

DECISION MAKERS

Helping Frame Policies

The role of policy makers in the crop biotechnology debate cannot be underestimated. They are the individuals whose decisions and opinions have significant influence or impact on national policies, laws, and regulations relating to agricultural biotechnology as well as on the overall directions of the country's agricultural development programs. Research has shown that in five Asian countries, biotechnology generates a lot of attention from stakeholders who tend to be directly involved in biotechnology and whose opinions and decisions have a significant influence on the future of biotechnology in these countries (Juanillo, 2003).

Policy makers play a crucial role in the formulation of policies that support biotechnology research and development, biosafety laws, approval for the commercialization of biotech products, and even the approval of funds for biotech activities. Experiences of many countries have shown that national political support and the enactment of guidelines and laws that favor biotechnology contribute to speeding up the commercialization of biotech products. On the other side of the coin, policy makers can promulgate policies that hinder research activities through moratorium of field trials and a complete ban on related biotech

research; delay deployment of crop biotechnology, affect public funding and support for public biotech research; and even their overly cautious stance in approving a regulatory system can lead to implementation difficulties. In both situations, the availability of or lack of science-based information can affect the policy environment for biotechnology. Decision makers in the educational or research systems also play important roles in providing direction for curricular or scientific initiatives, policy formulation, and implementation of innovative schemes.

Thus, designing appropriate communication strategies aimed at policy makers is important. Activities can be geared toward helping policy/decision makers better understand the technology so they can clearly address public concerns and arrive at a consensus for designing policies that favor research, adoption of new technology, and/or support program activities.

The following stories highlight how various decision makers were introduced to biotechnology and how their understanding of key concepts and issues led to the development of policies favorable for the development of biotechnology.

THIRA SUTABUTRA

Agriculture Minister Supports Biotechnology

By Supat Attathom



It is not often that a country's Agriculture Minister is a scientist by training and has actually done research with plants enough to understand the importance of biotechnology in improving a country's agricultural productivity. But that is exactly what Dr. Thira Sutabutra was when he became Thailand's Minister of Agriculture and Cooperatives from October 2006 to February 2008. He provided national leadership to a country that is a major exporter in the world rice market and which produces significant amounts of tapioca, rubber, grain, and sugar. Geographically, Thailand is situated in an area suitable for crop production and is hardly affected by natural catastrophes such as drought, tropical monsoons and flooding. However, crop production in the country is still affected by diseases and insect pests resulting in low yields. Dr. Thira firmly believes that "with an appropriate strategy, agriculture production in Thailand can be improved to generate more income for farmers."

The Bangkok-born Dr. Thira studied agriculture at the Kasetsart University. "I feel more comfortable working with plants than with sick people," he says. His keen interest in agriculture started in his early school years although he did not come from a farming background. He was determined to study agriculture as he

realized that "agriculture is very important in a country's development and a significant number of Thais are farmers." Through a government scholarship which was awarded to him in his junior year in college, he was able to study at the University of California, Davis where he finished his B.S. (Hons), M.S. (Plant Pathology) and Ph.D (Plant Pathology) in 1964, 1965 and 1968, respectively.

After graduation, he joined the Department of Plant Pathology at the Kasetsart University where he worked until his retirement in 2002. He spent most of his time working on plant diseases, particularly virus and phytoplasma diseases of crop plants such as ornamental plants (orchids), food crops (rice, corn, sugarcane, tomato, and yard long bean), and fruit crops (longan and citrus). He received several awards for his research accomplishments, particularly on Mycoplasma, the causal agent of Witches' broom disease of longan, and his characterization of the cowpea aphid-borne mosaic virus, from various academic institutes including Kasetsart University, University of California Davis, and the National Research Council. The researcher became the President of Kasetsart University from 1996 to 2002.

