

Feeding *the* Future

Green to Gene Revolution

Despite the success of the Green Revolution, the battle to ensure food security for hundreds of millions of poor people “is far from won,” said Dr Norman E Borlaug, President of the Sasakawa Africa Association (SAA), in an address last October to the Parliamentary and Scientific Committee at the House of Commons in London. His talk was entitled ‘From the Green to the Gene Revolution: A 21st Century Challenge.’

Population explosions, changing demographics, failed rural development programmes, including those designed to take farmers off the land into other jobs, and environmental abuses have all taken their toll. Enormous challenges lie ahead to ensure that the projected world population in 2025 of around eight billion people is adequately and equitably fed, and in environmentally sustainable ways.

In a packed meeting of the Committee, chaired by Dr Douglas Naysmith MP and the Committee’s President, Lord Soulsby of Swaffham Prior, Dr Borlaug warned that “world cereal demand is likely to increase by 50 per cent, driven strongly by rapidly growing animal feed use and meat consumption. Future expansion in food production must come largely from land already in

use and the productivity of these agricultural lands must be sustained and improved. Central to achieving these productivity gains will be a Blue Revolution, one in which water-use productivity is much more closely wedded to land-use productivity and that significant improvements in water-use efficiency can be achieved through conservation tillage, planting on beds and drip irrigation.”

New seeds

“Between 1965 and 2000, in developing Asian countries the area planted to new high-yielding wheat and rice varieties increased from zero to 170 million ha”, said Dr Borlaug. “The new seeds were the catalyst for a doubling in irrigated area, a 35-fold increase in fertiliser use, and a 20-fold increase in the use of agricultural machinery, and more than a three-fold increase in cereal production, from 309 to 962 million tonnes.” He

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Feeding the future in Ethiopia

Fertiliser Summit

The Africa Fertiliser Summit will be held from 9 to 13 June in Abuja, Nigeria, organised by the International Fertiliser Development Centre (IFDC). The summit will be hosted by the government of Nigeria and the New Partnership for Africa’s Development (NEPAD), and chaired by President Olusegun Obasanjo, conceived by him when chairing the African Union.

Bringing together African heads of state, African ministers, presidents and heads of international donor organisations and senior policymakers, it will discuss the food challenges of Africa and its fertiliser crisis. The theme is ‘bringing life to the continent’s soil’.

Dr Norman Borlaug will give a

keynote address at the summit and is a member of the Eminent Persons Committee along with former US President Jimmy Carter and Yohei Sasakawa, Chairman of the Nippon Foundation.

Dr Marco Quiñones, SAA Regional Director for Africa, who serves on the summit’s Technical Committee, says, “there is a need

for firm action to ensure that fertiliser is made available for Africa’s farmers. It must be affordable and used by farmers at optimum efficiency rate. The use of fertiliser is chronically low in Africa compared with Asia and Latin America.”

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April 2006



Working for health in Africa

Fight against Trachoma

Last September former US President Jimmy Carter and Rosalynn Carter visited the Amhara region in Ethiopia to commend the region on its preventative efforts against trachoma. Among those joining them were the then Federal Minister of Health for Ethiopia, Dr Kebede Tadesse, and senior officials from the Carter Center.

Ethiopia is thought to have the highest rate of blindness in the world, with trachoma accounting for approximately one-third of all cases of permanent loss of sight and visual impairment. Trachoma can be spread by flies that breed in human faeces, therefore establishing the means for community sanitation significantly reduces the population of flies and, subsequently, trachoma infections.

The effect of trachoma goes far beyond loss of vision. Sighted children become caretakers for the disabled victims and often leave school at an early age to help support their families. Families break down as women with trachoma are divorced by their husbands, and agricultural output declines.

“There is no excuse for the unnecessary suffering caused by blinding trachoma,” said President Carter. “Simple interventions such as the construction of latrines to improve community sanitation can make a vast difference in the number of trachoma infections in endemic areas, as well as to the overall quality of life in these

villages. While we cannot eradicate this devastating disease, we have the tools to eliminate the more serious complications of trachoma, such as blindness.”

With support from Lions Clubs International and the Conrad N Hilton Foundation, the Carter Center has fought trachoma in Africa since 1998. They have implemented the integrated SAFE strategy for trachoma control, which includes surgery to reverse in-turned lashes due to scarring from frequent trachoma infections; antibiotic treatment for active trachoma infections; facial cleanliness; and environmental improvements to reduce the number of trachoma-spreading flies in endemic communities.

The Carter Center focuses mainly on the last two components of the strategy (facial cleanliness and environmental improvements) in Ghana, Mali, Niger and Nigeria, while partner organisations perform surgeries and distribute azithromycin, a potent antibiotic donated by Pfizer Inc for trachoma control. However in Sudan and Ethiopia the Carter Center has



The Trachoma Control Programme promotes good hygiene practices with dedicated health workers and volunteers conducting health education and prevention activities for over 7,000 people in the Amhara region every year



Former US President Jimmy Carter, Carter Center Chair John Moores (centre), and Rosalynn Carter observe a face washing demonstration by a young Ethiopian girl in Mosebo village

been implementing the full SAFE strategy for trachoma control.

In just one year, Mosebo village, in the Amhara region of Ethiopia with a population of around 2,000 has seen 367 households build pit latrines to control the flies that spread trachoma, 41 patients receiving sight-saving lid surgery, 127 community volunteers trained on the SAFE strategy, and the entire population treated with Pfizer-donated azithromycin.

The economic feasibility of the programme, along with the support of village leaders and village volunteers, has resulted in the creation of more than 233,846 pit latrines between 2002 and 2005. A dedicated army of healthworkers and volunteers conduct health education and prevention activities for more than three million people in 654 villages in the Amhara region.

In addition, Carter Center support has helped the trachoma programmes in Mali, Nigeria and Niger surpass their latrine building targets by more than 50 per cent in 2005.

Dr Kebede Tadesse, the former Federal Minister of Health in Ethiopia emphasised the need to mobilise women to fight trachoma. “Women are at the highest risk for developing blinding trachoma, but this can be prevented if they are shown how to incorporate simple prevention measures in their homes and communities. Even one mother who cannot work or care for her family because she suffers from this dreadful disease is one too many,” he said. “While there is still much work left to do, we are committed to preventing trachoma in every endemic community in Ethiopia.” (See www.cartercenter.org)

SG 2000's new priorities and directions

Over the past 20 years, the Sasakawa Africa Association and its partner, the Global 2000 programme of the Carter Center, have worked with tens of thousands of frontline extension workers and several million farmers in 14 countries of sub-Saharan Africa to test higher-yielding technology for maize, wheat, rice, grain legumes, and roots and tubers. Technologies promoted by SG 2000 were developed by African national research organisations in collaboration with the international agricultural research centres. SG 2000's role has been catalytic, working primarily with national ministries of agriculture to mount dynamic field demonstration programmes so that farmers can evaluate for themselves the value of these improved technologies.

During these two decades, much has been learned and accomplished. First and foremost, it has been amply demonstrated that food crop technology exists in Africa to double and triple farm yields and that farmers are willing, able and eager to intensify production. However, formidable obstacles have stood in the way of broad-based adoption, due fundamentally, to unfavourable cost price ratios between inputs and output. Inadequate water resource development has left too many farmers at the sole mercy of rainfall, increasing the risk. Weak market linkages between producers and consumers have added to the risk of adopting the high-yield technologies.

Despite the deep poverty trap in which 25-30 per cent of Africans find themselves, urban food demand is growing. Unfortunately, too much of it is being met through imports, often from outside the continent. This market opportunity is one that Africa's smallholder producers can ill afford to lose.

Building integrated food supply chains, raising production and post-production quality standards to meet consumer requirements, and increasing the sensitivity among smallholders to market demand signals are all essential ingredients to getting commercial agriculture moving in Africa. All

of these considerations figure prominently today in SG 2000 programmes and plans.

Farmer groups

We work increasingly with organised farmer groups, and those most able to produce surpluses for the marketplace. We are working with others to introduce low-cost, small-scale irrigation systems, where feasible, that will help diversify farm enterprises and reduce production risks. We recognise the importance of integrating higher-value crops and enterprises within farming systems, as well as the staple foods so important to the farm family.

Organised farmers' groups are better able to obtain essential production inputs, such as fertiliser, seeds and crop protection chemicals at more favourable prices and on time. Organised farmers facilitate the development of contracts with traders and agro-industries. Organised farmers also facilitate the delivery of a range of farm services, from extension technical advice to contract services in irrigation, harvesting and agroprocessing.

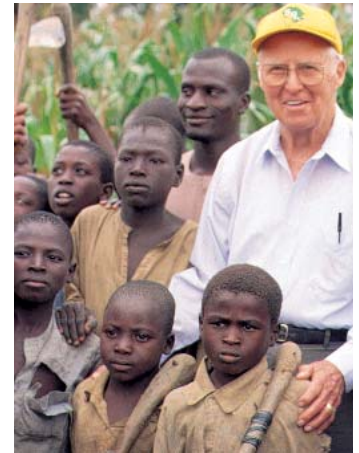
SG 2000 programmes are more complicated than they were 20 years ago, when our principal objective was to demonstrate the

potential of improved food crop technology. The new complexity requires the establishment of partnerships with a much more varied set of organisations up and down the supply and demand chains. This is one of reasons why the SAA Board decided to cut back the number of countries in which SG 2000 will remain active.

Focus countries

By 2007, SG 2000 will operate four country programmes (down from a high of 12 a decade earlier), namely Ethiopia, Uganda, Nigeria and Mali. These four "focus" countries will receive three quarters of our staff attention and resources.

Some selected activities will continue in non-focus SG 2000 project countries through one or



Dr Norman E Borlaug,
SAA President

more of our regional programmes in Quality Protein Maize, rice, and agroprocessing. The Sasakawa Africa Fund for Extension Education (SAFE) will continue working with agricultural universities in SG 2000 countries to strengthen extension education training, although SAFE too will shift its main emphasis to the focus countries.

Increased geographic focus, helping smallholders operate in commercial agricultural markets, added investments in small-scale water development, and expanded partnerships with a broader range of institutions are the pillars of SAA's new strategy to achieve greater impact in helping African governments and smallholder farmers accelerate growth in agriculture.

