

Feeding *the* Future

Twentieth Anniversary Celebrations

New strategies for accelerated growth

Celebrations of the twentieth anniversary of the Sasakawa-Global 2000 programme (SG 2000) in Africa, in Bamako, Mali, last November were marked by an international symposium, organised by the Geneva-based CASIN (Centre for Applied Studies in International Negotiations) aimed at ‘developing a roadmap to empower the small-scale farmer to become an effective commercial farmer’.

Speaking at the symposium, which was attended by ministers of agriculture from SG 2000 project countries, senior representatives from international organisations and foundations, research institutes and agribusiness organisations, Yohei Sasakawa, Chairman of The Nippon Foundation, paid tribute to his late father, Ryoichi Sasakawa, former US President Jimmy Carter and Nobel Laureate, Dr Norman Borlaug, for coming together two decades ago ‘to try and find a viable solution to Africa’s agricultural problems.’ Thus was formed the Sasakawa Africa Association (SAA), the

management organisation of SG 2000.

To date, The Nippon Foundation has invested US \$150 million in financial support to SG 2000 activities in 14 African countries. Now the emphasis will be on supporting a progressive and prosperous smallholder commercial class as SAA concentrates its resources on four African countries – Mali, Nigeria, Ethiopia and Uganda – over the next four years.

In the 20 year history of SAA, new strategies have been developed to achieve greater impact in helping African

governments and smallholder farmers accelerate growth in agriculture. Low-cost, small-scale irrigation schemes to help diversify farm enterprises – including livestock and dairy operations – within smallholder farming are being introduced. There has, too, been a change of philosophy from the prime concern of increasing the production of staple foods to improving farmer livelihoods.

Market demand

Effective farmer associations are now crucial for the development of linkages with traders and agro-industries. Building integrated food supply chains, raising production and post-production quality standards to meet consumer requirements, while increasing the sensitivity among smallholders to market demand signals, are also essential in getting commercial agriculture moving in Africa.

It was noted at the symposium that substantial new resources are being made available to help encourage Africa’s elusive ‘green revolution’ – such as the alliance between the Gates and Rockefeller foundations announced last September.

For Dr Norman Borlaug, in closing the symposium, change could not come soon enough. “Don’t wait for perfect conditions or the perfect seed variety. Use whatever is available – and get on with it.”



Mali’s President Amadou Toumani Touré hosted a special anniversary event at the Presidential Palace, Koulouba, at which he conferred Mali’s highest honour – the Medal of the Commander of the National Order of Mali – on both Yohei Sasakawa and Norman Borlaug.

In his address at the ceremony, President Touré emphasised the pivotal role that he intended agriculture to play in the Malian economy. “With immense land resources, and with the Niger Delta as one of the largest flood plains in the world, we are destined to become an agricultural power,” he said.

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Partnerships

SAA, World Bank, and FARA forge new partnership

Dr Norman Borlaug, SAA president, and John McIntyre, a World Bank agriculture director, signed agreements in Bamako, 1 November last year, to support a Framework for Technical Collaboration (FTC), a trust fund to be managed by the Forum for Agricultural Research in Africa (FARA). The new FARA, World Bank, SAA partnership, seeking to increase effectiveness and efficiency of agricultural advisory service provision, is now ready for implementation.

Dr Michael Abu Foster (also pictured), Country Director in Uganda and principal advisor for the FTC, writes that the “FTC will complement SAA’s overall efforts to transform the productivity of small-scale producers in Africa to improve food security and rural livelihoods.”

“The FTC can add value to agricultural reform processes under way by improving the design and implementation of national agricultural extension advisory programmes and increase opportunities for exchange of information and skills among project planners, managers and practitioners,” comments Marco Quiñones, SAA Director General.

The FTC will be housed at FARA headquarters and will receive multi-donor support for its implementation. Through the transformation of national agricultural advisory services, FARA hopes to contribute to the achievement of the New Partnership for Africa’s Development (NEPAD) Comprehensive African Agricultural Development Programme (CAADP).



The signing of the World Bank MOU with John McIntyre (left) and Dr Norman Borlaug

SAA has played a central role in conceptualisation and implementation of the FTC, which is being mainstreamed within FARA. Abu Michael Foster has been seconded to FARA for programme oversight, which

officially began in June 2007. Initial activities will include a consultative process with stakeholders to formulate a five-year project plan with priority areas for action, beginning in Mali, Ghana, Nigeria, Ethiopia, Uganda and Tanzania.



Collaboration with JICA

Junko Nakaji, a Japan Overseas Cooperation Volunteer (JOCV) with the Japan International Cooperation Agency (JICA), has been seconded by JICA to the SG 2000 project in Uganda – the first time that JICA has seconded a volunteer to an NGO. She expects to be with the project for two years.

Trained by JICA in Japan in agriculture and livestock breeding, Junko spent her initial weeks in Uganda assimilating local culture. She was then given the task of monitoring the impact of a new mobile rice mill project, funded jointly by JICA and SAA.

“Milling rice is a big problem for local farmers,” she says. “They find it difficult to transport rice to the stationary rice mills which are few and far between. Many farmers keep paddy rice in their homes.”

A visiting mobile rice mill could therefore be the answer – and already 2.7 mt has been milled in farmers’ fields. Junko, who is based in the One Stop Centre at Zerobwe, says that the project is still at the trial stage and must cover a large area to be viable.

SAA board news

SAA has announced two appointments to the board of directors – Katsumi Hirano and Masa Iwanaga.



Mr Hirano is Executive Director of JETRO (Japan External Trade Organisation) Johannesburg, a position he has held since 2004. He has long experience of Southern Africa in both the diplomatic and academic fields. From 1999 to 2004, he was a member of the Committee on the Southern Africa Region, established by JICA and, previously, a board member of the Japan International Volunteer Centre (JVC).



Mr Iwanaga has been Director General of the Mexico-based International Maize and Wheat Improvement Centre (CIMMYT) since 2002. Previously Director of the Biological Resources Division of JIRCAS (Japanese International Research Centre for Agricultural Sciences), he has spent 25 years working for four international centres which are part of the Consultative Group on International Agricultural Research (CGIAR) – CIP, CIAT, IPGRI and CIMMYT. He has a special interest in technical and policy issues affecting biodiversity and biotechnology.



G Edward Schuh, a SAA board member for more than 15 years, has officially retired as Regents Professor at the University of Minnesota. Dr Schuh recently held the Orville and Jane Freeman Chair in International Trade Policy at the Humphrey Institute of Public Affairs. Last May, a symposium in his honour was held in Minneapolis with an impressive array of speakers making outstanding presentations – among them Ann Krueger, until recently Deputy Managing Director of the International Monetary Fund (IMF).

SG 2000's new priorities and directions

There are approximately 67 million smallholder farm families in sub-Saharan Africa, comprising 400 million people. One-fourth of them reside in the four SG 2000 focus countries and project areas, namely, Ethiopia, Mali, northern Nigeria, and Uganda. At least half are food insecure farmers who experience hunger at some time each year. Most remaining smallholder farmers, although nutritionally and financially better off, have yet to achieve significant productivity and livelihood improvements. This has constrained agriculture from becoming the engine of economic growth that it can and must become.

Traditional agricultural extension in Africa has focused on increasing production, improving yields, training farmers, and transferring technology. Extension activities have been supply driven and usually commodity based. Most government extension efforts have tended to favour smallholder farmers who, under normal climatic conditions, are food-secure and better positioned to adopt productivity-enhancing technologies. Historically, government organisations have provided the bulk of smallholder extension services although the coverage has been limited in most countries to probably no more than 10 per cent of all smallholder farmers.

Extension vision

Over the past 10 years, a vision of extension services has crystallised, one that goes beyond technology transfer and farmer training to include assisting farmer group formation, dealing with marketing issues, and partnering with a broader range of service providers and agencies. These include: i) traditional public systems which deliver research and extension services and focus on farmer training using a large pool of government employed extension staff frequently limited in service delivery by poor public facilitation; ii) recently initiated

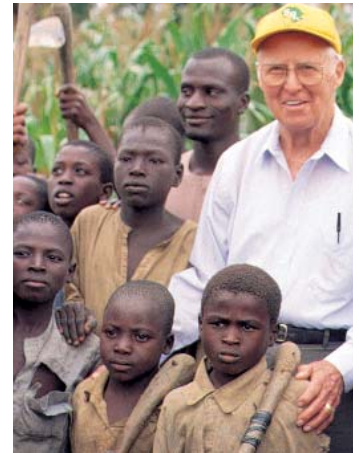
public/private partnerships which use public funds to hire private service providers to deliver demand-driven advisory services; iii) private extension services by commercial firms that address single-commodity cash crops and provide technical and production services to contract farmers; and iv) various NGOs, which provide a broad scope of farmer training in various aspects of rural development, but are quite location- and target-group specific, and relatively high cost per farmer served.

Regardless of the extension models being promoted in the four SG 2000 focus countries, government and non-government extension service providers tend to act independently with very weak co-ordination. Linkages between public research organisations and the various extension service providers are weak. Virtually no extension services are on offer to the extremely poor, who face a plethora of resource constraints – financial, physical, environmental, health and educational. Moreover, government extension organisations are not well-equipped to support market-led smallholder agricultural development, which require organisational development of farmer associations, market intelligence information, and advisory services in post-production technology and quality control.

Different needs

To treat smallholder farmers earning less than \$2 per day as an undifferentiated mass is a mistake. In fact, farmers below this economic threshold are at different stages of development, face different socio-economic circumstances, and have different technology needs. At the lowest level agriculture is not an economic activity but rather a cost – a pure subsistence function where all output is consumed. Only once basic subsistence food needs are met does farming become an economic activity and eventually reach the threshold above which it becomes a commercial business.

