

A quarterly newsletter of the African Agricultural Technology Foundation



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Project to develop rice varieties for saline and nutrient-depleted soils



A woman harvests rice: Africa relies heavily on imported rice to meet rising demand for the cereal. The new project will deploy biotechnology to breed nitrogen efficient and salt-tolerant rice for Africa.

Global rice prices have increased sharply over the past few years, largely due to increasing demand from countries in Africa, the largest importer of the cereal.

Rice is now a commodity of strategic significance and the fastest-growing food source in Africa, where it has been cultivated for centuries. It is now grown and consumed in more than 40 countries on the continent. In several African states, rice availability and rice prices have become a major determinant of the welfare of the poorest segments of consumers who are least food secure. Rice is therefore on the front line in the fight against hunger and poverty in SSA.

Rice consumption in Africa is growing by 6 percent a year and has created an annual shortage of 6.5 million metric tonnes, which is imported at an annual cost of about \$1.7 billion. Given the global food price crisis and competing demand in the traditional rice source markets in Asia, imports at such a large scale are not sustainable and Africa must look within for ways to improve rice production. The key lies partly in strategies to address constraints facing smallholder farmers, including research and introduction of new technologies.

Overcoming nutrient deficiency

A new project by the African Agricultural Technology Foundation aims to deploy biotechnology to help Africa's rice farmers overcome the problem of soil nutrient depletion, one of the major causes of declining food production on the continent.

The Nitrogen-Use Efficient and Salt-Tolerant (NUEST) rice project aims to develop rice varieties for saline soils and those that lack sufficient nitrogen, a critical nutrient for plant growth.

Soil nitrogen depletion has been identified as a root cause of falling food yields in Africa. In west Africa, for instance, nitrogen deficiency is a leading constraint to rice productivity in 87% of rice lands.

The magnitude of nitrogen deficiency is so massive that it cannot simply be corrected by large additions of nitrogen-bearing fertiliser. Furthermore, most small-scale farmers cannot afford such chemical fertilisers. Thus the increasing need to reduce pollution from N fertilisers is concomitant to strengthening the importance of developing rice varieties that can use available nitrogen more efficiently.

Salination of soils, on the other hand, partly due to over-irrigation, is an equally big constraint to agricultural production. Fresh water is a precious and scarce commodity and the ability to irrigate crops with salty water can improve productivity, reduce irrigation costs, and make more fresh water available for human consumption. Crops need to be adapted to grow in large areas degraded by salt accumulation. Salt tolerance has been enhanced in rice, tomato, alfalfa, canola and cotton. This technology gives the opportunity to increase yield in salty conditions and to reduce the use of fresh water for irrigation which provides potential for mangrove rice.

In the new project, AATF will use a multi-pronged approach that focuses on developing and cultivating stress tolerant crops, improving their nutrient use efficiency and working with farmers to integrate these crops into farms.

The Foundation has entered into an agreement with Arcadia Biosciences and the Public Intellectual Property Resource for Agriculture (PIPRA), in which the US-based agricultural biotechnology entities will provide their expertise and technology royalty-free for the development of nitrogen-use efficient and salt-tolerant African rice varieties.

The project also brings into collaboration agricultural research institutes in several African countries, which will provide technical expertise and locally adapted rice varieties into which scientists will build salt-tolerant and nitrogen use efficiency traits.

Working with national extension systems, AATF will then test the new rice varieties to pick those most preferred by farmers for dissemination across Sub-Saharan Africa.

Contact: [Nompumelelo Obokoh \(n.obokoh@aatf-africa.org\)](mailto:Nompumelelo.Obokoh@aatf-africa.org)

News

WEMA partners converge for annual review Project on course to deliver drought-tolerant maize for smallholder farmers

The first annual review meeting of the Water Efficient Maize for Africa (WEMA) project was held in Johannesburg, South Africa, from 16 to 20 February 2009.

The meeting brought together 45 participants from eight partner institutions and the Bill & Melinda Gates Foundation, one of the project donors. Partners took stock of the first year progress and also held thematic side meetings to plan for 2009 activities.