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 Yohei Sasakawa and President Takeju Ogata.

questioned what would have happened to the Asian population, without these gains, which grew from 1.6 to 3.5 billion people over this period.

Science and technology has had its greatest impact on the lands best suited to agriculture. Over the past 50 years, the world's farmers have been able to triple world cereal production, from 650 million mt to 1,900 million with only a ten per cent increase in the total cultivated cereal area (see table). As Dr Borlaug said, "if we had tried to produce the world cereal harvest of 2000 using the agricultural technology of 1950, we would have needed an additional 1.1 billion hectares of land, of the same quality, over and above the 660 million ha that were actually used. Too often, the environmental critics of modern agriculture fail to see these very beneficial aspects to producing more food, feed and fibre on the lands best suited for these uses, so that other lands can be spared for other uses."

Infrastructure needed

A major problem in sub-Saharan Africa is infrastructure, he continued. "One World Bank estimate predicts that it might take another 20 years for Africa to reach the road density that India had in 1960. Adequate transport is central to commercial agriculture and rural development. It is also necessary for schools, clinics, and improved communication between different ethnic groups."

Dr Borlaug described the Sasakawa-Global 2000 programme, now in its twentieth year, as helping to establish "several million demonstration plots, mostly maize, that have been grown by smallholder farmers, employing a relatively simple package of recommended technology. The average yields have been two-to-three times higher than national averages. But without roads, the cost of bringing in fertiliser is three to four times higher than what farmers in other regions pay. Thus African farmers are unable to apply even modest amounts of fertiliser to their crops."



Improving nutrition and other health-related characteristics in maize-dependent areas

Dr Borlaug mentioned the growth of Quality Protein Maize (QPM) with much higher levels of the amino acids lysine and tryptophan, which measurably improve nutrition for humans and mono-gastric animals in maize-dependent diets.

Scientists at the Maize and Wheat Improvement Centre (CIMMYT) were instrumental in developing QPM as a viable crop. African researchers in ten countries selected

QPM varieties which are grown by farmers on over 400,000 ha.

Promise of biotechnology

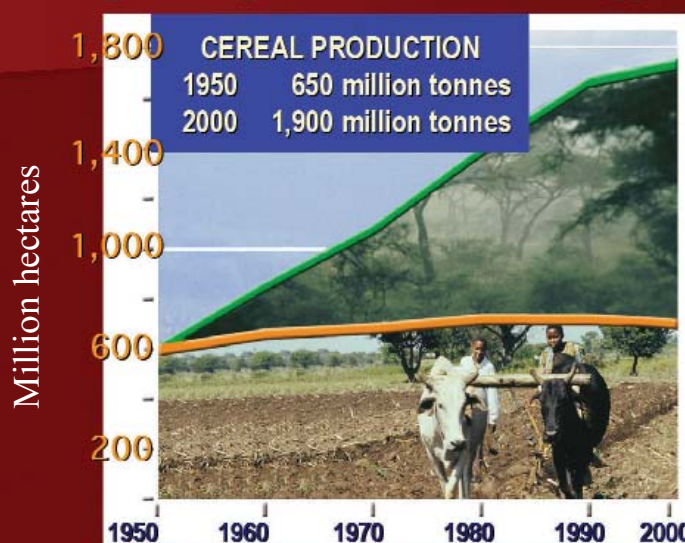
Over the last 20 years recombinant DNA methods have enabled breeders to select and transfer single genes, not only reducing the time needed in conventional breeding to eliminate undesirable genes but also allowing breeders access to useful genes from other distant species.

"So far," said Dr Borlaug, "agricultural biotechnology has mainly enforced producer-oriented benefits, such as resistance to pests, diseases and herbicides. But many consumer-oriented benefits, such as improved nutritional and other health-related characteristics, are likely to be realised in the future."

Despite formidable opposition in certain circles to transgenic crops, commercial adoption by farmers of the new varieties has been one of the most rapid cases of technology diffusion in the history of agriculture."

In conclusion, Dr Borlaug warned that the publicly funded international disease screening and testing system has broken down "a victim of the malaise that has led to steady declines in public sector research funding. Despite the challenges of the Millennium Development Goals, governments spend too much on armaments and too little on solid and economic development. We still have 900 million illiterate adults, with twice as many illiterate women as men, and 150 million primary school-age children not in school. This is not acceptable in the twenty-first century."

World Cereal* Production—Areas Saved Through Improved Technology, 1950-2000



* Uses milled rice equivalents

Source: FAO Production Yearbooks and AGROSTAT

LAND SPARED
1.1 billion ha

LAND USED
660 million ha

Contributions to agriculture



Robert D Havener – a “Builder of Bridges” between peoples and institutions

On 3 August 2005, Dr Robert ‘Bob’ Havener, SAA Board Member, succumbed to cancer at his home in Sacramento, California.

Over a remarkable career spanning nearly five decades, Bob worked as a livestock extension specialist for Ohio State University. As Ford Foundation officer assigned to Pakistan, he helped launch the Green Revolution, and later in the Middle East, organised the International Center for Agricultural Research in the Dry Areas (ICARDA).

Havener is the only person to lead three international agricultural research centres: CIMMYT, CIAT and IRRI. He helped establish Winrock International, and was its first president, where he assisted in organising the Sasakawa-Global 2000 programme in Africa and later helped create the Sasakawa Fund for Agricultural Extension Education (SAFE).

At the time of his death, Bob was serving on two other boards of directors beyond SAA - of IDE, an NGO specialising in smallholder micro-irrigation development, and the World Vegetable Centre (AVRDC). His interest in micro-irrigation and vegetables was motivated by his search for ways to increase smallholder wealth through water and higher-valued crops. He encouraged the SG 2000 team in Ethiopia to incorporate such technological interventions into the Ethiopian programme, where drought and smallholdings diminished efforts to reduce poverty.

Bob Havener was a builder of people. Upon retirement from Winrock International, Bob and his wife Liz asked that a scholarship fund be established for African women in agriculture. Administered by Winrock, some US\$ one million has been contributed to this fund, which provides graduate scholarships to deserving female candidates from throughout the continent.

A close collaborator of Norman Borlaug since the 1960s, a towering leader in the Consultative Group for International Agriculture Research (CGIAR), a superb and gifted administrator, and an effective extension practitioner, hundreds of agricultural researchers and extension workers around the world consider him a significant mentor.

Posthumously, his memory has been enshrined at ICARDA, with the newly established Borlaug-Havener wheat improvement centre. At IRRI, a major facility has been named in his honour.

The SAA family finds inspiration in the dedication, the example and wise counsel provided by Bob to the staff and to our donor, the Nippon Foundation. As a colleague in Nigeria wrote to his widow following his death, “May the soul of this gentle man rest in perfect peace.”

First Yara Prize for achievements in agriculture

The first annual Yara prize was presented to Ethiopian Prime Minister Meles Zenawi at an award ceremony in Oslo, Norway, last September. The prize recognises efforts for increased food production in African agriculture.

The Yara Foundation itself was established in 2005 by Yara International ASA aiming to support UN Secretary-General Kofi Annan’s call for an African green revolution and the UN Millennium Project’s goal for halving poverty and hunger in Africa.

“We now have a new understanding that is not based on aid, but on interventions that provide development that can prevent future famine by instilling a green revolution, rather than responding to crises,” said Professor Jeffrey Sachs, director of the United Nations Millennium Project, on presenting the award.

Dr Norman Borlaug talked of his 60 years of experience in addressing food problems in Asia and Africa and said that, “training local agricultural extension workers to improve soil fertility

is as important as the new crop varieties developed by agronomists like me.” He agreed that with Yara “Ethiopia is poised for a breakthrough in agriculture.”

In accepting the prize, Meles Zenawi said that it would encourage Africans to continue their efforts. “I consider this as not just an honour for me, but will encourage the ultimate architects and owners of the green revolution in Ethiopia, our peasant farmers. I receive it on their behalf.”



Thorleif Enger, Yara President and CEO, and Professor Jeffrey Sachs, present the Yara Prize to Prime Minister Meles Zenawi



Dr Norman Borlaug talks to former Malawi Minister of Agriculture, Gwanda Chakuamba, before last year’s Malawi workshop “Promoting Sustainable Food Security Through Partnerships.” This regional workshop, held at Chitedze Research Station and the Malawi Institute of Management, looked at ways of reducing chronic food insecurity in Malawi. Organised by SG 2000 and funded by the Nippon Foundation, the workshop included contributions from FAO, NEPAD, IFDC, USAID, CIMMYT, Ministry of Agriculture and officials and representatives of farmers’ organisations in Malawi.

Regional rice programme 2005

The Rice Regional Programme, led by Rice Regional Co-ordinator Tareke Berhe, formally started in April 2005. Countries included in the programme are Ethiopia, Mali and Uganda. Since then, Guinea and Nigeria have received some support as satellite countries.



NERICA 4 in upland Ethiopia: variety evaluation activities are strongly supported by JICA

Ethiopia's emphasis has been on variety introduction, evaluation and seed increase with 139 elite lines and improved varieties introduced from the West African Rice Development Association (WARDA), now the Africa Rice Centre, the International Rice Research Institute (IRRI), Guinea and Madagascar. They included Upland and Lowland NERICAs, irrigated (salt and alkalinity tolerance) and varieties for cold tolerance. Federal and regional research centres were supported to evaluate the new introductions.

In addition, three varieties, NERICA 3, NERICA 4 and Suparica 1, were verified and approved for release by the National Seed Release Committee. NERICA variety evaluation activities are strongly supported by the Japan International Cooperation Agency (JICA) in Ethiopia while the United Nations Development Programme (UNDP) has also been supporting rice activities in the Amhara region.

An important field day was held recently in the Fogera area of Amhara region attended by over 70 people from the Federal Government and representatives of

international organisations, regional officials, researchers and farmers. Variety evaluation, farmers' production plots (3-6 t/ha yields), postharvest and agroprocessing and rice food tasting were all demonstrated. Irrigated rice in the Awash and Wabeshebelle river valleys also showed great promise with recordings of 6-10 t/ha yields. NERICA 1 and 3 Sativa varieties have been selected and increased for variety release.

