

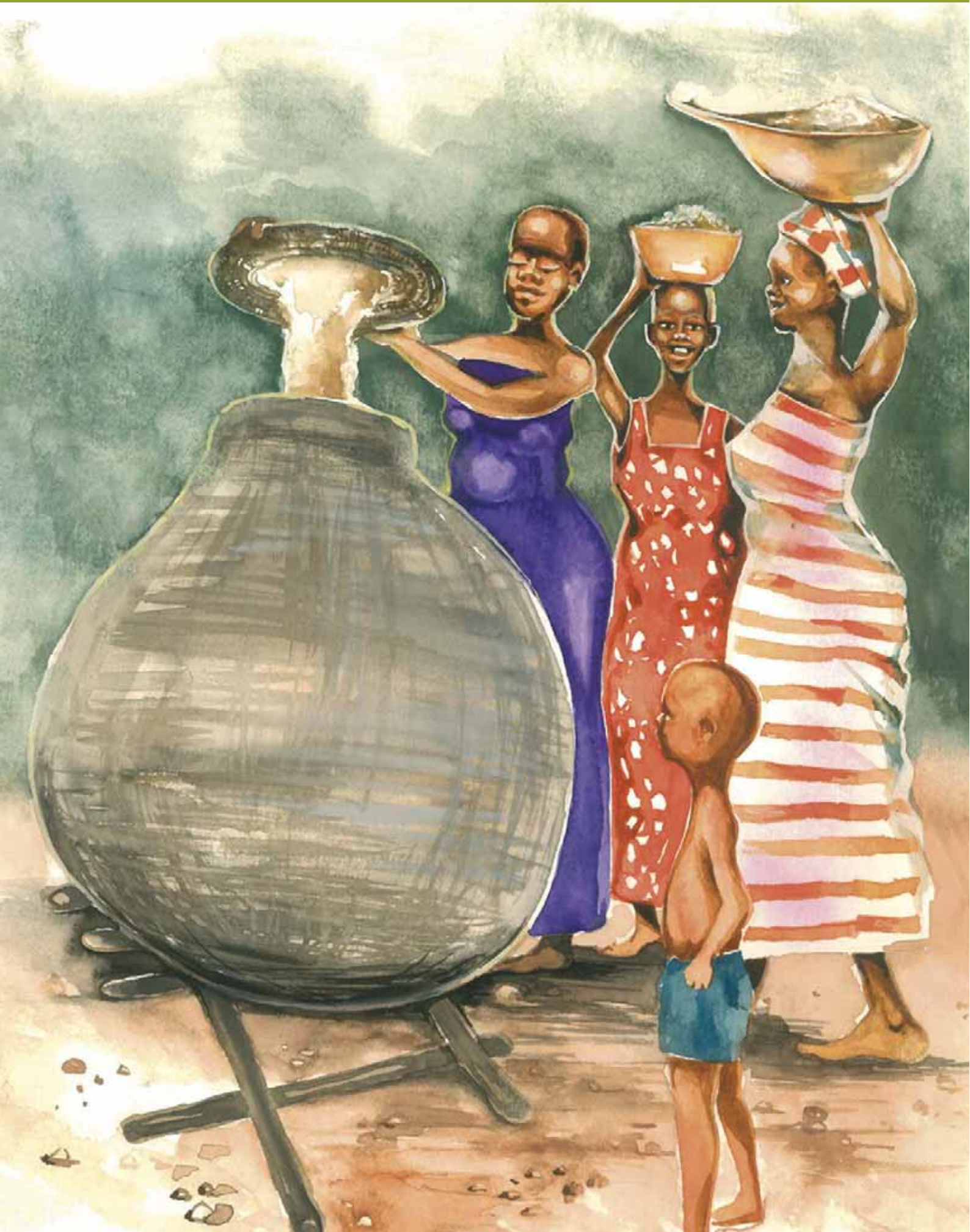


The African Agricultural
Technology Foundation

Harnessing the Potential of Public/ Private Partnerships

Annual Report 2005

Better tools, better harvests, better lives



Harnessing the Potential of Public/Private Partnerships

Annual Report 2005



Annual Report 2005: Harnessing the Potential of Public/Private Partnerships

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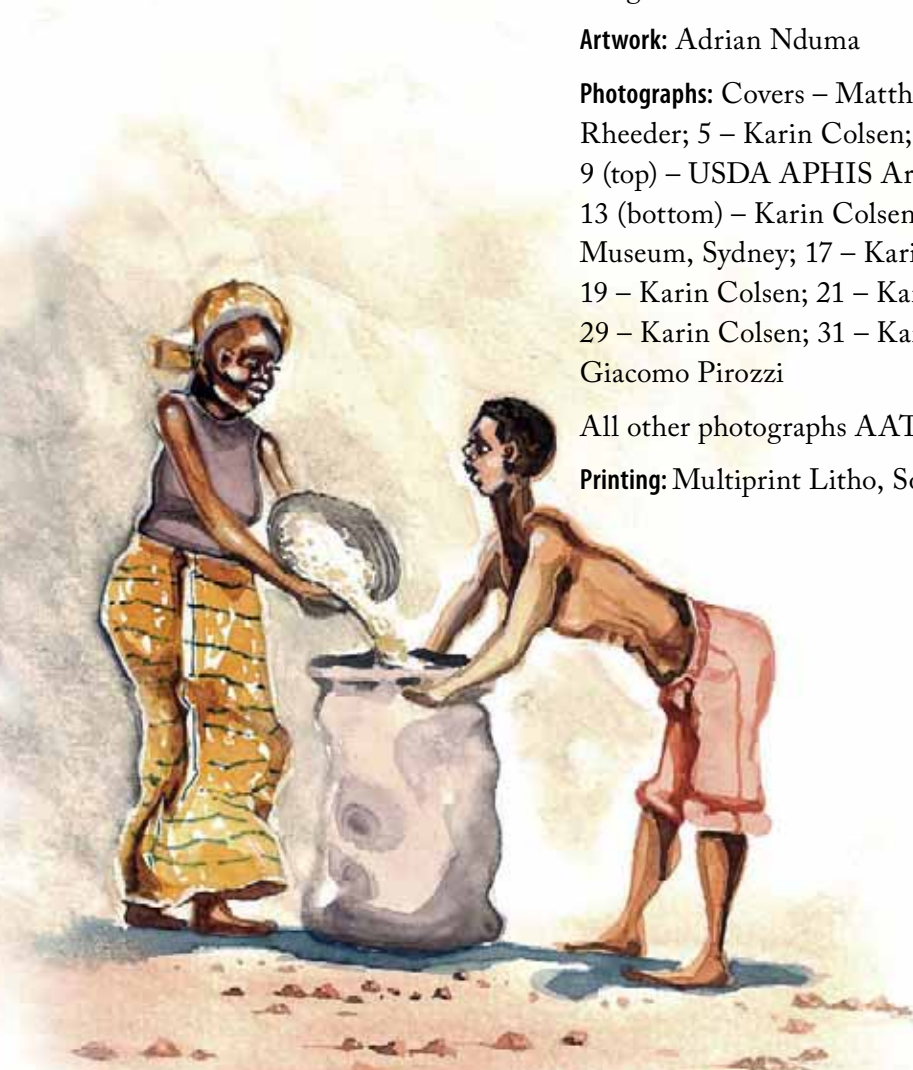
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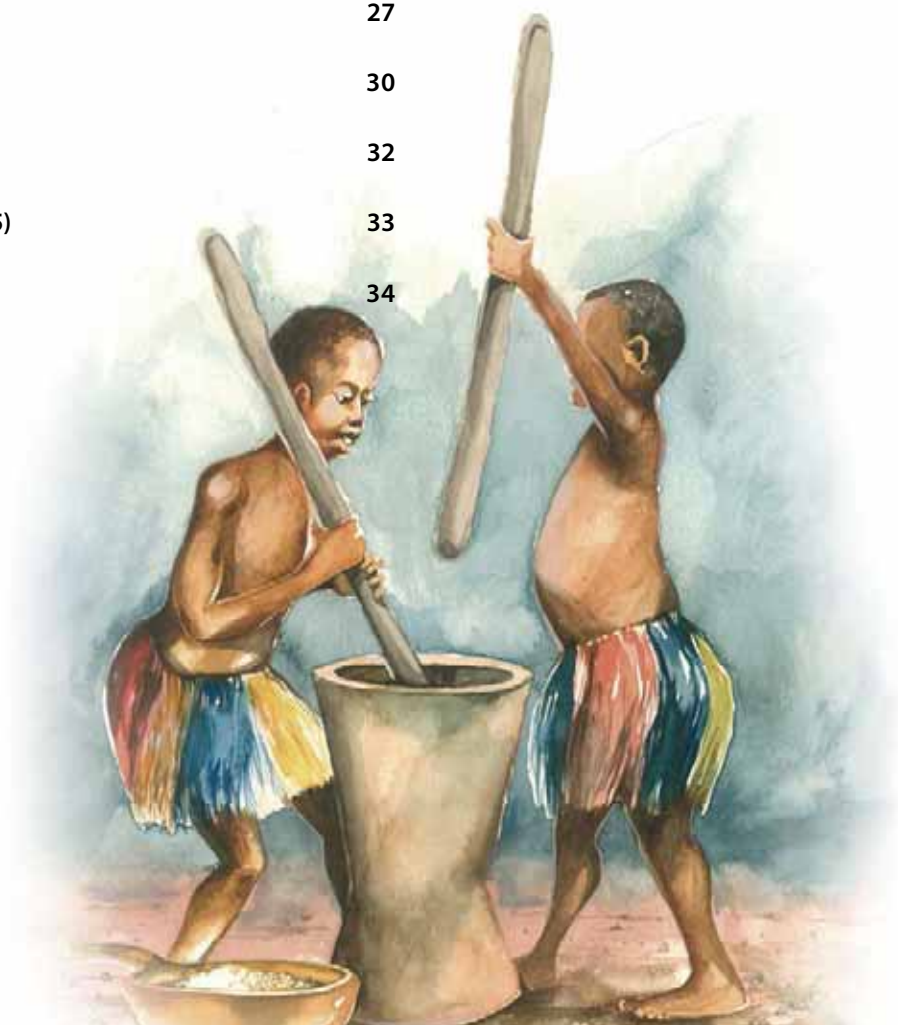
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Message from the BOARD CHAIR

AATF is in the business of brokering public/private partnerships that are specifically designed to bring the fruits of advanced proprietary research to bear on the problems faced by millions of Sub-Saharan Africa's resource-poor smallholder farmers.