The meeting was officially opened by the President and Chief Executive Officer of the Agricultural Research Council of South Africa, Dr Shadrack Moephuli, who lauded the project's progress and said Africa could end hunger through research.

Dr Ephraim Mukisira, Director, Kenya Agricultural Research Institute, was elected chair to the project's Executive Advisory Board (EAB), taking over from Dr Dennis Kyetere, Director General National Agricultural Research Organisation (NARO) Uganda. Dr Mukisira commended the WEMA partners for their hard work in 2008 and pledged the EAB's support.

Participants also had a chance to visit and speak to farmers around Johannesburg on



Molatsi Musi (left), a farmer growing GM maize in Olifantsvlei near Johannesburg, leads WEMA project team members on a tour of his fields.

their experience of growing both Bt and conventional maize varieties.

Addressing the meeting, Lawrence Kent of the Bill and Melinda Gates Foundation said: 'The WEMA team is made up of people of exceptional talent especially because of the mix from the public and private sector. The relationships formed are strong and will pay dividends for the project.'

WEMA, a public-private partnership led by the African Agricultural Technology

Foundation (AATF), aims to develop drought-tolerant African maize varieties using conventional breeding, marker-assisted breeding, and biotechnology.

The other partners in the project are CIMMYT, Monsanto, the national agricultural systems of Kenya, Uganda, Tanzania, Mozambique and South Africa and the Howard G. Buffet Foundation.

Contact: Sylvester Oike
(s.oike@aاتف-africa.org)

Identifying agricultural technologies in China

A five-member team led by AATF visited China in March 2009 as part of a project to identify agricultural technologies that could be used to improve Africa's smallholder agriculture.

China has made huge investments in agricultural technology in the last two and a half decades. Technology is used at all stages of crop and animal production.

The delegation's aim was to identify Chinese agricultural technologies, assess their relevance to addressing the productivity constraints in smallholder farming in Sub-Saharan Africa (SSA) and initiate the development of a strategy to access and deliver them to SSA.

During the three-week mission, the team held discussions with Chinese Government officials in the Ministry of Agriculture and related agencies and visited various research and training institutions including the Chinese Academy of Agricultural Science and Henan



AATF's George Marechera and Stella Simiyu-Wafukho (front row, right) with Chinese Government officials and consultants from Africa.

Agricultural University. The project to explore Chinese technologies is funded by The Rockefeller Foundation. Findings of the survey will inform discussions at the Forum on China -Africa (FOCAC) meeting to be held later this

year. FOCAC is China's platform for South-South cooperation.

Contact: George Marechera
(g.marechera@aاتف-africa.org)

Top scientists discuss key challenges: Early stage risk assessment for the *Bt* cowpea

Leading cowpea and agri-biotech scientists met at the Donald Danforth Plant Science Centre in St Louis, Missouri, on 2-6 March 2009 to address the regulatory issues critical to the deployment of *Maruca*-resistant cowpea.

AATF and the Program for Biosafety Systems (PBS) convened the panel of experts to help design strategies for the project that is carrying out research to develop cowpea varieties resistant to the legume pod borer *Maruca vitrata*.

The high level panel comprised scientists from Africa, US and Europe, who have extensive experience in cowpea research and GMO risk assessment and management. Some of the experts have served as independent advisors for international bodies such as the US Environmental Protection Agency (EPA).

Maruca causes massive destruction to cowpea, an indigenous crop of Africa, and a staple food crop for millions across west Africa. The *Maruca*-Resistant Cowpea Project

aims to incorporate the *Bt* gene into farmer-preferred cowpea varieties to give them inbuilt protection against the pest.

The panel's discussions and recommendations will be published in three papers focusing on issues of gene flow from *Bt*-expressing cowpea into wild relatives of the plant, pest resistance to the *Bt* protein, and impact on insects other than the pod borer.

Contact: Nompumelelo Obokoh
(n.obokoh@aatf-africa.org)

Kirkhouse Trust team visits AATF

Award-winning molecular scientist Sir Edwin Mellor Southern led a delegation from the Kirkhouse Trust, a Scottish charity he founded, to the AATF headquarters in Nairobi to discuss developments in the Cowpea Project. The scientist is best known for inventing the Southern blot, which is used for DNA analysis.