Good results

In Mali rice activities are concentrated into large ecological zones with rain-fed upland rice in the south and the central zone of the river Niger for rain-fed lowland/irrigated rice.

Good results were recorded in Mali in 2005. Foundation and certified seed were produced at 1.5t and 36t respectively while 200t were produced for commercialisation. NERICA 4 is the variety used and yields on farmers' fields ranged from 3-6 t/ha.

Training was undertaken by two trainers from Guinea and Ethiopia, who worked with 32 technicians

and 15 farmer leaders on conservation tillage, water harvesting and NERICA production. At Niono, six irrigated NERICAs were compared with the best standard variety. The irrigated NERICAs yielded 5-6t/ha, which was equal to that of the standard check, Gambiaika.

There was no impact country rice budget for Nigeria in 2005. However, NERICA seed production was supported on ten hectares with a production of 25t of seed of NERICA 1 variety.

Rice activities in Uganda concentrated mainly on organising and training farmers on NERICA production. Over 2,600 were trained and nearly 1,000 production plots supported with a placement of 55 postharvest and agroprocessing machines. This was done in partnership with SAA's Regional Postharvest and Agroprocessing Programme and a USAID financed project.

JICA collaboration

In addition to the production and postharvest, 75 new Upland and Lowland varieties were introduced from WARDA, West Africa and made available both to the national research and private sector. JICA Uganda is one of the close collaborators in the evaluation of NERICAs in Uganda.

"In our new regional role we will promote productivity enhancing technologies," says Tareke Berhe. "This will enable an increase of productivity per unit area.

SG 2000 Country Programmes, SAA Regional Programmes, developmental institutions and agencies such as the Africa Rice Centre, the African Rice Initiative (ARI), the Forum for Agricultural Research in Africa (FARA), regional WARDA affiliates, national research and extension and other relevant institutions are all to collaborate in the future.

They plan to focus on the following activities: identifying and evaluating new improved and broadly adapted rice varieties; support for the maintenance, production and availability of good seeds from improved varieties; promoting productivity-enhancing technologies; promoting postharvest and agroprocessing technologies and training young rice scientists and field technicians.

Field activities for the past year included the exchange and evaluation of elite germ-plasm from WARDA and IRRI in Guinea and Madagascar; support for seed multiplication of improved varieties and generation of productivity-enhancing technologies; promotion of postharvest and agroprocessing technologies in collaboration with

Tareke Berhe – new role

At the SAA Board meeting held in October 2004 a decision was made to establish a new regional programme in rice, with its primary focus being to expand its work in promoting the New Rice for Africa (NERICA). NERICA was developed by scientists at the Africa Rice Centre (formerly WARDA), as well as national collaborators in Guinea and a growing number of other African countries. Tareke Berhe, formerly the Country Director for Guinea, has now become the SAA Rice Regional Co-ordinator and is based in SAA's regional office in Addis Ababa.

SAA brought the SG 2000 country project in Guinea to an official conclusion in March 2005. Links will be maintained with former SG 2000 project countries through the SAA regional programmes that have been growing in strength for the past decade.

Prior to becoming Country Director in Guinea in 1996, Tareke Berhe was the Senior Crops Scientist for SG 2000 in Ghana, having started with SG 2000 in Zambia as a Senior Agronomist in 1989.

Regional rice programme 2005



Irrigated rice in Mali – production compares with the best standard variety

SAA'S Regional Programme; human capacity building through training of frontline staff; and the development and strengthening of partnerships between farmers. The need for such activities was identified through visits to the impact countries, meetings with stakeholders in each country and consultations with SG 2000 country programme staff. Significant accomplishments were made in 2005 with the diffusion of more than 133 elite germplasm; over 3,000 frontline staff and farmers trained on NERICA production; 622 ha of seed multiplication and production, 1,084 verification and research projects supported and over 60 postharvest machines provided (see tables one and two).

Best features

NERICA combines the best features of both African and Asian inter-specific rice crosses, maturing 40 to 50 days earlier compared to upland (rainfed) Asian varieties previously grown in West Africa. This allows farmers to add an additional crop, such as a fast-growing pulse, to their annual cropping cycle. Guinea has had the greatest production impact, where the first varieties of NERICA were introduced in 1997 (see Issue 21 for a full report on New Rice for Africa).

SAA's Regional Rice Programme is working closely with the Africa Rice Centre and its affiliate, ARI in all countries, JICA in Ethiopia and Uganda, USAID in Uganda, UNDP in Ethiopia, SG 2000 Country Programmes, the National Research and Extension (Advisory) Services, and the Regional Seed, Postharvest and SAFE programmes. A memorandum of understanding for closer collaboration has already been signed between SAA and the Africa Rice Centre and a similar one is expected to be signed



Part of the rice revolution in Uganda – farmer Nalongo Setabule in Ziroobwe, Luwero District

between SAA and IRRI.

Following the conclusion of the SG 2000 Guinea project in 2004, the Ministry of Agriculture has continued to promote the crop production technologies previously supported under the joint programme. The Minister of Agriculture, Jean-Paul Saar, allocated 100 million gnf (US\$33,000) for the continuation of NERICA diffusion in Guinea in 2005. In recognition of his strong affiliation, collaboration and support for the SG 2000 programme over the past eight

years, he was awarded a Merit Award Certificate signed by former US President Carter and Dr Norman Borlaug.

“Our programme in Guinea set the model for other areas of the continent in rice production,” said Dr Berhe. “The New Partnership for Africa’s Development (NEPAD) has identified NERICA as one of the continent’s best practices. It is the result of good science, research, development co-operation and strong and effective partnerships.”

Seed Movement of Experimental NERICA seed

Type	Number	Source	Recipient Countries
Upland NERICAs	6	ARI, Cotonou, Benin	Ethiopia, Mali, Uganda
Irrigated NERICAs	4	WARDA Sahel, Senegal	Mali, Ethiopia
Irrigated Elite Lines	69	WARDA, Benin	Ethiopia, Uganda
Irrigated Advanced Lines	31	WARDA Sahel	Ethiopia
Irrigated mangrove varieties	13	Guinea	Ethiopia, Madagascar, Tanzania
Upland, Madagascar	6	JICA Uganda	Ethiopia
Cold tolerant High altitude varieties	10	Philippine National Research Institute & IRRI	Ethiopia
Total	139		

SAA Regional rice field activities

Activity	Country			Totals
	Ethiopia	Mali	Uganda	
Seed Multiplication/Production (ha)	30	119	473	622
Demonstration/Verification/Research Plots (No)	34	21	999	1,059
Training	36	13	2,607	2,656
Placement of Postharvest machines	8	4	55	67

SG 2000 Regional QPM/Seed Programme

The SG 2000 Regional QPM/Seed Programme continues to support efforts to strengthen seed systems in project countries and replace common maize with Quality Protein Maize (QPM) for its improved nutritional value. In the last four years intensive work has been carried out on QPM improvement and variety/hybrid development. This has been undertaken by the International Maize and Wheat Improvement Centre (CIMMYT) and at the International Institute of Tropical Agriculture (IITA) in Nigeria, culminating in a series of new QPM hybrids and Open Pollinated Varieties (OPVs). Belonging to the main maturity groups, adapted to the tropical lowlands and mid-altitude/sub-tropical ecologies, they are being field tested this year.

National programme QPM improvement efforts in Ethiopia, Mozambique and Ghana have complimented efforts at the Consultative Group on International Agricultural Research (CGIAR) Centres. Following the first QPM release in Ethiopia, of the hybrid BHQP-542, Dr Dagney Wegary, has focused on the development of new mid-altitude QPM materials. CIMMYT's Dr Stafford Twumasi-Afriye, in collaboration with the Ethiopian Agricultural Research Organisation (EARO), has focused on developing Highland materials concentrating on converting the parental lines of the popular hybrid BH-660. The new QPM versions of BH-660 will be available for testing during 2007 and are expected to drive the QPM campaign in Ethiopia.

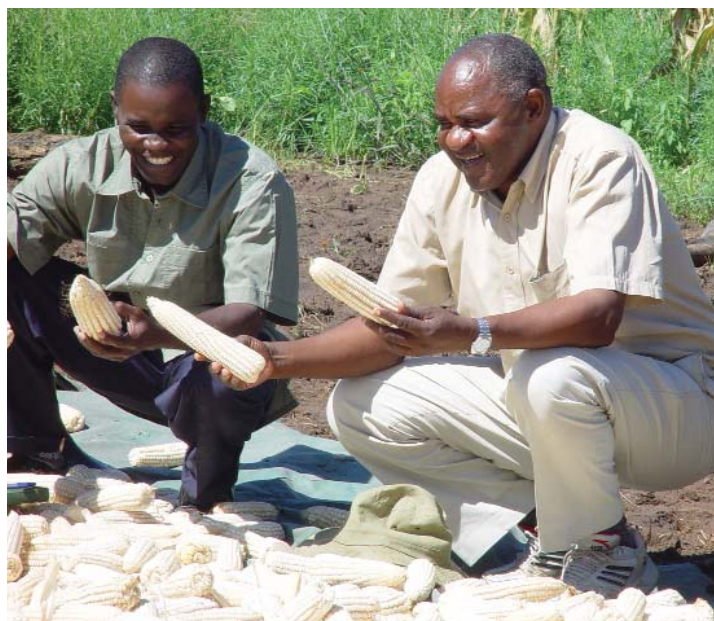
In Mozambique, the focus of the *Instituto de Investigacao Agraria de Mocambique's* (IIAM) maize programme, led by David Mariote and supported by the consultant, Miloje Denic, continues to be on the development of early and intermediate lowland tropical OPVs and hybrids. Taking over from Dr Peter Sallah, Manfred Ewool in Ghana is developing yellow QPM materials for animal feeding and food in parts of West Africa focusing on the conversion of the QPM OPV Obatanpa to yellow, and the normal yellow OPV Suwan-1 to QPM.

