

Feeding *the* Future

New Rice for Africa

Eighteen sub-Saharan African countries consume more than 100,000 tonnes of rice per year each, for a total of 19 million tonnes. In 2004, some 13.2 million tonnes were produced in sub-Saharan Africa and 5.9 million tonnes were imported. After wheat, rice is the second largest food import into the region, accounting for large amounts of foreign exchange.



Dr Monty Jones (second from the right) receiving the 2004 World Food Prize, created in 1986 by Dr Norman Borlaug (left). Dr Jones was selected for his work in developing NERICA, a rice variety uniquely adapted to the growing conditions of West Africa.

Until recently, Nigeria was Thailand's largest client for its rice exports. And yet, sub-Saharan Africa has the agro-ecological conditions to produce all the rice it consumes and even become a net exporter.

Rice is an old crop in Africa. An ancient sub-species of rice, *Oryza glaberrima*, is believed to have been first cultivated in parts of West Africa some 3,500 years ago. This African rice was more grass-like, didn't yield much, and the grains shattered at maturity. About 450 years ago, Portuguese

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Breakthrough year for African agriculture in 2005?

There is a chance that Africa's development aspirations can be achieved in 2005. In January, the UN Millennium Development Project issued an independent report to the UN Secretary General Kofi Annan showing how the Millennium Development Goals could be met through a co-ordinated programme of well-governed investments in infrastructure, agriculture, health and education; increased official development assistance (ODA); comprehensive debt relief; and a new agreement on trade liberalisation in the Doha round of negotiations. In March, UK Prime Minister Tony Blair's Commission for Africa will reinforce this message. Expectations are high that in July G8 countries will commit themselves to accelerated debt reduction and at least a doubling of ODA assistance between 2005 and 2015.

There are signs that Africa is growing more peaceful. A number of ongoing conflicts are subsiding. Led by two key peacemakers – Thabo Mbeki of South Africa and Olusegun Obasanjo of Nigeria – Africans themselves have started to resolve their own conflicts. For example, Kenya has been

instrumental in moving forward the peace process in Sudan and Somalia.

Finally, the New Partnership for Africa's Development (NEPAD) is making steady progress towards its plan for comprehensive development. Especially encouraging is that the African Peer Review Mechanism is being



accepted by a growing number of countries. This is a crucial step for mobilising the ODA and foreign private investments needed to transform African agriculture in the decades ahead. The year 2005 could be a defining moment.

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traders first introduced Asian rice, *Oryza sativa*, which was higher yielding and gradually replaced African varieties in lowland rice-growing areas. Improved versions of Asian rice were promoted in Africa during the 1960s and 1970s, and took hold in irrigated areas, such as the Niger river basin in Mali and near Mount Kilimanjaro in Tanzania, where water supply and soil conditions permit high-yield production. However, most of the rice grown in Africa is rainfed (70 percent of Africa's farmers grow rainfed or 'upland' rice), and African rice types are more adapted to these local growing conditions, although yield potential is low.

At the West African Rice Development Association (WARDA) in Côte d'Ivoire, a research team led by Dr Monty Jones of Sierra Leone launched a project to improve indigenous rice varieties well-suited to African conditions, by crossing them with the high-yield characteristics of the Asian types. They selected one of the most common African rice sub-species, *Oryza glaberrima*,



NERICA farmer in Guinea – 16 percent of the total upland rice area in Guinea is now planted with NERICA varieties.

and crossed it with *Oryza sativa*. While it had been possible to cross the two sub-species in the past, a major drawback was that almost all the progeny were infertile. Using tissue culture techniques, and the addition of cocoa milk to the culture – a tip received from Chinese rice scientists – the WARDA team were able to rescue

embryos from the African x Asian rice crosses, and eventually reduce the sterility of the progeny.

The African x Asian inter-specific crosses – dubbed New Rice for Africa (NERICA) – combine the best features of both types: they are very early maturing, resistant to drought and pests, have a bushy plant type that competes favourably against weeds, and yield much better than either the Asian or African types under lower levels of fertility and irrigation. Each panicle (branch cluster) of the NERICA varieties has around 400 grains, compared to 100 grains for the African types and 250 grains for the Asian types. Even under low-input conditions, NERICA varieties yield 1.5 t/ha. When modest amounts of fertiliser are applied – as in the Guinea programme supported by SG 2000 – NERICA yields more than double. Protein content is also higher than the Asian types.

NERICA matures 40-50 days earlier compared to the upland (rainfed) Asian varieties formerly grown in West Africa, allowing farmers to add another crop, such

as a fast-growing pulse, to their annual cropping cycle. The early harvest provides farm families with food during the hunger periods, as well as an extra harvest to sell. In addition, NERICA's ability to compete with weeds reduces the time needed for weeding.

Although more than 3,000 NERICA varieties have been produced at WARDA, farmers are currently using only about a dozen of them. By mid-2003, NERICA varieties had been released for commercial use in ten West African countries (Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Mali, Nigeria, Sierra Leone and Togo). Uganda and the Central African Republic have also released NERICA varieties, while Ethiopia, Madagascar, Malawi, Mozambique and Tanzania are currently evaluating several varieties for release.

The greatest production impact of NERICA to date has been in Guinea, where the first varieties were introduced in 1997 – the year SG 2000 launched its field demonstration programmes in association with the national

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New directions in agricultural extension

The African agricultural extension landscape is littered with projects, programmes and institutions of varying methodologies, institutional arrangements and funding mechanisms. While some productivity impacts were achieved for certain food crops, in general, relatively few farmers were well served by government extension programmes.

In the early 1980s, the dominant agricultural extension approach was the training and visit (T&V) system, introduced and aggressively promoted by the World Bank. Over a 15-year period, the T&V model was adopted by more than two dozen sub-Saharan African countries, with the World Bank providing loans in excess of US\$ 1 billion.

T&V addressed several major weaknesses of previous extension systems. It was production-oriented and knowledge-driven, with frontline staff receiving frequent training in new technology and

developing regular schedules of visitation to client farmers.

While T&V provided a strong field orientation, a continuing programme of in-service training, and an integrated management structure, it came to be seen as costly, limited in coverage, and characterised by prescriptive, supply-driven messages rather than developing demand-driven diagnostic skills.

SG 2000 began operating in Ghana and Sudan in 1986 and eventually spread to 14 countries. While not a 'system' per se, SG 2000 did have a strong philosophy about the need to mount large-scale field



Extensionists exhibiting processed food products at an agricultural fair in Kankan, Guinea

demonstrations with relatively large plot sizes (0.1 to 0.4 ha), where farmers were assisted by extension to obtain recommended inputs. In addition, SG 2000 focused most of its support on

frontline extension staff engaged in field demonstration programmes, helping with mobility, field training and per diems.

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The Millennium Development Goal on halving hunger

In September 2000, the nations of the world gathered at UN headquarters and pledged to cut global hunger in half by 2015. In sub-Saharan Africa, the Millennium Development Goal (MDG) on hunger calls for reducing the number of hungry people from an estimated 190 million people in 1996 to 95 million people by 2015. Sadly, rather than declining, hunger in Africa has increased, and now affects 200 million people annually.

Over the past two years, World Food Prize laureates M.S. Swaminathan and Pedro Sanchez have co-chaired a blue-ribbon panel, the Millennium Development Project Hunger Task Force (HTF), which has made recommendations on how best to achieve the MDG on hunger. Christopher Dowswell, SAA Director of Communications, was a member of the HTF, which is one of ten Millennium Project task forces under the leadership of Columbia University Professor Jeffrey Sachs and sponsorship of UNDP. Task Force findings are being synthesised and will be presented to UN Secretary General Kofi Annan in spring 2005.

Raising agricultural productivity

The HTF recognises the need for multiple agricultural production strategies in the major agro-ecological zones. Central to all production strategies, however, is the restoration of soil fertility. After more than 30 years of nutrient mining, African soils are seriously degraded and essential plant nutrients must be restored, using inorganic and organic fertiliser sources. In particular, the HTF calls for expanded use of mineral fertilisers.

On the more-favoured lands, agricultural production systems need to be intensified. Central to these intensification strategies should be the use of fertilisers, modern plant varieties and conservation tillage systems. Investments in the market infrastructure – including transport – are essential.

In marginal lands – where at least half of Africa's 200 million hungry people live and farm – the

nature of the agroclimatic stresses and remoteness from commercial markets calls for lower cost and lower risk technologies. Yield dependability is especially important. Greater use of improved varieties and livestock breeds can be extremely beneficial. Water resource development and management should also be a major priority.

Safety nets

Economic growth alone is not sufficient to eliminate hunger, since so many of the hungry live beyond the reach of markets, in deep poverty traps, where the benefits of growth do not reach. Thus, public safety net programmes are needed.

The HTF recommends nutrition-feeding programmes for orphans, the sick and the elderly, to ensure food security in the short run, combined with other health and education interventions.

The Task Force also proposes large food-based 'productive safety net' programmes, such as school meals and food-for-work in public works and eco-rehabilitation. Under-employed, hungry people are provided with part-time work and food rations and the natural and economic resource base of the rural area is enhanced.

Making markets work for the poor

In most African countries, less than one-third of domestically produced food enters into commercial marketing channels beyond the local area.

Greater government purchases of domestically produced food, for distribution through the proposed

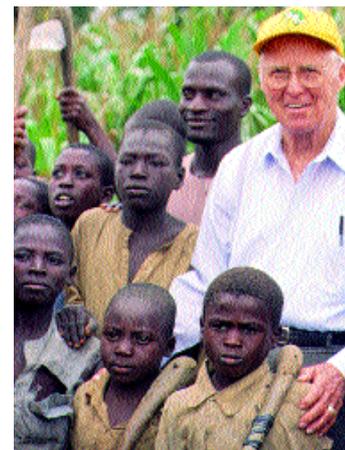
safety net programmes, could double the commercial market, helping to stabilise and improve farmgate and market crop prices.

The HTF recommends programmes of targeted, subsidised vouchers to help food-insecure families purchase enough fertiliser and seed to produce sufficient food for their nutritional needs.