The Kirkhouse Trust promotes education in the natural sciences and is a key partner

in the AATF managed project that aims at developing *Maruca*-resistant cowpea for Africa. It is supporting efforts to improve the capacity of national agricultural research institutes to apply marker-assisted selection (MAS) techniques to accelerate the introgression of the insect resistance trait and development of the improved farmer-preferred cowpea varieties.



AATF Technical Operations Manager Jacob Mignouna in discussion with Sir Ed Southern (right) and Robert Koebner.

OFAB Nigeria launched

The Nigeria chapter of the Open Forum on Agricultural Biotechnology (OFAB) for Africa was launched in April 2009 in Abuja. The chapter is a collaboration between AATF, the National Biotechnology Development Agency of Nigeria and the Agricultural Research Council of Nigeria and brings to three the OFAB chapters in Africa.

The first OFAB chapter was launched in Nairobi in 2006 followed by one in Uganda in 2007.

OFAB brings together various interest groups to improve public understanding of biotechnology.

In related news, AATF and the International Service for the Acquisition of Agri-biotech Applications (ISAAA) Africenter signed an agreement to continue collaborating in OFAB Kenya.

ISAAA Regional Director Margaret Karembu signed for the institute during a ceremony held in the AATF offices. www.ofabafrika.org



Dr Karembu and Dr Mataruka sign the agreement.

Consultative meeting on biological control of Aflatoxins held

A stakeholder consultative meeting on biological control of aflatoxins in food crops was held in April 2009 at the International Institute of Tropical Agriculture (IITA) headquarters in Ibadan, Nigeria. The meeting was convened by the African Agriculture Technology Foundation (AATF) and IITA to discuss prospects for a biocontrol method that uses natural Nigerian fungi to reduce the concentrations of aflatoxins in maize and out-scale it for the management of aflatoxins.

IITA in collaboration with the United States Department of Agriculture-Agriculture

Research Service (USDA-ARS), University of Ibadan and University of Bonn in Germany have developed an indigenous biological control technology to mitigate aflatoxin contamination in maize that reduces aflatoxin by more than 60%.

Aflatoxins are chemical poisons produced mainly by the fungus *Aspergillus flavus* in maize, groundnuts, cassava, and yam chips. The toxins are potent causes of cancer and suppress the immune system causing greater susceptibility of humans and animals to diseases. Aflatoxins also affect international trade since agricultural

products that have more than permissible levels of contamination are rejected in the global market. It is estimated that African economies lose about \$450 million annually to aflatoxin contamination.

This biological control will be used as a new type of aflatoxin intervention strategy to mitigate the negative effect of aflatoxins on human health and trade in Sub-Saharan Africa. According to Dr Ranajit Bandyopadhyay, the IITA Pathologist, atoxigenic strains for use in biocontrol have been identified for use in Kenya and Nigeria by USDA-ARS and IITA.

Meet new members of AATF Board of Trustees

Prof Michio Oishi and Prof Idah Sithole-Niang joined the AATF Board of Trustees in January 2008 and January 2009, respectively. They will each serve for a term of three years.



Prof Sithole-Niang

Prof Oishi

Idah Sithole-Niang is an Associate Professor and Head of Department at the University of Zimbabwe's Department of Biochemistry, which she joined in 1992. She teaches molecular biology and her research work focuses on cowpea crop improvement. She is also a Technical Advisor for the Program for Biosafety Systems (PBS) for Sub-Saharan Africa, co-coordinator of the Network for the Genetic Improvement of Cowpea for Africa (NGICA), and a member of the NEPAD Task Force on The African Biosafety Network of Expertise (ABNE).