N'Tji Coulibaly, the maize team leader at the *Institut D'Economie*

(IER) in Mali, evaluated several new QPM materials with the aim of complimenting the current QPM materials (Denbanyuman, CMS-475 and BR-473) already under production. Dr Shehu Garki Ado and his Maize Team at the Institute for Agriculture Research, Ahmadu Bello University (IAR-ABU) in Nigeria, officially released Obatanpa during 2005 and Dr Peter Sallah's assignment to Rwanda's maize improvement programme is expected to signify the introduction of QPM.

Dr Surinder Vasal, pioneering QPM scientist, began voluntary QPM breeding activities at CIMMYT in Mexico, to build on the work being done by other breeders. Dr Miloje Denic served as a consultant, based in Mozambique, for a five-month period during 2005, continuing to train the Mozambican team and develop germplasm for regional use.

Although the regional labs have been established using the tryptophan method, where the percentage tryptophan in total protein is used to quantitatively determine protein quality in maize, most of the laboratories are not yet delivering dependable results. "This greatly limits the capacity to monitor protein quality in most programmes and it appears that the main problem is the inability to consistently source local key chemical reagents of high quality. However efforts are underway to address this problem which should



Pedro Chauque (left) of the IIAM Maize Programme, Mozambique, and Nick Sichinga, National Co-ordinator in Malawi

be resolved during 2006," says Dr Wayne Haag, Regional Co-ordinator for the QPM/Seed Programme.

QPM activities

"Once the QPM varieties have been introduced and popularised, SG 2000 no longer engages in large QPM field demonstration programmes, as many of these activities are incorporated into national production efforts. Small-scale strategic interventions are, however, still supported in most countries," says Dr Haag.

In Ethiopia, some production activities are an integral part of the QPM nutrition study and in Uganda QPM Voucher Assisted Demonstration (VAD) kits are supplied to needy farmers. Further QPM production is supported among pig farmers encouraged to feed QPM and with Farmer-Based Organisations (FBOs) at select One-Stop Centres, where an effort is underway to supply QPM grain to specific markets. Mali is also working with eight FBOs, supporting QPM grain production for specific markets.

A modest number of demonstrations are still supported in Nigeria,

which helped the popularisation and release of Obatanpa in 2005. Production is also being supported in the QPM villages. Similarly, in Malawi, a large demonstration programme was used to continue to popularise the use of QPM and show its competitiveness. Ghana's targeted production is supported as part of a poultry (layer) feeding project in association with no-till. In Mozambique, support was given to seed companies to conduct demonstrations with the QPM Sussuma to aid their marketing efforts.

QPM information material is continuously distributed at major national and international events. In Uganda a combination of FBOs and One-Stop Centres organise production, postharvest processing, and the storage and supply of QPM grain to special markets, while exploring the possibility of including feed mills. A pilot intervention began in Mali, where QPM grain is produced by eight FBOs, processed and stored at village level using a system of inventory credit with the aim of supplying specific markets and providing greater income to farmers.

SG 2000 Regional QPM/Seed Programme

Working for nutrition

A major village based QPM nutritional study is underway in Ethiopia, now in its second year. The study is conducted by Dr Girma Akalu of the Ethiopian Health and Nutrition Research Institute (EHNRI), and involves the production and feeding of BHQP-542. In Ghana, a QPM-Malt feeding intervention, involving several daycare centres, a project led by the Self-Help Foundation (SHF) and Ghana Health Services (GHS), began at the end of 2005 and will continue for two years.

CIMMYT and Harvest Plus are sponsoring a PhD student, Nilupa Gunaratna, to do her thesis at Purdue University, by conducting a meta analysis of all available QPM nutrition data. The Harvest Plus project aims at bio-fortifying maize with Fe, Zn and Vit-A. The objective is to influence the project, so that these characters are added to QPM, rather than to common (normal) maize.

The nutritional superiority of QPM has been demonstrated by using it in pig and poultry feeding demonstrations and efforts are underway in Uganda and Ghana to integrate small-scale QPM

production and feeding to pigs and poultry (layer), respectively. In Uganda the intervention is led by SG 2000 Uganda and by the Self-Help Foundation and Heifer International, in Ghana.

Supporting the seed chain

The seed chain begins with Breeder Seed (BS). Although quantities required are small, much work is required to maintain maize varieties and lines. This activity is generally handled by National Agricultural Research Systems (NARS). In some countries, for example, Ethiopia, Ghana and Mozambique, the BS systems function well and the supply of BS is ensured. In 2005, efforts began in Uganda, in collaboration with the National Agricultural Research Organisation-Namulonge Agricultural and Animal Research Institute (NARO-NAARI) and CIMMYT, to strengthen the BS system. Work in Mali began with IER, *Service de Semence National* (SSN) and IITA, and in Nigeria, with IAR-ABU and IITA. Malawi will conduct a similar programme this year.

The commercial/certified seed sector is composed of public and



Soule Traoré of SG 2000 (left) and N'tji Coulibaly, Head of the IER Maize Programme, in a Foundation Seed field of Denbanyuman with field assistants in Mali

private institutions. In Ethiopia, the public company ESE dominates the industry and is attempting to target the production of BHQP-542 to areas with a clear comparative advantage.

In Uganda there are five or six private companies, led by NASECO, which promote QPM (Nalongo) and share a relatively small but growing seed market. The next step is to invest in quality control. The fledgling private sector relies on stakeholders who face the challenges of how to develop the seed market, while the Uganda Seed Trade Association (USTA) provides supplies for the large seed relief effort.

Denbanyuman, the QPM variety released in Mali, was promoted by the SSN seed production and distribution system. Efforts are underway to strengthen their field inspection and certification organisations. A private seed company, Faso Kaba, was established in 2005.

Premier Seeds is the largest of three or four private seed companies in Nigeria where there

is a real need to strengthen the existing companies and for more companies to be established. SG 2000 is collaborating with ex-maize breeder, Dr Joe Fajemisin, who is in the process of founding his own company.

CIMMYT sponsored a southern Africa regional seed workshop in Mozambique, led by John MacRobert, CIMMYT's seed specialist for Africa based in Zimbabwe. SG 2000 sponsored the attendance of nine people from both the private and public sector at the event.

The Rockefeller Foundation's SSA Agricultural effort, led by Dr Joe DeVries, is committed to establishing small-scale seed companies, supporting NARS in the development of OPVs and hybrids, as well as strengthening the BS and FS systems, vital to the survival of small companies. The establishment of AAC (African Agricultural Capital), a venture capital fund, to support the growth of small seed enterprises, is also a welcome addition to developing and strengthening the seed sector in sub-Saharan African countries.



Girma Akalu, nutritionist, conducting village based QPM feed trial, Ethiopia

Since 1993, the Sasakawa Africa Fund for Extension Education (SAFE) programme has grown from a pilot scheme to 11 programmes at selected universities and colleges in nine countries throughout Africa. A total of 1,508 mid-career extension staff have benefited from the programme with the main challenges still being the limited number of women candidates and the lack of qualified staff in agricultural extension at PhD level.

At Ethiopia's Alemaya University (AU), an external evaluation in July 2005 highlighted the stakeholders' support of the programme. This was due to the following: its flexibility and the fact that it is demand-driven; the curriculum being well-balanced in terms of theory and practicals; the high level of collaboration among the major stakeholders; that the programme has produced extension workers who have assumed leadership positions in Ethiopian agricultural agencies; and finally that farmers benefit from a wide range of technologies as a result of

students' off-campus Supervised Enterprise Projects (SEPs).

In 2005 34 students graduated from the programme at Makerere University in Uganda bringing the total number to 79. The curriculum was revised to include a full term for SEPs. "There is also a need for a second SAFE-type programme in Uganda as it is privatising its public extension system," comments SAFE Director Deola Naibakelao.

The SAFE programme at the University of Cape Coast (UCC), in Ghana, has made significant progress since direct funding from SAFE ended in 2002. UCC



External Evaluation Team Leader, Professor John Mwangi (right), with Dr Tesfaye Lemma, Head of the Extension Department at Alemaya University, Ethiopia

SAFE statistics, October 2005

Mid-career BSc and Diploma Courses	Graduated	Current	Total
UCC, Ghana (BSc)	264	53	317
Alemaya, Ethiopia (BSc)	191	56	247
Makerere, Uganda (BSc)	77	70	147
Sokoine, Tanzania (BSc)	131	159	290
KAC, Ghana (Dip)	178	90	268
IPR/IFRA, Mali (Dip)	-	82	82
Ahmadu Bello, Nigeria (BSc)	-	37	37
Abomey-Calavi, Benin (BSc)	-	11	11
Bobo-Dioulasso, Burkina Faso (BSc)	-	8	8
Bunda, Malawi (BSc)	-	11	11
Sub total	841	577	1,418

Scholarships	Graduated	Current	Total
BSc	26	3	29
MSc	51	7	58
PhD	3	-	3
Sub total	80	10	90
TOTAL	921	587	1,508

continues to invest resources in teacher training for agricultural extension at PhD level in Ghanaian universities to overcome the inadequate number of experienced teaching staff.

At the UCC-affiliated SAFE programme at Kwadaso Agricultural College (KAC) in Kumasi, 35 students completed their diploma programme in June 2005, bringing the number of graduates to 178. The Ministry of Food and Agriculture (MOFA) is renovating the facilities at KAC to ensure the smooth implementation of the SAFE programme and the related training programmes at the college.

The SAFE programme at the Polytechnic Institute for Training and Applied Research (IPR/IFRA) in Mali continues to make significant progress.

Enrolment of women has increased from one to ten over the last two years thanks to a special fellowship scheme by Winrock International. The Ministry of Agriculture, the main stakeholder, continues to provide financial and logistical support for the SAFE programme. In addition, the programme has received support from other local partners including *Campagnie Malienne de Développement de Textiles*, *Office de la Haute Vallée du Niger*, *Office du Niger*, CARE International, World Vision and Wageningen University in The Netherlands.

In Nigeria, the second group of students gained admission into the Ahmadu Bello University (ABU) SAFE programme in the last quarter of 2005. The first group of students are currently conducting their off-campus SEPs.

Plans are being made to launch a new SAFE programme at Debub University, Ethiopia in 2006 following a formal training needs assessment carried out in 2005. The assessment indicated a huge demand for the programme of more than 50,000 diploma holders.