A Minister's Support for Biotechnology

Dr. Thira's ascent to become the Minister of Agriculture and Cooperatives in 2006 under the Cabinet of Prime Minister Surayud Chulanont was in recognition of his managerial prowess as rector of a premier university and his agricultural background. He was expected to continue implementing Thailand's National Biotechnology



Policy Framework 2004 - 2011 of which one of six goals was to promote the country as “kitchen of the world” by maintaining and enhancing its competitiveness in agriculture and food industries. The biotech framework stipulates that “by the year 2011, biotechnology will be playing a vital role in the country’s development in line with government policy and the national agenda, which encompasses sustainable competitiveness, healthcare for all, equitable income distribution and a self-sufficient economy. The emphasis will be placed on applying core technologies, e.g. genomics, bioinformatics, plant and animal breeding by means of molecular markers to accelerate development in the following areas: agriculture/food, medical and care, environment protection, new knowledge creation for the development of higher value-added products, as well as for knowledge-based policy and strategic planning” (The Nation, 2006; Business in Asia).

Biotech as Tool to Create Crop Diversity

Dr. Thira is a strong supporter of science and technology in agriculture. As Chairman of the Board of the National Research Council for Agriculture, agricultural biotechnology was emphasized, particularly on biocontrol of insects and diseases, and value added for rice and other raw materials. “I strongly emphasized that agriculture needs technology such as biotechnology as a tool to create diversity for an efficient crop improvement technique. We need varieties that are resistant to diseases and insects. We also need varieties which have better nutritional values for daily diets,” he explains.

“As a plant pathologist, especially as a virologist, the best thing we can do is to tell the farmers to remove virus infected plants from the field. How can you help them if the whole tomato or chili pepper fields are infected?” asks Dr. Thira. “Thailand is the paradise of plant virus diseases because crop plants can be grown all year round and at the same time, pathogens and their vectors

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are always there. There is no winter break for diseases and insect vectors. Papaya is a good example. We attempted for more than 20 years to develop a variety resistant to papaya ringspot virus (PRSV) but without much success. This is the reason why we are interested in biotech crops. Any crop that can resist insects and diseases will be the key solution for tropical agriculture.”

To this day, Thailand still faces opposition to the introduction of biotech crops for agriculture production particularly from cause-oriented groups. The country placed a moratorium on field testing of biotech crops as a result of the cabinet decision in April 2001. “The cabinet decision is basically equivalent to a law and thus, nearly impossible to overturn,” Dr. Thira explains. “As the Minister of Agriculture and Cooperatives at that time, I wanted very much to remove this barrier that had a negative impact on the development of agricultural biotechnology.” To be able to do so, he formed an alliance within the cabinet members including Ministers from Science and Technology, and Natural Resources and Environment and re-submitted the case for cabinet consideration. In addition, groups of farmers that had undergone biotech workshops with the Thailand Biotechnology and Biosafety Information Center (BBIC) submitted a petition to the Prime Minister and cabinet members including Dr. Thira to allow field testing and planting of biotech papayas to control PRSV. Representatives from the BBIC, Biotechnology Association Alliance, and other groups testified in front of the Congressional Sub-committee on Agriculture of the Department of Agriculture on the benefits of biotech crops and received positive endorsement. With

all these efforts, the cabinet decided in November 2007 to allow field testing of transgenic plants with restricted measures. Thailand eventually revoked the ban on biotech field trials in December 2007 but the government and private stakeholders still consider the new requirements too restrictive. At present, the Ministry is working on the proposal to allow the field testing of papaya. The draft National Biosafety Framework is currently at the Office of the Council of State for legal review which is expected to be concluded in 2009 (USDA Gain Report, 2008).

Live Classroom Approach

The workshops organized by BBIC to orient papaya farmers on the need to find alternative ways to combat the PRSV disease problem are done at Kasetsart University using the “live classroom” approach. Here farmers are briefed on the process of developing a biotech crop from the laboratory to contained field level stage not only to demonstrate the science-based process of product development, but to show the benefits of planting such a crop when compared with the traditional varieties that are prone to certain diseases. Participants of these workshops are empowered with sufficient information to make decisions as exemplified by the farmers who submitted a petition to the government to allow field testing.