Michio Oishi is Professor Emeritus, the University of Tokyo; Chairman of the Board of Trustees and Director of the Kazusa DNA Research Institute; member of the Human Genome Organization (HUGO); member of the Biotechnology Strategy Council for the Prime Minister, Cabinet Office; Vice Chairman of the Japan Bioindustry Association (JBA); member of the Japan Association of Bioindustries Executives (JABEX) and a trustee of the Research Institute of Innovative Technology for the Earth (RITE).

www.aatf-africa.org/aboutaatf.php?subcat=3&sublev=6

Staff appointments



Dr Sylvester O Oikeh, a Soil Fertility Agronomist, joined AATF on 1 February as Project Manager for the Water Efficient Maize for Africa (WEMA) Project. Sylvester has more than 18 years of interdisciplinary experience in research and development projects in natural resources and crop management. He will be responsible for coordinating and monitoring WEMA project activities. He joined AATF from Africa Rice Centre (WARDA).

My vision for AATF

Dr Daniel Mataruka joined AATF on 1 March 2009 as Executive Director, succeeding Prof Jennifer Thomson who had served as Interim Executive Director since September 2008. Daniel previously worked for about 13 years with the private sector company Tongaat Hulett Starch (THS), a leading large scale agro-business company operating in southern Africa. Daniel speaks of his vision and plans for AATF



You come from the private sector where work style, culture and stakeholder expectations are different from those of a public institution such as AATF. How does this shift fit in with your career path and would you see it as a challenge?

In fact, my career has not only been in the private sector. It began in the public sector in 1983 as a maize agronomist with Research and Specialist Services, Zimbabwe, and then I moved to the University of Natal, South Africa, where I lectured in crop science from 1992.

Perhaps, the difference between the private and public sectors has been over-emphasised. The two sectors actually aim for the same benefits – better lives for people and communities. The differences in my view are the stakeholders one is accountable to and the demands they pose. This influences the strategies and tactics one employs to achieve the desired end result.

I believe experiences and approaches from the two have synergistic effects and ought to impact positively on society in general and on development programmes in particular. This dual exposure should enable me to harness the best practices from the two sectors with particular input from the private sector to enable the actualisation of AATF's vision.

It is my belief that privileged people should make it a personal goal to contribute to a better human race and my current role at AATF fits in with that thinking.

As the new head of AATF, what is your vision for the organisation?

AATF's vision is clearly stated in all our documents as *Prosperous Farmers and a Food Secure Sub-Saharan Africa*. This is a noble vision that I fully subscribe to. Wouldn't it be great if it could be attained in our life-time?

What do you see as your immediate goals for AATF?

My total focus is on the actualisation of AATF's vision. To do this meaningfully, it will be important to:

- have AATF's footprint on as much of Sub-Saharan Africa (SSA) as possible. To achieve this, AATF must spread its projects and activities throughout SSA beyond the current concentration in east Africa and parts of southern and west Africa;

- broaden the range of technologies accessed beyond novel breeding techniques including GM technologies to encompass agro-processing (value addition), biological control, etc;
 - expand the donor portfolio; this will be key to all our current and planned activities; and
 - work at ensuring exemplary relationship management of key stakeholders.
- These four will be my key priorities going forward.

What do you see as your main challenges – from the individual and organisation point of view?

At the personal level, my particular challenge will be to catch up and build on the commendable developments that have taken place in AATF for the past five years.

Organisationally, the challenges relate to acceptance and recognition of the importance of our technologies by country governments along with the preparedness of different countries in SSA on issues related to regulatory compliance of the technologies we offer.

What would you define as the key assets that you have at AATF that would support the attainment of your goals?

Without a doubt the quality staff at AATF is a major asset. The team members are specialists in their areas of expertise and have managed to steer the organisation and its projects quite professionally over the years. They have what I would call the 'hard skill'. However, since AATF is about negotiating access to technologies, forming and managing partnerships, I shall make it my personal aim to cultivate and nurture this team in the 'soft skills', especially relational and personal skills along with management skills. This will result in a well rounded team that will be more effective in driving towards the vision.

The second key AATF asset is its partners and investors. I have noted that past relationships have not always been smooth but what I find satisfying is that these partners and investors have made long-term commitments to work with AATF – they are there for the long haul – and are closely involved and show great interest in AATF's work.