SAFE funded and co-organised the workshop on the SEPs Philosophy, Concept, Organisation, Contents and Challenges with the IPR/IFRA in Mali for representatives from the Ministry of Agriculture, the academic departments at IPR/IFRA and staff from UCC in Ghana. The West Africa Regional SAFE Technical Workshop at the Polytechnic University in Bobo-Dioulasso, Burkina Faso, was held from 3 to 5 May 2005 for staff from the Benin, Burkina Faso, Ghana, Mali and Nigeria SAFE programmes.

In March 2005, SAFE funded an exchange visit by the Vice-Chancellor and a team from ABU in Nigeria to the UCC in Ghana. The visit culminated in the signing of a Memorandum of Understanding (MOU).



Sylvest Masereka, Alumni Chairperson of Makerere graduates of the SAFE programme

Learning from the alumni

“As the programme develops we need to keep track of our graduates, a growing number of whom are heading for the private sector,” says SAFE Programme Director Deola Naibakelao. “We therefore want to strengthen our alumni associations as a tool for bringing together graduates and current students, and as a means of producing valuable feedback which will improve our programme.”

Ethiopia alumni

The second congress of the SAFE Alumni Association was held at Alemaya University in Ethiopia, attended by 54 graduates. The association agreed to provide material and administrative support to students during their SEPs and Alemaya University management agreed to accommodate the association. The association also decided to have a representative from each of the ten regions of the country, thereby expanding its committee. The regional representatives met at the end of 2005 and discussed plans for strengthening the Association including byelaws, membership contributions, registration with the Ministry of Justice and the need for a professional association. They also expressed an interest in participating in the tenth anniversary stakeholder workshop of the mid-career programme proposed for 2006.

immediate application of knowledge and skills, recruited people who showed a strong commitment to agricultural development and was farmer oriented. They also agreed that its multidisciplinary content enabled graduates to perform effectively in diverse areas of their work, and that the supervised extension projects encouraged independence. Among the recommendations made was the need to sensitise current and emerging employers, on the comprehensiveness and practical nature of the programme. The association also expressed its wish to become a strong constituent member of the Uganda National Association of Agricultural Extension and Education (UNAAEE).

SAFE programmes at the University of Cape Coast (UCC) and Kwasado Agricultural College (KAC). It plans to hold its third congress and a professional Agricultural Extension Conference at Kwadaso Agricultural College in Kumasi in Ghana in August 2006.

Since its inception, the association has carried out many activities including setting up a roster of SAFE graduates in Ghana (UCC and KAC) with 150 graduates already registering. It also held two biannual alumni association congresses, in 2002 and 2004, at which graduates discussed issues relating to how they could support the SAFE programmes in Ghana, as well providing leadership in the formation of the Ghana Association of Agricultural Extension Professionals.

Ghana alumni

Established in 2002, the SAFE Alumni Association in Ghana consists of graduates from the

Uganda alumni

Sixty-five graduates of the SAFE programme at Makerere attended their first meeting of the Alumni Association which was formed at the end of 2005. Discussions took place regarding the challenges they faced in the field, the content of the extension degree programme, as well as providing suggestions for improving the training given at Makerere University.

The association discussed the relevance of the programme and agreed that it offered strong farmer participatory skills. It was practical, allowing



Facing up to future challenges at the Alumni Association's first meeting, Makerere

The 2005 G8 Summit highlighted the importance of developing the private sector as the driving force of rural development. Micro, small and medium scale enterprises (MSMEs) are in fact dominating the African private sector, most of them operating in urban areas. The challenge of SAA's Agroprocessing Programme (SAA-AP) is to enhance and prove the economic viability of rural agroprocessing, linking agriculture to the urban market. In the last five years the project has expanded to support other SG 2000 programme countries in stimulating the development of rural-based cottage industries.

"This year Mrs Leony Halos-Kim, former Head of the Postharvest Engineering Unit of the International Institute of Tropical Agriculture (IITA), conducted an impact study of the programme, analysing the economic viability of rural agroprocessing enterprises," says Toshiro Mado, SAA Agroprocessing Programme Officer. "The results show that the project's major accomplishments include awareness of improved agroprocessing technologies in the rural areas and the establishment of a support mechanism to sustain the operation and management of these technologies. Farmers and processors also appreciated the increase in their processing capacity, the production of value-added products and access to markets."

By mid-2004, the collaborating manufacturers reported the sale of over 500 sets of cassava processing packages; about 150 units of the multi-crop thresher; and around a 100 units of the wet-type grinder. These machines have been successfully adopted in rural areas providing reliable income for farmers, processors, small-scale entrepreneurs and local manufacturers. The analyses of primary and secondary data from the project sites show the profitability of several small-scale businesses now booming in the rural areas of Ghana, Benin and Ethiopia.

Gari (fermented and roasted cassava) has become an important commercial product in West Africa, finding a market in the region and in Europe. In Ghana and Benin many small-scale processors use either traditional

methods, imported machinery, or the improved processing package introduced by the SAA-AP project. The implication of operating to full capacity, assuming that the supply of fresh cassava root is not a constraint, will more than double the net profit and the return on investment would increase to 67 per cent (see table).

Ownership of the gari processing equipment strengthens the groups of users enabling them to leverage more funding support for their activities. For example, in Benin, the Takissari Women's Group was able to convince the French NGO, *L'Institut Régional de Coopération Développement* (IRCOD), to subsidise the purchase of a second set of processing equipment and build a store for their product. Similarly, the Agodenuo Women's Group was able to get the *Centre d'Action Régionale pour le Développement Rural Atlantique* (CARDER) to help them buy a grater and a Lister engine, and persuade the government to install a borehole as a potable water source.

An export market has also emerged for Shea butter, produced in rural areas in the Savannah zone of West Africa. The wet-type grinder was introduced in Benin and Ghana for processing Shea butter as well as the production of groundnut butter and oil in Ethiopia. Although the wet grinder contributed to the improvement of the quality of Shea butter paste, continuing improvement of the Shea butter production system components will give a more stable production capacity and income.



Farmers with the multi-crop thresher which allows early crop collection and reduces handling and other postharvest losses

Comparison of gari processing methods

Items of cost	At Current Capacity	At Rated Capacity
Capital Costs, US\$	1,617.00	1,617.00
Fixed Costs per Annum, US\$	1,011.69	1,011.69
Variable Costs per Annum, US\$	90,946.80	181,893.60
Total Operating Costs, US\$	93,575.49	184,522.29
Gross Revenue per Annum, US\$	153,792.00	307,584.00
- Sale of gari	145,152.00	290,304.00
- Sale of Peels (for animal feed)	8,640.00	17,280.00
Net Income per Annum, US\$	60,216.51	123,061.71
- Net profit per ton cassava, US\$	139.39	142.43
- Return to total cost	0.64	0.67
- Return to variable cost	0.66	0.68
Breakeven Capacity		
- Tons of gari	77.98	153.77
- Tons of cassava	278.50	549.17
Breakeven Costs per ton, US\$	773.61	762.74
- Gari Output, tons	120.96	241.92

Current capacity based on processing an average of 9t of fresh cassava per week.

In 2001, the SAA-AP project introduced the multi-crop thresher developed by the IITA. The project continues to work closely with the Extension Department of the Ministry of Agriculture in Ethiopia on promotional activities, and with Selam Technical and Vocational Centre (STVC) Ethiopia, to adapt the machine to local conditions.

By mid-2004, there were seven

individually owned threshers going from farm to farm, proving both time efficient and cost effective compared with traditional methods (see table).

SAA, in collaboration with SVTC, continues its adaptation work on thresher design to optimise its capacity and cleaning efficiency. This should enhance its performance and reduce costs to both manufacturers and farmers.

SG 2000 country profiles



Burkina Faso

The agricultural season in Burkina Faso for 2004 to 2005 has been one of the most challenging in recent years. The two main difficulties were rainfall which, after a late start, suddenly stopped before most crop cycles had ended, and the invasion of locusts before crop maturation in the Sahel region. Despite these unique conditions, total cereal production reached 3.06 mt with a surplus of 565,000 mt compared to 1,008,625 mt in 2003 to 2004 and 547,000 mt in 2002 to 2003.



Investing in irrigated agriculture in the drive for self-sufficiency

“Of the 3.06 mt of cereal produced in 2004 there were 880,912 mt of millet, 594,580 tons of maize and 1,481,212 mt of sorghum. The production percentage change from the previous year’s yield was minus 14 per cent,” reports Country Director Marcel Galiba.

According to an international survey commissioned by the Government, Burkina Faso appeared to be the only country member of the CILSS (*Comité Permanent Inter Etats de Lutte*

Contre la Sécheresse au Sahel) to post a surplus. Food aid to the amount of US\$2.4 million, however, was required mainly in northern areas where farmers had planted their crops and were waiting for harvest. The Government responded to this need by distributing 9,500 tons of cereals to the affected areas and by securing cattle by putting an emergency plan into action.

Food security is still a major concern for the Government of



Officials from the Ministry of Agriculture, Water and Fisheries visiting a wheat plot: food security remains a major concern

Burkina Faso and one of its strategies is to support import substitution, such as expansion in the planting of wheat. This was abandoned in 1978 and has been put back on the agenda. Burkina imports wheat and its derivatives worth approximately US\$30 million annually. With only 3,500 ha of wheat, Burkina would be able to cover 90 per cent of its needs. Wheat can be grown between the rainfall lines of 650 mm and 900 mm, and the Sourou Valley has a potential of 35,000 ha of land that can be irrigated.

With the technical support of Morocco, 350 ha of wheat were planted. One thousand tonnes of wheat were harvested and already put in the processing chain through millers. The wheat flour obtained produced a high standard of bread.

The Government has pledged to make the required investment of nearly US\$10 million to cover 3,500 ha under irrigation which would lead to Burkina Faso becoming almost self-sufficient in wheat. This programme will help fight poverty as 3,000 jobs are expected to be created in the rural areas with more than US\$1.3 million distributed to producers.