“The International Service for the Acquisition of Agri-biotech Applications’ (ISAAA) report on the global status of commercialized biotech/ GM crops has proven to be very useful,” says Dr. Thira. He also receives regular copies of BBIC publications such as its quarterly newsletter that highlights activities and developments in crop biotechnology. Dr. Thira serves as advisor of the BBIC newsletter.

Dr. Thira’s ties with ISAAA had actually started as early as when he was still the President of Kasetsart University. He hosted the First Papaya Biotechnology Network for Southeast Asia in March 1998. This workshop was co-organized by ISAAA and attended by researchers from Thailand and neighboring



Farmers discuss issues regarding genetically modified organisms in a BBIC-sponsored workshop.

countries such as Malaysia, Indonesia, Vietnam and the Philippines. It was intended to utilize modern biotechnology to solve the PRSV problem in the region. As a follow up to that activity, BBIC was established in 2000 to facilitate information dissemination within and outside the country. Dr. Thira fully supported its establishment and subsequent activities such as a series of seminars and workshops for various stakeholders to enable them to better understand the benefits and concerns regarding biotechnology.

The Future for Crop Biotechnology

Thailand has a long history of supporting biotechnology and was a leader in the region for a time. The ban on field testing and commercialization of biotech crops continues to slow down research and development initiatives in biotechnology. “Sooner or later the country may lose its competitiveness in crop production. I have no doubt about the food safety aspect of biotech papaya,” said Dr. Thira. “But we want to make sure that it will retain its resistance to PRSV under field conditions. That’s why we need to bring back the field trial of biotech plants. And if we don’t do it now, we may have to buy GM seeds from outside within 10 years,” Dr. Thira adds.

The former Agriculture Minister mentions that Thailand still lacks a critical mass in specialized areas such as biotechnology. “The country remains weak in basic research due to the lack of incentives for researchers. Current research topics are geared toward immediate problems demanded by users. It is quite difficult for the public to appreciate any product, particularly those derived from basic

research such as the biotech plant, amidst the strong opposition by pressure groups. ISAAA has done a very good job in disseminating information and educating the public through various mechanisms. It can’t happen in one day but sharing of efforts by concerned parties as what ISAAA is doing will be the key to success,” Dr. Thira concludes. □

ALFRED NDERITU

Reaching Out to the Legislature

By Margaret Karembu and Daniel Otunge



For a man who grew up watching his father struggle miserably with rice growing, it is not surprising that Hon. Alfred Nderitu, a former Kenyan legislator, has dedicated his energy and resources in trying to fight for the improvement of agricultural practices in the country.

“The sad childhood memories are partly what drove me into politics, to fight for the rights of rice farmers, whom I believed, were being grossly exploited from “cooperative” rice farming. My father was a rice farmer. And like many others in the Mwea Irrigation Scheme in Central Kenya, they were receiving negative returns year in, year out. It was unbelievable that one could dedicate his entire time to farming and yet end up with huge debts due to the oppressive regulations and controls, more importantly poor quality seeds,” Nderitu sadly narrates.

He recalls that anyone who attained the age of 18 years was thrown out of the scheme. “The farmers

were not even allowed to build permanent houses because they were simply tenants,” he exclaims.

“I saw the need to change some of these draconian rules and laws,” states the 51-year old Hon. Nderitu who joined Parliament in 1997. And he is proud of his 10 years that he spent as a member of the Legislative House for he believes he made the change he so passionately desired – that of improving the livelihood of many rice farmers. “Rice farming is now a more profitable venture,” he says.

However, Nderitu believes farmers are not getting the best returns to their investment due to the many production constraints such as low quality seed, pests and diseases and erratic weather conditions.