Resource mobilisation

The Task Force concluded that, from a technological standpoint, Africa could meet the Millennium Development Goal of halving hunger by 2015. Achieving it is more a matter of political choice than anything else. It will require greater governance capacity and much larger capital investments in infrastructure, institutions and people.

The New Partnership for Africa's Development (NEPAD) has estimated that sub-Saharan Africa needs to invest at least US\$ 300 billion in agriculture and rural development over the next 15



**Dr Norman E Borlaug,
SAA President**

years. A significant portion must come from African nations themselves. In response, African leaders have pledged to double, on average, state support to agriculture over the next five years. Greater funding must also come from the international donor community, especially to finance the large requirements for infrastructure development and eco-rehabilitation.

In return for increased foreign aid, African leaders have agreed to meet higher performance standards in their use of public funds and to conduct 'peer reviews' of each other. In exchange for meeting these standards, African governments want greater autonomy in planning their development programmes and the pledge of increased aid from OECD nations.

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.

director of rural development. More than 26,000 farmer-managed seed selection/demonstration plots planted with NERICA have been grown in Guinea since 1997 through the collaborative programme involving the Ministry of Agriculture, WARDA and SG 2000. In 2003, Guinean rice imports dropped to a ten-year low, with only 32,000 tonnes imported, compared to 313,000 tonnes in 2002 – a reduction worth US\$ 50 million in potential foreign exchange savings.

Increasing rice production in Africa, says Tareke Berhe, SAA's rice co-ordinator for Africa and SG 2000 country director in Guinea, is relatively easy, with the range of improved varieties that are available and with the adoption of improved management practices, especially in soil fertility management. A greater challenge exists in post-production, where there is a need to improve threshing, polishing and grading of the grain. The imported rice from Asia still has a

clear advantage over most locally produced rice, as post-production activities are still very primitive, resulting in an inferior product.

By combining good production technology with high-quality post-production technology, a quality NERICA grain can be made available in urban markets that will compete favourably with the imported rice from Asia and the USA. "Africa needs to stop importing those food crops it can produce itself," says SAA President Norman Borlaug. Each time African governments opt for imported food grains over locally produced grains they rob their own smallholder farmers with the potential for commercial sales.

This situation is especially damaging in land-locked countries where high transport costs on imported grains actually provide a market edge to local production. Yet countries such as Mali import rice for urban markets rather than promote quality improvements in their own domestic rice marketing systems.



The NERICA varieties from WARDA have prompted great excitement in many African countries and among the donor community. NEPAD (the New Partnership for Africa's Development) has identified NERICA as one of the continent's "best practices". Additional funding is now being provided by the Government of Japan and the

African Development Bank to accelerate NERICA research and development – especially its diffusion throughout Africa. For WARDA director general, Kanayo Nwanze, NERICA quite simply is a 'miracle crop' – the product of good science, outstanding research and development cooperation and partnerships.

New directions in agricultural extension *continued*

"One characteristic that these publicly funded extension systems had in common," explains SG 2000 Uganda country director Michael Abu Foster, "is that they were rarely funded to provide universal extension service to smallholder farmers." While extension workers were often deployed nation-wide, they rarely had sufficient operating budgets to

be active in more than 15-20 percent of all villages. Moreover, field activities often all but stopped during the hiatuses between donor-funded projects. During these lean periods, extension workers frequently had no alternative but to stay close to post.

Private contraction of advisory services

By the mid 1990s, external and World Bank evaluations of the T&V model – in Africa and elsewhere – led to disillusionment with this approach and a renewed openness to consider other ways of providing agricultural advisory services. In particular, new models from Latin America were gaining advocates. These extension advisory services were decentralised in their organisation and management, more responsive to client needs and frequently delivered by private contractors.

The rationale for contracting advisory service providers is that 'outsourcing' is intrinsically more efficient than public extension services, given the myriad

problems of civil service employment, inadequacy of operational budgets and top-down centralised priority setting and management systems. It is assumed that private service providers have a vested interest in performance, and that the available operational funds can be matched to a proportional number of staff to realistically cover an assigned area.

A major innovation in new extension systems is the process whereby users can determine, by mere show of hands, the main enterprises for which they want to receive services. This in-built accountability provides a mechanism for farmers to change the agenda of researchers and extension workers if they do not agree with it. Farmers do not necessarily change the technical recommendations but they do determine the farm enterprises for which technicians give recommendations, based on research results. This mechanism causes some friction with researchers and extension workers since it may disrupt their agendas and may not be aligned with

mandates and the terms of funding.

Privately delivered advisory services have been effective for tobacco and other high-value crops that demand specialised growers, such as tea, coffee, cotton, cocoa and some horticultural crops. The method of service contraction for specialised growers is usually simple and cost recovery is built into the marketing process through a buy-back scheme. The service provider is almost always the buyer of produce or, alternatively, service provision is outsourced to a few service providers on an area-specific basis.

Venezuela has been a pioneer in publicly funded but privately delivered advisory services. These services tend to be fairly specialised, such as production of vegetables for supermarkets and production of high-value crops. A single, national-level contractor provides the services, using regionally deployed staff, and there tends to be a fairly



As farmers strive to increase their livelihoods through value-adding activities, they are seeking advice on post-production issues from extension workers.

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Former US President Jimmy Carter and Rosalynn Carter observe a Ghanaian woman collecting pond water on a recent visit to Africa. She demonstrates how her family's drinking water is strained through a nylon filter to prevent them from contracting Guinea worm disease. In endemic countries like Ghana, filtering all drinking water is a key element in eradicating Guinea worm disease.

Today, the number of people suffering from Guinea worm disease has been reduced worldwide by more than 99 percent – from 3.5 million cases in 1986 to fewer than 16,000 cases reported in 2004, thanks to filtering and other prevention methods. The Carter Center leads the global campaign to eradicate Guinea worm disease in a few remaining African countries.



The Carters examine a boy's pipe filter. Worn around the neck, the device is used like a straw to protect people from contracting Guinea worm disease, a parasitic water-borne disease that breeds in stagnant pools of water.

Ghana is one of the most endemic Guinea worm countries remaining in the world. The debilitating effects of the disease have a direct impact on agricultural production among small-scale farmers.

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centralised management style. The quality of service provision is high and delivered by well-trained staff. Advisory services usually focus on organised rural communities that already have cooperative methods of working.

The Ugandan case

In Africa, Uganda has taken the lead in public funding of privately delivered advisory services through the National Agricultural Advisory Services (NAADS), which was started in 2000. "In contrast with Venezuela, Uganda has opted for a highly decentralised system, with many contracts being tendered to sub-counties – the lowest unit of local government. The process of preparing contracts has been drawn out, involving several consultations with representatives of farmers at meetings held in each sub-county. The crop focus is much broader than in Venezuela and calls for more comprehensive support to farmers engaged in

mixed cropping enterprises," says Michael Foster.

Although a plurality of service providers has been achieved, concerns about quality of service have arisen. In particular, linking so many decentralised service providers with the national research organisation for training and technical backstopping has been difficult. Local power structures may also be masking the extent of farmer empowerment, since some members of the consultative forums do not always know why one service provider is chosen over another. Greater transparency of the contracting process and stronger supervision of the performance of service providers is needed.

The lack of continuity in awarding contracts means either frequent changes of service providers or long breaks between contracts. Also, the synchrony between service provision to help build farmers' organisations and provision of technical services has taken time to achieve. The net result is some disenchantment with the contracting process

among service providers, who demand greater security and guarantee of contracts over a longer period of time.

There is significant debate in Uganda about the cost effectiveness of the private contracting process, especially the short periods of contracting and complex contracting mechanisms. It remains a significant challenge to retain farmer involvement in programme planning at the sub-county level, with larger contracts awarded to cover an entire district for a longer period of time (one to two years). Finally, there is considerable political pressure for faster scale-up from the pilot project phase. This diminishes the capacity of NAADS to learn from the preceding contracting period and to effectively monitor performance.

"Clearly, the Ugandan experience has shown that significant challenges exist – and adjustments are required – to reach less-specialised food growers who are not linked to strong farmer organisations. Greater effort will be needed to build more market-driven producer associations. The mechanism of service contracting

at sub-county level needs to be strengthened by increasing the size and duration of contracts, thereby providing greater incentives to private service providers," Michael Foster concludes.

In summary, private contraction of agricultural advisory services has gained momentum in Africa. This is in part because donors, especially the World Bank, are championing this new approach. Other donors and stakeholders with a competing philosophy for service provision by public means are waiting to see the impact of the private contracting process. Key questions remain unanswered – will private contracting lead to improved conditions of employment for contracted extension staff? Will there be greater accountability in responding to farmers' needs and demands? Will cost recovery from farmers for subsistence staple food crops be possible? Finally, will larger proportions of farmers be reached through contractual agreements on performance standards?

SG 2000 Regional QPM/Seed Programme

The SG 2000 Regional QPM/Seed Programme, initiated in January 2003, supports efforts to replace maize with Quality Protein Maize (QPM) and to strengthen seed systems in SG 2000 project countries.

As more maize breeders become involved with QPM, there is a strong demand for breeding expertise. Although most aspects of breeding QPM are the same as for normal maize, there are some additional skills required for handling the opaque-2 gene and its modifiers. Such skills are necessary particularly when breeders wish to convert elite normal maize to QPM.

In response to this need, SG 2000 has been working with Dr Surinder Vasal – pioneering QPM scientist, former maize breeder from the International Maize and Wheat Improvement Centre (CIMMYT) and co-winner of the 2000 World Food Prize. “During 2004, Dr Vasal undertook three consultancy missions in sub-Saharan Africa. The main objectives were to strengthen the conversion process from elite normal maize to QPM, advise on grouping and recombining existing elite QPM germplasm,

and to identify and address gaps in the current QPM improvement effort in order to facilitate the formation of new elite QPM hybrids and Open Pollinated Varieties (OPVs),” explains Dr Wayne Haag, regional co-ordinator for the QPM/Seed Programme.