Thus, the nature and type of support extension services for each of these smallholder



**Dr Norman E Borlaug,
SAA President**

categories must also vary, and be tailored to the circumstances and needs of distinct client groups. SG 2000 work plans today reflect this understanding. Today, there is a clearer realisation that technology recommendations need to be segmented so that they are more suitable for different categories of smallholder – from the severely resource-constrained to the emergent commercial farmers. Such segmentation includes agro-ecological conditions and biological yield potential, but it also considers financial and physical resource endowments, level of connectivity to markets (infrastructure), and food production objectives. All these factors influence farmers' willingness and ability to adopt a new technology.

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.

Regional Rice Programme

“One of the main reasons that African nations have to import rice is because locally produced rice is of much poorer quality in terms of colour, taste, smell and the presence of foreign materials,” says Tareke Berhe, Director of SAA Regional Rice Programme (RRP). “However, both quantity and quality can be improved if better seed stock is used and improved practices are applied.”

Underpinned by the motto “from plant to plate”, the RRP aims to achieve these goals in its target countries of Ethiopia, Uganda, Mali and Nigeria by improving activities right along the rice production chain from genetic and agronomic aspects to marketing and end use.

The programme, which formally started in 2005, is now entering its second phase, with a focus on promoting better technologies among small-scale farmers and the development of value-added agroprocessing operations.

In its first year of operation, the RRP has made a number of advances, high among them being the introduction of 295 of the latest and elite lines of rice to all four countries. These were sourced from the Africa Rice Centre (WARDA – formerly the West African Rice Development Association) and the International Rice Research Institute (IRRI), as well as from two other rice growing nations, Guinea and Madagascar. The introductions included both irrigated and rain-fed varieties and those suitable for

upland and lowland growing. In Ethiopia, cold and salt-tolerant varieties were also used.

Bringing in the New Rice for Africa (NERICA) has proved a particularly interesting undertaking, says Berhe. From the first generation of NERICAs (1-7), NERICA 4 had already been released in Mali and Uganda and NERICA 1 had been used in Nigeria. Now a number of new varieties have been added. NERICAs 3 and 4 were released in Ethiopia during 2006, with NERICAs 1 and 2 under verification for release there. Meanwhile, NERICA 1 has been introduced in Uganda and at least five lowland/irrigated varieties have been introduced in Mali.

The second generation of rain-fed upland NERICAs (8-18), together with 60 lowland and irrigated NERICAs, are also under testing in the four countries. The cold-tolerant varieties introduced to Ethiopia from IRRI and salt tolerant varieties, introduced from the WARDA Sahel Centre in Senegal, are also showing promising results.



Promoting productivity enhancing technologies



Supporting the maintenance, production and availability of good seed from improved varieties

Maintaining quality

Ensuring that these new seed types are of the highest quality is a vital RRP activity. Support starts at the research level, where careful attention is paid to the provision of good breeder and foundation seeds. This support is then extended to the level of farmer groups and trained private seed producers to make sure that high-quality, certified seed is produced.

In 2006, the RRP supported the production of over 1,460 mt of improved seed in the four countries, while 2,075 ha were planted as a seed source for 2007. Mozambique and Guinea's very active seed production programmes are also being supported by SG 2000.

Achieving high-quality production is not just a result of seed quality, but also of the techniques used to achieve it, so demonstration and training activities are high-profile components of the programme. Over 10,000 farmers in the four countries have been able to use the full range of production technologies through RRP support. Pivotal to this effort have been the 37 field days held in 2006 to showcase improved technologies not only to farmers, but also to the wider public and, crucially, local decision makers. RRP-backed training introduces

farmers to improved agronomic practices, such as timely planting and weeding, the correct application of fertiliser and best water management practices. The programme provides support for research into the development of these technologies at a national level and to national extension programmes to promote their use by farmers. The RRP also supports the practical application of improved technologies through demonstration and seed production plots.

At the postharvest stage, SAA's Agroprocessing Programme collaborates with the RRP to provide demonstrations, training and promotion of improved techniques. As part of this, 518 postharvest and agroprocessing machines, including threshers, rice mills, par-boilers, sieves and cleaners, have been distributed and sold in 2006.

Nigeria leads the way here, followed by Mali and Uganda. Mozambique and Guinea were also active in promoting postharvest and processing technologies. Mali, Uganda and Ethiopia carried out several postharvest and processing demonstrations and training in the production of different food recipes from rice.

Farmer co-operation

Assisting farmers to organise collective storage facilities is a feature of SG 2000 activities in Mali, where the process is known as Warrantage, and Uganda, where the facility is called the One Stop Centre. In both cases, farmers own a common storage centre where cleaned grain of good quality can be stored, processed and then sold at a date when market prices are attractive. The farmers involved are also trained in how to add value to the process by developing collective marketing strategies, as well as pre- and postharvest handling techniques.

By end-2006, eight centres had been established in Mali and six in Uganda, with more due to open in 2007. This approach has proved sufficiently successful for plans to be drawn up to extend the idea to Ethiopia and Nigeria.

Building capacity

Berhe views the need to build capacity within countries to improve research and train the personnel who will form the backbone of future educational efforts as being just as important as the more obvious developmental aspects of the RRP.

This training takes many forms, whether it be theoretical or practical, done on-the-job, at a local point or further afield. In some cases, training is done regionally, as was the case when researchers and

technicians were sent between Ethiopia, Uganda and Kenya on exchange visits. Experts are also sometimes brought in from outside, such as when two WARDA scientists and two postharvest and processing machinists from the Philippines helped train Ethiopian experts on a course held in Addis Ababa in February 2006. In another example, Ethiopian machine manufacturers travelled to Uganda and trained machinists there.

Strong linkages

Collaboration has been essential to success at both national and international levels. All SG 2000 country projects have developed excellent working relationships with others, providing foundations for the Regional Rice Programme to build on.

Working closely with partners brings many advantages, such as pooling financial and management resources, better co-ordination of projects and access to a wider pool of expertise.

At the country level, SG 2000's partners are national institutions, such as research and extension bodies, colleges and universities, farmers' organisations and other agricultural institutions. Internationally, WARDA and IRRI provide the sources for the best rice varieties and elite lines, while the Japan International Cooperation Agency (JICA), USAID and others provide finance

and training and others in project countries.

Collaboration also extends into the realm of politics, where sympathetic implementation of projects and careful lobbying have helped generate policies that favour high-quality rice production. In particular, a preparedness to tailor the RRP's work to tie in with domestic goals and a willingness to let nationals run projects where practicable can pay big dividends.

Such moves tend to engender good relations with political authorities, making it much easier to lobby for favourable agricultural policies. In 2006, these efforts produced effective contacts between the RRP and the President of Mali,

the Minister of Agriculture and Vice-President in Uganda, and the Minister of Agriculture and Deputy-Prime Minister of Ethiopia, among other influential officials.

In Ethiopia, successful lobbying has pushed rice high up the political agenda. In 2006, rice was reclassified as a fourth "National Food Security crop" – after wheat, maize and the country's traditional staple cereal crop tef – in a move that favours rice research and promotion. Meanwhile, in Uganda, high tariffs imposed by the government on imported rice ensure local rice growers receive a good price for their crops.



Close collaboration with the agroprocessing programme



Encouraging rice as an African staple

Regional rice programme goals

Under its broad-based strategy, the initiative aims to:

- Identify, introduce and support the evaluation of new, improved and adapted rice varieties from WARDA, IRRI and other sources;
- Support the maintenance, production and availability of improved varieties of good seed in collaboration with National Agricultural Research and Extension Establishments;
- Promote productivity – enhancing technologies;
- Promote postharvest and agroprocessing technologies;
- Help the development of enterprises dealing with storage, marketing and increased utilization of rice;
- Support the training of young rice scientists and field technicians;
- Develop strong linkages and working relationships with partners;
- Lobby for favourable agricultural policies.

SG 2000 Regional QPM/Seed Programme

Replacing conventional maize hybrids and varieties grown by African farmers with significantly more nutritious Quality Protein Maize (QPM) materials remains the primary focus of the SG 2000 Regional QPM/Seed Programme. Intensive maize breeding work is resulting in a new generation of QPM hybrids and Open-Pollinated Varieties (OPVs) that have the potential to yield as well as, or better than, conventional maize. The International Maize and Wheat Improvement Centre (CIMMYT) in Mexico, the International Institute of Tropical Agriculture (IITA) in Nigeria, and a number of African national agricultural research programmes have worked together for the past five years to produce the new QPM materials. In 2006 these materials moved from the protective confines of the research plot to large-scale field testing, and the best of them are now nearing commercial release in target countries.



QPM farmer discussing his poultry production with extension supervisor in Uganda

“The complexity of achieving our goal of replacing conventional maize with QPM is hard to overstate,” says Dr Wayne Haag, SAA Director for the QPM/Seed Programme. “There are a number of very successful conventional varieties and hybrids currently being grown by African farmers; replacing them will require that the new QPM materials be highly competitive – and not only in terms of yield.”

For any new materials to stand a chance of replacing widely grown conventional hybrids and OPVs, they will have to meet or exceed existing postharvest standards for storage and processing, as well as gain the acceptance of consumers who have well-established preferences for grain colour,

texture and flavour. These standards and preferences vary widely from country to country, which means that no single QPM hybrid or variety is going to fit the bill in all project countries. Instead, maize breeders – especially those working in national programmes – must tailor their efforts to meet local opportunities, needs and preferences. This in turn means that progress towards the SG 2000 goal for QPM is going to vary from country to country, and be highly influenced by national and local conditions.