Our work is in the background: negotiating, solving problems and assuaging peoples' very real concerns. We add value to the work being carried out by others by putting African scientists in touch with the technology they need to do their work. We act as a link between public and private institutions that own technologies, and we help to bridge the gap between those institutions and the smallholder farmers in the region who can realise the potential of new agricultural technologies. Everyone involved has their part to play in overcoming chronic hunger, malnutrition and poverty to ensure that Africa will soon achieve food security and prosperity. Our role is to make sure that the institutions that can bring new technologies to smallholder farmers are engaged and committed. We are immensely pleased to report that it is working.

The Foundation's efforts have produced significant results this year. As can be seen in this Report, outstanding progress has been made in several key projects. Ground-breaking deals for technology access have been made and partnerships for technology delivery have been formed that will change the lives of millions of smallholder farmers in Sub-Saharan Africa.

Africa faces many difficult challenges as it looks to the future and contemplates how it will lift itself out of poverty and ensure its food security. Improving the productivity of agriculture – especially smallholder farming – is increasingly recognised on the continent as key to driving the development process and to generating widespread economic growth.

It gives me great pride to be able to say here: Thank you – to our investors who have put their faith in AATF, to those who are donating technology, and to our many partners, advisors and friends who are working hand in hand with us. On behalf of the farmers in Sub-Saharan Africa and ourselves, we are grateful to all of you for taking with us our first steps on the long road to making the vision of eradicating hunger and poverty in Africa a reality.

Prof Jennifer Ann Thomson
AATF Board Chair

Message from the EXECUTIVE DIRECTOR

The year 2005 was an exciting one for AATF, a year in which the Foundation witnessed the realisation of some of the promises made to stakeholders at its inauguration. It has been a year of substantive accomplishments. The *Inaugural Annual Report* focused on the origins of the Foundation – how the idea of AATF came into being and how that idea took shape and became manifest in a tangible organisational form. It further described what AATF planned to do. Now AATF can point with pride to what it has done and is doing, and to what its accomplishments portend for future endeavours.

One of the most significant achievements in 2005 was the signing of a breakthrough licensing agreement between Monsanto and the Foundation. The accord provides a royalty-free, non-exclusive license for the Foundation to use Monsanto's *cry1Ab* gene for the development of insect-resistant cowpea varieties. Under this model agreement, the Foundation is allowed to sublicense Monsanto's proprietary technology to collaborating institutions that will develop *Bt* cowpea varieties. AATF has executed sublicenses with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Plant Industries in Australia and the International Institute of Tropical Agriculture (IITA) in Nigeria, all of which are collaborating to produce *Bt* cowpea varieties that are well-suited to farming systems in Sub-Saharan Africa. Other licensing agreements for rights to a broad range of technologies – gene technologies, biological control technologies and mechanical implements – are being negotiated with a number of public and private institutions.

Significant progress in 2005 also came in the fight to control *Striga* in farmers' maize fields. The International Maize and Wheat Improvement Center (CIMMYT), in collaboration with the Kenya Agricultural Research Institute (KARI) and the Weizmann Institute in Israel – using maize germplasm provided by BASF – developed a technology known as STRIGAWAY® based on herbicide-resistant maize seed coated with the herbicide Imazapyr.

AATF facilitated the introduction of STRIGAWAY® maize seed technology to about 5,000 farmers severely affected by *Striga* in western Kenya. The dissemination of the new seed was supported by Non-Governmental Organisations (NGOs) and extension services of the Ministry of Agriculture. The demand for seed among farmers is growing, and the Western Seed Company and Kenya Seed Company are multiplying the improved maize seed for sale to farmers for the 2007 long rains season.

Through its work AATF has clearly demonstrated the viability and importance of fostering partnerships between technology donors, public research institutes that adapt the technology, seed companies that bring the products of the technology within farmers' reach, NGOs and government extension agents that familiarise the farmers with the technology.

AATF will stay on course in its mandate of accessing technologies that hold the potential of increasing small-holder farmers' productivity, assembling partnerships to convert these technologies into useful products, and ensuring appropriate stewardship for sustained use of these products.



Dr Mpoko Bokanga
Executive Director



SUB-SAHARAN AFRICA:

Where Hunger and Poverty Stifle Potential

In Kenya, a farmer looks with dismay at the devastation of his crop. He had planted a full crop of maize – enough to feed his family of seven and still have some to sell for cash. But now all his hopes for the season are dashed; there is little to harvest. His maize crop has been strangled, sucked dry by the *Striga* weed. He does not have enough money to buy food to feed his family throughout the year. And as has been the trend, it is likely that the *Striga* problem will be even worse next year.

In Uganda, another farmer considers the bananas that would have provided her family with the carbohydrates they need. She even planned to sell some of her crop in the local market. But her crop has fallen victim to the banana bacterial wilt disease that is spreading like bushfire across the region.

These are but two examples of the struggles faced by smallholder resource-poor farmers throughout Sub-Saharan Africa, where nearly two-thirds of the poor depend on farming for their survival. These farmers and millions more like them feel helpless as they watch their labour going to waste, their land lying idle, and their dreams for a better life dashed yet again.

Sub-Saharan Africa has the highest hunger and malnutrition rates in the developing world – nearly 200 million people lack food security. The vast majority of the region's poor people live in rural areas and depend on agriculture for their livelihoods. But Sub-Saharan Africa farming operations often suffer from poor crop yields, and consequently low incomes, because farmers lack access to improved agricultural technologies.

In Asia, Latin America and elsewhere in the developing world, crop yields have doubled or even quadrupled in the past 40 years thanks to the use of modern agricultural technologies. In contrast, farm productivity in Sub-Saharan Africa has actually decreased; today the region is characterised by poor rural infrastructure, a lack of ready access to affordable inputs and the widespread use of outdated farming methods.

UNLEASHING THE POWER

of Public/Private Partnerships

Public/private partnerships (PPPs) hold great promise for achieving agricultural development in Africa. Indeed, PPPs are necessary considering that no single institution can, by itself, achieve the task of improving farmers' livelihoods.

It is imperative that partners working across the agricultural value chain be mobilised and organised to provide synergy and sustainability of deployed innovations on farmers' fields. Consequently, institutional alliances – which strive to unite a wide variety of public and private sector organisations around shared research and development objectives – are on the increase.

AATF takes a very proactive role in facilitating the creation and sustenance of such partnerships. In fact, they constitute the Foundation's primary means of bringing advanced proprietary agricultural technologies, know-how and information to bear on the problems faced by smallholder farmers in Africa.

In order to be effective in fostering the creation of PPPs and in unlocking their latent potential for the good of society, AATF invests in understanding what it takes to make such partnerships effective.

Alliances between public and private sector organisations are inherently complicated. The goals, objectives, incentives, modes of operation and indicators of success tend to be very different between such organisations. Yet there are clearly areas of common interest shared by these entities – areas of endeavour in which success brings benefits to all involved.

One of AATF's roles is to help identify such common ground, to facilitate its cultivation and motivate partners to come together. Elsewhere in this report we describe successful PPPs with which AATF is involved and the



A busy market in Kampala, Uganda. Many of the suppliers of the produce for sale in such markets throughout Africa are smallholder resource-poor farmers, who rely on sales to sustain their families.



role(s) that the Foundation is playing in achieving their symbiotic potential. While each of these partnerships is unique, all share to a greater or lesser extent a common set of characteristics.

Engagement

Creating a successful PPP requires all partners to be fully engaged in the process from the outset.

Participating organisations must recognise that a considerable time commitment will be required for detailed discussions aimed at providing clarity on shared objectives, negotiating the roles and responsibilities of each partner, and determining in advance how disagreements will be fairly resolved. Because the organisational cultures of public and private entities can be divergent, considerably more time may be needed to achieve consensus on these kinds of issues than would be the case with like-minded institutions.

Commitment

Successful PPPs are characterised by an unusually high degree of commitment by the partners.

This dedication goes beyond that embodied in the legal agreements that establish the partnership. It is a heartfelt commitment to achieving the aims of the alliance, sometimes even in spite of the legal framework that defines the partnership.

This kind of commitment rests on mutual trust and an abiding shared belief in the overriding purpose of the partnership. In the context of that commitment and trust, partners find themselves much more willing to enter into confidentiality agreements – to allow partners a glimpse of what is within the power and control of others involved and to provide each other with proprietary information without fear of betrayal.

Patience and understanding

That patience is a virtue becomes clear when public and private sector organisations join together in a common cause.

As noted earlier, the organisational cultures of such entities are normally very different, and those involved in PPPs must have patience with one another – and consciously strive to understand how and why their perspectives differ – in order to reap the potential benefits of the alliance.

Flexibility

Successful partnerships are characterised by flexibility. They are both able and willing to change what they are doing and how they are doing it, and to evolve in response to new circumstances or challenges.

Such flexibility is indicative of the mutual commitment and trust of the partners, and reflects an understanding that the goals, objectives and *modus operandi* of the partnership must be periodically and systematically reviewed and, if needed, modified.