According to Hon. Nderitu, biotechnology can address some of these constraints to increase productivity. He takes issue with some non-

government organizations (NGOs) and others opposed to the technology, challenging them to talk from a point of knowledge. To emphasize this point, he recalls a widespread opposition from a section of bankers in Kenya in the nineties who were opposed to the introduction of computers because they felt it would render them jobless. "A former head of state in Kenya was even opposed to mobile phone technology! These are the same unfounded fears shrouding modern biotechnology," states Hon. Nderitu. "Let them visit India which is becoming the greatest producer of biotech cotton."

Equally, farmers in Kenya, through biotechnology, would significantly increase their farm productivity. "Through fighting major crop pests like the African bollworm for example, I have learned from the experimental trial site being conducted by Kenyan researchers at the Kenya Agricultural Research Institute (KARI) center in Mwea that application of biotechnology can raise cotton yields by over 20 per cent more than the conventional one even without the adapted germplasm."

And the *mheshimiwa* (Swahili for an honorable member of parliament, past and current) believes he has gathered enough evidence from farmers commercially growing and trading with biotech crops. "I had rubbed shoulders with all kinds of farmers - small and large or so, I thought, but what I experienced in the United States of America (USA) changed my entire perception of farming and agriculture in general."

U.S. and South Africa Tour of Biotech Farms

In October 2008, Hon. Nderitu, was lucky to be facilitated by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) *AfriCenter* to represent Kenyan farmers at the World Food Prize awarding ceremonies in the USA. The World Food Prize is an international award recognizing the achievements of individuals who have advanced human development by improving the quality, quantity or availability of food in the

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world. The prize was created in 1986 by Nobel Peace Prize Laureate Norman Borlaug (who is also a patron of ISAAA), and recognizes contributions in all fields involved in the world food supply – food, and agriculture, science and technology, manufacturing, marketing, marketing, nutrition, economics, poverty alleviation, political leadership and the social sciences. As well as recognizing personal accomplishments, Borlaug saw the prize as a means of establishing role models who would inspire others.

While in the US and as part of the event, the *mheshimiwa* had a chance to visit farmers growing biotech crops. One farmer, a Mr. Gerald, had over 12,000 acres of biotech maize and over 5,000 acres of biotech soybean. His neighbor had 24,000 acres of biotech maize and over 12,000 acres of biotech soybean.

"I was amazed at how these farmers have flourished through growing of biotech crops. For one, they do not own the land, but have leased it from the Government at a rate of US\$6,000 per year per acre. Each farmer has about five farm employees spending about US\$2,000 monthly on wages with a mere farm laborer pocketing at least US\$150 per month."

But what impressed *mheshimiwa* the most was the fact that farmers did not grow to sell to the government or private companies unless on contract. "Farming is an industry. The produce, be it maize, soybean or milk for those in the dairy sector, is processed right at the farm. It is the processed (value-added) product that is marketed,

and in most instances, under contract from consumer chain outlets.”

And he quickly compares this practice with the situation in Kenya. “With the exception of a few multinationals in the tea, coffee and fresh produce sectors (e.g. Del Monte in Central Kenya with pineapples), and maybe former colonial farms like the Delamere (in the Rift Valley), the rest of Kenyans in the agricultural sector are mere spectators,” states Hon. Nderitu. “In America, commercial farming is heavily entrenched in the agricultural practice. This cannot be said of the Kenyan growers.”

Further, Mr. Nderitu reckons that the American experience only managed to consolidate his resolve for the adoption of genetically modified (GM) crops in the country. He had been to South Africa in 2006, in another ISAAA *AfriCenter* facilitated exposure visit for policy makers from Kenya and Malawi. The high level fact-finding study tour for decision makers, which was co-organized by AfricaBio (South Africa), the African Biotechnology Stakeholders Forum (ABSF-Kenya), BioEROOC (Malawi) and ISAAA *AfriCenter* took place in May 2006. It was attended by a total of 24 participants from three African Countries (Kenya, Malawi and South Africa), half of whom were members of Parliament from the respective countries. Topics covered during the workshop included: an introduction to biotechnology; status of biotechnology in Africa; overview of small scale farmers’ biotech projects in South Africa and the government’s perspectives on biotechnology and biosafety among several others.