For example, in Ethiopia the major challenges are to identify a superior version of the current intermediate maturing QPM hybrid BHQ-542 and develop a

QPM hybrid that can compete successfully with the country's popular long season normal hybrid BH-660. In Uganda, the need is to identify QPM hybrids that private Ugandan seed companies can take to market, building on the successful OPV, Longe-5. In Mali, the white QPM OPV, called Denbenyuma, competes well against conventional white maize materials. However, yellow maize is also important in the local market and yellow QPM materials still need to be identified that can compete with the popular conventional maize variety, Sotubaka. In Nigeria, the QPM OPV Sammaz-14 is being adopted at a rapid rate, but because there is an active private seed sector in the country, there is a need to identify and promote the release of additional QPM hybrids that private companies can then commercialise.

Despite the variability in circumstances from country to country, notable progress is being made towards the SG 2000 QPM goal. In Ghana, three new OPVs and three new QPM hybrids have been identified as candidates for release, to complement the QPM workhorse, Obatanpa. Ghana's QPM breeder at the Crops Research Institute (CRI), Dr Manfred Ewool, is leading the effort to develop competitive yellow OPVs and hybrids, and it is

hoped that this work will lead to releases that can benefit other countries where yellow maize is widely accepted, such as Mali, Nigeria and Ivory Coast.

In Malawi, the new QPM OPV Sussuma is under large-scale seed production and the release process should come to fruition in 2007. In addition, four very promising QPM hybrids from CIMMYT have been identified by the Malawi national programme as candidates for release. In 2006, Zimbabwe released its first QPM material, CZH01021, a hybrid of CIMMYT origin. Kenya's national programme recently released two QPM hybrids, KH-501Q and KH-502Q, and a private Kenyan company – Western Seeds – has released an OPV tagged as WS-104Q. This variety is also being tested regionally by the company.

Collaboration is key

Success in achieving the SG 2000 goal for QPM will ultimately depend on strong collaboration among and between many different national, regional and international public and private partners. In 2006, the SG 2000 Regional QPM/Seed Programme continued to work closely with researchers in a number of national programmes, including Ethiopia, Ghana, Kenya, Mali, Mozambique, Nigeria, Senegal, Tanzania and Uganda.



Alpha Diallo of CIMMYT – Kenya's breeder with fellow breeder and their new QPMs in Kenya



Kano State Co-ordinator (left) with farmer demonstrating Sammaz-14 seed production in Nigeria

The Programme's efforts were further leveraged by partnerships with such far-reaching sub-regional organisations as ASARECA and CORAF, and by drawing on the expertise of researchers working for CIMMYT, IITA, and the International Centre for Research in the Semi-Arid Tropics (ICRISAT). SG 2000's efforts to establish and/or support local seed enterprises in Mozambique and other countries have been strengthened by partnerships with the Rockefeller Foundation, and now with the joint Rockefeller/Gates initiative in support of crop improvement and seed systems in Africa. At the request of the UN Millennium Village Project, the SG 2000 Programme and its partners brought QPM and No-Till technology to a newly established Millennium Village in Bonsasso, Ashanti.

Strengthening seed systems

The first link in any effective formal seed system involves the production of high-quality breeder seed (BS) that underpins the eventual multiplication and delivery to farmers of commercial certified seed. The objective is that breeders/research maintain their materials and produce the first seed used for further multiplication. While the quantities needed are

relatively small, great care must be taken to ensure the integrity of the varieties and lines with which they work.

"The good news," says Haag "is that breeder seed systems are in the process of getting into pretty good shape in the countries where we're working. In general, the proper quality controls are in place, assuring the maintenance and availability of high-quality BS for public- and private-sector producers to use. However, more problems arise when it comes to the production of foundation (FS) and certified seed (CS)."

For the most part, there are adequate stocks of FS being produced, though production systems are in need of additional refinement in several countries. The foremost challenge is maintaining quality controls once a number of small-scale seed growers and companies become involved in the process. This is especially true with respect to the production of the CS eventually marketed to farmers. To address this challenge, in 2006 the SG 2000 QPM Programme organised a number of joint field visits with certifying authorities, company representatives, seed growers and researchers.

These visits made clear to all that, in addition to making sure the usual guidelines are followed for

producing CS – such as using only foundation seed and properly isolating production fields to avoid contamination – other steps should be taken. For example, work is needed to ensure that certified seed fields are planted using good agronomic practices, both as a quality-control measure and to help advertise the potential of the seed. In that same vein, fields should be clearly labelled, and producers should clear a 1.5 – 2.0 metre walking path around each field to allow for more effective presentations during field days, and more importantly, to facilitate the work of certification inspectors. As the number of certified seed companies grows, there is a need to strengthen their own field inspection and certification capabilities. In Uganda, for example, each company must now have their own inspectors, duly trained and certified by the national authorities, who also regularly monitor their work with unannounced field visits and assessments of company inspection processes.

QPM nutrition research continues

Despite years of research and mounting evidence of the clear nutritional advantages of QPM, some policy makers still need to be convinced. Research on human and animal nutrition relative to the use of QPM is therefore on-going. In Uganda, plans are in place for a nutrition intervention project using QPM involving nutritionist

Barbara Tembo and Texas A&M graduate student Anette Kuteesa, and work will commence in 2007. The QPM-Malt intervention work in Ghana that was conducted in 2006 by Ghana Health Services and the Self Help Foundation will continue during 2007. In Ethiopia, the QPM study underway at Sibiu-Sire, the results of which will soon be available, will continue in 2007. And as part of the Harvest Plus initiative and in collaboration with CIMMYT and SG 2000, Purdue University graduate student Nilupa Gunaratna continues her thesis work on compiling evidence and strengthening the case for QPM.

QPM labs and quality analysis

As reported last year in this newsletter, significant progress has been made towards establishing functional QPM labs in selected African countries. The problem remains one of sourcing the proper glacial acetic acid needed to conduct reliable quality tests. CIMMYT is currently providing limited back-up testing at its labs in Mexico, but more importantly has developed and is working to verify a new testing protocol that substitutes the more readily available glyoxilic acid for glacial acetic acid. If the effectiveness of this protocol is borne out in 2007, the QPM labs in Africa will be much closer to achieving their goal of providing reliable local quality analysis.



Eggs with QPM produced by former leprosy sufferers at Sebu-Seri village in Ethiopia

Agroprocessing

The agroprocessing sector is uniquely positioned to drive economic development in sub-Saharan Africa (SSA). However, this potential is still not widely recognised and policy to direct resources towards agro-industry is weak in many countries. Partly as a result of this, the gap between the sector's contribution to African economies and that of manufacturing industry remains wide.

This untapped potential prompted SAA to develop an Agroprocessing Programme (SAA-AP) in the mid-1990s, aiming to improve the viability of rural agroprocessing and to establish better links between farmers and their markets.

In general, food production in SSA has been gradually increasing, due to technological improvements and better application of technology, as well as an increase in the amount of land under cultivation. However, the growth in food production has failed to match the growth in the region's population over the last two decades, so a pressing need to boost output remains.

This picture is not universal, of course. The diversity of climate, soils and farming systems across the SSA region ensures that many areas do not face perpetual food shortages. Variations in rainfall patterns and the varying fragility of farming environments can produce vastly differing situations even within the same country and across the year.

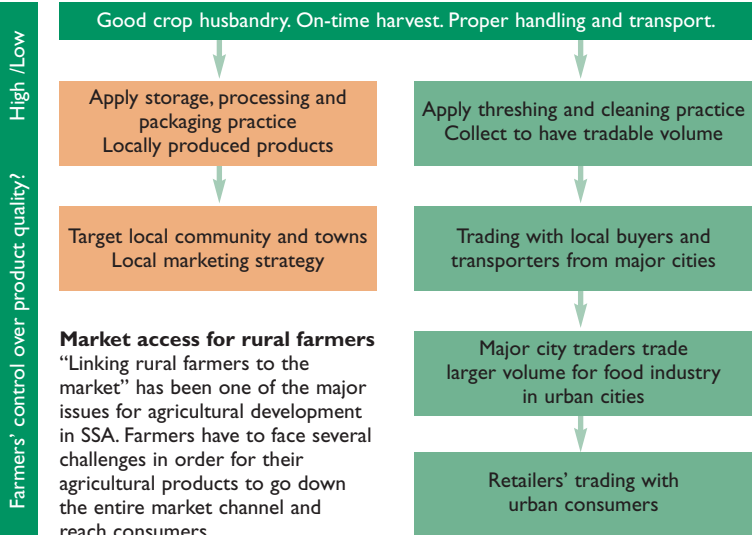
Farmers counteract such imbalances by preserving and processing their products, perhaps

selling them to provide funds to tide them over in more difficult times and provide stability. So small-scale agroprocessing activities have long been common practice.

"Increasing population and the associated growth in urbanisation across the continent is creating new challenges for the agricultural sector, including small farmers, who stand to gain enormously if they can meet the rising demand for value-added, high-quality products from the more affluent parts of African society," says Toshiro Mado, Director of SAA's Agroprocessing Programme (SAA-AP). "The shift towards value-added agriculture is making some headway, but it remains fragile in many countries, so support for the sector is vital at this stage."

The channels along which goods must pass from rural farmers to major cities are long, complex and hindered by a lack of adequate infrastructure. Producers' control over quality usually decreases as goods move further downstream along the marketing chain, which means ensuring their standard is maintained by the time they arrive

Agricultural market channel



Private tef threshing service provider: this multi-crop thresher was made by a local manufacturer

at the end-consumer – essential for successful sales – is no easy matter. By helping farmers with processing and pre-packaging, SAA is helping to remove many of these uncertainties.