Dr Vasal’s missions involved working with maize breeders and support staff from CIMMYT and the International Institute of Tropical Agriculture (IITA), national agricultural research systems in Ethiopia, Ghana, Kenya, Mozambique and Nigeria, as well as with the private sector, including SeedCo, Monsanto, Premier Seeds and Quality Seed. “In addition to strengthening the skills of the breeders, Dr Vasal is assisting with facilitating more QPM germplasm exchange among them,” says Haag.

During the past four years, SG 2000, INIA (*Instituto Nacional de Investigación Agronomica*), the



Dr Miloje Denic (right) with Pedro Fato, Director of INIA's national maize programme



Dr Vasal examining QPM grains with IITA staff members at IITA in Nigeria

World Bank and CIMMYT have sponsored the work of Dr Miloje Denic, a QPM breeder. Dr Denic has been crucial to the QPM promotion effort in Mozambique and has made significant contributions regionally. He was instrumental in establishing the QPM improvement programme at INIA, attracting additional resources to the programme and training staff. Along with INIA breeders he carried out adaptive breeding in Obatanpa, which resulted in the release of the OPV Sussuma. The team has also converted several elite normal materials to QPM and during 2004 they released the early flint OPV, Matuba-Pro. In addition, Dr Denic and INIA breeders have been responsible for developing high levels of Maize Streak Virus and Downy Mildew Resistance in several QPM materials. These will serve not just Mozambique, but also other African countries.

QPM lab training

In order for the full benefit of QPM to reach the farmer and consumer an effective system of quality control and maintenance must be developed. During the past three years, there has been considerable effort to effectively use ‘light boxes’ – an important

tool in protein quality control and maintenance. Additionally, SG 2000 is working with several partners to develop a network of regional and national labs to support the various QPM improvement and seed production activities. These labs are set up to analyse the percentage of tryptophan in protein. Lab results will complement the light boxes and quantitatively verify the protein quality.

“To date, regional labs have been established in Ethiopia, Nigeria and Zimbabwe, and national labs are either established or well advanced in Ghana, Mozambique and Uganda, with some efforts under way to establish a national lab at Ahmadu-Belo University in northern Nigeria,” says Wayne Haag.

During October 2004, a lab training workshop was held at IITA, sponsored jointly by CIMMYT, IITA and SG 2000. The course was co-led by Dr Bussie Maziya-Dixon of IITA and Jaime Cesati from CIMMYT. Dr Evangelina Villegas, co-winner of the 2000 World Food Prize, assisted with the course preparation. The 14 course participants were taught the tryptophan analysis method. The group also formed a network



Abenaa Akuamo-Boateng from the Ghana Health Service with fellow health workers

of labs to facilitate regular communication and exchange of information. Although continuing support for these labs is necessary, it is expected that most of them will become fully functional during 2005.

Supporting the seed system

During the past year, Pedro Chauque from INIA Mozambique continued to support seed production activities in Malawi, while Dr Peter Sallah, of the Crops Research Institute (CRI) of Ghana, provided support to Senegal. Both of these activities were sponsored by the SG 2000 Regional Programme.

INIA and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) have developed a foundation seed unit in Mozambique. The unit will serve as a commercial and marketing intermediary between INIA and the private sector, with the aim of aggressively promoting use of INIA varieties and generating income. A foundation seed unit has also been established at CRI Ghana and should become fully functional during 2005.

Monsanto continues with its plans to produce and market QPM

foundation seed for hybrids in Tanzania. A new seed company, Qualita, has been formed in Mozambique, especially committed to producing and marketing INIA varieties.

Estimates of commercial QPM seed production show no fundamental change from 2003 to 2004, with totals for the 14 countries reaching 3,743 and 3,793 tonnes respectively (see table). "We estimate that somewhere between 700-1200 tonnes of QPM seed are being marketed by private companies, mainly involved in supplying seed for seed relief activities to countries not included in the table. Total QPM seed production and distribution in sub-Saharan Africa is therefore probably approaching 5,000 tonnes," says Dr Haag. The vast majority of the QPM seed is Obatanpa, or a re-selected version of Obatanpa. Using a seeding rate of approximately 20 kg/ha, this would plant about 250,000 ha annually. Although this amount is significant, it is still very small when compared to the total amount of maize seed planted annually.

Ghana retains the lead in terms of annual QPM seed production but has levelled off at 1,500 mt/year, while Uganda's production is

expanding rapidly. Other countries producing significant amounts include Burkina Faso, Mali, Mozambique and South Africa and continued expansion is expected in these countries. Ethiopia, Malawi, Nigeria and Tanzania, and possibly Kenya and Zimbabwe, are also expected to pick up rapidly in the next few years. The speed of expansion will largely depend on the availability of competitive QPM hybrids.

The QPM OPVs will continue to play an important role. The advantage is that there is a considerable farmer-to-farmer seed movement, as well as farmer-produced seed. As an example, although annual QPM seed production and marketing in Ghana covers only about 10-12 percent of the total area planted, the total area covered by QPM is estimated at somewhere between 40-65 percent of the total area.

QPM and infant nutrition

Over a period of eight years, Abenaa Akuamo-Boateng, Nutrition Officer with the Ghana Health Service, conducted a series of village-level, infant feeding trials, comparing QPM to normal maize. As Wayne Haag explains, "The evidence accumulated from these trials demonstrates that QPM significantly increases infant growth and reduces stunting. General health, measured by the number of days a child is ill per month, is also significantly improved and there is a strong tendency towards reduced mortality. This evidence validates the objective, now shared by many stakeholders, of substituting QPM for normal maize."

Abenaa's studies, while demonstrating the superiority of QPM over normal maize, also highlighted the 'intake problem' associated with feeding infants a starch-based staple – infants are unable to consume enough energy and protein to attain optimal growth. In her fourth and final

study, Abenaa used malt to alter the viscosity of maize porridge, thus allowing infants to take in two to three times the amount of protein and energy compared to traditional preparations. Although malt improved intake and growth for normal maize as well as for QPM, the QPM-malt treatment was significantly superior to the normal maize-malt treatment.

In her publication, *Quality Protein Maize, Infant Feeding Trials in Ghana*, Abenaa recommends that wherever maize is the staple weaning food, the use of QPM and malt should be promoted simultaneously. A pilot QPM-malt intervention is expected to begin in Ghana during 2005 in partnership with various Ghanaian institutions, the Self-Help Foundation and SG 2000. The purpose will be to determine how the QPM-malt intervention can be effectively 'scaled-up' to the national level.

Estimates of commercial QPM seed production, 2003-04

Country	2003 mt	2004 mt
Benin	73	100
Burkina Faso	513	311
Ethiopia	180	80
Ghana	1,350	1,500
Guinea	30	125
Malawi	8	37
Mali	160	200
Mozambique	300	150
Nigeria	80	100
Senegal	0	20
South Africa	250	250
Uganda	739	850
Tanzania	50	50
Togo	10	20
Total	3,743	3,793

Honoured at Alemaya University

During October 2004, Alemaya University in Ethiopia celebrated its 50th anniversary and honoured the achievements of individuals and organisations who have made significant contributions to agricultural research, development and extension.

Among those awarded prizes were SG 2000 staff members, including the late Takele Gebre, Dr Tesfaye Tesemma from SG 2000 in Ethiopia and Dr Tareke Berhe, country director of SG 2000 in Guinea, as well as the SG 2000 programme in Ethiopia.

SG 2000 Ethiopia was recognised for its efforts to increase crop production and productivity through a comprehensive technology transfer programme, in collaboration with the extension service of the Ministry of Agriculture; for invigorating the linkage between research and extension; and for being instrumental in launching the National Extension Intervention Programme, which has resulted in

increased yield of major staple food crops throughout the country. Dr Marco Quiñones, SAA Regional Director for Africa, received the award on behalf of SG 2000.

The late Takele Gebre received an award for his exceptional contribution to agricultural development in Ethiopia and for the leading role he played in the formulation, introduction and implementation of an improved agricultural extension management system. Bizugenet Takele received the award on behalf of her father.

Tesfaye Tesemma was recognised for his work at Alemaya University as a researcher and instructor for over 29 years, and for his outstanding contribution to

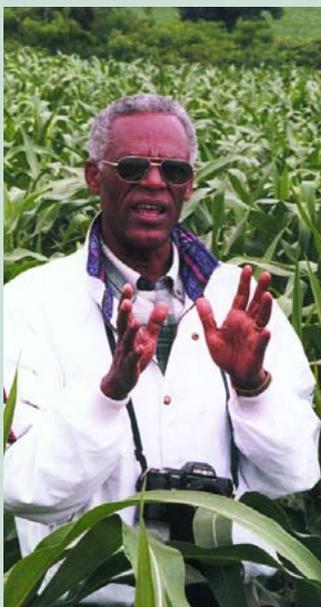


SG 2000 honoured at the 50th anniversary celebrations at Alemaya University, Ethiopia

research in durum wheat, bread wheat and tef (*Eragrostis tef*) and the release of several varieties.

Tareke Berhe was awarded a prize for his important contribution in tef research – particularly for

developing the crossing technique for tef and releasing a number of crosses and local selections that have played an important role in increasing the yield of tef on fields throughout Ethiopia.



**Takele Gebre
1947-2004**

Takele Gebre, former National Project Co-ordinator of the SG 2000 project in Ethiopia, died on 21 September 2004. He is survived by his wife, a daughter and two sons.

Takele was born in May 1947. He took his MSc. degree (1985) in Agricultural Extension from the University of Queensland, Australia, and his BSc. degree (1973) in Agricultural Education from the former College of Agriculture of Addis Ababa University, now Alemaya University, in Ethiopia.

Takele was one of the few experts in Ethiopia, with over 26 years of experience in the field of agricultural development. He served the Ministry of Agriculture in various capacities, including as Head of the Department of Agricultural Extension, where he

played a leading role in the formulation, introduction and implementation of an improved agricultural extension system. He was instrumental in the training of most of the national extension managers currently leading the extension service. Takele also worked as National Director of the Agricultural Extension Project of the Ethio-Italy Programme for Rehabilitation and Development, as well as Project Director of the Arsi Rural Development Project and Head of the Extension and Training Division of the Wolayita Agricultural Development Unit.