Adequate resources

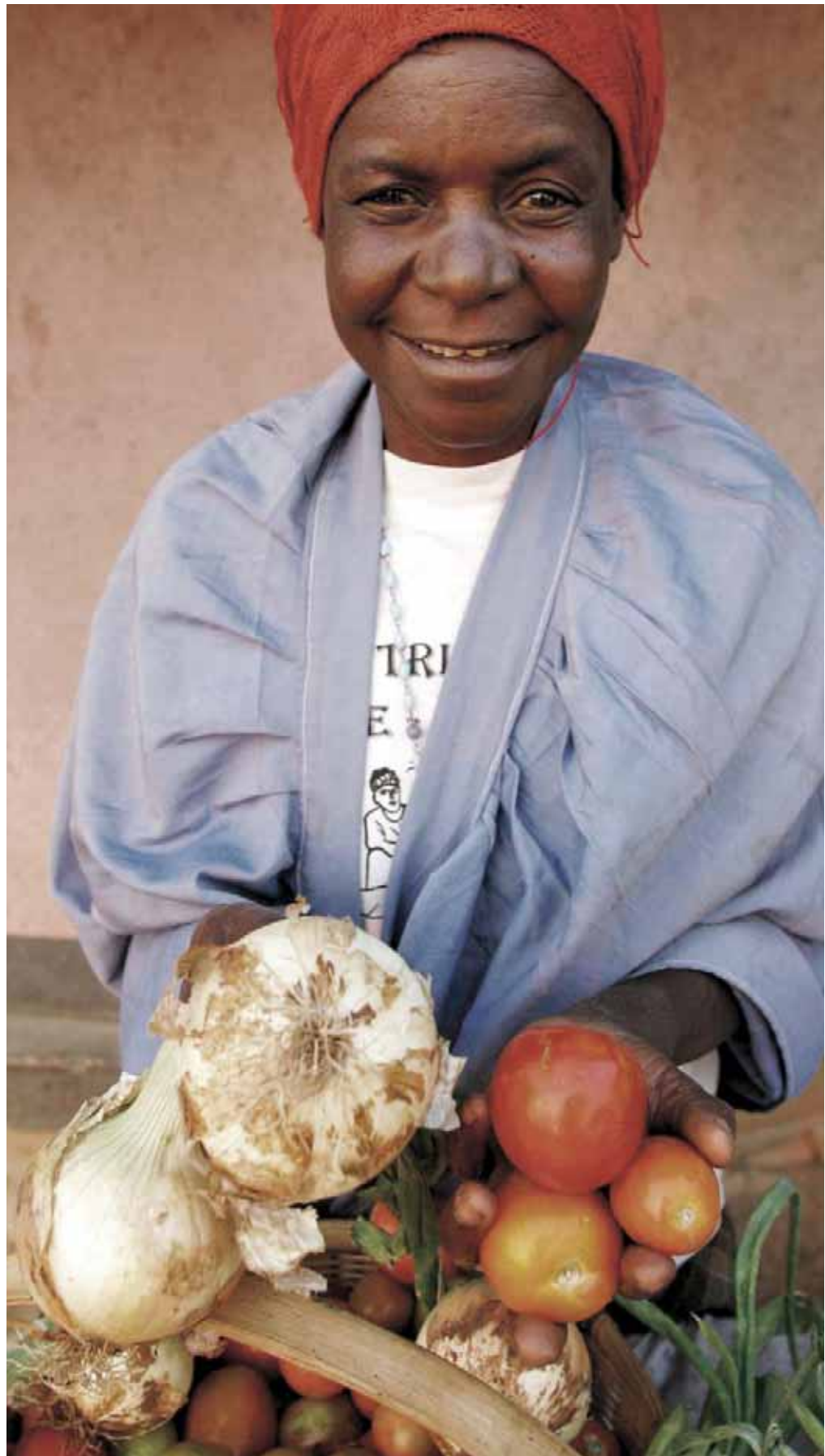
Having adequate financial and in-kind resources available is critical to the success of a public/private partnership. Resolving this issue paves the way for dealing with all other barriers to success; it gives momentum to the partnership and imparts an ability to focus on goals, objectives, research and development, and marketing, as well as the critical activities of performance monitoring, evaluation and impact assessment.

Ready access to information

In any organisation, decision making is shaped by the information available. The same is true within a partnership, though the flow of information to the people who need it is often much more complicated. Successful partnerships give careful attention to information systems and flows, and ensure that key information is readily available to decision makers. Clear, open and timely communication fuels trust and mutual commitment, and helps bring all parties together around issues that must be addressed.

An agreed face for the partnership

A potentially thorny issue that requires explicit discussion and agreement is what the partnership will look like to “outsiders”. Successful PPPs have reached an accord on who will represent the alliance to its many potential audiences – financial supporters, beneficiaries, other agricultural R&D organisations that could become involved in the partnership, and in many cases the media.





CONTROLLING “WITCHWEED” in Sub-Saharan Africa

Striga hermonthica – commonly known as “witchweed” – is an aggressive parasitic weed that seriously affects the production of cereals such as maize, pearl millet, sorghum, upland rice, sugarcane and Napier grass. *Striga* infests as much as 40 million hectares of farmland in the region and causes yield losses ranging from 20% to 100%. It affects the livelihoods of more than 100 million people causing annual crop losses estimated to be worth US\$ 1 billion.

Striga weed attaches to the roots of growing host plants through the haustorium, siphoning off water and nutrients for its own growth. In addition during its subterranean phase, it initiates damage to its host through phytotoxins. Eventually, host plants that succeed to emerge above ground may wither culminating in total crop loss in severe infestation.

Emerged *Striga* produces characteristic “pretty” purple flowers that belie its devastating effects. At maturity the weed sheds its tiny seed (< 0.3mm in size), with a single plant producing about 50,000 – 200,000 seeds. This seed can remain dormant and viable in the soil for up to 20 years. With every planting season, some of the dormant seeds germinate, attach to host plants and regenerate profusely, escalating the *Striga* menace and threatening farmers’ livelihoods.

Consolata Ogona is a 53 year-old mother of eight and a maize farmer in Busia District in Kenya. As a young girl, she recalls watching her father and his friends uproot the weed from their farms. The uprooted plants were thrown by the roadside as proof to government officials that they were controlling the weed’s spread. They had no idea that by throwing the plants by the roadside they were actually helping to spread the weed. Another farmer, Salome Ken from Vihiga District, had to abandon part of her maize-growing land to the encroaching weed. “I had to start planting bananas instead of maize so that my land [did] not go to waste,” she laments.

Bringing science to bear

For half a century, scientists have been looking for suitable methods to control *Striga*, including agronomic practices, host-plant resistance and herbicide application. While some of these control methods have reasonable potential, they are labour intensive and/or costly, limiting their use by resource-poor smallholder farmers. The best control measure is one that acts before the *Striga* seed germinates or shortly after the germinating *Striga* seed attaches to the roots of the host plant. To eliminate the threat of *Striga*, the soil must be depleted of all *Striga* seeds. On the other hand, the *Striga*

biology demands that its efficient control is done before or during the time it is attaching itself to its host. Thus, ideal technologies must both control the weed before crop yields are affected and deplete the amount of *Striga* seed left in the soil.

To address this challenge, AATF is collaborating with the International Maize and Wheat Improvement Center (CIMMYT), BASF – a multinational producer and supplier of agro-chemicals, the Kenya Agricultural Research Institute (KARI), the Western Regional Alliance for Technology Evaluation (WeRATE) – a consortium of NGOs, and seed companies to disseminate a technology known as STRIGAWAY®, which kills *Striga* when it attaches to and starts feeding on the germinating maize plant. This enables the maize to grow normally and farmers to realise higher yields, as the maize plant is able to grow to its full potential.

The technology is based on a natural form of herbicide resistance that was originally found in maize lines owned by BASF. Using the BASF seed, CIMMYT worked with KARI to incorporate the natural herbicide resistance into maize varieties that are adapted to the climatic conditions of *Striga*-infested areas in eastern and southern Africa. The International Institute of Tropical Agriculture (IITA) is involved in a similar project in western Africa.

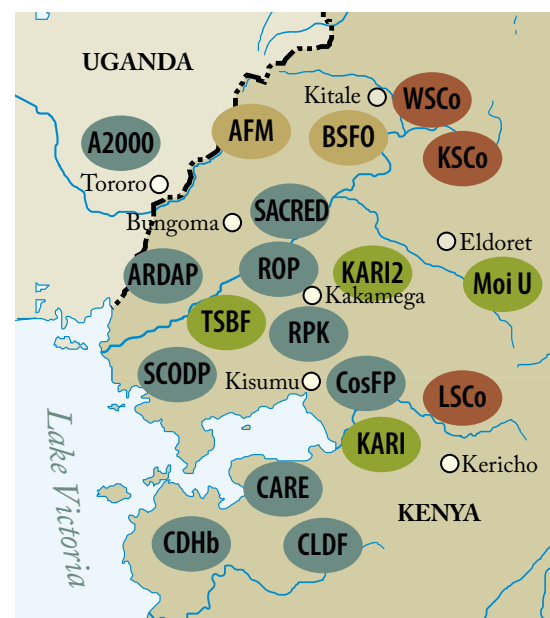
The Weizmann Institute of Science (Israel) and CIMMYT developed a herbicide coating formulation that does not harm the germinating maize seed but kills the *Striga* seedling that tries to attach to the maize roots.

In 2005, AATF and WeRATE collaborated on a project designed to assess recently developed *Striga* management technologies in farmers’ fields in western Kenya and to promote stakeholder awareness of witchweed and how to effectively control it as a means of backstopping the efforts of CIMMYT and BASF. Known as the *Striga* Management Project, the partnership was later expanded to include 12 NGOs and 2 farmer associations, with individual NGOs responsible for different geographical areas.