SAA-AP activities

Active since the mid-1990s, the SAA agroprocessing programme's early focus was on Ghana and Benin, where the association collaborated with the International Institute of Tropical Agriculture (IITA) on a project bringing improved postharvest and agroprocessing technologies to small-scale farmers. Having made considerable progress in Ghana, Benin and other countries (see Feeding the Future 22), the programme is now primarily focused on Ethiopia, Mali and Uganda.

SAA-AP covers four major activities:

- Research and development for agroprocessing technology in collaboration with local manufacturers;
- Training manufacturers to produce improved agroprocessing equipments;
- Field demonstration of improved agroprocessing technology in collaboration with the agriculture ministries and local manufacturers;
- Development of agroprocessing enterprises in collaboration with farmers' co-operatives and private agroprocessing service providers.

"Threshing is the vital first step in converting a harvested crop into a value-added, quality product, so SAA's programme has been very active in developing improvements at this stage," comments Mado.

In 2001, the SAA-AP project introduced a multi-crop thresher developed by the IITA, initially for use with rice in Guinea. More recently, Sasakawa has been supporting the development of multi-crop machines to thresh tef in Ethiopia. Around 100 threshers have been bought by Ethiopian farmers and private service providers – a figure that can make a big difference given that one thresher can be used by more than 150 farmers in a season. The SAA programme is now trying to develop a new type of multi-crop thresher with both threshing and cleaning functions.

Using a threshing machine offers huge savings in time and labour over conventional processing, given that the latter involves perhaps three or four labourers and half a dozen oxen – animals that could be freed up for ploughing. The machine is also able to separate grain from soil and sand much more efficiently, while the rapidity of the process improves the chances of getting the threshing done before the grain gets wet and deteriorates in the rainy season.

Other benefits also emerge rapidly. In the Ethiopian region of Shashemeni, for example, local tef has come to be regarded as a high-quality product, since farmers

started using a private threshing service. This means it attracts a premium from local traders, who offer 10 per cent more for mechanically threshed tef. Shashemeni's farmers are now eager to extend their reach along the processing chain by seeking the use of a grain cleaner, which will add further value to their products.

Building manufacturing capacity

Most farmers and groups involved in small-scale agroprocessing work manually or with rudimentary mechanical technology. In most SSA countries, there is insufficient local capacity to produce and distribute agro/food processing equipment at reasonable prices.

“So one important strand of SAA-AP is identifying potential local manufacturers and offering them technical support and practical training on how to

produce good quality equipment,” adds Mado. “These manufacturers can then sell to rural customers and provide an after-sales maintenance service, forging a link between industry and agriculture.”

Most small-scale metal manufacturers face two major constraints: a lack of access to good machine design and difficulties in holding on to skilled staff. The project addresses these issues by providing a design for relatively cheap, multi-function equipment tailored for farmers with limited funds and for the seasonal nature of agriculture in the region.

Food product development

Capacity to process high-quality food products is still low in much of SSA – a factor that means agriculturally rich countries still find themselves importing large

amounts of processed foods.

The SAA programme encourages women farmers to use locally available harvested products to produce marketable food products based on their own traditional recipes, suitable for both the local community and for city populations.

Home economists provide technical advice on improving the nutritional value and hygiene of foods, which are often based on household recipes, to help make the end products more marketable.

In the Babile district of Ethiopia,

the success of added-value products such as groundnut butter and ground nut-based cake has had the added benefit of pushing up groundnut prices by 20 per cent since the farmers' co-operative started production. This SAA-supported scheme shows how a farmers' group can move up the value chain by targeted use of agroprocessing technology and marketing. In addition, these women are now accumulating the experience and know-how to enable them to broaden their involvement in agribusiness in the future.

The Agroprocessing Programme supports the less fortunate in society in Ethiopia – such as those who have suffered from leprosy. One hundred members of the Ethiopian Association of Ex-Leprosy Patients were invited to Selam Vocational Training Centre – SAA's local collaborator – during their annual meeting. SAA is providing them with technical support to improve their agroprocessing/ income generating opportunities.

SAFE

Now in its 14th year of operations, the Sasakawa Africa Fund for Extension Education (SAFE) is working to address the deficit of tertiary education among Africa's extension workers, five sixths of whom do not have university degrees. Existing SAFE-backed agricultural extension courses have been expanding and are being reinforced by new programmes, launched to meet increasing demand for training.

“Our goals are to open doors to leadership positions for mid-career extension workers through advanced training, to link courses more closely to the real world of African farmers, and to help universities keep abreast of the rapid changes taking place in rural areas”, says SAFE Director Deola Naibakelao. “Over 1,100 people seeking mid-career extension training had graduated from SAFE courses and scholarship schemes by February 2007, with a further 771 students under tuition at that time.”

At a well-attended tenth SAFE Anniversary Stakeholder Workshop held by Haramaya

(formerly Alemaya) University in eastern Ethiopia, employers expressed satisfaction with the success of the decade-old mid-career programme there. They requested that similar programmes be developed for other disciplines, such as agricultural economics. Graduates from the university now number 215 students, following the graduation of 24 more in July 2006.

Also in Ethiopia, the new SAFE programme at Hawassa (formerly Debub) University in Awasa, to the south of Addis Ababa, admitted its first batch of 24 students, including three women, in October 2006.



Third year students at Bunda College in Malawi discussing a maize project by one of the students

They were selected only from Oromiya Region and Southern Nations Nationalities Peoples Region (SNNPR) during this first round. The university has now established a fully-fledged Department of Agricultural Extension and recruited two new staff, both graduates of the SAFE programme at Haramaya University.

At Makerere University in the Ugandan capital Kampala, a proposal for a new SAFE-type degree programme has been presented to the university management for approval and is set for launch in the 2007/08 academic year. This part-time degree will cater for new private extension service providers unable to allow full-time study.

At Malawi's Bunda College, the SAFE programme admitted 18 new students in October 2006, bringing the total to 23, of which six are women. Bunda has significantly strengthened linkages with the Ministry of Agriculture after a slow start due to frequent changes among senior ministry staff. The ministry has already paid fees to finance ten candidates for the academic year starting August 2007.

Under a Memorandum of Understanding (MOU) between the University of Cape Coast (UCC) in Ghana and Ahmadu Bello University (ABU) in Nigeria, UCC has sent a lecturer from the Department of Agricultural Economics and Extension in the School of Agriculture, to ABU to continue his PhD studies. As well as teaching part-time, he is also providing support to the SAFE programme at ABU, including teaching and planning supervised enterprise/experience projects (SEPs). Meanwhile, two senior staff of ABU are currently spending sabbatical leave in the School of Agriculture at UCC.

At Kwadaso Agricultural College (KAC) in Ghana, 50 diploma students from the UCC-affiliated SAFE programme graduated in

October 2006. This brings the number of graduates there to 232, including 44 women. Ghana's Ministry of Food and Agriculture has renovated several facilities at KAC, such as classrooms, the library, hostels, the water supply and telephone lines, to ensure smooth implementation of the SAFE programme.

In Nigeria, 16 of the 19 SAFE students who enrolled in the programme in 2002 graduated in February 2007. Three of them graduated with First Class Honours and nine with Second Class Honours. There are currently 45 students enrolled on the programme. As part of scaling-up activities, the second SAFE programme in Nigeria will be launched at Bayero University, Kano, in August 2007, where preparations are at an advanced stage.

At the Polytechnic Institute for Training and Applied Research (IPR/IRFA) in Katibougou, Mali, the first batch of 15 students enrolling in 2002 completed their programme in December 2006. The Technology Village at IPR/IRFA is now fully operational, offering practical training and education programmes for both students and farmers.

PhD training fellowships

One of the most critical challenges facing all SAFE programmes is the lack of qualified teaching staff at PhD level to nurture and sustain the SAFE programme. To help rectify this, SAFE has provided three PhD fellowships to train lecturers from the University of Bobo-Dioulasso in Burkina Faso, Hawassa and Haramaya Universities in Ethiopia, and two Masters' degree fellowships for lecturers from IPR/IRFA in Mali. The Department of Agricultural Economics and Extension at UCC has agreed to assist in the training of these PhD fellows in Agricultural Extension from August 2007. These fellowships add to the Masters' degree fellowships that SAFE offers to qualified candidates in SG 2000/SAFE programme countries.

SAFE website

SAFE has now launched its website (www.safe-africa.com). Content is in the process of being developed to make the site more functional.

SAFE statistics, February 2007

Mid-career BSc and Diploma Courses	Graduated	Current	Total
UCC, Ghana (BSc)	246	55	301
KAC, Ghana (Dip)	231	77	308
Haramaya, Ethiopia (BSc)	215	98	313
Hawassa, Ethiopia (BSc)	-	24	24
Makerere, Uganda (BSc)	130	41	171
Sokoine, Tanzania (BSc)	233	190	423
IPR/IFRA, Mali (Maîtrise)	15	91	106
Samanko, Mali (Dip)	-	25	25
Ahmadu Bello, Nigeria (BSc)	16	45	61
Abomey-Calavi, Benin (Licence)	-	56	56
Bobo-Dioulasso, Burkina Faso (Licence)	-	24	24
Bunda, Malawi (BSc)	-	23	23
Sub total	1,086	749	1,835

Scholarships	Graduated	Current	Total
Diploma	-	6	6
BSc	26	5	31
MSc	51	10	61
PhD	3	3	6
Sub total	80	24	104
TOTAL	1,166	773	1,939

Women enrol

The new Technical Diploma level SAFE programme at the Samanko Agricultural Training Centre, close to Mali's capital Bamako, took in its first crop of 25 students in October 2006. The ten women who enrolled represent the largest female enrolment in one batch since the inception of the SAFE initiative. The programme is affiliated to IPR/IFRA.