In 1993, Takele Gebre joined the SG 2000 project in Ethiopia as Principal Local Programme Co-ordinator – a position he held until June 2001. In July 2001, he was promoted to National Project Co-ordinator and took full

responsibility and authority for the project. Takele worked hard to bring the national extension and research systems together to formulate practical agricultural packages. The promotion of these packages has been instrumental in increasing the production and productivity of crops on farmers' fields throughout the country.

Takele Gebre had a strong devotion and commitment to agricultural development in Ethiopia in general, and improvement of the livelihood of smallholder farmers in particular. His untimely death and great contribution to the country's agriculture will be remembered by all Ethiopians for many years to come. He will be greatly missed by his colleagues at SG 2000.

The Sasakawa Africa Fund for Extension Education (SAFE) continues to expand in the face of increasing demand. In April 2004, the SAFE management team held a strategic planning workshop in Mali to reflect on progress made during the past three years, identify challenges and opportunities and devise strategies for programme improvement and expansion.



SAFE students at the IPR campus in Mali

The team agreed that future programme expansion should continue to focus on mid-career students and empirical learning and remain demand-driven – key areas that have made the programme innovative in the past. “As the SAFE initiative expands, it is vital to ensure programme sustainability after SAFE support ends. We should also assist SAFE alumni associations in each country and help them to evolve into viable professional agricultural extension associations,” reports SAFE director Deola Naibakelao.

At the meeting, it was agreed that the programme should work with participating SAFE institutions to devise staff training strategies in light of the inadequate number of experienced teaching staff in agricultural and extension education. “The SAFE programme is staff-intensive and without an investment in staff development, the programme may not be sustainable,” comments Deola Naibakelao.

Last year, Malawi’s Ministry of Agriculture and Bunda College of Agriculture requested SAFE assistance in developing a training programme for extension staff. The curriculum for the new

SAFE-type programme at Bunda College is now ready. “This is a dream come true,” said Professor Kanyama-Phiri, the Principal of the college, and proposed using a similar process of curriculum development for all programmes at Bunda College.

At the University of Cape Coast (UCC) the SAFE programme curriculum was revised in late 2003. It now takes two years to complete the programme, instead of two-and-a-half years. This change reflects the expressed needs of stakeholders who advocated a shorter training programme. The UCC is under pressure to increase the annual intake of students although limited teaching staff and financial and material resources will make this difficult.

The diploma level SAFE programme at Kwadaso Agricultural College (KAC) in Ghana is increasingly gaining the attention of both public and private extension services. Due to the success of the SAFE programme at KAC, the Ministry of Food and Agriculture is planning to upgrade certificate-granting agricultural colleges in Ghana to diploma-granting institutions like KAC.

At Alemaya University in Ethiopia a technology village has recently been established with support from SAFE. This will strengthen practical teaching and will demonstrate to the farming community improved technologies. The village already has a range of labour-saving and value-adding equipment, such as crop processing technologies, shallow-well water pumps, butter churns, tillage equipment, beehives and honey extractors. All of this material is appropriate for Ethiopian agriculture and affordable for small-scale farmers.

Throughout the year, SAFE has funded various workshops. One of these was a training workshop at Makerere University in Uganda for representatives from four SAFE partner universities in East Africa. “The objective was to raise awareness of the SAFE programme theories and to provide the necessary knowledge and skills for running a SAFE-type programme effectively,” says Naibakelao. “The outcome of the workshop will go a long way towards harmonising and improving the quality of various SAFE programmes in the sub-region.”

Makerere University recently held its second stakeholder workshop at

which delegates examined ways of sustaining the programme. One key concern was the lack of finance for some students. Employers from the districts renewed their support for the SAFE programme. They promised that all their staff would be fully funded, provided they seek permission for study leave before joining the programme, and would receive support during their field projects.

SAFE funded and organised a workshop at the Rural Polytechnic Institute for Training and Applied Research (IPR) campus in Mali for representatives from SAFE institutions in Benin, Burkina Faso and Mali. Two delegates from a potential SAFE institution in Guinea were also invited. The workshop provided a platform to understand the SAFE programme and to find ways of integrating it within the educational system of francophone Africa.

The main partners of the SAFE programme in Mali, including IPR, the Ministry of Agriculture, Fisheries and Livestock and the SAFE management team have signed a Memorandum of Understanding, which outlines the roles and responsibilities of each partner in the successful implementation of the programme.

SAFE statistics, August 2004

Mid-career BSc and Diploma Courses	Graduated	Current	Total
UCC, Ghana (BSc)	204	60	264
Alemaya, Ethiopia (BSc)	164	59	223
Makerere, Uganda (BSc)	45	85	130
Sokoine, Tanzania (BSc)	92	152	244
KAC, Ghana (Dip)	99	79	178
IPR/IFRA, Mali (Dip)	-	31	31
Ahmadu Bello, Nigeria (BSc)	-	30	30
Sub total	604	496	1,100
Scholarships	Graduated	Current	Total
BSc	23	3	26
MSc	47	8	55
PhD	3	-	3
Sub total	73	11	84
TOTAL	677	507	1,184

Agroprocessing

Partnerships are being forged in a number of SG 2000 programme countries to stimulate the development of rural-based cottage industries that “focus on processing locally-produced crops for the market,” says Toshiro Mado, SAA agroprocessing programme leader. Over ten years ago, SAA teamed up with the International Institute of Tropical Agriculture (IITA) to introduce improved agroprocessing tools and machinery to small-scale farmers.

“Many are now reaping the benefits,” comments Mado. “More processing capacity increases the motivation of farmers to improve crop production. New off-farm income opportunities are created. Agro-industry in the rural areas becomes reality.”

SAA’s collaboration with the GRATIS Foundation in Ghana is an example of one such partnership. Formerly the Ghana Regional Appropriate Technology Industrial Service Project, funded by the European Union and the Canadian International Development Agency to promote small-scale industrialisation, GRATIS was incorporated into a foundation in 1999 with the mission of “developing and disseminating sustainable and marketable technologies to industry, particularly small-scale and medium-scale enterprises.”

SAA and GRATIS joined hands in 1995 to provide improved agroprocessing technology to

small-scale farmers and producers, and SAA has been involved in training technicians to manufacture and assemble equipment, working with both GRATIS and IITA.

Increasing demand for equipment and after-sales service for customers led to the formation of the Manufacturers’ Network in Ghana in 2001. The network, established by SAA/IITA with GRATIS, comprises nine GRATIS regional workshops and two private workshops. According to Dankyi Dafoor, Executive Director of the GRATIS Foundation, “the network is responsible for the manufacture and sales of agroprocessing equipment. It provides after-sales service, supplies spare parts, undertakes product demonstrations and exhibits at agricultural fairs and trade shows locally and internationally.”

There is a technical committee to ensure that locally-produced



Toshiro Mado with participants at a training programme for manufacturers in Uganda

equipment conforms to IITA specifications and standards – as well as meeting customer requirements. The committee makes recommendations on design modification, mobility and specification of materials to the network.

GRATIS has now expanded its activities beyond Ghana, reaching out to the West African sub-region with the export of agroprocessing equipment to Liberia and Sierra Leone in 2002 and 2003.

One visitor in June last year was Sierra Leone’s Minister of Trade and Industry, Dr Kadie Sesay. Following a demonstration by GRATIS of agroprocessing equipment, including cassava processing, palm fruit and oil press, rice mill and multi-crop threshers, the Minister called for the strengthening of relations with GRATIS – and the establishment of technology transfer centres in Sierra Leone for the training of income generating activities and supply of agroprocessing equipment.

Across the continent – in Ethiopia – the Embassy of Japan has supported a proposal, submitted by the Bishan Babile district staff and local farmers’ co-operative, to build an agroprocessing centre, mainly for the processing of drought resistant crops for income generation. Bishan Babile, located

in East Haraghe Zone, produces sorghum, groundnut and sweet potato, but is an area of chronic food insecurity. The proposal included two hand pumps to secure safe drinking water.

Within a year, the project was completed and members of the co-operative now process groundnuts and sweet potatoes into different types of food products which are sold to customers by a local shop at the agroprocessing centre.

In Uganda, there have also been initiatives aimed at promoting agroprocessing technology. A JICA-sponsored training programme was recently held at Nakawa Vocational Training Centre, supported by SG 2000. Three different types of rice threshers were manufactured as a result of the training programme and these will be used to reduce postharvest rice loss. The Vice President of Uganda, who has actively been promoting upland rice, visited the workshop and met with the participants.

“Industrialisation in African countries is too often seen as an urban activity,” comments Toshiro Mado. “We believe that small-scale agroprocessing offers huge opportunities to stimulate activity in rural areas – and that this potential is still virtually untapped.”

Sale of agroprocessing equipment, August 2004

Type of equipment	Benin	Ghana	Ethiopia	Total
Grating machine	235	367	0	602
Double screw press	186	374	0	560
Fermentation rack	44	305	0	349
Bagging stand	24	264	0	288
Sifter	44	266	0	310
Chipper	4	34	0	38
Multicrop thresher	76	24	46	146
Digester	5	77	0	82
Wet-type grinder	60	8	8	76
Rice mill	1	2	0	3
Flour mill	0	0	11	11
Ground nut sheller	0	0	44	44
Total	679	1,721	109	2,509

SG 2000 country profiles



Burkina Faso

Burkina Faso continues to report excellent agricultural production results. In 2003/04, Burkina was first among Sahelian countries with a cereal surplus of 1,008,625 mt – producing nearly 65 percent of maize in all the countries of the CILSS (*Comité Permanent Inter Etats de Lutte Contre la Sécheresse au Sahel*). Rainfall, as recorded in five of the SG 2000 operating areas, was 1,054 mm in 63 days against 835 mm in 52 days in 2002, which was also a good production year.