SG 2000 covered seven agricultural regions and focused mainly on maize (QPM), rice (NERICA) and cowpea (see table). “For the third year in a row, certain interspecific rice varieties, for both the lowland and irrigated areas, have continued to show excellent yields. This has resulted from the successful track of Masongo, the most widely used QPM cultivar in Burkina Faso, as well as the use of NERICA (WAB 450-I-B-P91-HB). These were both created by the national rice programme,” says Marcel Galiba.

The site-specific varieties for the lowland area could play a major role in rice production in Burkina as 70 per cent of rice cropping is in the lowlands, which accounts for 48 per cent of the total production.

SG 2000 yields, Rainy Season, 2004

Crops	No. of villages	No. of plots	Yield (kg/ha)	
			PTPs*	Check plots
Maize	91	249	2,706	1,396
Rice	28	48	2,574	1,351
Cowpea	69	138	747	448
Total	188	435		

* Production Test Plots

During the 2005 main crop season (May to October) Ethiopia enjoyed generally satisfactory rainfall. Despite the late onset of rains, crop yields have been good, even in the Rift Valley areas where normally moisture is the major limiting factor in crop production.



Dr Aberra Debelo, SG 2000 Programme Co-ordinator with Governor Ahmed Sani of Zamfara State, Nigeria looking at a seedling of an improved avocado

On-farm demonstration plots, comparing Quality Protein Maize (QPM) and tef (a major cereal crop in Ethiopia) under both conservation tillage (CT) and non-CT conditions, were established in selected districts during the season (see table). In both crops, CT plots produced a higher grain yield and were more profitable, supporting the results from previous years.

CT's strengths also lie in solving topsoil erosion and the problem of over-ploughing, especially with tef, which leads to the loss of organic material. In addition, the problem of over-ploughing by farmers trying to remove weeds is eliminated through the use of a non-selective herbicide before planting.

SG 2000 continued to promote

water harvesting techniques in the Rift Valley in partnership with the regional/zonal/district agricultural offices, the International Livestock Research Institute (ILRI) and the Melkassa Research Centre. In one of the techniques, rainwater is collected and stored in underground cisterns and used to create drip irrigation on fruit and vegetable plots of 500m². During 2005, an additional 14 storage structures, each with a capacity of 60-70,000 litres, were installed, serving seven farms at a time bringing the total number to 39 now using drip irrigation.

Another water harvesting technique utilises water from shallow stream or river diversions with plots fed by drip irrigation and additional livestock exploitation opportunities. These drip irrigation facilities have been

Research Award for SG 2000

Dr Tesfaye Tessema, Senior Agronomist with SG 2000 Ethiopia and Dr Takeke Berhe, Rice Regional Programme Co-ordinator, have been awarded certificates and gold medals, respectively, for their outstanding contribution to wheat and tef research in Ethiopia. The award was presented on the Golden Jubilee of the establishment of the Debrezeit Agricultural Research Centre, as part of the Ethiopian Agricultural Research Institute.

installed in 31 farm households and, with a constant water supply, each household is capable of producing enough vegetables to sell three times a year. Five of these farm households benefit from having one improved dairy cow each and are selling milk and milk by-products every day.

"Both the drip irrigation facilities as well as the dairy cows have been provided on credit by SG 2000 to the farm households," says Dr Aberra Debelo, SG 2000 Programme Co-ordinator.

"Repayment has been adjusted to be paid back over a period of four years, including commercial bank interest, and most farmers, except those who have joined the pilot project very recently, have already started paying their debts."

The net cash income could have been higher had it not been for the high cost of concentrate feed (see table). However, as the farmers grow more Napier grass and perennial fodder trees, their feed expenses will be reduced. "Some of them have already started growing QPM under CT, for selling green maize 'on the cob' and converting the green biomass into silage to overcome feed shortage during the dry season," says Debelo.

The water harvesting pilot project has attracted wide international

interest, as well as being a success with the local people. Sister SG 2000 programmes in Africa and other countries have visited the project sites with the intention of duplicating the techniques at home. In July 2005, a delegation of 38 members from Zamfara State of Nigeria, led by the Governor, visited the sites followed by another delegation of 42 members led by the Deputy Governor. Later in September, another high-level technical delegation visited from Kano State, Nigeria, led by the Commissioner of Agriculture.



Beletu Teshome grows maize and vegetables and is a dairy farmer thanks to stored rainwater

QPM yield comparison (averages) under CT and Non-CT, 2004

Zone	Woreda	Average yield (t/ha) 1		Production cost (Birr/ha) 2		Total income (Birr/ha) 3		Net income (Birr/ha)	
		CT	Non-CT	CT	Non-CT	CT	Non-CT	CT	Non-CT
West Wollega	Ghimbi (69)	4.30	4.05	1,488	1,578	4,730	4,455	3,242	2,877
East Wollega	Sibu-Sire (15)	2.65	2.30	1,858	1,804	2,915	2,530	1,057	725

1 Numbers in () indicate number of plots used in calculating average grain yield of maize in the respective weredas.

2 Production cost includes cost of seeds, fertilizers, herbicides and labour cost for seedbed preparation, planting fertiliser and herbicide applications, hand weeding and harvesting.

3 Price of 100 kg of maize grain at harvest in Ghimbi and Sibusire is 110 Birr.

Crop production estimates released by the Ministry of Agriculture and Food Security confirm a reduction in production from last year for most crops. Maize production dropped by 29 per cent, from 1,733,125 mt to 1,225,234 mt resulting in the worst maize season in ten years. As maize is Malawi's main staple food an official national cereal gap of 874,766 mt is estimated and even with food aid in stock of 424,000 mt there has still been a gap of 450,766 mt.

The Malawi Vulnerability Assessment Committee Analysis concluded that the effects of two drought years and chronic poverty would lead to serious food shortages in Malawi. Unreliable rains that stopped early and inadequate availability of second basal dressing fertiliser were the two main factors undermining crop production in 2004/2005. The season got off to a good start in October, with many parts of the country receiving normal to above average rainfall. Unfortunately the tailing off of the rains started when most crops were at critical development stages, such as tasselling and cobbing in maize, pegging in groundnuts and rice transplanting when moisture is needed most. The scarcity of basal dressing fertiliser in the first half of the season was also a contributing factor to poor yields. The distribution of free inputs by the government under the Targeted Input Programme also faced challenges that resulted in late distribution in some areas. The government has done as much as possible to ensure that fertilisers are available on time and subsidised fertiliser for smallholder farmers who grow maize. The government sold and distributed 56,023 free treadle pumps to smallholder farmers to encourage winter crop production

under irrigation. Hectareage under irrigation has now increased from 45,101 to 61,113.

"In 2004/2005 SG 2000 demonstrated in all ADDs (Agricultural Development Divisions) with 5,870 farm field school plots of 0.01 ha each, consisting of 814 zero tillage plots and 2,813 planted with Quality Protein Maize (QPM). QPM varieties and zero tillage have much to offer Malawi," says Country Director, José Antonio Valencia. "SG 2000 is committed to bringing these and other productivity enhancing food crop technologies to smallholder farmers saving time and reducing labour. Zero tillage and QPM can be especially important where endemic disease like HIV/AIDS is crippling farming families. The yield average of the zero tillage plots was 4.2 mt compared with the national average this year of 800 kg per ha."

Although the rains stopped early, SG 2000 plots, especially under zero tillage, were not affected. "The main advocates for change are no longer scientists or aid workers, but the farmers themselves who spread the word to neighbouring farms of the impact of zero tillage," says Valencia. One farmer, Wilson Kamwamba, said that, "apart from increasing harvest, zero tillage



Labour saving zero tillage has much to offer Malawi

saved money. I used less labour in land preparation and at the same time reduced soil erosion, improved soil fertility and moisture retention because of the mulch covering the soil."

In July 2005, SG 2000 received requests to train staff and farmers on crop production technologies. These organisations included the National Association of Smallholder Farmers (NASFAM), Plan International, Farmers World, Agora and Lutheran and Baptist groups.

SG 2000, with the Ministry of Agriculture and Food Security, began its 2005/2006 programme in August by training 756 farmers and staff from all ADDs with 12,632 Farm Field School Plots targeted. They included a QPM hybrid from CIMMYT Harare, OPV QPM and zero tillage plots. Farmers have pledged to provide their own inputs and SG 2000 has provided the QPM hybrid seed, training and crop production

technology backup throughout the growing season.

Also in August, staff and farmers from Zamfara State in Nigeria, including the State Governor Ahmad Rufai Sani, visited Malawi and were briefed on the activities of SG 2000.

Dr Marco Quiñones, Regional Director for Africa, visited Malawi and saw SG 2000 winter production using irrigation in Kasungu, Lilongwe and Machinga ADDs. He was impressed to see well-grown and fertilised maize plots with good plant population grown by smallholder farmers. He also visited water harvesting structures in Machinga ADD where local farmers are trying to harvest runoff rainwater. "I am encouraged by the reaction to water harvesting by local farmers and I feel we are making progress. I am going to send an expert on water harvesting to train farmers further in constructing these structures," said Dr Quiñones.



Jeff Mutimba, SAFE Programme Co-ordinator, East & Southern Africa, discussing improved granaries with a farmer

QPM results, 2004/2005

ADD	Area (ha)	Number of farmers	Total production (kg)	Range (t/ha)	Yield kg/ha
Blantyre	46.8	468	142,598	0.2 – 9.4	3,047
Machinga	91.2	912	294,069	0.2 – 8.6	3,224
Lilongwe	43.3	434	194,999	0.3 – 11.1	4,503
Salima	23.2	232	58,968	0.2 – 8.6	2,542
Kasungu	4.1	41	14,873	0.8 – 6.0	3,628
Mzimba	41.8	418	172,279	1.6 – 8.9	4,122
Rumphi	30.9	309	133,986	2.0 – 7.8	4,336
Totals	281.3	2,814	1,011,772		3,597

There was a food shortage in Mali in 2005. According to the Food Security Commission the food shortage, amounting to 347,010 mt, was the result of insufficient rainfall and the locust invasion of 2004. It reported that 101 out of 703 municipalities in Mali suffered shortages which affected one per cent of the population. This caused a significant increase in cereal prices, which forced the government to take action in providing free cereal distribution, the importation of 110,000 mt of tax-free rice and 100,000 mt of maize.