Meanwhile, the University of Abomey-Calavi in Benin admitted 31 students, including one woman, in 2006. This brought the total number of students enrolled in the programme to 56. Students enrolled in the SAFE programme finally relocated to a new permanent site at Sekou, about 40 km from the main campus in Cotonou.

At a regional level, the SAFE programmes in East Africa region recently held a very successful workshop at Sokoine University in Tanzania. It was attended by 25 participants drawn from universities and ministries of agriculture in Ethiopia, Malawi, Tanzania and Uganda. Participants discussed their experiences and recommended that a newsletter be introduced to facilitate networking between SAFE partner institutions.

Water harvesting and micro-irrigation

Spurred by devastating cyclical droughts, the Ethiopian Government initiated in 2002 what would become a large-scale water harvesting programme aimed at protecting those hardest hit when the rains fail – resource-poor farmers in the semi-arid areas of the Ethiopian countryside such as the Rift Valley. SG 2000 joined in this effort in 2003, working initially with 30 farmers to establish small-scale water harvesting systems coupled with proven micro-irrigation techniques that make optimal use of scarce harvested water. These early systems were situated in strategic locations where farmers, extension officers and policy makers could see first hand how the technologies can dramatically increase the incomes and improve the food security of very poor farmers in dry areas.

Since then, the SG 2000 initiative has grown into an innovative public/private venture involving the Ethiopian Federal and State Ministry of Agriculture and Rural Development (MoARD), the Ethiopian Institute of Agricultural Research (EIAR), the International Livestock Research Institute (ILRI), and two large farmers' co-operative unions, representing the interests of 120 farmers' primary societies co-operatives and some 125,000 Ethiopian Rift Valley farm households.

"We provide technical support and the initial revolving credit needed by farmers to construct small-scale water harvesting and micro-irrigation systems," says Dr Aberra Debelo, SG 2000's Project Co-ordinator, Ethiopia. "The systems are designed to provide enough water to sustain agricultural activity year-round on individual 1000m² plots. We also

work with farmers to diversify their operations, bringing cash crops, livestock and dairy into their traditional staple crop production systems."

The partnership provides improved livestock (on credit), as well as superior forage materials, fruit and vegetable seeds and seedlings, and high-quality seed of staple crops. Farmers are trained in water harvesting and drip irrigation techniques, livestock management, dairy operations, the production of fruit and vegetable cash crops, and postharvest agroprocessing activities that add value to farm outputs. Beyond that, the partnership helps farmers learn how to access and respond to rapidly changing input and output market information.

"The impact of this initiative has been dramatic", says Dr Marco Quiñones, SAA Director General for Africa. "The average annual incomes of participating farmers and farm households have increased significantly, from less than US\$500 to about US\$2000. They've been able to achieve this because having water readily available allows them to grow cash crops and include livestock and dairy in their operations. They're also able to intensify their farming operations, using land, labour and capital on a year-round rather than seasonal basis."

Regular monitoring of the initiative also shows that decision making by participating farmers has become much more sensitive to changing input and output markets, and that they have



Water storage under construction



Potatoes grown under micro-irrigation

become much more entrepreneurial in their behaviour. Farm households involved in the project have enjoyed major improvements in food security, nutritional status, and general family health. They now have more options for health care and for educating their children, and many have also invested in improved family housing.

Efforts are underway now to scale up the activities of the partnership, which will require both an intensification of the Ethiopian Government's participation as well as additional external funding. There is a need to fully integrate socio-economic assessments into the work so as to more accurately monitor and evaluate impacts. The participation of farmer co-operative unions needs to be

broadened in order to ensure sustainability of the initiative over time and to involve more farm households. As the number of farm households increases, the availability of revolving credit through participating farmer co-operatives will also need to expand. As the activities of the partnership grow, there will be opportunities to scale out the proven practices to other water-stressed agricultural areas in Africa. "Our current geographic focus is the semi-arid Ethiopian Rift Valley," notes Dr Quiñones "but the approaches we've developed and shown to be very effective there will be equally useful in countless other areas in Africa where the lack of water limits agricultural productivity."

Ethiopia

Ethiopia has reported four straight years of strong harvests, underpinned by healthy rainfall levels. The main meher harvest for 2006-2007 has shown an estimated five per cent production increase on the already robust levels of the previous year. The rains have been especially good for highland crops, and should support the secondary belg harvest which runs from March to May, accounting for around 10 per cent of overall cereal output. Cereal production rose from 10 million mt in 2002 to 14 million mt in 2005, jumping to 19 million mt in 2006.

Conversely a combination of natural and man-made factors has resulted in serious and growing food insecurity in many parts of the country. To counter this, the government has put in place food security programmes within the framework of a 'Plan for Accelerated and Sustained Development to End Poverty (PASDEP)'. This plan has been under implementation in most of the chronically food insecure *woredas* (districts) since 2003. The overall objective is to increase food availability and access at household level through improved livestock and crop production and access to income generating activities.

Ethiopia possesses about 13 million ha of heavy, black-clay soils (vertisols), of which about 2.5 million ha are under crop production. The rest are used

mostly for natural grazing. Seasonally flooded vertisol areas are left as waste land for communal grazing. Vertisols are mainly located in the highlands, 1,500 metres above sea level and are difficult to work since they get sticky when wet and crack badly when dry. Above all, they remain waterlogged during the main rainy season (June-September). As a result, water logging is one of the major constraints to crop production in vertisol areas.

In order to overcome the adverse effect of water-logging, farmers have been trying different traditional methods such as hand tools and the traditional plough called 'maresha'. For the most part, the methods are inefficient or require hand labour that subjects the farm family to the drudgery of hard work. Consequently, the



The improved BBM implement in operation

planting of crops like wheat on such soils is delayed until the rainy season starts tapering off in early September. Often, this exposes the crop to moisture stress later in the season, thereby resulting in low grain yield. With improved soil drainage, vertisols have good potential for crop production. However, they are still generally regarded as marginal soils by most Ethiopian farmers.

In an effort to change perceptions about vertisols, SG 2000 has been conducting on-farm demonstrations on the use of the Broad Bed Maker (BBM), a locally manufactured simple farm implement, in specific vertisol areas of the country - mainly in Oromiya region. BBM is used in making raised beds in order to drain excess water from water logged soils and improve soil drainage so as to allow early planting of wheat and provide an opportunity to increase yield. At the outset, training on how and when to operate the BBM was provided to both the field staff and the farmers in the intervention areas.

Improved implement

The new and improved BBM farm implement, which is lighter than earlier versions, is based on the traditional Ethiopian plough - but in addition has two separate mould board-shaped wings made from 3 mm thick sheet metal that are attached to the traditional wooden frame. As a pair of oxen pulls the BBM through the soil, it makes two parallel furrows, each about 80 cm apart, 15 cm deep and 40 cm wide that are controlled by the operator. During the field operation, the mould board-shaped wings scoop the soil towards the middle, forming heaps, while the chain attached at the back of the metal wings spreads the soil evenly and also covers the seeds. This results in raised seed beds, where the two furrows located on either side of the beds serve as outlets for draining excess water.

The BBM implement is only effective when the soil is friable - easily crumbled - and not when it is very wet. The optimum time for operating the implement is therefore short and ranges from

Number of 0.25ha wheat plots involved in scaling up the BBM technology in vertisol areas of Oromiya, Amhara and the Southern Regional States 2006 crop season.

Region	Number of plots used for scaling up BBM	Traditional (Shaga) *
Oromiya	7,779	147,338
Amhara	5,036	92,735
Southern	147	Data not available
Total	12,962	240,073

* Shaga is a better method of the traditional practices used by farmers in vertisol areas.

10-15 days after the start of the main rainy season. In order for the drained water to leave the field easily, it is imperative that the field has some slope and that the furrows are not laid down the slope and cause soil erosion by forming gullies. BBM offers a number of other benefits to farmers: it drains excess water; allows farmers to plant early and harvest early; and to sell the produce at a higher price before other crops reach the market. In cases where the first crop is earlier in maturity, it also allows the possibility of double cropping.

Planted earlier

BBM demonstrations conducted on farmers' fields in various areas of the country during the last few years have conclusively proved that wheat can be planted at least one month earlier than the traditional planting date used by the farmers of the area. The yield of improved wheat varieties grown on raised beds, using BBM, along with recommended agronomic practices, was found to be far superior to that traditionally grown on flat beds as indicated in the table opposite.

Although the advantage of BBM technology over traditional practices is evident, its adoption rate by farmers has been slow. Farmers have given a variety of reasons for the slow uptake rate, notably the high cost of the implement and inaccessibility of credit to buy it. Aware of the problem, the government decided to carry out a pilot 'scaling up' of the technology in the 2006 crop season, by making available thousands of BBM implements through its Rural Agricultural Technology Centres. These were distributed on credit, through farmers' organisations (unions), to a substantial number of farmers in vertisol areas of Oromiya, Amhara



Wheat planted on raised beds prepared using BBM

and the Southern Regional States, where demonstrations on the use of BBM have been carried out by SG 2000. Prior to dispersal of the implements, the farmers' organisations were briefed on the management of the credit system. Additional training was also given to field extension staff and farmers on how to get best results out of BBM technology. The numbers of

plots in use for scaling up BBM technology in the above regional states are shown in the first table.

Superior yields

Yield data of wheat, comparing BBM and the traditional practice (shaga), are not yet available. However, according to farmers who attended field days as well as

preliminary field assessments, it appears that wheat yields on the BBM plots are still superior to the ones grown using the traditional practice. BBM technology is set to expand in the coming season – and farmers now see the advantages over the old cumbersome model.

Average grain yield of wheat obtained using BBM as compared to the traditional practice (flat bed) in specific Districts of Oromiya Regional State, 2000, 2003 and 2004 crop seasons.