As part of the intensive 5-day program, delegates visited Bt white maize demonstration sites in the Soweto and Olifantsvlei area and saw first hand the potential benefits the biotech maize could bring for small-scale farmers in areas where stalk borer damage is a limiting production factor.



Parliamentarians on a tour of a Bt cotton trial in KARI Mwea during the Biosafety Bill process.

The delegations were also provided with an additional opportunity of participating in a one-day field trip to Makhatini Flats in the Kwazulu Natal province of South Africa on the eastern coast of the country. This trip allowed them to see, touch and feel the Bt cotton grown by small scale farmers and to discuss with them, the role the technology played in cotton production on their farming enterprises. The delegates also visited the Makhatini research farm, under the KwaZulu Natal Department of Agriculture, and two other small scale cotton farms. The visit occurred during the harvest season and delegates were able to have a one-on-one discussion with the farmers and researchers.

“I listened to the South African government officials talk about their bold decision to commercialize GM crops in the country after setting up the necessary regulatory mechanisms to ensure safe and responsible use of the technology. In the biotech maize and cotton fields, I listened to farmers speak about their change of fortunes since adopting GM crops. Joseph Buthelezi’s story, the chairperson of the Ubongwa Farmers’ Association, which he told us represents more than 4,000 small-scale farmers in the Makhatini region was



Hon. Alfred Nderitu (holding corn) with other legislators in South Africa discussing Bt maize with a farmer.

the most fascinating. “Before I started using this Bollgard cotton seed, the bollworm was harvesting my crop, literally! Bt cotton has changed my life as a small-scale farmer and that of my fellow Union members. I used to work every day of the week, getting exposed to dangerous chemicals and at the same time realizing very little income, but not any more. My yield has more than doubled, he said. And the story was the same for another farmer - Jabulile Gumede, from the same area, said that the Bt cotton had contributed significantly to her farm’s cost-effectiveness, sustainability and productivity due to the reduction of farm input costs but most importantly pesticides and the reduction in the number of sprays. “We now spray twice compared to more than ten times when we were planting conventional cotton the farmers told us.”

While this workshop was intended to concentrate on general biotechnology awareness and the visual demonstration of the technology, issues pertaining to food security, policy and the regulation of the technology took center stage. A key message from the delegates was the need to converge science and politics in the African region.

And Hon. Nderitu made a resolve and an obligation that when he got back home, he would play his part, especially through the mobilization of relevant Parliamentary Committees on Agriculture, Health and that of Education, Science and Technology to ensure that Parliament enacts the necessary legislation for the commercialization of biotech crops in Kenya. True to his word, Nderitu championed the cause for the Biosafety Bill to its eventual tabling and debate in Parliament. Although Parliament adjourned just before voting for the Bill, the *mheshimiwa* is very proud to have been associated with the highly informed contributions from his fellow that characterized its extensive debate both in Parliament and outside.

He argues that while GM crops or biotechnology is not the panacea for the world food crisis, biotechnology is the future for agriculture. “It has enormous potential to greatly increase productivity and help solve major production constraints. With biotechnology, the country has the potential to be self sufficient in cotton production and even produce surplus for export considering that there is a lot of idle land suitable for cotton growing. All it requires is making the ‘bold decisions’ to acquire the right technologies, like India has done with Bt cotton, and the Government playing its rightful role of developing enabling policies and support,” says Mr. Nderitu.

Message Maps

He believes much of the opposition to biotechnology in Kenya and indeed in the continent is based on misinformation. He says there is need for organizations like ISAAA and others in the know to fast track the passing of right information and knowledge on biotechnology to farmers.