Sustaining the use of STRIGAWAY® technology

With the assistance of NGOs and Kenya’s Ministry of Agriculture extension services, the new technology has been tested in on-farm trials and demonstration plots and has been introduced to about 5,000 farmers in western Kenya. Data collected from on-farm trials and farmer fields indicate that maize yields have increased on average from 1.5 tons/ha to over 3 tons/ha. In fact, farmers are reporting that they can grow maize once again in fields that had been deemed unsuitable for maize production because of *Striga*. Preliminary data indicates that the amount of *Striga* seeds in the soil of fields planted with STRIGAWAY® maize dropped by about 30 percent over two cropping seasons. This reduction in the *Striga* seed bank may have been higher if the second season (short rains 2005/06) had not been affected by periods of severe drought that negatively impacted on maize growth.

Rose Katete, a member of the Apokos Women’s Group in Teso District, has tried the new maize seed. “My fellow women farmers and neighbours



Top: *Striga hermonthica*. Its pretty appearance belies its devastating effects.

Middle: Farmer Onyango Baridi inspects his maize plantation.

Bottom: The AATF-WeRATE *Striga* network



have seen the results and are asking when the seed will be available,” she said. The herbicide-coated and herbicide-resistant maize variety has been named *Ua Kayongo* meaning “Striga killer”.

Dick Morgan, Chairman of Sabatia Smallholder Farmers Association in Vihiga District says, “In our village *oluyongo* (*Striga*) is equivalent to poison. It is believed that *Striga* weed poisons both maize and the soil. With the coming of *Ua Kayongo* maize, farmers have baptised this seed *mukombozi* (saviour). *Ua Kayongo* maize means saviour to the farmers.”

Teresa Lubusi from Sabatia says that *Ua Kayongo* maize means no empty food stores for farmers. “This maize helps farmers manage the problem of *Striga* weed (*oluyongo*) in their maize fields. In our culture *oluyongo* means something that strangles. It is believed that *Striga* weed strangles both maize and the soil. Farmers have baptised *Ua Kayongo mwiha mulahi* (a good bride groom).”

These stories are clearly encouraging, as are the scientific findings from extensive field testing. There are also other effective technologies that control *Striga*, including: the “push-pull” system developed by the International Centre of Insect Physiology and Ecology (ICIPE); and suicidal germination and soil fertility management recommendations from the Tropical Soil Biology and Fertility programme of the International Centre for Tropical Agriculture (TSBF-CIAT). AATF and its partners are thus proposing to join forces in a *Striga* Eradication Initiative (SEI) with the aim of reducing *Striga* infestation to negligible levels in maize fields in Sub-Saharan Africa. In this initiative, *Striga* control technologies will be tailored to the needs of each country.

In western Kenya, partnerships between public research institutes, private companies, NGOs and government agencies have demonstrated their effectiveness in bringing the valuable STRIGAWAY® technology to smallholder farmers. It is expected that the SEI will benefit from the same sort of synergies realised by those public/private partnerships and to lead the way in eliminating the *Striga* scourge affecting maize farming in Sub-Saharan Africa.

Striga Management Project update

AATF’s *Striga* Management Project, initiated in January 2005, was designed to confine, reduce and eliminate *Striga* infestation in western Kenya, thereby improving maize yields, food security and the well-being of the rural poor. Field tests of the Imazapyr resistant maize hybrid, *Ua Kayongo*, treated with STRIGAWAY® have now been conducted during two cropping seasons in 18 administrative districts in western Kenya and eastern Uganda. To date, 5,299 field test packages have been distributed for on-farm testing by twelve NGOs, three research organisations, two farmer associations and the Ministry of Agriculture extension staff. In most cases, the technology effectively controls *Striga*. However, some emergence is observed late in the maize cropping cycle, suggesting that Imazapyr provides 6-10 weeks of protection from *Striga* and that the herbicide eventually becomes either



immobilised or diluted within the plant.

In 2005, the AATF *Striga* Management Project installed IR-maize field tests on 1,353 farms during the long rains and on over 3,500 farms during the short rains. In some cases, farmers reported no rain for 60 days during the short rains and were impressed with *Ua Kayongo's* ability to tolerate dry conditions. In most cases, *Ua Kayongo* offered excellent control of *Striga* and, in the *Striga* infested fields, its productivity was markedly better than the maize varieties farmers are currently planting. A weed-free band occurs around the base of each maize plant that likely results from diffusion of the Imazapyr that was not absorbed by the maize seedling. This weed-free band extends from

Clockwise from bottom left:
Farmers Rose Katete and Lydia Alice Ngereso:
Happy with produce from STRIGAWAY® maize
harvested from fields previously rendered
unproductive by *Striga*;
Members of the Sabatia Smallholder Farmer's
Association in Vihiga District at a meeting in
Vihiga where they learned how to produce
STRIGAWAY® maize.



2cm to 5cm from the base of the maize stem and, because the hardest weeds to manage are generally those closest to the plant, it makes for easier weeding operations.

Farmers see *Ua Kayongo* as the best *Striga* control technology now available and want to adopt it for use on their farms. In addition to the immediate benefits, most farmers noticed that in the fields where they grew *Ua Kayongo* for a second time there was very little *Striga* emergence as compared to fields where they grew other commercially available hybrids.

***Striga* Network field trials (led by WeRATE)**

The purpose of the field trials was to independently evaluate alternative *Striga* management technologies across the range of agro-ecological conditions in western Kenya. During the long rains in 2005, 97 on-farm trials examining eight management options were conducted in districts of Western and Nyanza Provinces, specifically Bungoma, Busia, Bondo, Vihiga, Siaya and Teso Districts. Data were collected from 94% of the on-farm experiments and the amount of *Striga* seed in the soil was measured on 90% of those farms. On 18% of the farms, there was no *Striga* infestation at all. Moderate and severe *Striga* infestations were observed on 37% and 45% of these farms, respectively.

Measuring *Striga* seed in the soil (led by KARI-Kibos)

Towards the end of the short rains season of 2004/2005, a total of 100 sites were selected based on intensity of *Striga* infestation for the implementation of the *Striga*Net trials. During 2005, the *Striga* laboratory located at the Kenya Agricultural Research Institute (KARI) at Kibos measured the amount of *Striga* seed found in 777 soil samples. The highest amount of seed (and least variability) was noted among field trial sites in Bondo (371×10^6 seeds/ha) and Busia Districts (200×10^6 seeds/ha). Overall moderate infestation was observed in Siaya, Teso and Vihiga Districts (73×10^6 seeds/ha). Infestation was lowest and most irregular in Bungoma District, where only 20% of soil samples tested positive for *Striga* seed. These results suggest that efforts should be redirected to areas and farms where *Striga* is worse, particularly when operating at the periphery of its biological invasion.

***Striga* awareness**

A number of high profile activities to publicise the *Striga* Management Project both nationally and internationally were undertaken in 2005. These activities included:

- 6,000 hard copies of the project's press release were distributed;
- An article on *Striga* management was published by the *Farmer's Journal*;
- A 16-page illustrated extension booklet, "*Ua Kayongo: The Striga Killer*" was printed and over 3,000 copies distributed;
- Over 80 participants attended a stakeholders meeting held in early June, which featured 18 presentations, 8 exhibits and plenary discussions on *Striga* management;

- An exhibit on *Striga* management was prepared and displayed at six events in Kenya, including the Nairobi International Show and the AATF Board Meeting;
- A 15-minute documentary on the AATF *Striga* Management Project was produced and broadcast on KBC television, and then copied onto compact disks and distributed to interested parties;
- Web pages on *Striga* management and the project were posted on websites www.africancrops.net and www.formatkenya.org; and
- Project scientists presented and published 3 papers at the Seventh African Crop Science Conference conducted in Entebbe, Uganda from 5 to 9 December 2005.

Through the efforts of AATF and its consortium of partners, smallholder farmers are benefiting from the donation of modern technology that is leading to the availability of *Striga*-reducing maize varieties. Fields covered with the witchweed’s purple flowers will soon diminish and hopefully become a thing of the past. These same fields will instead be covered with healthy, productive maize plants, giving hope to millions of resource-poor smallholder farmers and their families in Sub-Saharan Africa.



Top: Farmer Salome Ken from Vihiga District, Kenya explains the performance of STRIGAWAY® maize on her farm during a field visit.

Bottom: Farmers at work in a maize plantation in Zambia.



Accessing Proprietary Technology for Improving COWPEA PRODUCTIVITY

Cowpea is one of the most important legumes produced in Sub-Saharan Africa, providing grain and fodder for millions of smallholder farmers in the region. Worldwide, the annual production of cowpea averages about 12 million tonnes, of which more than two-thirds (about 7.6 million tonnes) is produced in Sub-Saharan Africa. The crop is rich in high-quality protein and contains nearly as much energy by weight as cereal grains, which makes it significant to meeting dietary needs in countries where protein-deficiency is the norm. Cowpea is directly consumed as a food staple by nearly 200 million people in Africa who eat the protein-rich grains and leaves. The green or dry haulms are also valuable feed for livestock, particularly in the dry season when herbage is scarce. The crop is thus a cornerstone to sustainable crop-livestock farming systems in the arid and semi-arid regions of Sub-Saharan Africa.

Cowpea productivity in traditional African farming systems is very low, averaging only about 0.3 tons/ha. These low yields are mainly due to biotic stresses, especially insects – and in particular the *Maruca* pod borer. Despite the use of insecticides by cowpea farmers, crop losses still easily exceed 70%. Notably, the insecticides are expensive, and may be toxic to farm workers and detrimental to the environment. In addition, the costly insecticides have but a nominal effect, due largely to a build up of resistance in the insect population that has taken place over time. Moreover, insecticide sprays frequently get washed away by rain, degrade under intense solar radiation and may not be optimally targeted for insect pests living within plant tissues.