Region	Zone	District	Year *	Average grain yield (tons/ha)		
				Traditional	BBM	
Oromiya	Southwest Shewa	Becho	2000 (25)	0.5	2.3	
			2003 (10)	0.5	1.9	
			2004 (26)	1.8	2.6	
		Dandi	2000 (20)	0.5	2.5	
			2003 (10)	0.5	2.6	
			Alemgena	2000 (20)	0.9	2.4
			2003	-	-	
	Northwest Shewa	Illu	2000 (10)	0.8	2.2	
			2003	-	-	
			Ambo	2000 (10)	0.5	1.4
				2003	-	-
		Yayagullelle	2000 (30)	0.5	2.7	
2003 (10)			0.5	1.5		
Bereh Aleltu	2000 (10)		0.6	2.9		
	2003	-	-			
East Shewa	Akaki	2000 (10)	0.8	2.7		
		2003	-	-		
	Gimbichu	2000 (10)	0.8	3.4		
		2003	-	-		

* Numbers in brackets indicate number of plots used in calculating average yield of wheat/ha/year of the respective District.

Mali's 2006 rainy season was erratic, compared to 2005 when rainfall was good throughout the country and an increase over the previous year. A dry spell in June pushed many farmers to extend their planting time up to early August but with the rains continuing until October, many plots completed their cycle.

“The past 20 years of SG 2000 activities in sub-Saharan Africa have demonstrated that, given science-based technologies, farmers can produce better results and contribute towards a modern agricultural economy,” says Marcel Galiba, Country Director for Mali. “Here in Mali, where SG 2000 started in 1996, production has certainly increased over the last ten years – with a surplus in the years when there was good rainfall. The weakest link has always been at the downstream level with postharvest, processing and marketing.”

Gross grain production figures indicated that the trend was continuing with over 3.4 million mt for the 2006-07 period. This was 16 per cent higher than the five year average and one per cent higher than the previous year. While the food situation is stable, Mali's food imports will reach 146,700 mt, made up of rice (112,300 mt), wheat (4,590 mt) and coarse grains (3,560 mt). Food aid itself will provide 13,470 mt of rice and 7,670 mt of wheat.

The grain balance sheet for 2006-07 shows a net surplus of 264,300 mt in which coarse grains (millet,

sorghum, maize and fonio) represent 79 per cent of the total. Per capita food availability stands at 253 kg, up 8.4 per cent over the previous period and 18 per cent above the official consumption standard of 214 kg per person a year.

“Grain is in good supply in local markets. Price levels are lower than last year and below the five-year average for the same time of the year. Rice is still the best crop in terms of profitability in the market-place,” says Galiba.

Income opportunities

Last year, SG 2000 launched a five-year Market Oriented and Commodity Based Programme For Farmers' Organisations. Designed as a new approach for promoting postharvest, agroprocessing and marketing, to ensure food security and reduce rural poverty, it was tested as a pilot project in 2005.

Now given the acronym MAP (marketing programme), its principal objective is to increase the income-earning opportunities for its stakeholders – the farmers' organisations.

“If farmers are to have access to markets and be competitive, they



A purchase contract is exchanged between Traoré M Diallo, co-ordinator of 17 cereal security stocks of Yiromadio (Bamako), and Bakary Togola, President of Niamala Cereal Producers' Co-operative

must be organised,” says Galiba. “MAP can only be a reality through strong producers' groups and group empowerment – which we call GEM. We know that these groups are the foundation of sustainable agricultural development. But we also know their weaknesses – such as illiteracy, poor management, lack of negotiation skill and little access to information.”

Each village in the scheme will have a development centre known locally as Niet@Kene – meaning space or environment for all to move forward.

“We see Niet@Kene as centres of excellence for rural development,” says Galiba. “Stakeholders will look at all aspects of development and the opportunities that can be provided. They must keep in mind two points – prosperity and durability. They must be made to improve their income without mining their soils or jeopardising their habitat. Farmers' organisations will be registered at each development centre by 2008.”

As part of this programme, and with the objective of linking

producers to markets, a cereal stock exchange (*Bourse de Céréales*) was established in March last year in partnership with the National Department of Agriculture, the Permanent Assembly of Chambers of Agriculture, and Afrique Verte (an international NGO). Five commodities were auctioned amounting to 815,976 mt – with 60 per cent being sold for US\$162,000. The Bourse brought together producers and buyers. Galiba described it as “rich in learning.” Farmers were encouraged by the results – and agreed to hold a similar auction in Ségou in April.

Earning potential

As an indication of the amount of money now going into the empowered farmer groups through MAP, 454 producers have earmarked 529 ha of their land for marketing purposes. This is expected to provide 1,373 mt of maize, millet and rice seed – with the potential of earning farmers more than US\$366,975.

Two training sessions for MAP

Table 1: Rainfall (mm) in 2006 compared to 2005 (A) and the period 1971-2000 (B)

Regions	2006	A	B
Year	612	-196	-24
July	675	-90	-88
August	333	32	0
September	463	48	-13

A= 2006 rainfall – 2005 rainfall B= 2006 rainfall – (1971/2000) mean rainfall

took place in Bamako, the first in January 2006, and the second in September. Supported by SG 2000's Regional Agroprocessing Programme, local equipment manufacturers were trained in the use and development of maize sheller and grain winnowing machines. These have now been placed in villages in the region of Sikasso.

In partnership with the Marketing and Processing Project (MPP), financed by USAID-West Africa and monitored by Dr John Sanders of Purdue University/ Intersoil and Dr Ouendeba Botorou, former Millet Network Co-ordinator, the village of Tingoni was selected to crop 50 ha of millet for the market. To improve yield, a new cultural practice – tied-ridges – was included in the technological package. The use of fertilisers and tied-ridges gave average yields of 1,314 kg/ha, nearly double previous yields. SG 2000 was able to bring two agroprocessing enterprises, Danaya and Mam Cocktail, to meet with the Tingoni producers and come to an agreement to buy the millet. Twenty tons were sold at 100 CFA francs/kg – this included a premium of 20 CFA francs above the market price.

Galiba describes the twentieth

Table 2: Cereal Stock Exchange (CSE) of March 2006

Cereal	Quantity (kg)		Unit cost (CFA)	Total cost	
	Presented	Sold		CFA	\$
Maize	530,803	221,200	110	24,332 000	46,435
Sesame	215,000	215,000	250	53,750 000	102,576
Millet	53,165	53,165	135	7,177 275	13,697
Rice seeds	14,316	-	-	-	-
Soybean	2,685	-	-	-	-
Total	815,976	486,365	-	85,259 475	162,708

anniversary celebrations of the SG 2000 programme in Africa and the Symposium on ‘Stimulating African Smallholder Commercial Agriculture’ held in Bamako (see page 1) as an excellent opportunity to showcase Mali's agriculture.

Optimal productivity

President Amadou Toumani Touré again expressed his commitment to agricultural intensification with support for an ‘agricultural orientation law’ which will offer “the tools and guarantees required for the emergence of a modern agricultural economy based on high production targets and optimal productivity”. The President stated that he would encourage “the mobilisation of private investment for the

development of agriculture in the broadest sense – from production to processing.”

Under the CSLP (Strategic Framework to Fight Poverty) adopted since 2002, the Government has launched its National Programme for Food Security (PNNSA), covering the period 2006-10. The budget of nearly US\$228 million will cover eight sub-programmes dealing with natural resource management, crop intensification and diversification, marketing and agroprocessing, health and nutrition.

“At the present time the agricultural sector remains subsistence agriculture – despite its impact on the economy. It provides employment and income for more than 80 per cent of the population, approximately 40 per cent of the GDP and around 60 per cent of public earnings,” says Galiba.

“Mali is constrained by limited and erratic rainfall, low control of water, poor soils, a low level of agricultural inputs supply, and a low level of access to agricultural equipment. There is pressure on land, a lack of infrastructure and a lack of organisation of stakeholders in the farming sectors.”

Galiba, however, also points to the potential – 2,500,000 ha of land suitable for irrigation, a young and vigorous population, the strong emergence of producers’



A good harvest in Niamala production area



Constructing a Niet@Kene at Niamala – a future centre of excellence

organisations, considerable local research achievements, an institutional environment favourable to private investment in the farming sector – and the new law of agricultural orientation, as mentioned by President Touré. “We at SG 2000 believe,” he says, “that through pilot villages and the MAP GEM – the commodity chain approach oriented towards the market – farmers’ organisations and producers can improve their incomes and take the road of relative prosperity. “It is important for Mali and its agricultural industry that this happens. Subsistence agriculture can never be an engine of growth for the economy.”

This is the 15th year of the SG 2000 programme in Nigeria which started modestly in two states, Kaduna and Kano, and with two crops – maize and wheat. Since that time well over 100,000 farmers have benefited from the programme, which has expanded into 12 core and six facility states. The crops involved include maize, rice, millet, sorghum, wheat, cowpea, soybean, sesame, cassava and cotton.

“The promotion of crop-based extension packages has led to a substantial increase in crop yields,” says Ahmed Falaki, SG 2000 project co-ordinator. “We are also promoting the New Rice for Africa (NERICA) amongst upland farmers and QPM for better nutrition. We encourage farmers to use conservation tillage – to reduce the drudgery of constant weed control. We introduce labour saving agroprocessing technologies suitable for micro-enterprise development.”

Nigeria’s farmers – as with most small-scale farmers in Africa – are dependent on the rains and, last year, a prolonged dry spell after the start of the rains in mid-April, caused some anxiety. However, the rains stabilised, were uniformly distributed and lasted up to mid-October, instead of stopping by mid-September.