“The village small-scale irrigation schemes, the use of improved varieties, soil fertility management practices – all played their part,” says country director Marcel Galiba.

The downside was the slump in cereal prices with maize hitting the bottom at 51 CFA francs per kg in December 2003, the equivalent of around ten cents a kilo or US\$ 100 a tonne. “This was below costs of production,” comments Marcel Galiba. “From managing shortages, Burkina has to learn to deal with bumper harvests.”

An economic analysis was carried out calculating costs of production with a break-even point related to external inputs. Three commodities were chosen and prices were based on those paid in 2003 to producers in Bazega, Nahouri and Zoundweogo. Sweet potato, largely traded across the border with Ghana, was found to have a very high yield and gave more income to farmers than maize and cowpea (see table).

Cowpea is widely spread in Burkina and the market potential estimate for the sub-region is

nearly 500,000 mt with demand continuing to increase. The country already produces 456,000 mt, with the target for 2004 at 640,000 mt. In the Plateau Central Region, the Union of Cowpea Producers has more than 400 farmer groups.

“The region has low rainfall and poor soils – hence the reliance on cowpea,” says Marcel Galiba. “The area harvested has grown by 33 percent and production by 50 percent between 2001 and 2003. Good quality seed has been distributed to farmers to enable them reach this year’s target.”

The 2004/05 season was characterised by lower rainfalls compared to the preceding season. Cereal production is estimated around 3,062,501 tonnes. This production is 14 percent lower than the preceding year. However, Burkina is expected to have a surplus of 565,000 mt.

The 9th Farmer National Day, held in December 2004, was an opportunity for all stakeholders to set objectives for the coming season. Among many targets, farmers pledged to produce four million tonnes of cereals,



Participants at the Masongo Day

600,000 mt of cotton and increase cowpea and sesame production by ten percent.

National emphasis is also being given to increase rice production. At present, Burkina must import around 98,000 mt, at a cost of nearly US\$ 50 million, to meet rising consumption levels. Local production is only 100,000 mt of paddy – roughly equivalent to 70,000 mt of milled rice.

In response to this challenge, 33 entries of the WAB series (West African Rice Development Association Bouaké interspecific crosses) were tested on the Tiebele plain. Two local checks were used – FKR21 (ITA257) and FKR41 (WAB 56-125). Ten producers hosted the tests and 41 were invited to a Participatory Varietal Selection with researchers. The entries showed good vegetative growth with yields ranging from 1,334 kg/ha to 5,300 kg/ha. Eighteen lines were superior to FKR41 and 12 lines matched FKR21. However, two entries were described as outstanding with yields above 5,000 kg/ha. They were WAB 24-36-1-B-B and WAB 880-1-38-8-P3-HB. Producers were highly interested in both lines.

Burkina Faso hosted, from 21 to 23 June, a ministerial conference on ‘harnessing science and technology

to increase agricultural productivity in Africa: West African perspectives.’ Jointly organised by USAID, ECOWAS (the Economic Community of West African States), WAEMU (the West African Economic and Monetary Union), and the CILSS, and headed by President Blaise Compaoré, the meeting voiced strong support for biotechnology. Indeed, Burkina has already started testing Bt cotton. Dr Norman Borlaug’s call “not to miss the gene revolution” was recalled by US Agriculture Secretary, Ann Veneman. If the Millennium Development Goal of reducing by half the number of hungry people in Africa by 2015 was to be met then biotechnology must have a leading role to play, the conference was told.

In November, the first ‘Masongo Day’ was organised. A forum was held with farmers from all the agricultural regions of Burkina Faso to discuss Masongo, a QPM cultivar. Producers stressed the need for good quality seed, the availability of inputs and also the creation of small agroprocessing units. On the last day, dishes using Masongo were prepared, including a type of yoghurt made with Masongo. The event is expected to expand the use of QPM in Burkina through new products.

Average yield and cost for maize, cowpea and sweet potato, 2003

	Maize	Cowpea	Sweet potato
Input costs/ha (\$)	137	63	147
Production costs/ha (\$)	406	219	678
Yield (kg/ha)	3,268	929	32,767
Cost of 1 tonne (\$)	124	236	21
Average producer price/tonne (\$)	186	350	182

Ethiopia is enjoying a bumper harvest and during the 2004 main season produced 14.27 million tonnes of crops – 24 percent higher than in 2003 and 21 percent above the average for the past five years according to a recent UN report.

The report, released by FAO and the World Food Programme, noted that crop production in 2003 totalled 11.49 million tonnes. Good rainfall, increased use of fertiliser and improved seeds, especially wheat and maize, contributed to the steep rise in production.

“Ethiopia’s estimated annual food need (in grain) stands at 12.6 million tonnes, resulting in a surplus grain production of 1.67 million tonnes. The UN report estimates emergency food requirements to be around 387,500 tonnes and ideally this should be purchased within the surplus regions in order to assist domestic markets,” says Dr Tesemma, SG 2000 acting national co-ordinator in Ethiopia.

During the 2004 season, SG 2000 sponsored 859 on-farm demonstration plots. The demonstrations were concentrated in 15 districts of Oromiya, Amhara and Southern Nations, Nationalities and Peoples (SNNP) regional states and included conservation tillage on Quality Protein Maize (QPM) and tef, the most widely grown cereal in Ethiopia.

Demonstrations also focused on the effectiveness of broad bed makers – a farm implement used to make raised beds in order to drain excess water from waterlogged clay soils (vertisols), thereby improving the soil environment and enabling wheat growing in particular. In addition, demonstrations focused on



Using drip irrigation farm households can increase income by growing high-value crops such as vegetables.

fertiliser application methods on tef in vertisol areas and ‘push-pull’ technology – a biological control method against stem borer in maize fields.

“We have also strengthened the water harvesting pilot project, which was initiated in 2002 in the moisture stress area of the Rift Valley. An additional 24 run-off water collecting structures have been constructed (60m³ each), of which 18 were for nine new farmers, while six were for those who had joined the project in 2003 and had only one structure each. Using drip irrigation, the water will be used by each farm household to increase income by growing high-value crops such as vegetables and fruits,” explains Dr Tesemma.

In order to diversify farm household income still further, a dairy component has been added to the water harvesting project, in partnership with the International Livestock Research Institute. One pregnant heifer was given to each

of the first 12 farmers who joined the pilot project, all of whom had received training on horticultural crops and dairy production. SG 2000 extended credit to the participants, which is to be paid back within four years. Some of the farmers have already started repaying their debts from the sale of vegetables and milk produced.

To strengthen the water harvesting pilot project, a Memorandum of Understanding has been signed between SG 2000, the International Center for Research in Agroforestry and the Ethiopian Agricultural Research Organisation. The collaboration between these organisations will enable the dissemination of high value fruit trees and improved fodder trees for dairy cattle, which will improve nutrition and income security, and the intercropping of legume trees and shrubs to regenerate soil fertility.

“We are also continuing our efforts to promote postharvest technologies, under the guidance of Toshiro Mado, SAA/SG 2000 agroprocessing programme leader,” says Dr Tesemma. SG 2000 is supporting government extension and research programmes, which help promote the various field activities of the SG 2000 programme.



Papayas can be grown under drip irrigation.

Average tef yields, 2003 demonstration plots

Region	Zone	Average yield (t/ha)		Production cost (Birr/ha)		Total income (Birr/ha)		Net income (Birr/ha)	
		CT	Non-CT	CT	Non-CT	CT	Non-CT	CT	Non-CT
Oromiya	East Wollega	1.3	1.1	916.6	1,123.2	2,729.2	2,379.1	1,801.5	1,253.9
	Arsi	1.4	1.4	1,147.9	1,301.6	2,884.0	2,949.3	1,736.1	1,647.7
	West Wollega	0.8	0.8	549.0	546.0	1,665.0	1,504.5	1,116.0	958.5
Amahara	East Gojam	1.4	1.3	1,090.9	1,292.2	2,743.4	2,566.8	1,652.6	1,272.2
SNNPR	Hadiya	1.2	1.1	958.0	1,114.9	2,034.7	1,850.0	986.5	735.0

CT: Conservation tillage
Non-CT: Conventional tillage

In Guinea, there is continued focus on NERICA, the new Rice for Africa, and the area of NERICA production is increasing rapidly from year to year. A survey by experts from the West African Rice Development Association (WARDA) estimated that 58,000 ha were planted with NERICA in 2003. The most rapid increase took place in the region of Labe.



A farmer next to his NERICA field

During September 2004, Guinea celebrated the International Year of Rice with a number of high-level events and activities. The occasion was organised and financed by the Ministry of Agriculture, UNDP, FAO, the Embassy of Japan and SG 2000 and was hosted by Jean Paul Saar, Minister of Agriculture and Livestock. Yoshio Yatsu, member of the Japanese parliament and a former Minister of Agriculture was guest of honour.

“It was an extremely successful event,” says SG 2000 country director Tareke Berhe. “UNDP chartered a plane to take participants to the region of Faranah where we visited NERICA experimental plots, production plots and postharvest and agroprocessing activities. The delegation also

inaugurated a model postharvest and agroprocessing centre financed by SG 2000.”

During the occasion several key messages were emphasised, including the need for fertiliser and other inputs for NERICA, postharvest and agroprocessing technologies, support for women’s groups and concern for the environment.

Other VIP guests attending the event included representatives from UNDP in New York and Guinea, representatives from FAO and WARDA, the Japanese Ambassador to Guinea, Dr Marcel Galiba, SG 2000 country director for Mali and Burkina Faso, as well as several high-level government officials.

During 2004, the Guinea programme continued its human



Participants at the International Year of Rice celebrations included Yoshio Yatsu, former Japanese Minister of Agriculture, Dr Fujimura, UNDP New York, and Jean Paul Saar, Minister of Agriculture and Livestock, Guinea.

and institutional capacity building activities through continued training of farmers and extension field staff. A total of 79 women were trained on-the-job in improved methods of parboiling rice, and six technicians and 19 farmers were shown how to operate rice postharvesting machines, such as multi-crop threshers and rice polishers. This training was organised in collaboration with SAA’s postharvest unit which sent its expert, Antoine Aoga from Benin. “SG 2000 helped train 24 field technicians working for AFRICARE International in soil fertility. An additional 185 students from the School of Agriculture in Mamou participated in the construction of a model postharvest machine hangar,” explains Tareke Berhe.