Hon. Nderitu applauds another ISAAA initiative he believes was instrumental in guiding debate on the Biosafety Bill and its eventual approval

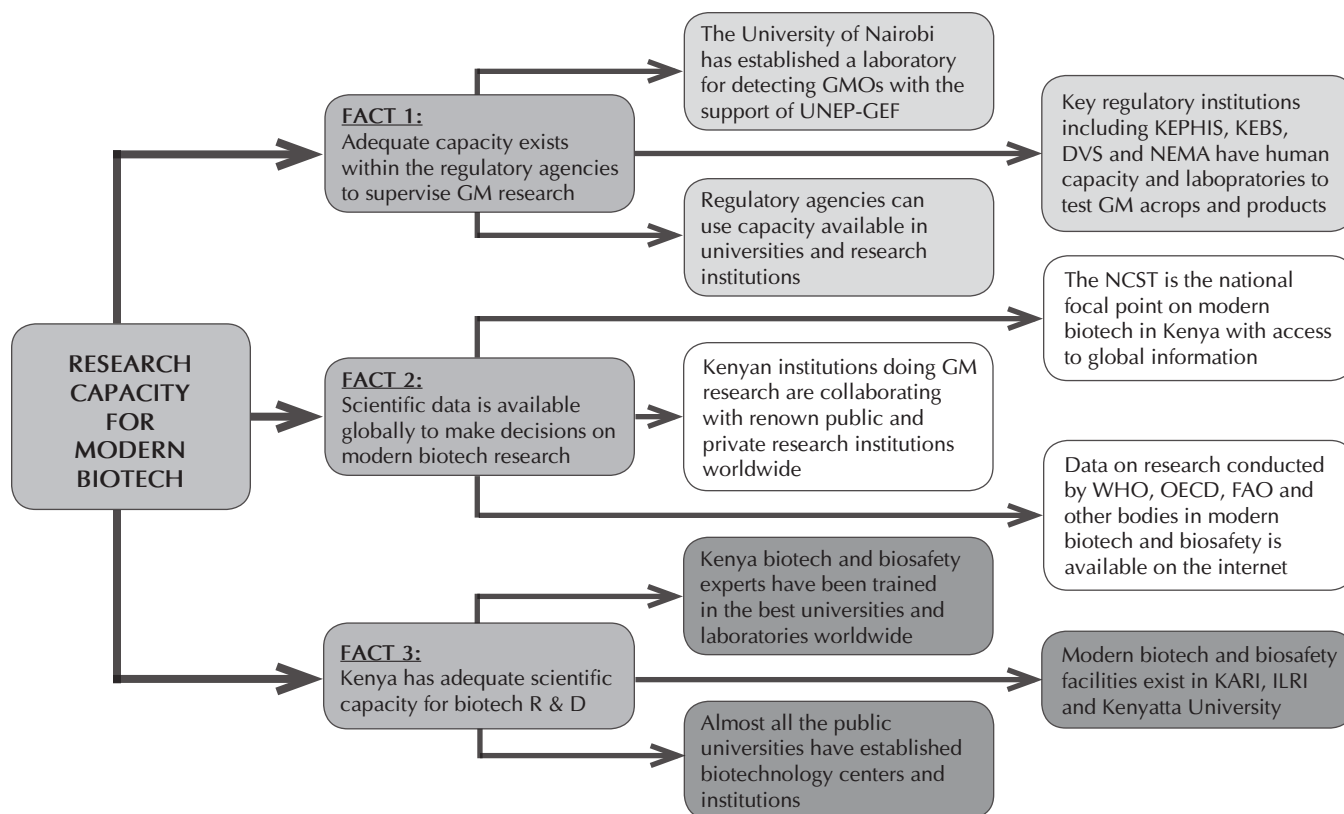


Figure 1. Message map on research capacity for modern biotech in Kenya.