Confidence

“This gave us confidence to accelerate the transfer of programme ownership and responsibility to states and local governments,” comments Falaki. “They are now scaling up the transfer of crop-based technologies to their own farmers – using their own resources to provide inputs on credit, establish training plots and build the capacity of their frontline staff.”

Bauchi, Kano and Zamfara states have been particularly effective in this area with maize demonstration plots (see table). The states also recruited additional frontline extension staff, trained them, and provided motorcycles for extension visits to farmers. Over 44,000 target farmers were trained and provided with loans for inputs by the governments of the three states.

With SG 2000 now concentrating



A farmer working with SG 2000 posing with his children and grandchildren at Rogo village, Kano State

on NERICA and QPM, the 2005 wet season was the last for supporting Management Training Plots (MTPs) under the SG 2000 programme. The average yield was 2.1 per cent higher than the previous season at 4.6 t/ha – and higher than the national average. Across the states, the highest yield recorded for the season was 7.4 t/ha in Kano State. The average cost of production per ha was US\$386 with the net income at US\$728. The net income to farmers for the season was 21 per

cent higher than the previous season – US\$376.

During the 2005/6 dry season, some 385 wheat MTPs were established in Jigawa and Kano states. In this case, the average yields at 3.7 t/ha were lower than the previous season (3.9 t/ha). The reason for this was that temperatures had remained consistently high during the early growth stage of the crop, contributing to a decline in yields. The national average yield was 1.2 t/ha during the same season with the average production cost per ha at US\$1,734 – the average net income being US\$1,091, 30 per cent higher than the previous season.

Joining hands

Meanwhile, through the rice regional programme, a number of partners joined hands to support SG 2000’s work with NERICA. These included WARDA, USAID-Markets, the Presidential Initiative on Rice, the Multinational NERICA Rice Dissemination Project and PrOpCom.

“The rice season has faced major problems,” says Falaki, “including a lack of competitiveness resulting from low and uneconomic productivity, poor quality of produce in meeting market specifications, a failure in quality standards, and little or no emphasis



Generating income by growing watermelons off-season assists SG 2000 Kangarwa famers of Jigawa State to expand their production of food and cash crops

on encouraging private sector participation.”

Working with SG 2000’s Regional Rice Programme, which produced some NERICA foundation seed, SG 2000 Nigeria produced 25 mt of seed during the 2005 wet season – which doubled in the 2005/06 wet season, using farmer contract growers.

Around 1,965 MTPs of NERICA and rice were established under the supervision of extension staff while 8,915 additional plots were set up by state governments, with input loan packages provided to farmers to be paid back after harvest.

Major problems

“If the main problem of the rice sector is the availability of seed,” says Falaki, “the second most serious problem is postharvest and the processing of rice in order to meet the stipulated quality standards and demand specifications to attain a guaranteed market for the commodity at competitive prices.”

SG 2000 is already promoting a small-scale village level rice parboiler made by a SAFE graduate at Ahmadu Bello University. This has led to several women’s groups parboiling and polishing rice to an acceptable standard for local markets.

On a larger scale, SG 2000 – in partnership with an indigenous fabricating company called Hanigha – is supplying processing machines (parboiler, cleaner/ de-stoner, dryer and polisher) through a revolving loan package to rice growing communities in Magarya village (Jigawa state) and Gombe (Gombe State).

Through SG 2000’s Regional QPM/ Seed Programme, 250 mt of certified seed has been sold to farmers. This also provided support for breeder and foundation seed production with certified seed being produced by private sector companies and local farming communities.

Quality checks

“The QPM quality checks are keeping pace with production,” says Falaki. Extension agents and a number of skilled farmers have been trained and provided with light boxes to ensure that quality is maintained at field level while the laboratory at Ahmadu Bello University is shortly to start QPM quality and analysis. More than two QPM villages have been established in the six SG 2000 operational states and a pilot QPM nutrition education programme has begun in collaboration with the State Ministry of Health at Muntsira village in Kano State.

Agroprocessing, too, is making a mark – the main focus being rice processing, threshing/ winnowing of field crops and oil extraction.

“These technologies have proved to be efficient, acceptable and affordable,” comments Falaki, “including a wooden winnower, a multi-crop planting marker and a village-level oil extractor.”

Field days held across the SG 2000 states have demonstrated the value of QPM and NERICA, agroprocessing, and water harvesting and drip irrigation technologies – particularly in the marginal rainfall areas for growing high value crops and raising livestock to generate better income. Farmers were interested, too, in a new millet variety called Zativ. Developed by ICRISAT, Zativ is an early maturing, high yielding, drought resistant millet tolerant to most pests and diseases.

National level

At a national level, the Federal Government has launched a programme entitled “Doubling maize production”, to meet the national demand for maize by industry – flour mills, breweries and feedmills – as well as for human and animal consumption. The programme has a three-year target period and is run on SG 2000 maize production technology lines.

For its part, SG 2000 has been



A wooden winnower developed through KNARDA/South-South co-operation is being disseminated to farmers by SG 2000 to curtail the drudgery involved in winnowing of grains

testing a new technology – high density planting – doubling the plant population from 53,333 to 106,666 per ha, the fertiliser rate per ha, and use of herbicide for total weed control. This has produced dramatic results. Instead of the 4 to 5 t/ha usually obtained by farmers, the results from 60 demonstration plots indicated yields of an average 11 t/ha.

“We look forward to the reaction from farmers at our field days!” says Falaki.

A number of farming communities have shown appreciation to SG 2000. Africa Director Marco Quiñones had traditional titles conferred on him at separate ceremonies by two respected traditional leaders, the Emir of Gumel in Jigawa State and the Emir of Akko in Gombe State.

“It is a great honour for me,” commented Quiñones, “but the achievement belongs to the farmers who are now receiving a good return for their efforts.”

Scaling up maize MTPs (ha) by some SG 2000 states

Year	Bauchi	States Kano	Zamfara
2004	3,260	2,500	6,368
2005	4,800	15,250	20,720
2006	5,245	16,300	22,526

Maize/QPM MTPs during 2005 wet season

State	No. of farmers	No. of ha	Yield range (kg/ha)	Average yield (t/ha)
Bauchi	763	190.80	2,060-6,572	4.2
Gombe	1,852	463.00	1,370-7,147	4.8
Jigawa	493	123.30	3,715-6,678	5.0
Kano	676	168.93	2,818-7,413	4.8
Katsina	112	28.01	2,716-6,642	4.2
Kaduna	256	64.00	4,776-5,542	5.1
Total	4,152	1,038.04	-	4.7

Uganda remains a net food exporter and principal source of food security in the Great Lakes and East Africa region. The World Food Programme (WFP) purchased 170,000 mt of maize and beans last year – eight per cent of its total food donations – with US\$40 million bought from small-scale farmer groups. It intends to increase this to 20 per cent because of improved standards of maize quality – a result of the joint efforts of various partners, of which SG 2000 is one.

“High maize prices reflect shortages of production in Tanzania and Kenya,” says Country Director Michael Abu Foster. “In Uganda, a maize crop of over 700,000 mt was harvested with another 600,000 mt expected at the end of the year. Areas under rice are also expanding. The production areas under NERICA have grown to 20,000 ha from 10,000 ha in 2004. The approach has shifted from increasing demonstrations within national programmes to scaling up community interventions that help develop value chains of commodity crops.”

In early 2006, Uganda experienced less favourable weather conditions nationwide – particularly drought – resulting in a decline in performance in the agricultural sector. However, the weather improved in the latter part of the year with heavy rainfall across the country until December. On the whole, internal food sources were adequate and Uganda provided a significant share of food for Internally Displaced People (IDPs) in camps in Northern Uganda.

Agricultural reforms

Uganda’s agricultural investments are guided by the Plan for Modernisation of Agriculture (PMA) – a sector-wide policy framework that focuses on increasing productivity and integrating agricultural programmes to build synergies across various sectors. The impact of the PMA has helped to create new institutional arrangements that support production, agroprocessing and marketing more effectively than the previous single focus projects. National Agricultural Service Institutions (NASI) such as the National Agricultural Advisory Services (NAADS), the National Agricultural Research Services (NARS) and farmers’ organisations continue to implement new programmes in the context of institutional reforms – and the new emphasis, by NAADS, on establishing higher level farmer organisations is seen by SG 2000 as a major opportunity for scaling up the impact of agricultural innovations.

Sasakawa has been assisting NAADS in this area, using



Loyce Ogoola – a ground farmer of TMATA One Stop Centre in Tororo attending to her field

experience gained from its own One Stop Service Centres (OSSC) – the community-based approach providing rural populations with access to agricultural services through farmer-owned and farmer-managed associations. A new research initiative, through NARS, is now ready to roll out programmes after extensive reorganisation to permit a more active private sector involvement in providing research services.

In July 2006, the previous National Agricultural Research Organisation (NARO) was restructured as NARS to make the country’s research system more effective and demand driven. There are now six national research institutes for research of national strategic importance and six zonal agricultural research institutes (ZARIS) undertaking zonal adaptive research.

Targeting communities

The One Stop Centre Associations (OSCAs) will be used as a platform for launching interventions focusing on developing value chains for commodity crops to meet commercial demand for farmers’ produce. SG 2000 interventions will involve a targeted number of rural communities over a five-year period so that tangible results and impact can be adequately measured.

The year 2006, therefore, saw the start, by SG 2000, of a move away from a general national extension programme to targeting specific rural communities. Greater resources were allocated to establish farmers’ organisations of specialised producer groups on a formal basis. The challenge for national programmes will be to replicate the commodity value chain approach in other communities through specific partnerships supported by additional resources. SG 2000 Uganda, the Japan International Cooperation Agency (JICA) and NAADS have been key partners in these initiatives – working to scale up the impact of technology application and integrate innovations into the national agricultural service system.