At the regional level, two project staff participated in an International Fertilizer Development Center (IFDC) training course on integrated soil fertility management

in Togo and two other staff members participated in rice workshops held in Côte d’Ivoire and Ghana. The SG 2000 project continued providing material and technical support to national extension and research establishments.

“We are also continuing to build and strengthen our partnerships,” says Berhe. “A Memorandum of Understanding between SG 2000 and WARDA will soon be signed.” Other examples of partnerships include cost sharing of soil fertility studies among SG 2000, AFRICARE International, PEGRN (*Projet Elargie de Gestion des Ressources Naturelles*) and the University of Faranah. In addition, several of the postharvest activities are shared with a newly established unit for the modernisation of crop production and postharvest, DYNAFIV (*Dynamisation des Filières Vivrières*), at the Ministry of Agriculture.

By working closely with national extension, research and development agencies, SG 2000 Guinea is increasingly ensuring the adoption and continuation of its activities. At present, most agricultural projects in the country incorporate activities carried out by SG 2000 and use technologies developed by the project. There are encouraging signs that the Ministry of Agriculture will adopt and multiply SG 2000 efforts, provided that funds are made available. The recent creation of the DYNAFIV unit is a good example of this.

Field activities, 2004

Seed production (ha)	Training (persons)	Technology promotion
Rice (NERICA) 110.0	Food processing 79	Postharvest machines 3*
Maize (QPM) 26.0	Hangar construction 185	Narrow-cribs 2
Soybeans 5.0	Narrow-crib construction 38	NERICA PTPs ** 25
Cowpeas 5.0	Machine manufacturing 6	Soil fertility demonstration 10
Mucuna 2.5	Machine operation 25	Soybean & cowpea 3
	SAFE 3	Hangar construction 1
Total 148.5	236	44

* 3 sets consisting of multi-crop thresher, parboiler and rice polisher

** Production Test Plot

A process of scaling up the SG 2000 technology transfer in Malawi is currently taking place. Last year, the Director of Agricultural Extension Services toured the country and observed the impact of SG 2000 technologies on improving food security. Since then, the Ministry of Agriculture has concluded that one way for Malawi to escape the food insecurity trap is by ensuring that all farmers adopt the SG 2000 maize production technologies – maize being the staple food.

Senior extension officers from the Ministry of Agriculture have been trained in SG 2000 technologies. The training course provided an overview of SG 2000 activities in Malawi and the achievements of the programme in terms of maize yields – the average yield across demonstrations being 5.8 mt/ha. It also focused on fertiliser management, zero tillage and conservation agriculture, Quality Protein Maize (QPM) production, rain harvesting and postharvesting techniques. A total of 172 senior staff from all eight Agricultural Development Divisions (ADDs) of the Ministry of Agriculture attended the course and action plans were developed by each ADD to implement the new technologies.

Malawi has not been self-sufficient in maize since 1999/2000. Since then, adverse weather conditions and poor agricultural policies have affected maize production. The 2003/04 rain season started late in most parts of Malawi and the whole season was characterised by poor and erratic rains with prolonged dry spells. Total maize production fell to 1.72 million tonnes, with a 467,000 tonnes deficit. “In order to reverse the situation, it is crucial to increase crop diversification, introduce

drought tolerant crops and change eating habits,” says SG 2000 country director José Antonio Valencia. “Malawi has plenty of groundnuts, cassava, sweet potatoes and other cereals which could supplement maize.”

A training course on water harvesting, attended by around 30 people from the Ministry of Agriculture, took place in June 2004. The course focused on rainwater harvesting and development of efficient smallholder irrigation systems. It was emphasised that rainwater can be collected and stored in water reservoirs such as ponds, basins and tanks, from where it can be used for crop production, supply to livestock, domestic consumption or other productive uses. Since the training course, 20 water tanks have been constructed.

QPM is now considered an important crop amongst Malawian farmers because of its high nutritional value. The Ministry of Agriculture has embarked on QPM studies on livestock and human nutrition and SG 2000 donated two metric tonnes of QPM to the Ministry for such studies. A total of 37 mt of QPM seed was produced this year to distribute to farmers.

Workshop in Malawi

In collaboration with the Ministry of Agriculture, SG 2000 will be organising a workshop in Malawi from 7-8 April 2005 on promoting sustainable food security through partnerships. The main themes of the workshop are the need for agricultural intensification of food crops; the importance of markets as prime movers in agricultural production and modernisation; and the imperative of putting the right agricultural policies in place. The workshop is supported by the Government of Malawi and it is hoped that it will make a significant contribution to the development and expansion of agriculture in Malawi.



Participants at a training course on water harvesting

QPM demonstration results, 2003/04

ADD	Area (ha)	Number of farmers	Total production (kg)	Range (t/ha)	Yield per RDP* (kg/ha)
Blantyre	62.2	622	271,769	0.250-9.820	4,369
Machinga	54.0	540	235,886	0.270-9.800	4,368
Lilongwe	56.5	565	253,337	1.000-9.000	4,484
Salima	25.6	256	118,122	0.030-9.360	4,614
Kasungu	11.3	113	74,119	2.000-10.000	6,559
Mzuzu	42.0	420	227,205	1.010-11.500	5,409
Total/average		2,516	1,180,438		4,692

* Rural Development Programme

The regional director for Africa, Marco Quiñones, visited Malawi during March 2004 and was accompanied by the Director of Agricultural Extension Services from the Ministry of Agriculture. The two visitors were impressed to see a number of Management Training Plots (MTPs), zero tillage and postharvest structures. After the visit, Quiñones had a meeting with the Minister of Agriculture, who thanked him for the work SG 2000 is doing to increase maize production in Malawi.

“This year we have expanded our operation area to Karonga ADD. We are now going to operate in ADDs with a total of 5,870 MTPs – of these, 4,761 will be QPM, which equals 476.1 ha. The remaining will be zero tillage,” says Valencia.

In close collaboration with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Initiative for Development and Equity in African Agriculture, SG 2000

hosts a radio programme twice a week for farmers. “The programme features technological innovations and agricultural matters and farmers can write to us and have their questions answered. Farmers are also interviewed on their achievements and the programme is becoming increasingly popular,” concludes Valencia.



Farmers consider QPM an important crop because of its high nutritional value.

Swarms of locusts (*schistocerca gregaria*) invaded Mali last year, posing a major threat to agriculture with all regions of the country infested. A swarm can cover 100 km² and can contain 5 billion insects, travelling 100 km in a day, destroying grazing land and field crops within minutes. The resulting income losses in rural areas can lead to migration.



The Minister of Agriculture, Seydou Traoré

Yet, overall, 2003/04 results were encouraging with Mali achieving a production surplus close to 200,000 mt of cereals, ranking fourth among CILSS countries (*Comité Permanent de Lutte contre la Sécheresse au Sahel*) in terms of cereal outputs. Rainfall increased too; for example, in four of the SG 2000 operating regions, Mopti, Ségou, Koulikoro and Sikasso, the average rainfall was 1107 mm in 68 days, compared with 823 mm for 49 days in the previous season.

The locust plague, which led to an emergency meeting of the representatives of 12 African countries in Dakar at the end of August last year, has not been met with an adequate response by the international community. There was a shortfall in the required US\$ 118 million estimated by FAO to meet the threat. At the national level, President Amadou Toumani Touré and his 28 ministers pledged to donate a month's salary. SG 2000 has donated US\$ 2,000 to contribute to the fight against the plague.

"It was a very serious situation," comments SG 2000 country director for Mali, Marcel Galiba. "The bumper harvests in the Sahel and the good results over the last five years were melting away. The year 2005 may be a difficult year for food security. In Mali, the Ministry of Agriculture has declared that 450,000 mt of food will be lost out of an expected harvest of 3.1 million tonnes."

The Quality Protein Maize (QPM) cultivar, Denbanyuman, is making "great progress in Mali," according to Marcel Galiba. Introduced in 1996 by SG 2000, Denbanyuman has flourished in all maize growing areas. Seed production reached more than 200 mt in 2002. Following farmers' demand for a yellow QPM (Denbanyuman is white), the variety CSM 475 was introduced. To reduce dependency on Ghana for seed, QPM breeder seed was produced for the first time by the National Maize Research programme, following collaboration with the SAA Regional QPM Programme headed by Dr Wayne Haag, who sponsored a training course in Kumasi, Ghana, for scientists from the region.

Inter-African collaboration with QPM continues with Senegal's Ministry of Agriculture purchasing 15 mt of certified seeds (both Denbanyuman and CSM 475) from Mali to meet the demands of its own farmers for the 2004 rainy season – one tonne of certified seed having been distributed for



The SAA team with President Amadou Toumani Touré

the 2003 off-season. Senegal expects to put 2,000 ha under QPM as a direct result.

The financial co-operatives or rural banks known as CREPs (*Caisse Rurale d'Epargne et de Prêt*), first established in Benin in the early 1990s by Marcel Galiba, have taken root in Mali. Today there are 15 CREPs in four regions, with a total membership of 2,614 which includes 902 women. Results for 2003 showed a 13 percent increase in savings while term deposits reached nearly US\$ 30,000. Members received loans totalling US\$ 65,000 – 51 percent for agriculture, 44 percent for trading and 5 percent for livestock.

"The basic idea behind the CREP movement is to encourage people in rural areas to mobilise savings which can then be used for agricultural development and the welfare of members," says Marcel Galiba.

The CREPs have played a major role in supporting stockists, in

seed production and through inventory credit schemes. Ten tonnes of fertiliser were distributed to farmers last year. A strong partnership is being built with BMS (*Banque Malienne de Solidarité*) which provided US\$ 38,000 in 2003 and US\$ 46,000 in 2004. The loan interest rate is between 7 and 8 percent, allowing CREPs to refinance members at a rate between 12 and 15 percent per year.