Acronyms: DVS – Directorate of Veterinary Services; FAO – Food and Agriculture Organization; ILRI – International Livestock Research Institute; KARI – Kenya Agricultural Research Institute; KEBS – Kenya Bureau of Standards; KEPHIS – Kenya Plant Health Inspectorate Service; NCST – National Council for Science and Technology; NEMA - National Environment Management Authority; OECD – Organization for Economic Cooperation and Development; UNEP-GEF – United Nations Environment Programme-Global Environment Facility; WHO – World Health Organization

by Parliament in 2008 – the *Message Maps*. “We politicians do not have time to read and digest big scientific reports given the majority do not have a basic science background in the first place. Not only did those message maps aid our understanding of what my fellow parliamentarians thought was a very complex topic but exposed them to the bigger picture of the world of biotechnology with crispy facts and statistics both in-country and globally. They (message maps) responded to many of the concerns thus building confidence in the technology, good enough to diffuse the many doubts of more and more members of the National Assembly,” explains Hon. Nderitu.

Message maps are tools for presenting facts and figures on a particular subject that end-users or those directly involved consider highly technical or of major public concern in a format that facilitates quick reading and comprehension. In the period leading to the tabling of the Kenya Biosafety Bill for enactment by Parliament (2006 to 2008), ISAAA *AfriCenter* in collaboration with local experts developed a variety of biotech Message Maps targeting parliamentarians and high-level policy makers. The one-page messages aimed at contributing to a better understanding of the various concerns related to modern biotechnology

and biosafety in view of heightened and polarized debates on the subject that was creating a lot of fear thus impeding informed decision making on the same. The messages developed covered the following key topics with reference to Kenya:

- Governance of modern biotechnology
- Legislation on biosafety
- Field trials of modern biotech crops
- Research and scientific capacity for modern biotechnology
- Modern biotechnology and trade implications
- Global adoption and status of commercialized GM crops
- Food and feed safety of biotech products
- Benefits of Bt cotton
- Modern biotechnology and the subsistence farmer
- Modern biotechnology and the environment
- Biotech crops and Intellectual Property Rights (IPRs)

More and more countries in the region for example Burkina Faso, Mali and Egypt have since localized the message maps to suit their situation.

And the *mheshimiwa* has some advice to ISAAA: "Besides these initiatives, ISAAA needs to devise ways of ensuring that farmers can have access to their other invaluable information and knowledge resources on biotechnology such as videos with experiences from other countries (Bt Cotton in India and China) and publications such as the Global Status of Commercialized Biotech/GM Crops that I believe can build confidence in farmers and other stakeholders." He however, notes that while the information can easily be understood by policy makers, the materials particularly the printed ones and those on the ISAAA website need to be simplified to a level that is easily understood by most farmers and those without a University education.

Biotechnology Crusader

He is of the opinion that ISAAA and its collaborators need to come up with an initiative that particularly targets farmers to diffuse the fears and anxiety that have been created by gross misinformation. "There is need to establish local biotechnology information and education centers at every administrative district or even at the Constituency level. In addition, there is need for massive public campaign and awareness creation about the real attributes of biotech crops and products."

Hon. Nderitu, who has turned himself into a biotechnology crusader, is not disappointed with his awareness campaigns. "People are positive about the technology and keep asking me when the Bt cotton is going to be commercialized. All I get is positive feedback."

For the *mheshimiwa*, there is no turning back on the technology - he has taken on what is currently available in the country and already, four acres of his land is under tissue culture bananas. A civil engineer by profession, Hon. Nderitu has a lot of faith in biotechnology that he is contemplating leasing at least 1,000 acres of land from the Government that he would develop into a demonstration farm for biotech crops. And he has transformed himself into "thinking big" so he says. By Kenyan standards, "I am a commercial farmer. What I earn from farming is far much more than my pension. For instance, I have been earning close to Ksh 140,000 (USD 1,800) per week over the last six months from my five acres of mango trees, which is mainly for export."

