

Nalongo, the local name given for Ghana’s quality protein maize (QPM) variety, Obatanpa, was released officially in Uganda in November last year. Eighteen tonnes of Nalongo seed are being planted on 750 ha in 2001 through collaboration with seed growers’ associations and private seed companies. “Our target is to produce 1,000 tonnes of clean Nalongo seed in this current year,” says Mike Foster.

Yield comparisons of QPM Obatanpa and normal-protein Longe 1 maize variety in verification plots in four districts, 2000

District	Obatanpa t/ha	Longe 1 t/ha
Bugiri	4.3	3.9
Tororo	4.5	4.1
Mukomo	4.5	3.9
Mbale	5.1	5.0
Mean	4.6	4.2

Source: Namulonge Agricultural and Animal Production Research Institute (NAARI), Kampala

SG 2000 publications and videos

For copies please contact Raitt Orr & Associates Ltd in London

Publications



1. Proceedings of Workshop 2000: The Food Chain in Sub-Saharan Africa.
2. Proceedings of Workshop 1999: Innovative Extension Education in Africa.
3. Proceedings of Workshop 1998: Partnerships for Rural Development in Sub-Saharan Africa.
4. Proceedings of Workshop 1998: Microfinance in Africa.
5. Proceedings of Workshop 1998: Enhancing Postharvest Technology Generation and Dissemination in Africa.
6. Proceedings of Workshop 1997: Agricultural Intensification in Sub-Saharan Africa.
7. SG 2000 in Nigeria—The First Seven Years (1999).
8. This is SAA: An introduction to the work of the Sasakawa Africa Association.

Other publications available:

- Proceedings of Workshop 1996 on Women, Agricultural Intensification, and Household Food Security.
- Proceedings of Workshop 1996: Overcoming Rural Poverty in Africa.
- Proceedings of Workshop 1995: Achieving Greater Impact from Research Investments in Africa.
- Proceedings of Workshop 1994: Strengthening National Extension Services in Sub-Saharan Africa.
- The Earth and the Sky—the change and challenges in African agriculture, (1998).

Videos



1. Setting the Grassroots on Fire—Norman Borlaug and Africa's Green Revolution, (1999).*
2. Ethiopia, My Hope . . . My Future . . . The 'Green Revolution' in Ethiopia, (1998).*
3. Breaking the Mould. Bringing African Universities into Development, (1997).*
4. Fulfilling the Promise. How nutritionally-improved maize can alleviate malnutrition in maize-dependent countries, (1997).*
5. Facing the Future. The SG 2000 Programme for Agricultural Development in Africa, (1996).*
6. You Can't Eat Potential. Breaking Africa's Cycle of Poverty, (1996).*

All videos are available in English and French. Video formats are PAL, Secam and NTSC.

* Also available in Japanese.

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