Four additional OSCAs have therefore been set up which are enabling 11 farmers’ associations to provide services to 8,800 members and their neighbours in 14 districts. Value chains for upland rice and Quality Protein Maize (QPM) have been

Table 2. Summary performance of QPM block farming – 2006

District	Value of inputs UGX Millions	Area planted hectares	Estimated Production (MT)	Recovery (MT)		
				Expected	Actual	Per cent
Bugiri	2.044	14	49	6.8	5.3	78
Busia BABTA	0.82	5	17.5	2.7	2.0	74
Iganga RAPTA	1.312	8	28	4.3	1.6	37
Mpigi NABTA	3.608	22	77	12	9.0	75
Mukono BAMTA	4.985	30.4	106.4	30.6	24.0	78
BAMTA Wakisi	1.64	10	35	5.4	4.0	74
Nakasongola	0.82	5	17.5	2.7	1.2	44
Luwero ZAABTA	0.492	3	10.5	1.64	1.6	98
Kamuli	0.492	3	10.5	1.64	1.2	73
Total	16.213	100.4	351.5	60.98	49.9	70

* Average yields at 3.5 MT/HA.

established and scaled-up through the use of 671 demonstration plots at these OSCAs.

Other interventions have included adding value through postharvest training at 78 sites on grain threshing, drying, milling and grinding, improving access to markets through training on collective marketing at 24 sites, and integrating SG 2000 and NAADS methods to assist with institutional development in four districts.

“There was also a need,” says SG 2000’s Project Co-ordinator Emmanuel Kayaayo, “to disseminate NERICA production technologies in two selected districts beyond the project area and 787 seed multiplication plots were established. This was done in partnership with JICA.”

Kayaayo feels that progress is being made, not least in that responsibility for maintaining services is being transferred to rural communities.

“There is increased access to services for production, postharvest and marketing. By setting up One Stop Centres in the four additional districts of Bugiri, Kamuli, Nakasongola and Kyenjojo, the project area for service centres has been greatly enlarged from 35 sub-counties in seven districts to 46 sub-counties in 11 districts.”

Kayaayo reports, too, that “there was increased membership of farmers’ associations from 24 per cent in the previous year to 86 per cent of the intended target. All associations have seen improved management and organisational capacity. Some 46 executives and 280 farmers’ leaders were trained in these areas of professional activity – a high proportion of them being women.”

Seven of the more mature associations have completed a five-year strategic plan and produced annual work plans for 2006 while financial and administrative controls were also put in place. Seven centre managers were supported and trained, on an interim basis, to manage the associations. Savings were mobilised at group and association level and the most developed associations audited by EPSEDEC, a partner organisation. More than

1,500 farmers were trained, thus strengthening their contribution to the maize and rice value chains.

Poor farmers were helped with voucher assisted demonstration kits, enabling them to adopt technology and receive income, and subsequently register for the associations. Progressive farmers were assisted to scale up production on 1 to 5 ha plots through a co-investment scheme for block farming on a cost-recovery basis. Complementary postharvest and marketing training activities were undertaken to add further value to each maize and rice crop.

QPM value

The maize QPM Longe 5 (Nalongo) was planted on over 100 ha in block farms. First season yields averaged 3.5 t/ha and ranged from 2.3 t/ha to 4.1/ha. Nine associations participated in block farming of QPM with 49.9 mt sold through collective marketing. Seventy per cent of allocated funds were recovered through effective One Stop Centre Association Management. SG 2000 will slowly change the emphasis from demonstration plots to block farming as the organisational and management capacity of farmers’ associations increases.

SG 2000, in collaboration with WFP and Uganda Grain Traders Limited (UGTL), jointly trained OSCA farmers in collective marketing. Secondary level processing of maize grain to flour is planned in two associations. At Busia OSCA (known as BAMTA), a maize-grinding mill is being installed to process maize flour for human consumption. Farmers at Buwagajo BAMTA – another OSCA – have installed a feed processor for preparing poultry feed.

Pig losses

An outbreak of African swine fever caused severe loss in piggery for farmers across the country. Many subsequently turned to poultry production – using QPM for feed. In one of the associations, farmers produced tertiary products, eggs and improved cross-bred local birds, thus strengthening the QPM value chain. A total of over 310 birds and several thousand eggs have been



Minister of Agriculture, Animal Industry and Fisheries, Hilary Onek, at a closing ceremony for training fabricators

produced at this site alone, with a further 17 sites established to promote poultry through the QPM maize value chain.

The availability of QPM seed has been assured by previous investment in private-public partnerships for seed production and distribution. Nalongo seed is now sold on a commercial basis by at least six seed companies. It continues to be the most widely available maize seed variety on the market with 3,875 mt of seed sold over the past four years.

In rice, 305 mt of NERICA seed was produced in ten districts on 497 multiplication plots of one acre each, totalling 103.5 ha, of which 14 mt was maintained in a seed bank by participating farmers.

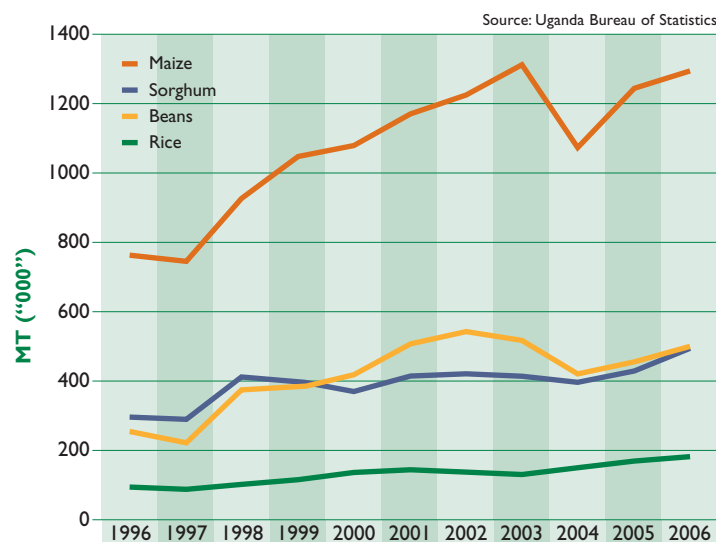
Block farms totalling 13 ha produced over 40 mt of NERICA 4 grain. A total of 44 operators

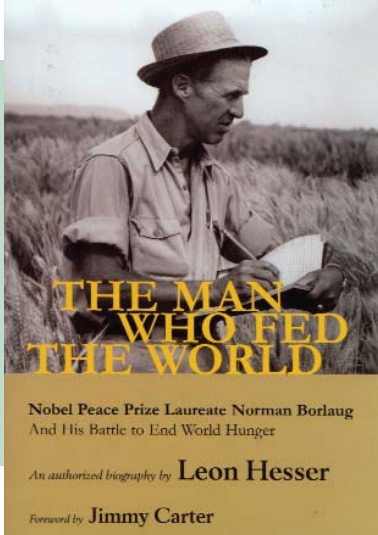
were trained on the safe use of herbicides while yield trials on farmers’ fields confirmed that NERICA 4 continues to outperform other types of available rice varieties.

A total of 78 farmers were trained on rice postharvest technologies. Field days last year attracted over 540 farmers and 40 artisans were trained in 13 training sessions to manufacture and operate a variety of equipment for drying and cleaning rice.

As part of the agroprocessing programme, equipment used for training purposes included a powdered feed mill, a manual feed mixer, maize shellers, a maize mill and polisher, cassava graters, powdered chippers, a screw press, motorised and multipurpose rice processing threshers and a motorised ground nut paste grinder.

Disaggregated cereal production trends in Uganda (1996-2006). Major cereals production trends 1996.





The title of this biography, *The Man Who Fed the World*, is indeed appropriate. My good friend Norman Borlaug has accomplished more than any other one individual in history in the battle to end world hunger . . .

Since 1986, I have had the distinct pleasure of working with Norman Borlaug in sub-Saharan Africa where, in spite of AIDS, endemic malaria and other maladies, populations are increasing faster than food supplies. I have witnessed first-hand the reverence that thousands upon thousands of Africans have for Dr Borlaug's untiring efforts to relieve their hunger.

Norman Borlaug's scientific achievements have saved hundreds of millions of lives and earned him the distinction as one of the 100 most influential individuals of the 20th century. I commend Leon Hesser for making more people aware of the remarkable life and achievements of this American hero.

Former US President Jimmy Carter in his foreword to the book. For copies see www.amazon.co.uk

SG 2000 publications and videos

For copies please contact Raitt Orr & Associates Ltd in London

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Sasakawa Africa Association 20th Anniversary Report.

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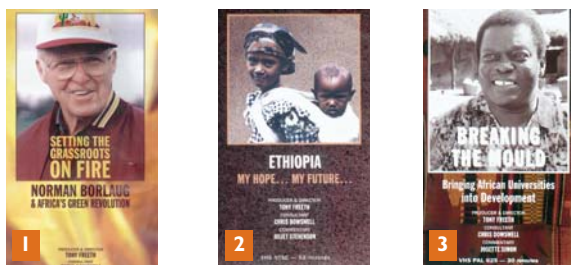
New publications (2006):

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

Videos



1. Setting the Grassroots on Fire – Norman Borlaug and Africa's Green Revolution (1999)
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All videos are available in English, French and Japanese. Video formats are PAL, Secam and NTSC.

Other videos available:

- Fulfilling the Promise. How nutritionally-improved maize can alleviate malnutrition in maize-dependent countries (1997)
- Facing the Future. The SG 2000 Programme for Agricultural Development in Africa (1996)
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