However, says Country Director, Marcel Galiba, “the growing season for 2005 was much more encouraging and with results looking more promising. Rainfall was good throughout the country with an increase from the previous year. The harvests are predicted to yield three million mt of cereal and 600,000 mt of cotton.”

In May, the Head of State, President Amadou Toumani Touré, launched an ambitious food programme, the National Programme for Food Security, which is supported by the Special Programme for Food Security, the flagship of the Food and Agriculture Organisation of the United Nations (FAO). This initiative will cost US\$226 million

and aims to make Mali food secure by 2015 by promoting effective, tangible solutions to the elimination of hunger, undernourishment and poverty. National ownership and local empowerment is of key importance in the effectiveness of this programme.

From the start of the programme in 1996, most of the focus has been on technology transfer and crop intensification. To support this work, strong ties link a variety of partners such as the *Institut d'Economie Rurale* (IER), the national research system, the department of extension and farmers’ organisations, as well as organisations within the private sector.



Contract farmer at Zantiebougou with his NERICA 4 field

The year 2005 was a test year for a new approach for promoting postharvest, agroprocessing and marketing as a way to ensure food security and reduce rural poverty. Starting in 2006, SG 2000 is running a Market-Oriented and Commodity-Based Programme for Farmer Organisations. This programme is set to run for five years.

“Marketing lies at its heart,” says Galiba. “By looking at the data from 2005 (see table), it is possible to see where there is potential for continued development.” It is worth noting that these statistics do not include the production figures of home consumption relating to food security. SG 2000 brings the required basic inputs, along with training, supervision and monitoring, and facilitates access to markets through guarantees and contracts with users.

“The programme is expected to put more than US\$250,000 into farmers’ pockets,” he comments. “After all, the only way to measure progress is improving income at farmers’ level. We have often

spoken about quantity, but quality is one of our key objectives, too. We are communicating this at all levels – from top to bottom in society.”

Bakary Togola, a former SG 2000 farmer from Niamala in the Sikasso region, was elected in July 2005 as the President of the Permanent Assembly of Farmers' Associations of Mali (APCAM). The choice of a president with such a wealth of experience has empowered farmers further. As the son of a farmer, Bakary Togola has been involved in all facets of rural development in Mali. Starting as a farmer in his village, he went on to conduct research trials with the IER and run demonstration plots for the government extension services with SG 2000. He then turned to seed production and became involved with the Farmer’s Union. Prior to his current position he was the President of the *Syndicat des Producteurs du Coton et du Vivrier* (SYCOV) - Union of Cotton and Food Crops Producers of Bougouni District of Sikasso region. “Mr Togola shares our vision that organising the market is essential to building a strong and sustained production system in Mali,” says Marcel Galiba. “He will be a powerful ally for us in this work.”

Galiba reports excellent collaboration with SAA’s regional rice, seed and agroprocessing programmes. “NERICA 4 variety of rice has produced yields for farmers ranging from three to six ha,” he says.

Average national cereal price at farm gate (CFA francs)

Months	Maize		Millet		Sorghum	
	2004	2005	2004	2005	2004	2005
January	40	71	51	83	50	81
February	43	83	53	110	51	108
March	45	99	55	120	51	119
April	54	111	55	130	57	128
May	56	130	54	144	59	140
June	52	145	54	152	55	155
July	54	151	58	163	58	165

Market-orientated and commodity-based programme for farmer organisations 2006-2010

Commodity	No. of villages	No. of farmers	Area Planted (ha)	Harvest Marketed (t)	Price Expected (US\$)
Maize	8	204	161.5	626.0	93,900
Rice	1	43	64.0	200.0	80,000
Millet	6	106	101.0	150.0	22,500
Sesame	2	72	315.0	95.0	57,000
Hibiscus	1	12	8.0	1.5	4,500
Total	18	437	649.5	1,072.5	257,900

SG 2000 in Mozambique reports that the Government of Mozambique and the International Rice Research Institute (IRRI) have prepared a Memorandum of Understanding (MOU), expected to be signed in early 2006. High priority will be given to promoting the exchange of rice information and personnel, as well as research on rice and rice-based farming systems. The MOU work plan will be developed by the government and IRRI, with financial resources available for co-operative activities.

Following the creation of the Consultative Group on Rice (CGR) in August 2003, most rice initiatives are based at the Unit of Promotion of Commercial Agriculture (GPSCA) which undertook a comprehensive study in 2005 to determine how to co-ordinate with stakeholders. "The outcome shows that stakeholders in the rice sector need to increase productivity through more efficient use of labour, improved water control and irrigation systems, and the use of appropriate technology which leads to higher volumes of production and marketable surplus," says Carlos Zandamela, SG 2000 Project Co-ordinator for Mozambique.

"These results are achievable through effective rice associations, the promotion of commercialisation mechanisms and by establishing a rice information and dissemination system. These would include a rice market and policy unit, a rice production forecast system, a network of paddy collection centres and rice wholesale markets. Improvements should also be made on storage systems, milling systems, the reduction of milling costs and the quality of domestic rice."

Public investments such as irrigation and drainage will be the

main components (absorbing about 72 per cent of total investment) with the aim of rehabilitating or building 40,000 ha of irrigated land promoting water use associations. The two other main components of public investments are in research and institutional development. Research includes the establishment of a seed programme, development of basic seeds, and pilots to test new technologies.

An estimate of the increase in investment by farmers, millers and wholesalers indicates that future investment will increase by US\$18 million per year with additional private investment linked to transportation, input trade and business development services. Investment projections for the next decade show that production of paddy could increase by at least 120,000 t with existing land use. By lowering the importation of rice, savings on foreign exchange are estimated at about US\$15 million per year.

In line with a joint IFDC and SG 2000 project proposal, a training programme on the use and importance of Urea Super Granule (USG) was held in October at Chókwe Research Station of the National Institute for Agricultural Research (IIAM) in collaboration



A field day last year in Manica Province attended by government officials, farmers and private sector organisations, including the new seed company Qualita – SG 2000's partner in producing Sussuma seed

with SG 2000 Malawi. The training programme involved researchers from IIAM and extension workers from the National Directorate for Rural Extension (DNER) and also served as preparation for the use of a briquette machine imported from Bangladesh.

The maize programme provided training for seed producers, animal feed producers and fertiliser and pesticide distributors, and was held in Chimoio, Manica Province in October. During the training, major aspects of the maize value chain were analysed and stakeholder partnerships established.

Most of the major seed companies were involved in producing the Sussuma QPM variety and Qualita, a new company established in Mozambique, produced 50 mt of quality Sussuma seed.

A 40-day study was conducted by Jemisse Baptista, studying at Eduardo Mondlane University in

Maputo, on poultry fed on four different diets (see table). The highest body weight was obtained from the diet combining QPM and 50 per cent lysine which also resulted in higher carcass yield, higher chest yield and less abdominal fat compared to the other diets. This can be attributed to the effect of Lysine in stimulating the digestibility of other amino acids resulting in an increased gain in weight. The fast growth of chickens fed QPM plus 50 per cent lysine also resulted in a gain of one production cycle per year (three cycles).

In addition, QPM promotional activities have encouraged seed growers like Qualita, Seed Co, Pannar and IAP to increase QPM seed production and promotion, and major feed producers such as *Companhia Industrial da Matola* are now being persuaded to incorporate QPM maize in the composition of their products.



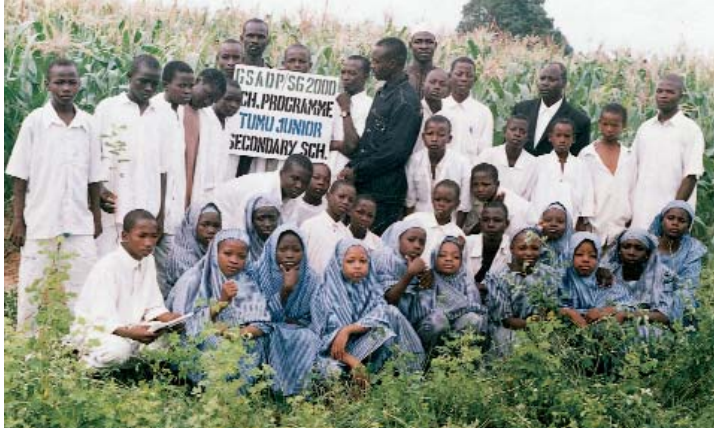
Higher carcass yield using QPM and lysine

Poultry feeding comparison

Diet	Cost of feed (US\$)	Carcass weight (kg)	Gross revenue	Margin on feed cost (US\$)
Normal maize+100% lysine	1.55	1.44	3.16	1.61
QPM + 100% lysine	1.67	1.81	3.98	2.31
QPM + 50% lysine	1.67	1.87	4.11	2.43
QPM + 0% lysine	1.66	1.79	3.93	2.26

Sussuma QPM was used in the above study.

During the 2005 wet season many Nigerians became farmers overnight when the price of maize tripled from the 2004 harvest. Rainfall arrived early in mid-April and although it was above the 30-year average it also finished early, affecting late crops such as sorghum and cowpea.



School in Gombe State with maize MTP – expanding the school programme in collaboration with DFID

Ahmed Falaki, SG 2000 Project Co-ordinator, reports that during the 2004 wet season farmers established 3,232 hybrid and Quality Protein Maize (QPM), 141 conservation tillage, 1,255 millet, 876 cowpea, 846 sorghum, 751 rice, 695 soybean, 372 sesame, 343 groundnut and 59 cotton Management Training Plots (MTPs). The average yield of hybrid and QPM was 4.6 t/ha compared to the national average of 1.4 t/ha. The average cost of production was US\$367 per ha with a net income of US\$576 per ha. For maize conservation tillage plots, the average yield was also 4.6 t/ha with the cost production at US\$350 and net income of US\$557 per ha. During the 2004/05 dry season, the average wheat yield was 3.9 t/ha which was lower than that of the previous season (4.1 t/ha) but three times the national average yield of 1.3 t/ha. The cost of production for wheat was US\$492 per ha and the net income was US\$761 per ha. Other MTPs established included 215 for green maize, 90 for tomato, 65 for onion, 42 for cowpea and 22 for pepper. The cost of production for green maize was US\$482 with a net income of US\$1,102.