The International Institute of Tropical Agriculture (IITA) in Nigeria and National Agricultural Research Systems (NARS) in west Africa have dedicated over 30 years to cowpea research and development and as a result cowpea production in west Africa has notably increased during the past decade, particularly in Nigeria where production went from an average of 300kg/ha to 1,200kg/ha (Dr O Coulibaly, personal communication, 2006). Drawing on an impressive collection of diverse cowpea germplasm, gathered and safeguarded by the Institute since its founding in 1967, IITA scientists have produced a range of high-yielding cowpea varieties that possess resistance to major diseases, insect pests and parasitic weeds.

A number of these varieties are now grown by farmers in west Africa and total cowpea production has increased from about 1.2 million tonnes in the mid-1970s to more than 3.3 million tonnes today. Despite these important strides, IITA researchers could do little more than watch as the *Maruca* pod borer decimated cowpea in the region.

While conventional plant breeding techniques have contributed to overcoming most of the biotic and abiotic constraints to cowpea production, such

as viruses, diseases, nematodes and drought, the conventional approach has not been successful in combating the *Maruca* pod borer or other pod-sucking insects. The reason is that there appear to be few if any genes for insect resistance available in current cowpea cultivars or in the wild relatives of cowpea for breeders to use in bolstering the crop's resistance to this particular threat. Since cowpea is predominantly an African crop, it has attracted little interest from the large scientific organisations and companies that hold the rights to technologies that can make cowpea more resistant to pod-sucking insect pests.

Smallholder farmers therefore resorted to using insecticides to combat *Maruca* and other cowpea pests such as aphids, flower thrips, and pod borer and pod-sucking bugs. The insecticides effectively control these pests from the seedling stage to the post flowering stage. However, they are a very expensive method for resource-poor smallholder farmers as they have to be sprayed up to ten times during the crop season for effective control. In addition these insecticides also have harmful health effects to the farmers.

To Bt or not to Bt

Proteins coded by the cry genes from the widely occurring bacterium, *Bacillus Thuringiensis* (*Bt*), have been known to have an insecticidal effect on members of the Lepidoptera family. For about ten years, crops engineered to express cry genes have been planted by farmers on commercial scale in several countries including South Africa, with great reduction in the use of insecticides to protect their crop. In feeding trials, the protein coded by the gene *cry1Ab* has been shown to be highly effective in controlling the cowpea pod borer, *Maruca*. As in other *Bt* crops, it is expected that a cowpea plant that would express the *cry1Ab* gene would be less susceptible to attack by *Maruca*. The *cry1Ab* gene donated by the Monsanto Company is being used to transform cowpea, with the expectation that the gene will be expressed in cowpea and that the toxin produced by the gene will also be effective in controlling *Maruca*.

It is anticipated that the *cry1Ab* gene will strengthen the genetic backbone of cowpea, leading to higher yielding varieties that can achieve their potential with a minimum use of chemical insecticides. Of course, inserting the *cry1Ab* gene into cowpea is not a remedy for all of the crop's afflictions and complementary agronomic measures are needed to keep the pod borer and other pests at bay over time. Cowpea farmers will integrate the new improved cowpea varieties to their existing cropping systems that will certainly be translated into substantial increase in cowpea productivity and profitability.

This initiative aims to facilitate the development, distribution and adoption of appropriate technologies that will substantially increase cowpea productivity in Sub-Saharan Africa. In particular, the project aspires to produce cowpea seed of a high commercial quality – seed that is appealing to consumers and that can be produced efficiently with less use of expensive insecticides (there are other insects that will still need to be controlled by



**Top: The *Maruca* pod borer.
Bottom: Cowpea grains.**



Some participants in a cowpea small group of experts meeting held in Ouagadougou, Burkina Faso, in June.

insecticides, but *Bt* cowpea will considerably reduce the number of applications needed). Resource-poor smallholder farmers will benefit from this technology in a number of ways: they will receive higher yields, their production costs will be reduced, their cash income will rise from selling surplus grain, they will have more readily available protein-rich fodder for livestock, and in general their families will enjoy better nutrition and the improved health that comes with it.

The good news!

In May 2005, AATF brokered a licensing deal with Monsanto Company in USA, which donated access and use of the *cry1Ab* gene to develop an insect-resistant cowpea in Africa. AATF has sublicensed the use of the *cry1Ab* gene to Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) and IITA, which will work with national research institutes in west Africa to incorporate this special gene into high-yielding cowpea varieties that are well adapted to African farming conditions. Having only just begun, this genetic transformation work is still at an early experimental stage, and AATF will work closely with regulatory authorities in the region to conduct rigorous field testing and adhere to all established regulatory guidelines and rules. Towards this goal, AATF is working with a consortium of research and development partners, including the Network for the Genetic Improvement of Cowpea in Africa (NGICA), which is a network of individuals and organisations interested in the genetic improvement of cowpea with the goal of addressing the constraints to its production and utilisation.

Bt cowpea varieties will contribute greatly to improving the nutrition and health status of consumers in rural communities and in the growing cities of Africa. Dr BB Singh, leader of cowpea research at IITA, says, "The *Bt* gene

has worked in cotton, maize and eggplant, and it will also work in cowpea. Extensive studies have shown the *Bt* gene to be completely safe. It has been used for years by organic farmers and has no effect on the nutritional quality or taste. And the exciting thing is that, once this gene has been inserted into cowpea, it will breed true – meaning that smallholder farmers will be able to save and plant their own seed.” The license obtained by AATF ensures that farmers will not have to worry about saving their seeds.

A business plan that focuses on how the cowpea project will be managed over time, including a clear definition of the roles and responsibilities of the various partners, is nearing completion, as is a communication plan aimed at promoting the acceptance of the products arising from the initiative.

There is still a lot of work to be done before the *cry1Ab* gene can be fully integrated into the farming scene in Sub-Saharan Africa. But that goal is increasingly within reach, thanks to AATF’s efforts to acquire the much needed proprietary technology on behalf of the poor, Monsanto’s willingness to license its intellectual property to the Foundation, and the enthusiastic participation of national and international research organisations. AATF is seeking financial support for this cutting edge public/private partnership that is expected to have a dramatic impact on cowpea productivity in Sub-Saharan Africa.

Lingering legal concerns

Most African countries, with a few exceptions such as Equatorial Guinea and Somalia, have signed the Cartagena Protocol on biosafety, which is meant to govern the transboundary movement of living modified organisms (LMOs).

African signatories to the Cartagena Protocol, however, are at different stages in developing their national biosafety frameworks and regulations. The implications from a legal perspective are that a comprehensive knowledge of the regulations of each country where AATF has a presence must be known in order to guide the selection of countries where LMOs can be introduced.

Environmental safety – Not only must genetically modified cowpea varieties be field tested to prove their effectiveness against the *Maruca* pod borer, they must also be found to be safe for the environment in a Sub-Saharan African context. Regulatory authorities from each coun-



try will require an analysis of risks (provision of “safety dossier”) regarding the development, testing and deployment of *Bt* cowpea in order to approve field tests and/or the release of *Bt* cowpea into the environment.

Food and feed safety – Cowpea’s importance as both a human food and livestock fodder in Sub-Saharan Africa cannot be overstated. As such, all efforts to introduce this genetically modified crop must take into account the social, economic and political context of each country and be done in a safe and responsible manner. Consumers will be reassured that neither they nor their livestock will come to harm from the consumption of transgenic cowpea. This project is one of several of such Foundation initiatives aimed at reducing poverty in Sub-Saharan Africa by increasing agricultural productivity. Progress towards bringing advanced proprietary technology to bear on cowpea improvement has been truly substantial.

AATF’s role as an honest broker is working – it is proving that the approach to forming effective public/private partnerships and dealing with complex IP and liability issues is viable. But the most important thing about this initiative is the good faith contributions being made by all project partners towards ensuring more secure livelihoods for the resource-poor smallholder farmers in the region.



Working with TECHNOLOGY DONORS

AATF's core business is facilitating the acquisition and transfer of appropriate proprietary agricultural technology to researchers and resource-poor smallholder farmers in Sub-Saharan Africa. The Foundation strives to do this across the entire product value chain in collaboration with public and private organisations and civil society.

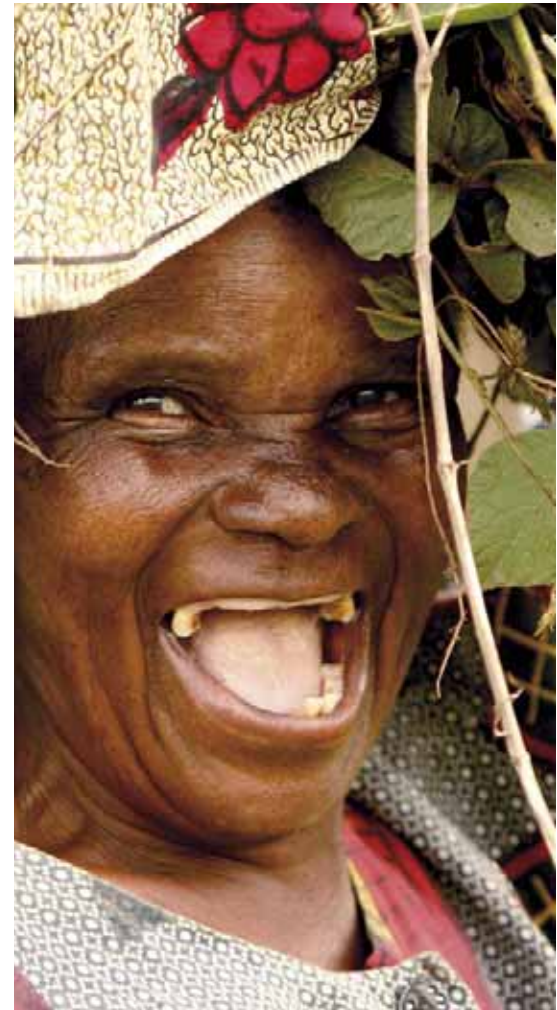
Technology donors are primarily large, profit-driven companies whose first allegiance is to their shareholders, and advanced public research institutions with a mandate to produce technology as international public goods. While private companies have little commercial interest in most African countries – where markets are generally small and most crops are produced by smallholder farmers for domestic consumption – they, like their public sector counterparts, recognise the growing need of bringing the benefits of agricultural technologies to meet the needs of farmers in Sub-Saharan Africa. Together, private and public technology developers hold a very large amount of agricultural intellectual property (IP) – products and technologies that, with some adaptation, can be used to benefit and increase the productivity of Sub-Saharan African farmers.