Following a visit of the regional director for Africa, Dr Marco Quiñones, in May 2004, 12 SAA staff members visited Mali from 21 November to 3 December 2004 to conduct a gap analysis of the country. During the visit, the SAA team met with more than 20 major stakeholders. The team also met with the Head of State, President Amadou Toumani Touré, who provided a fascinating insight into the challenges faced by Mali to reduce poverty and achieve sustainable development.

Average national grain prices (CFA francs)

Months	Maize		Millet		Sorghum	
	2003	2004	2003	2004	2003	2004
March	101	45	134	55	125	51
April	97	54	134	55	124	57
May	102	56	135	54	125	59
June	97	52	135	54	116	55



Rice being sold in a local market

The focal point of Mozambique's agricultural policy is the National Agricultural Development Programme (PROAGRI), which plans and finances research, extension and investments for a market-oriented agricultural development. The second stage of the programme, PROAGRI II, is due to start in early 2005 and will run for five years.



Testing cassava flour for bread baking

The long-term vision of the Ministry of Agriculture and Rural Development (MADER) and PROAGRI II is the development of "an agricultural sector that is integrated, sustainable, competitive, diversified, a basis for welfare and economic accumulation, [and] articulated through value-added chains with broadly shared benefits." The agricultural sector should contribute to improved food security and poverty reduction by supporting the efforts of smallholders, the private sector, and governmental and non-governmental agencies to increase productivity and ensure sustainable use of natural resources.

"In order to achieve this objective, PROAGRI II will focus on three broad intervention areas – smallholders, the commercial agricultural sector and natural resource management," explains Carlos Zandamela, SG 2000 Project Co-ordinator for Mozambique. The four main activities of the programme will focus on marketing, financial and investment services, applied research and creating an enabling environment for business.

"The numbers of donors supporting the programme has been increasing, as has the level of commitment. Since 1999, the amount of funding provided has risen from US\$ 202 million to US\$ 275 million," says Zandamela.

Fertiliser and seed input supply in Mozambique is currently inadequate. Trade credit for agri-input supplies and production credit for small farmers is difficult to obtain or requires restrictive collateral that is mostly unavailable.

MADER has therefore invited the International Center for Soil Fertility and Agricultural Development to assist in designing and implementing a project to address the whole rice improvement value chain. This includes input supply and credit, farm production practices, marketing and milling. The three-year pilot project will target 24 districts in seven provinces where the government-backed rice promotion initiative is under way. These provinces account for 97.5 percent of all rice production in Mozambique.

The project aims at addressing the inadequate input system and lack of credit by issuing input-purchasing vouchers to farmers in rice-growing areas. It will encourage the development of private enterprise through fabrication, marketing and distribution of urea briquettes and will thereby improve the accessibility of fertiliser. With the combination of UDP (urea deep placement) technology, a best management package (seed, nutrients, crop protection products), and continued demand for rice, yield increases of up to 3.8 t/ha over conventional practices may be expected from farmers who were previously using no or very little input. Based only on the



Pigs fed with QPM gain more weight than those fed with normal maize.

voucher recipients, the project is expected to produce 178,000 tonnes more rice over a three-year period.

During the first phase of SG 2000 activities in Mozambique successful field-level demonstrations were conducted. "We are now focusing on postharvesting as a key way to translate field yields into marketable products – working in particular with cassava processing and the Sussuma (QPM) maize variety," Zandamela says.

More than six million tonnes of cassava are harvested every year. However, its consumption has been restricted to rural areas or to poor families due to lack of proper processing and conservation strategies. The National Directorate for Rural Extension, the National Institute for Agronomic Research, Eduardo Mondlane University, farmer associations and the media are therefore collaborating to promote cassava products and their introduction into formal markets. A postharvest working group undertook a market study and

tested a flour combination for bread baking, which contained 10-15 percent cassava flour. This proved to be just as popular as the pure wheat flour.

A national agricultural survey in 2002 indicated that there are more than 1.6 million pigs in Mozambique, of which 96 percent belong to the family sector. Pigs are the second most important source of meat after poultry and are mainly fed with maize. However, normal maize lacks essential amino acids and this significantly affects productive and reproductive functions in pigs.

Pig-feeding QPM demonstrations were held at *Estação Zootécnica da Chobela* of the *Instituto de Produção Animal* in a joint programme with the *Instituto Nacional de Investigação Agronómica* from December 2003 to March 2004. The demonstrations showed that pigs fed with QPM gained more weight than those fed with normal maize – 81.4 kg compared to 56.6 kg in males and 84.6 kg compared to 57.3 kg in females.

QPM seed production, 2003/04

Variety	Foundation seed quantity (kg)			
	Umbeluzi	Chókwè	Sussundenga	Total
QS 7705 (hybrid)	2,200	-	-	2,200
Sussuma (OPV)	1,703	1,750	900	4,353
Pop 62 Q SR (OPV)	200	-	-	200
Line P28 (parent of QS 7705)	150	-	-	150
Total	4,253	1,750	900	6,903

The 2004 rains arrived early last April, followed by three to four weeks of dry weather before the rains stabilised in May. On the whole, rainfall was above average and uniformly distributed. Farmers anticipated a good harvest, particularly in states like Bauchi, Kano and Zamfara, which made arrangements for their farmers to receive a good quantity and quality of fertiliser before the season started.

“It is sometimes a fine balance,” says Ahmed Falaki, SG 2000 project co-ordinator. “In 2003 only Bauchi state procured its fertiliser ahead of the season. Farmers elsewhere were faced with an acute shortage of fertiliser. However, SG 2000 project farmers had been forewarned about this situation.”

Dr Falaki was therefore pleased that during the 2003 wet season project farmers had established 3,722 hybrid, 1,831 quality protein, 141 conservation tillage, 1,802 rice, 1,386 millet, 917 sorghum, 742 cowpea, 571 soybean and 246 sesame Management Training Plots



Hajiya Mairo Tukintawa, group leader, from Kano state with her millet heads

(MTPs). The average yield of hybrid and Quality Protein Maize (QPM) during the wet season was 4.9 t/ha compared to the national average of 1.6 t/ha. The average cost of production was US\$ 354 per ha with a net income of US\$ 307 per ha. For maize conservation tillage plots, the average yield was 3.6 t/ha – with the cost of production at US\$ 285 and net income US\$ 191 per ha.

“An important objective of the SG 2000 programme is to provide hands-on skills training for extension staff and farmers,” says Dr Falaki. “During the 2004 wet season, some 1,230 extension staff and no less than 32,500 farmers were trained with the support of the state and local governments.”

The process of accelerating extension outreach is gaining rapid momentum. Apart from Bauchi, Kano and Zamfara states have funded the training of 10,000 farmers each and provided inputs (seed, fertiliser and agro-chemicals) on loan for farmers to plant one hectare each with a crop of their choice. In addition, both states have distributed new motorcycles to extension staff to enable them to supervise farmers’ MTPs more quickly and efficiently. Sokoto state provided similar support to 250



Farmers displaying maize cobs during a field day

farmers and 20 extension staff. Local governments in Kaduna (Lere, Zaria and Soba) and Katsina (Chiranchi, Sandamu and Zango) are fully funding their training and MTP demonstrations.

QPM development has moved ahead. Working with Ahmadu Bello University (ABU) and the West and Central Africa Maize Network (WECAMAN), the QPM Obatanpa is about to be officially released. Six hectares of Obatanpa/Sasuma will help to satisfy the demand for seed while, in Kaduna state, three QPM villages have been established. UNICEF, the National Animal Production Research Institute and Helen Keller International have come in as partners to promote QPM for infant feeding and livestock fattening.

SG 2000’s other partners include the International Institute of Tropical Agriculture (IITA), for soil fertility, QPM, OP-Maize, cowpea

and striga control; Monsanto/Candel for conservation tillage; the West African Rice Development Association (WARDA) for the NERICA rice varieties; the Institute for Agricultural Research/ABU for conservation tillage and QPM; the International Fertiliser Development Centre (IFDC) for input dealer development; the Raw Materials Research and Development Council for sesame and soybean; and the Lake Chad Research Institute for wheat and millet. Collaborative work has also been done with the Nigerian Agricultural Co-operative and Rural Development Bank and Union Bank for advancing credit; USAID for the rice alliance; the FAO Special Programme for Food Security, covering capacity building; PRISMS (Promoting Improved Sustainable Microfinance Services) for small and medium-scale agricultural enterprises; and Britain’s DFID for the secondary school programme.

SG 2000 farmers are cultivating the two released varieties of NERICA, which will help to address the problems of rice cultivation in the upland environment.

One innovative approach has been to establish MTP demonstration plots in selected schools and prisons in Bauchi, Gombe, Jigawa and Kaduna states. Dr Falaki explains: “The aim is to supplement the food that students eat while staying in hostels. We hope that prison inmates will take away new agricultural skills when they leave prison – and perhaps not offend again!” The pilot demonstrations have been encouraging and requests have been received for the programme to be expanded to other prisons and schools.

Hybrid maize/QPM MTPs, wet season 2003

State	Area (ha)	Average cost of production (per ha US\$)	Gross income (per ha US\$)	Average net income (per ha US\$)	Average grain yield (t/ha)
Bauchi	549.50	295	562	267	4.2
Gombe	222.30	327	693	366	5.5
Jigawa	120.50	385	666	281	4.3
Kano	128.19	367	676	309	4.6
Katsina	195.60	268	807	539	5.7
Kaduna:					
Lere Zone	75.75	432	686	254	5.5
Maigana Zone	43.00	356	544	188	4.3
B/Gwari Zone	53.25	398	651	253	5.2
Average/ Traditional yield	1,388.09	354	661	307	1.2

Exchange rate: US\$ = 135 Naira.