“With the process of accelerating extension outreach continuing to

gain momentum Kebbi and Sokoto States have joined the scaling-up of the extension technology dissemination using the SG 2000 approach,” says Dr Falaki. “Several states and local governments are now fully financing the MTP demonstrations through input loan support to farmers.”

The scaling-up of technology dissemination is yielding results in several states. With the full support of the Governor of Zamfara State, Ahmed Sani, the southern part of the state has been converted into a “corn belt” with hundreds of thousands of hectares under maize cultivation. Under his Zamfara Comprehensive Agricultural Revolutionary Programme (ZACAREP), support was provided to over 20,000 target and 140,000 participating farmers for capacity building, logistics, input loans and market support.

The Governor sponsored a delegation of 25 farmers and nine officials to visit Ethiopia and Malawi resulting in SG 2000 providing technical support for capacity building in water harvesting, small-scale irrigation and farmer organisations. In turn, the Governor invited farmers from the Oromia Region of Ethiopia to visit Zamfara. In addition, a delegation of five, led by the



Karaye, Kano State: scaling up technology dissemination

Commissioner of Agriculture Alhaji Ahmed Riruwai from Kano State, paid a similar visit to Ethiopia and Malawi.

The Mass Food Production Programme in Kano has led to an increase in the spread of maize-growing areas especially to the north of the state. The Governor has supported over 25,000 farmers in producing their crops using the MTP approach.

In 2005 QPM development continued to thrive with the formation of a QPM working group including SG 2000, International Institute of Tropical Agriculture (IITA), Institute for Agricultural Research (IAR), National Agricultural Extension and Research Liaison Services (NAERLS) and seed companies which promoted the research, dissemination and the use of QPM, as well as strengthening the seed delivery system. The first QPM variety (Sammaz 14) has been officially released by the IAR through the National Varietal Release Committee (NVRC). The first QPM village was established at Layin Taki, Kaduna State with over 80 per cent of the farming families growing Obatanpa.

With the ban on rice importation due by December 2005, initiatives such as NERICA are in place to boost local production. “We will have 25mt of seed available for distribution when the rains come in June,” says Falaki.

SG 2000 has strengthened both its local and international partnerships across a range of institutions and development organisations. The collaboration with Britain’s Department for International Development (DFID) resulted in the expansion of the school MTP programme, the proceeds of which supplement school food and the purchase of laboratory equipment, computers and game facilities. Collaboration with other partners involves soil fertility restoration, conservation tillage, promotion of NERICA, sourcing finance, agroprocessing and nutrition.

The positive impact of MTP pilot demonstrations in prisons, which started in 2003 in Kaduna and Jigawa states, have led to continued requests for SG 2000 to extend the demonstrations to other prisons countrywide.

Wheat MTPs, dry season 2004/5

State	No. of farmers	No. of ha	Yield range (t/ha)	Average yield (t/ha)
Bauchi	24	6.00	4.1-4.9	4.4
Jigawa	324	81.00	3.5-6.2	4.2
Kano	168	42.00	2.7-4.4	3.7
Katsina	24	5.24	3.2	3.2
Total	537	134.24	-	3.9

There are clear indications that a rice revolution is underway as Uganda enjoys a surplus food supply due to good first and second rains in 2005. Several districts are now growing NERICA 4 causing upland rice production to hit an all time high. With the implementation of agricultural service institutional reforms, the Plan for the Modernisation of Agriculture (PMA) process and the National Agricultural Advisory Services (NAADS) have had good reviews by multi-donor groups.

SG 2000 has been instrumental in helping to pioneer the so-called rice revolution and Vice President Professor Gilbert Bukenya continues to campaign to make Uganda self-sufficient in rice production. This year, customs duty tariffs of 75 per cent were placed on the members of the East African community for exceeding importation quotas. There is strong commitment in Uganda to make regional market integration work and the Economic Commission for Africa (ECA) recently reported in a survey that Uganda is one of several African countries that is likely to meet the Millennium Development Goal targets.

In 2005, SG 2000 has focused mainly on sustainable farmer empowerment activities through the One Stop Centre (OSC) approach. As Country Director Abu Michael Foster reports, "Of the planned 20 One Stop Centre Associations 55 per cent are currently in development stages of formalisation, institutional capacity building, enterprise development and setting up management structures." A centre in Ziroobwe, Luwero district was launched by August 2005 as well

as two other structures of the Ziroobwe Agaliawamu Agribusiness Training Association (ZAABTA), a rice mill donated by the Japan International Cooperation Agency (JICA) and a warehouse by Save an Opportunity Uganda (SAO) with a fourth centre in progress in Pallisa district.

Foster comments, "SG 2000 has integrated its activities into NAADS both at national and local government level. Quick roll out and creation of short term impacts for increased household income has occurred with the formalisation of partnerships in three districts, namely upland rice in Kamuli and Luwero districts and groundnuts in Tororo district." Where there is demand for increased rice production to feed into the mills, SG 2000 has continued to facilitate the farmer-to-farmer seed multiplication programme using the seed loan and recovery programme. A total of 5.4 mt of NERICA rice seed was loaned to 384 farmers and planted on 80 ha in Ziroobwe, Luwero district, with a 60 per cent recovery up to the end of August, which is ongoing. The training of ten technicians



Uganda's Minister of Agriculture, Animal Industry and Fisheries, Janat Mukwaya (centre), launched the ZAABTA One Stop Shop Association in Luwero District last year. JICA representatives, farmers and SG 2000 partners attended

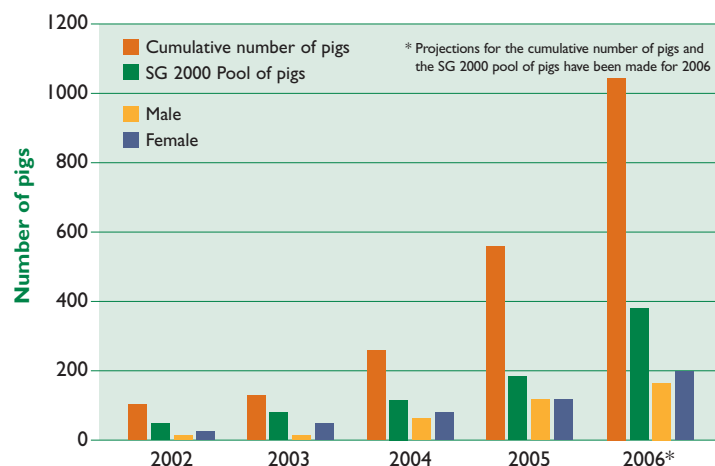
from local agro workshops, under the SG 2000 Uganda and JICA partnership, resulted in the increased production of rice threshing machines that have been tested and placed with rice grower groups to improve the quality of rice at the postharvest stage.

The QPM promotional campaign has boosted seed sales of the eight companies involved in QPM seed from 611 mt to 1740 mt, supporting the successes of the QPM working group's countrywide marketing campaigns.

The Voucher Assisted Demonstrations (VAD) have also been successful and prove to be a valuable tool for persuading active farmer groups at the One Stop Centres to join the associations. In 2005, a total of 564 VAD kits containing QPM, upland rice and groundnuts were planted in 12

districts covering 47 sub-counties. In addition, field days were organised in eight districts focusing on priority enterprises like NERICA, QPM and agroprocessing to explain the OSC approach to district leaders, other stakeholders and farmers. The demonstrations that received full-package treatment (maize, beans and groundnuts) performed well with significant increases in yields in comparison with 2004. SG 2000 has also intensified the pig stock multiplication programme, which is intended to generate income among vulnerable households in the OSC catchment areas. There are currently over 300 improved pigs for multiplication available in the SG 2000 pool to be distributed to new farmers.

Categories of pig in production programme

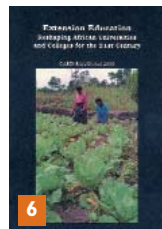
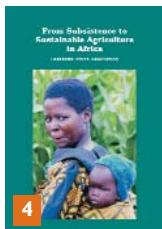
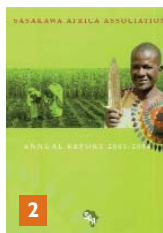
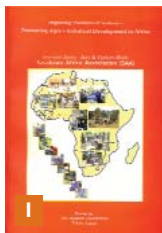


Postharvest storage – Wakiso District maize farmers' group crib

SG 2000 publications and videos

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Publications



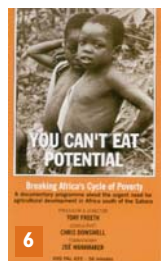
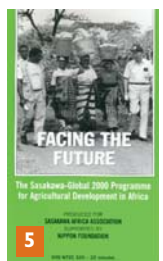
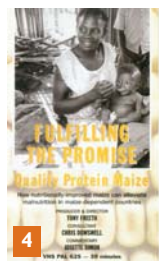
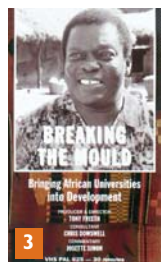
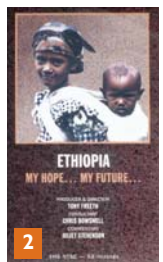
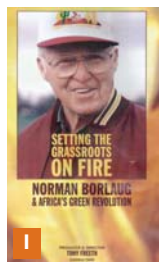
New publications (2006):

1. Improving Postharvest Systems - Promoting Agro-Industrial Development in Africa

Other publications available:

2. SAA Annual Report 2003/04
 3. SAA Annual Report 2002/03
 4. Proceedings of Workshop 2002: From Subsistence to Sustainable Agriculture in Africa
 5. Proceedings of Workshop 2001: Food Security in a Changing Africa
 6. Proceedings of Workshop 2000: Extension Education – Reshaping African Universities and Colleges for the 21st Century
- 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
 - This is SAA: An introduction to the work of the Sasakawa Africa Association

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.

Feeding the Future is produced for SAA by Raitt Orr & Associates Ltd, London SW1 and designed by B-Creative.

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