A growing number of these institutions are allowing AATF to access and facilitate the use of key technologies, knowledge and research products for humanitarian purposes. These technology donors naturally want to be sure that their technologies and research products are shared and used properly, that all regulatory requirements are met, and that they will not be held liable for the use, and possible misuse, of their intellectual property, especially since they are not obtaining financial gains from its donation.

Managing donated intellectual property

From its inception, AATF has carefully followed clearly articulated guidelines in managing donated technology.

Nevertheless, given the sensitivities of its many partners, especially those donating novel technologies for humanitarian purposes, the Foundation decided that a more formal and Board-approved IP policy was needed. This policy was developed in 2005, and is expected to be endorsed by the AATF Board of Trustees in 2006. The proposed policy is aimed at ensuring that knowledge and products resulting from AATF's activities will be used for the maximum benefit of resource-poor smallholder farmers and in compliance with international IP regulatory regimes. It will reinforce AATF's responsible use of IP owned by technology donors, while allowing the broadest possible use of the technology by target beneficiaries.





The proposed policy has three primary elements:

1. Clear objectives and principles of conduct governing how the intellectual property of donor organisations will be accessed and used.
2. Strict guidelines on how and when IP protection will be sought and managed by AATF.
3. Basic principles for guiding recipients in the use of donated IP, know-how and protected material, both to protect the interests of the donors and to ensure that the use of such information is consistent with the Foundation's mission and humanitarian purpose.

AATF is currently applying these principles in the management of IP in two projects: the cowpea project and the Africa bio-fortified sorghum project.

The cowpea project – In line with its proposed IP policy, the Foundation conducted a comprehensive technology due diligence and freedom to operate (FTO) assessment for its project on improving cowpea productivity. An experienced lawyer of the bio-pharmaceutical firm Innogenetics Inc guided and reviewed the study, investing about 500 hours on a *pro bono* basis.

In May 2005, the Foundation obtained a royalty-free, non-exclusive license from Monsanto to use their *cry1Ab* gene for the development of cowpea varieties resistant to the pod-borer insect, *Maruca vitrata*. This technology was subsequently sublicensed to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia and the International Institute of Tropical Agriculture (IITA) in Nigeria for use of the gene in the genetic transformation of cowpea.

Africa bio-fortified sorghum project – In July, the Bill and Melinda Gates Foundation made a grant award of US\$ 16.9 million to a consortium of research partners led by the Africa Harvest Biotechnology Foundation International (AHBFI) for a new Africa bio-fortified sorghum project, designed to develop nutritionally enhanced sorghum varieties suitable for growers and consumers in Africa. AATF is a member of the consortium, and was asked to assume a license brokering and IP management role in the project. Other members of the consortium include: the University of Pretoria, the University of California Berkeley (UC Berkeley), Pioneer/DuPont, the Council for Scientific and Industrial Research (CSIR), the Agricultural Research Council of South Africa (ARC), the International Crops Research Institute for Semi-Arid Tropics (ICRISAT), and the Forum for Agricultural Research in Africa (FARA).

AATF has prepared a confidentiality clause for inclusion in all project sub-grant agreements and a template non-disclosure agreement for use by member institutions. Several meetings were held by AATF in the last quarter of the year with consortium members to conduct a technology/IP inventory. A full FTO assessment and the development of an IP policy manual for the project are planned for early 2006.

Liability protection is key

Like all business organisations, biotechnology companies have a duty to ensure, in so far as is practicable, that techniques are developed and used

to prevent damages resulting from the use of products they distribute. In deciding on issues of liability, the courts will try to determine whether preventive action could have been taken without undue expense, difficulty and inconvenience. For example a company may well be held legally responsible in a product liability claim if it could have engineered biological barriers but did not do so, resulting in damages to persons or property.

AATF is proactive in its role of product stewardship. It ensures that smallholder farmers and research partners comply with all relevant licensing conditions, standards, guidelines, regulatory requirements and any instructions regarding the use of GM crops. Scientific and technical safeguards are developed for all projects, and stakeholders are advised on the appropriate use of technologies and products. This will not safeguard them against every instance of potential liability, but it will serve as very persuasive evidence for the courts that all reasonable precautions were taken to avoid damage.

AATF further protects technology donors from liability through the use of “indemnification” provisions and warranty disclaimers in agreements, as well as the conduct of comprehensive risk analyses on each project. Most non-profit organisations are typically averse to providing indemnification in the agreements they sign, but AATF is not a typical non-profit organisation. The Foundation, on a case-by-case basis, indemnifies technology donors. AATF’s risk analysis procedures allow for the early identification of risks and the development of risk mitigation strategies for each project, thus reducing exposure to possible liability claims.

African countries have not, as yet, developed legal liability regimes targeted specifically at GMOs. The unique characteristics of African agriculture must be taken into account when developing a liability regime, so as not to inhibit scientific innovation while still addressing the needs of African agriculture. AATF is actively monitoring advancements in the regulation of the use of GMOs in Africa, while continuing in its unrivalled role of bringing together improved production technologies to resource-poor smallholder farmers in Sub-Saharan Africa and providing high levels of liability protection to both the technology donors and smallholder farmers.





AATF HIGHLIGHTS

January AATF was registered as a charity by the Charity Commission of England and Wales

February AATF and Africa Harvest Biotechnology Foundation International (AHBFI) signed a Memorandum of Understanding governing their collaborative efforts

March Extensive field testing of Imazapyr Resistant (IR) maize began and rapidly expanded to include about 5,000 farmers in 12 districts in western Kenya

May Monsanto and AATF signed a ground-breaking royalty-free, non-exclusive license agreement for the use of Monsanto's *cry1Ab* gene in the development of insect-resistant cowpea varieties; Sublicensing agreements were also signed between AATF and two key partners – CSIRO-Australia and IITA-Nigeria – giving them access to Monsanto's *cry1Ab* gene for use in the genetic transformation of cowpea

June The third cowpea improvement stakeholders' meeting was held in Burkina Faso, leading to a refined project concept note

July The official launch of the STRIGAWAY® technology to fight *Striga* infestations in maize fields by BASF, CIMMYT, AATF and KARI in Kenya; AATF and the National Agricultural Research Organisation (NARO) of Uganda signed a Memorandum of Understanding governing their future collaboration; A comprehensive technology due diligence appraisal for the cowpea productivity improvement project in Africa was finalised, including a freedom to operate assessment

August A banana productivity improvement stakeholders' meeting was held in Kampala, Uganda

September Group discussions on the control of mycotoxins in food grains were held in Accra, Ghana

October AATF and Africa Harvest signed a collaborative agreement for the African Bio-fortified Sorghum (ABS) Project; A Small Group Meeting on the control of locusts and grasshoppers using bio-pesticides was held in Dakar, Senegal

November A Small Group Meeting on strategies for the industrialisation of cassava in Africa was held in Ibadan, Nigeria; AATF and Public Intellectual Property Resource for Agriculture (PIPRA) signed a Memorandum of Understanding governing their future collaboration

Update on OTHER INITIATIVES

Protecting bananas and plantains from bacterial wilt disease

Nearly 90% of all bananas in Sub-Saharan Africa are grown by smallholder farmers for home consumption or for sale in local and regional markets. About 20 million people depend on bananas or plantains as their major source of dietary carbohydrates, and 70 million people in Africa obtain up to a quarter of their carbohydrates from this crop.

The banana crop is susceptible to numerous pests and diseases, including bacterial wilt, which is caused by the bacterium *Xanthomonas campestris* pv. *musacearum*. Bacterial wilt was first reported in Ethiopia, where it caused minor problems since banana production was limited. However, in 2001, the disease spread rapidly within major banana-producing districts of Uganda and currently threatens production of banana throughout the Great Lakes Region of Africa. Bacterial wilt causes wilting and premature ripening of the banana fruit, with reported cases of yield losses in excess of 90%. To date, there is no chemical or biological control for bacterial wilt and, because there are no known sources of resistance available in the banana germplasm, breeding resistant varieties through conventional means offers little hope.

At the request of IITA, AATF is currently negotiating a royalty-free licensing agreement with Academia Sinica, the main scientific research organisation in Taiwan, for access to proprietary genes that have been used to protect potato from bacterial wilt and to enhance the resistance of tobacco and broccoli against soft rot. Research and field tests with these crops suggest that the use of the technology will provide a valuable cost-effective means for combating bacterial wilt in bananas and plantains.

In 2005, AATF signed a memorandum of understanding with the National Agricultural Research Organisation (NARO) of Uganda that outlines how constraints to banana productivity in Uganda may be addressed by the two institutions. In addition, AATF held a stakeholders' meeting in Kampala and prepared a draft project concept note on developing banana bacterial wilt resistant germplasm, in collaboration with the Institut de Recherches Agronomique et Zootechnique (IRAZ) and Academia Sinica Inc.

Raising the productivity of rice in Africa

Rice constitutes a major part of the diet in many Sub-Saharan African countries. The demand for rice in the region has been growing rapidly since the mid 1970s, and the average increase in rice consumption is now more than 6% annually while rice production is only increasing at 3% per year. This brisk growth in demand is largely due to population growth and rapid urbanisation.



Top: Bananas are a primary source of food and income for millions of Africans.

Bottom: A healthy rice field. In Africa, rice has been gaining in popularity as a food crop rapidly since the mid 1970s.