Like many countries in sub-Saharan Africa, Tanzanian agriculture is mainly rain fed. This type of agriculture increases the risk of food shortages because of vulnerability to changes in weather, coupled with low use of production technologies. During 2003, for instance, the inadequate rainfall experienced in parts of the country meant that crop production only grew at 3.6 percent, compared to 5.3 percent in 2002. In 2003/04, most parts of the country, particularly the north-eastern and central region, received insufficient rainfall, which resulted in an overall food deficit of about ten percent.

Irrigation offers a means of reducing the dependency on rain, thereby stabilising food crop production and reducing the risks of food shortages. It is also a sustainable option for increasing agricultural production and productivity. “When one talks about irrigation, many stakeholders immediately think of large-scale schemes which require substantial amounts of funding as they are long-term investments. However, there are alternative small-scale irrigation technologies that can be constructed and managed at community and household level with minimum cost and technical expertise,” says Jiro Aikawa, SG 2000 representative in Tanzania.

“An effective use of rainwater harvesting can improve rural livelihoods in less favoured rainfall areas and harvested

rainwater can be used for crop production, livestock and selected domestic needs,” Aikawa explains.

In August 2004, SG 2000 organised and sponsored a training course on rainwater harvesting and construction of underground water storage tanks in the village of Makanya, in Same district. This demonstrated the options available to small-scale farmers to increase water availability at household level. The course was organised in collaboration with the Ministry of Agriculture and Food Security (MAFS) through the Participatory Agricultural Development and Empowerment Project – a five-year project run by MAFS and financed by a credit fund from the World Bank.

“The training consisted of both theory and hands-on practise. Two types of underground water storage tanks were constructed – a



Hune Nega from the Ethiopian Ministry of Agriculture conducts a water harvesting training course in Same district.

hemispherical tank and a dome-caped tank. In total, 12 trainees from Babati, Hai, Hanang, Iramba, Karatu, Kiteto, Same, Singida and Uyui district councils, as well as from MAFS, participated in the training course. The training was provided by Hune Nega – a resource person from the Ministry of Agriculture in Ethiopia,” adds Aikawa.

It is expected that the participants will use their newly-acquired knowledge and skills to demonstrate the water harvesting technology in their respective districts. In the long term, other development partners interested in agriculture and rural development are also expected to support the promotion of rainwater harvesting techniques.

Fertiliser project for smallholders

Poor infrastructure and lack of funds are common problems in African agriculture, limiting crop output for small-scale farmers.

Yara International – the world’s leading supplier of plant nutrients in the form of mineral fertilisers – has introduced a business concept for providing mineral fertiliser to small farms and stimulating a move away from subsistence farming to commercial farming.

In Tanzania, Yara intends to establish a forward stocking project, assuring the local commercial sector that adequate amounts of fertiliser are available in local markets prior to the growing season.

Contributing to the stabilisation of prices, the project will make fertiliser more affordable to small-scale farmers. Yara will be seeking joint financing or support from donors, such as the Norwegian Agency for Development and Cooperation.



Irrigation can help reduce dependency on rain and thereby stabilise food crop production.

The food security situation was adversely affected by unusually low rainfall in the first season of 2004 – from February to July. There was an estimated 30 percent fall in production due to drought. In spite of this, widespread food deficits did not occur – with the exception of Karamoja. Cereal prices rose by 18 percent, which limited access to food in lower income households. Reduced maize production, too, affected humanitarian programmes in eastern and central Africa, for which Uganda is normally the major supplier of locally purchased relief food.

The One Stop Centre (OSC) approach – established by SG 2000 as a community-based approach to provide rural populations with access to agricultural services through farmer-owned and farmer-managed associations – has made rapid progress in the past year (see *Feeding the Future*, issue 20). According to country director Abu Michael Foster, “In 2004, ten districts have been participating under the OSC approach. Thirty-five percent of the planned 20 associations have been established within the first two years of the five-year programme. Trainers have carried out capacity building and enterprise development training in all the seven associations that are fully registered. The association members are busy implementing programmes to further build capacity of their farmers’ associations. The trainers of trainers are actively carrying out programmes to generate income through various enterprises, ranging from crop production to agroprocessing and marketing.”



Robert Waiswa, a NERICA farmer, in Iganga district

Furthermore, as Michael Foster points out, two of the seven associations – Tororo and Luwero districts – have completely merged the OSC approach with the NAADS programme in terms of funding and implementation. NAADS – the National Agricultural Advisory Services – helps to develop institutional arrangements that integrate and support production, agro-processing and marketing. NAADS is part of the Government’s plan for the modernisation of agriculture.

“In the same spirit of partnership,” adds Foster, “SG 2000 has entered an agreement with a UNDP Private Sector Foundation programme to co-fund and implement an OSC in Pallisa.”

The seven associations under the OSC approach now comprise over 200 paid-up member groups with a total of 5,539 farmers. Sixty percent of the members are women. The OSC approach was extended to three new districts in 2004.

SG 2000 is supporting a multi-stakeholder initiative to make Uganda self-sufficient in rice production. The initiative was launched by President Museveni in March in Wakiso district. SG 2000 has direct programme interventions in 32 percent of the 34 districts involved in the campaign – and supported all the districts by creating seed banks to ensure the purity of NERICA during the production stages. This activity, combined with training, is conducted in partnership with USAID’s Agricultural Productivity Enhancement Programme. Over 703.3 ha were planted with upland rice in the first season in 2004.



Farmers participating in voucher-assisted demonstrations

SG 2000 is working with a number of partners to promote improved grain handling of rice and maize in several districts. In Zirombe, Luwero district, SG 2000 is collaborating with the Japan International Cooperation Agency (JICA) to promote rice growing and processing. Meanwhile, the World Food Programme, Uganda Traders Limited and the Uganda National Farmers’ Federation joined with SG 2000 to organise a grain handling programme in 12 districts of eastern and northern Uganda to promote the quality of maize grain.

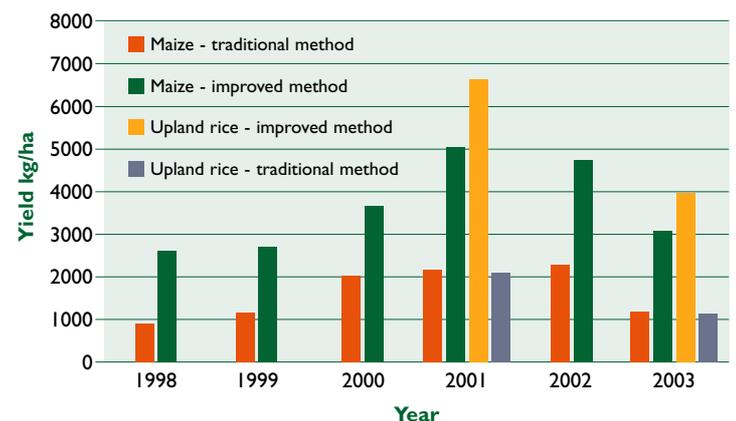
Seed and stock multiplication activities have focused on upland rice, groundnuts, pigeon peas and pigs. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has provided US\$ 5,000 for multiplication of groundnuts as part of a regional collaborative approach to boost production of

legumes. SG 2000 is drawing on seed from this partnership programme to help scale up production in those districts that have chosen legumes as strategic crops. Under the NAADS programme, SG 2000 helped farmers’ groups to establish 40 acres of groundnuts – Serenut II – in the first season of 2004.

Five hundred and fifty-four vulnerable farmers participated in voucher-assisted demonstrations (VADs) in the first season. As the VAD kits are used at training sites for the groups, the poor are given a chance to host, participate and be visible within the community and to improve their food and income security from the proceeds of the VADs. The VAD system has also boosted sales for the stockists who delivered good quality inputs against the voucher issued.

“The beneficiaries of VADs are the young, widows, orphans and families affected by HIV/AIDS,” says Michael Foster.

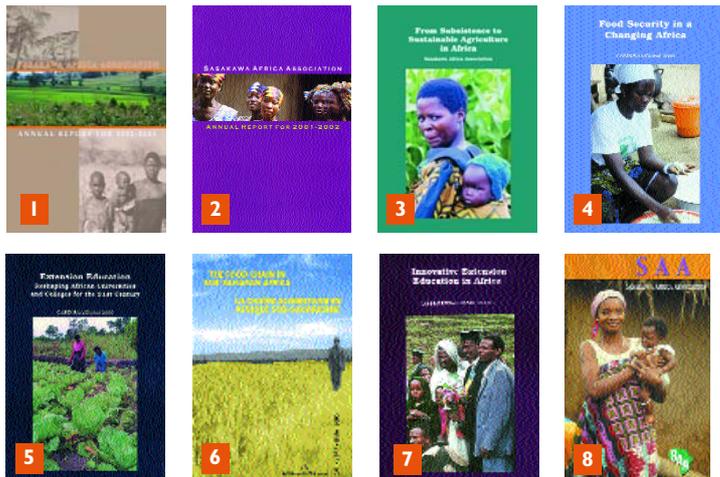
Cereal production, traditional and improved methods



SG 2000 publications and videos

For copies please contact Raitt Orr & Associates Ltd in London

Publications



1. SAA Annual Report 2002/03
2. SAA Annual Report 2001/02
3. Proceedings of Workshop 2002: From Subsistence to Sustainable Agriculture in Africa
4. Proceedings of Workshop 2001: Food Security in a Changing Africa
5. Proceedings of Workshop 2000: Extension Education – Reshaping African Universities and Colleges for the 21st Century
6. Proceedings of Workshop 1999: The Food Chain in Sub-Saharan Africa
7. Proceedings of Workshop 1999: Innovative Extension Education in Africa
8. This is SAA: An introduction to the work of the Sasakawa Africa Association

Other publications available:

- SG 2000 in Nigeria – The First Seven Years (1999)
- The Earth and the Sky – the change and challenges in African agriculture (1998)
- Proceedings of Workshop 1998: Enhancing Postharvest Technology Generation and Dissemination in Africa
- Proceedings of Workshop 1998: Microfinance in Africa
- Proceedings of Workshop 1997: Agricultural Intensification in Sub-Saharan Africa

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, French and Japanese. Video formats are PAL, Secam and NTSC.

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