Unfortunately, many biotic and abiotic factors limit rice productivity in Sub-Saharan Africa thus creating a continuously increasing gap between production and consumption. The West Africa Rice Development Association (WARDA) has been working for years on overcoming constraints to rice production, and recently AATF joined in supporting these efforts by exploring collaborative linkages to promote technological interventions that will improve rice productivity in Africa. In particular, WARDA and AATF have confirmed their mutual interest in developing rice varieties with increased nitrogen use efficiency (NUE), as well as salt tolerance (ST).

Arcadia Biosciences has proprietary technologies for enhanced NUE and ST that have been demonstrated in canola, rice, alfalfa and tomato. Consistent with its dual objective of commercial and humanitarian deployment of such technologies, Arcadia Biosciences has recently licensed its NUE technology to Monsanto for use in canola and has reconfirmed its commitment to sharing the technology with AATF for the improvement of rice in Africa.

Controlling aflatoxins in foodstuffs

Food grains are highly susceptible to contamination by different moulds which under the right conditions can produce mycotoxins that are dangerous for humans and livestock. Indeed, a WHO report showed that over 20,000 lives were lost to food poisoning in Africa in 2003. Food grains contaminated with mycotoxin-producing fungi are unsafe for human and livestock consumption.

The problem of mycotoxins in Africa's food supply cannot be addressed through regulatory controls alone. Technologies that reduce insect infestation and fungal contamination of crops while they are still in the field and/or in storage need to be applied. In this regard, AATF held a consultative meeting of experts in September 2005 in Accra, Ghana, following which a draft concept note for control of aflatoxins in peanuts was prepared.

The United States Department of Agriculture-Agricultural Research Service (USDA-ARS) holds a patent on an effective technology for controlling aflatoxin production in peanuts, which it has licensed to a private company, CircleOne Global Inc, for commercial use. CircleOne has deployed the technology in peanut-producing areas in the USA, and is further testing it in Latin America, while also negotiating its introduction into China.

AATF has initiated negotiations with USDA-ARS and CircleOne for access to this technology for use in Africa.



Aflatoxin is a toxin produced by the mould *Aspergillus flavus* (picture) on various foodstuffs. Consumption of aflatoxin-infested foods can cause cancer and even death.

Developing nutritionally enhanced sorghum varieties

Sorghum is one of the important staple crops cultivated in arid and semi-arid regions of Sub-Saharan Africa. The African Bio-fortified Sorghum (ABS) project aims at developing sorghum varieties enriched with amino acids methionine and lysine, vitamins A, E and D, and the micronutrients iron and zinc. The project is being led by the Africa Harvest Biotechnology Foundation International (AHBFI), and involves a consortium of partners including AATF, the University of Pretoria (South Africa), the University of California, Berkeley (USA), Pioneer/DuPont, the Council of Scientific and Industrial Research (CSIR) in South Africa, the Agriculture Research Council (ARC) in South Africa, the Agriculture Research System (ARS) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). AATF's role covers management of intellectual property (IP) and license negotiations for the needed proprietary technologies.

At the request of the consortium, in early August 2005, AATF prepared a "confidentiality" clause for inclusion in all project sub-grant agreements and a template consultant non-disclosure agreement for use by the member institutions.

In October 2005, a project collaboration agreement was signed between the AHBFI and AATF signalling the official start-up of the Foundation's involvement in the project. Further, AATF held meetings with project collaborators, including Pioneer, CSIR and ICRISAT to conduct a technology/IP inventory.

Improving cassava productivity on smallholder farms

Cassava is a major staple as well as a cash crop in many parts of Sub-Saharan Africa. It fits well into smallholder farming systems, thriving across a wide range of ecological zones. It is available all year round, providing household food security and offering an affordable source of calories for smallholder farmers.

Yet traditional production and processing methods lead to high production costs and reduced product quality, limiting the ability of African cassava to enter local industrial markets or compete in global markets.

The overall goal of this project is to improve cassava productivity through the introduction of appropriate mechanisation aimed at optimising labour productivity during production and processing operations, and opening up new market opportunities for cassava products. AATF's role is to clarify and resolve key IP issues involved in the acquisition and deployment of



Top right: Much of Africa is arid or semi-arid. Sorghum's ability to grow in such conditions make it invaluable as a food crop.

Centre: Cassava has great potential as a cash crop, but traditional production and processing methods limit the ability of farmers to market it at a competitive price.

Below right: Participants at the 2nd Planning Meeting of the Africa Bio-fortified Sorghum (ABS) Project held at the Windsor Golf, Hotel and Country Club, Nairobi, Kenya, 12 – 17 February 2006.



proprietary machinery for cassava production and processing and facilitate access by African entrepreneurs to the know-how for the production of such machinery.

Working with its partners, the Foundation helped organise a meeting of experts in November 2005 to initiate the development of a strategic plan for the industrialisation of cassava in Africa. An important first step in the strategy development process, the expert meeting at the IITA campus in Ibadan, Nigeria, resolved that the Cassava Industrialisation Strategy for Africa should be geared towards the goal of reducing cassava production costs and increasing the output of high quality industrial products to strengthen the continent's position in a globally competitive world.

It was further resolved that the Strategy should guide the formulation of policies and implementation of activities designed to assist the various actors in the cassava value chain, effectively tackle problems of an emerging cassava industrial sector and adopt practical solutions that will lead to the setting of achievable goals. The Strategy should also address the potential demand for industrial products without jeopardising the availability of traditional food products from cassava, encourage each country to develop its industry according to its available resources and market opportunities within a global competitive framework, and support private sector investments in vertically integrated agribusiness ventures involving large-scale farms and agro-industries to meet the expanded demand for domestic, regional and international markets.

Specific recommendations by the Expert Group included:

- The establishment of a legal framework that facilitates the acquisition and use of land for large-scale farming, and the setting up of funding facilities and financial incentives for cassava enterprises development;
- The development of mechanisms to facilitate access to technological innovations and proven technologies for efficient cassava production, processing and utilisation through facilitated access and delivery of proprietary technologies and enhanced R&D capacity;
- Improving market access opportunities through the development of sustainable market information systems, the provision of adequate market infrastructure and the removal of domestic, regional and international trade barriers;
- Strengthening the infrastructure (such as energy, water, roads and communications) in the areas of greatest industrial potential for cassava, so as to improve the competitiveness of emerging cassava-based industries and to attract industrial investors, both local and foreign into this sector;
- Strengthening manpower development institutions and capacity building programs that will enhance expertise in enterprise management and provide the skills required for the development of cassava-based agro-industries; and
- Giving full regard to environmental protection, waste management and the utilisation of by-products while taking steps to improve the competitiveness of African industries in the context of globalisation.

Update on DISCONTINUED INITIATIVES

Controlling locusts and grasshoppers in Africa

Locusts and grasshoppers are major pests in many regions of the world, including most of the drier parts of Africa. Swarms of locusts have periodically invaded vast areas of the continent, consuming food crops and stripping vegetation, leaving in their wake devastated farms and rangelands. Grasshoppers, although rarely occurring in swarms, constitute a more chronic problem that leads to yield losses.

Most locust outbreaks are controlled through the large-scale application of chemical pesticides. This approach is very expensive to implement, and is accompanied by severe environmental damage since the broad spectrum pesticides that are used also kill non-target organisms, including freshwater aquatic life and birds.

After many years of research and testing, an environmentally-friendly and cost-effective bio-pesticide derived from the spores of the fungus *Metarhizium anisopliae* has been developed by the Centre for Agriculture and Biosciences International (CABI) and IITA. It has been licensed to a private company, Biological Control Product (BCP), for use in southern and eastern Africa and in the Middle East. BCP sells the product under the brand name Green Muscle®.

In 2005, IITA approached AATF to assist in creating public/private partnerships that can further deploy the bio-pesticide as a low-cost and sustainable option for controlling locusts and grasshoppers in Africa. AATF held consultations with partners regarding:

- Obtaining the support of FAO's locust monitoring and emergency response unit and developing a strategy for the use of the bio-pesticide to control grasshoppers and prevent locust outbreaks;
- Negotiating for licensing of the bio-pesticide for use in Africa where locusts and grasshoppers are a chronic problem to ensure that the product is produced in sufficient quantities and acceptable quality; and
- Exploring issues of registration and marketing that will facilitate access of this technology to smallholder farmers.



Grasshoppers, like locusts, pose a threat to crops in many parts of Africa. A low-cost, biologically friendly alternative to the chemical pesticides that are usually employed to control these pests has been developed.



A Small Group Meeting was organised in Dakar, Senegal in October 2005 and a product concept identification report was prepared and presented to the AATF Board of Trustees in November 2005. The Board questioned whether AATF had a comparative advantage over other institutions for the coordination of such an initiative and was not convinced that AATF could resolve the various uncertainties in this project, including the mustering of the needed political will in all concerned countries to mobilise resources and institutions. The Board advised AATF management to discontinue this initiative.

Strengthening seed systems in Africa

Seed is a fundamental input in all farming systems and represents the form in which many of the technologies for improving agricultural productivity that are obtained by AATF will be disseminated. It is thus critical that mechanisms for development and delivery of high quality seeds to small-holder farmers are strengthened to ensure sustainable and affordable use of such seeds.

Although most African countries have policies and regulations governing their seed sectors, these are largely non-functional primarily due to insufficient quantity and quality of seeds for the market, as well as the absence of an efficient network for seed dissemination. Whereas many national breeding programs are capable of producing good breeding lines and foundation seed, they often have limited capacity to produce seed on a large scale for commercialisation. This situation is further aggravated by the lopsided institutional inefficiencies which limit the use of breeders' material for seed production by private companies.

High-value seeds such as those to be promoted by AATF (e.g. IR maize, *Bt* cowpea, etc.) will greatly benefit from the presence of a robust mechanism for generating breeding lines with the right attributes, producing foundation seed and multiplying seed for distribution to farmers. The transaction costs associated with this process need to be kept low enough to ensure that seeds are available to farmers at an affordable price and that their sale can generate some revenues to the public research institutes and to plant breeders. Thus, the challenge of bringing high quality seed to farmers in Sub-Saharan Africa requires a close partnership between public research institutes that have capacity for crop improvement and seed production systems, whether privately owned or controlled by farmers' associations, which have built-in mechanisms for seed quality control.

In view of the above, AATF held consultations in 2005 with stakeholders in the seed sector that were aimed at:

- Facilitating the implementation of functional regulatory frameworks to govern the development and deployment of improved seeds along the entire seed chain;
- Promoting arrangements that include cost recovery mechanisms, such as royalties, that will benefit developers of seed while guaranteeing returns to private investors and maintaining seed prices within farmers' reach; and



- Providing product stewardship during seed production and deployment.

Following these consultations, a project concept identification report on strengthening seed systems in Africa was prepared that included: 1) a situational analysis of the African seed sector to identify key constraints and opportunities, and 2) identification of mechanisms for facilitating the transfer of high-quality seed from public research institutions to the private seed sector in a mutually beneficial way for sustainable delivery to farmers. The concept was presented to the AATF Board in November 2005. The Board was of the opinion that this initiative did not fall in the category of projects to be undertaken by AATF. It observed that many of the bottlenecks were due to government-imposed regulations and that there were other initiatives for seed market development, seed supply chain management and improvement of seed regulations. Therefore, the Board advised AATF management to discontinue its efforts on the proposed initiative.



FINANCIAL REPORT

This Financial Statement covers the period from January 2005 through December 2005 and provides comparative figures for the previous 16-month period (September 2003 through December 2004).

Funding

Total contributions from development partners amounted to US\$ 2.094 million, a demonstration of the importance donors attach to AATF's mission. The Foundation is grateful to all its development partners and acknowledges their contributions.

Expenditures

Overall expenditures for the period totalled just over US\$ 2.2 million. The difference between income and expenditures (a negative US\$ 0.112 million) was mainly due to depreciation and the accrual of unutilised staff leave time. At 41% of the total budget, expenditures on supporting services for operations were down significantly on the previous period. Project expenditures increased by 44% over the previous period to US\$ 1.28 million. The decrease in expenditures on supporting services and the increase in project expenditures is both highly desirable and fully consistent with the Foundation's business plan. The AATF is firmly committed to responsible use of the funds entrusted to it and will ensure that project spending continues to be emphasised relative to operational costs.

Summary statement of activities (abridged version)

For the period January – December 2005, with comparative totals for the previous 16-month period

	2005 (US\$)	Previous period (US\$)
Income		
Grants	2,075,219	2,665,640
Other income	19,040	13,593
Total income	2,094,259	2,679,233
Expenditure		
Project costs	1,279,751	886,410
Communication, publicity and advertising	22,065	148,927
Operating costs	904,651	1,058,505
Total expenditure	2,206,467	2,093,842
SURPLUS (DEFICIT)	(112,208)	585,391

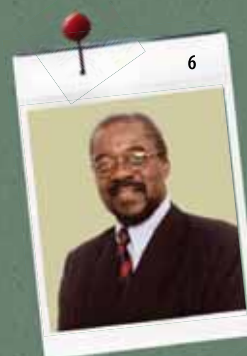
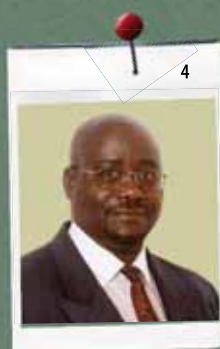
Statement of financial position (abridged version)

As of 31 December 2005

	2005 (US\$)	2004 (US\$)
ASSETS		
Non current assets		
Equipment and motor vehicles	93,143	93,075
Intangible assets	3,992	9,952
Total non current assets	97,135	103,027
Current assets		
Bank and cash	532,322	469,208
Accounts receivable	193,903	312,393
Total current assets	726,225	781,601
TOTAL ASSETS	823,360	884,628
LIABILITIES AND FUND BALANCES		
Current liabilities		
Accounts payable and accrued expenses	196,558	145,618
Total liabilities	196,558	145,618
Fund balances		
Restricted	152,758	29,907
Unrestricted	474,044	709,103
Total fund balances	626,802	739,010
TOTAL LIABILITIES AND FUND BALANCES	823,360	884,628

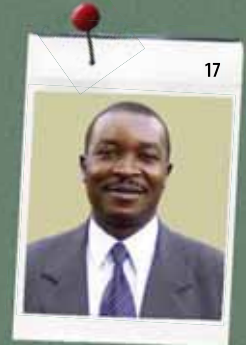
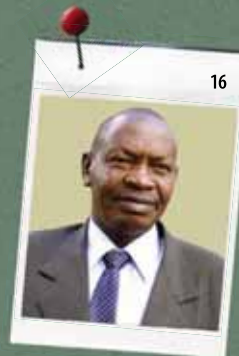
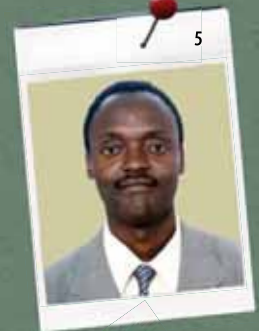


AATF Trustees (as of 31 December 2005)



- 1 Jennifer Ann Thomson (Chair):** Professor of Molecular and Cell Biology, University of Cape Town, South Africa
- 2 Walter S Alhassan (Vice-Chair):** Coordinator, Agricultural Biotechnology Support Project II (ABSPII), West and Central Africa and Sub-regional Coordinator, Programme for Biosafety Systems (PBS), Ghana
- 3 Mpoko Bokanga (Ex-officio):** Executive Director, African Agricultural Technology Foundation, Kenya
- 4 Vincent Gwarazimba:** Director, Nhimbe Agro Systems, Zimbabwe
- 5 Assétou Kanouté:** Coordinator, Réseau Ouest et Centre Afrique pour la recherche participative agricole/West and Central Africa Network for the Promotion of Participatory Agricultural Research (ROCAPA/ WECANPAR), Mali
- 6 Eugene Terry:** Consultant, Atecho & Associates, USA
- 7 Michael W Trimble:** Director, Trimble Genetics International, USA
- 8 Alhaji Bamanga Mohamed Tukur:** Group Chairman, BHI Holdings Limited (Daddo Group of Companies), Nigeria and Executive President, African Business Round Table, South Africa
- 9 Kevin B Nachtrab:** Director, Intellectual Property and Licensing, Innogenetics, NV, Belgium

The AATF Team (as of 31 December 2005)



- 1 **Mpoko Bokanga:** Executive Director
- 2 **Hodeba Jacob D Mignouna:** Technical Operations Manager
- 3 **Richard Boadi:** Legal Counsel
- 4 **Francis Nang'ayo:** Regulatory Matters Specialist
- 5 **Gospel Omany:** Projects Manager
- 6 **Nancy Muchiri:** Communications and Partnerships Manager
- 7 **Jacob Quaye:** Interim Administration and Finance Manager
- 8 **Martha Tilahun*:** Administration and Finance Manager
- 9 **Ketty Lubandi*:** Administration and Finance Manager
- 10 **Joan Abila:** Executive Assistant to the Executive Director
- 11 **Zainab Ali:** Special Assistant to the Executive Director
- 12 **Peter Werehire:** Publications and Website Officer
- 13 **Martin Mutua:** Accounting Officer
- 14 **Nancy Okita*:** Administrative Assistant
- 15 **Samuel Kariuki:** Administrative Assistant
- 16 **George Njogu:** Driver
- 17 **Gordon Ogutu:** Liaison Assistant/Driver

* Left the Foundation during 2005

BOARD

Advisory Committee

The Board Advisory Committee counsels the AATF Board on a wide range of strategic issues relating to AATF operations.

Gerard Barry: Golden Rice coordinator, International Rice Research Institute, Manila, Philippines

Douglas Gibson Brew: Senior Natural Resources Adviser, UK Department for International Development (DFID), UK

Giselle Lopes D'Almeida: President, Interface Network, Dakar, Sénégal

Josué Dioné: Chief, Sustainable Development Division, United Nations Economic Commission for Africa, Addis Ababa, Ethiopia

Aleke Dondo: Managing Director, K-Rep Development Agency, Nairobi, Kenya

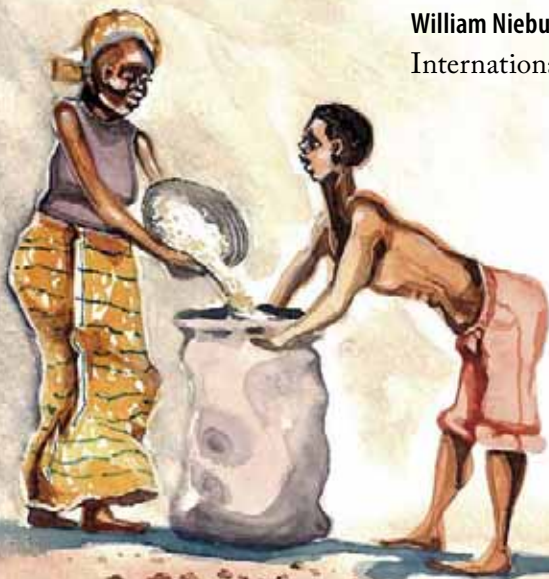
Monty Jones: Executive Director, Forum for Agricultural Research in Africa (FARA), Accra, Ghana

Josette Lewis: Biotechnology Advisor, US Agency for International Development (USAID), Washington, DC, USA

Peter Joseph Matlon: Director, Africa Regional Program, The Rockefeller Foundation, New York, USA

John Mugabe: Advisor to NEPAD, Secretary to NEPAD's African Forum on Science and Technology for Africa's Development, Pretoria, South Africa

William Niebur: Vice President, Product Development, Pioneer Hi-Bred International Inc, Johnston, Iowa, USA







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