He was excited over the President's assent to the Biosafety law in February 2009 and hopes for its quick actualization to stimulate commercialization of biotech crops in Kenya. □

ZAIDAH BINTI MOHD YUSOFF

Educating the Young to Appreciate Biotech

By Mahaletchumy Arujanan and K. Cheng Liew



Zaidah Binti Mohd Yusoff is one of the foremost science educators in Malaysia. After earning a Diploma Science in Education and BSc. (Hons) in Biology (Major) and Biochemistry (Minor) from Universiti Sains Malaysia, she forged her way through being a secondary school teacher between 1977 to 1997. Today, she is the Assistant Director and Chief of the Elective Science Unit, Science and Mathematics Section of the Curriculum Development Division (CDD) where she plays a central role in designing and developing the curriculum for national upper secondary schools in the four elective science subjects: biology, chemistry, physics and additional science. The CDD is vital in disseminating and implementing the curriculum, monitoring curriculum implementation, developing support materials for the curriculum, and evaluating and enhancing the quality of the curriculum to meet current requirements and future trends of the nation.

With the Malaysian government's concerted thrust in developing the biotechnology industry, the CDD has been enhancing and developing a curriculum to support the government's vision. Through the science curriculum that is designed and developed with learning areas for biotechnology, teachers will then be able to impart knowledge and skills to students. Where appropriate, emphasis will be placed on the applications of biotechnology, its impact on everyday life, current issues in biotechnology, the history of biotechnology, the nature and practice of biotechnology, ways of scientific thinking, and designs of experiments which will be more interesting and relevant to students. To further stimulate a culture with an enthusiasm and interest for biotechnology, and an appreciation for scientists, activities and programs are being planned for

teachers and students. In Zaidah's words, "We are educating the young who are learning science to become future specialists in the biotech field."

Role of Science and Technology

As a secondary school educator, Zaidah is very optimistic with regards to the role of science and technology, citing it as a powerful influence on our daily lives, with almost every segment of human society, especially social, economic and medical aspects revolving around it. "One example would be the invention of the mobile phone," she comments. "Its influence is almost inseparable to most people living today."

"I also believe that research is an on-going process in designing and creating technologies that can solve problems and improve life," she says.



Zaidah (left, second row, wearing glasses) participates in biotech dialogue.

“This is why while designing and developing the science curriculum at CDD, we hope to provide students with the knowledge and skills in S&T while enabling them to solve problems and make decisions in everyday life based on scientific attitudes and values. We also make sure that the curriculum also aims at developing a concerned, dynamic and progressive society with an S&T culture that values nature and works towards preservation and conservation of the environment.”

However, in this respect, she is also concerned about the directions and risks of future S&T. Being concerned about the effects of biotech products as double-edged swords, Zaidah is vocal about both positive and negative aspects of the technology. Where people are being optimistic about technology, she maintains a skeptical outlook preferring for the science to speak for itself. However, she also notes that “crop biotechnology scientists need to tackle many issues such as ethical, social and legal issues as well as production issues. There is a pressing need for greater dialogue and understanding on biotechnology.”

Spreading the Word

Zaidah is innately involved in spreading the knowledge of biotechnology to the various educators under her charge. She has organized visits, talks and workshops on biotechnology for secondary school teachers and CDD officers with scientific background through extensive collaboration spearheaded by the Malaysian Biotechnology Information Center (MABIC) to ensure a greater understanding of the subject matter. To achieve such means, she has extensively collaborated with various biotech organizations including MABIC and research organizations such as the Malaysian Palm Oil Board (MPOB), Forestry Research Institute Malaysia (FRIM), and Malaysia Agricultural Research Development Institute (MARDI).

“With the knowledge gained they (the teachers) are more confident to teach and now they can do something different in their classrooms like sharing knowledge and establish more practical hands-on activities.”

Among the various talks she has organized with the assistance of MABIC include biotechnology workshops for teachers at the National Science Center, seminar for teachers and CDD officers on *Teaching Biotechnology in School: The Effective Pedagogy* at the CDD, Ministry of Education, workshop for teachers on tissue culture technology at FRIM, and another biotechnology workshop for teachers on *Enhancing Effective Pedagogy* at MPOB.

She also pulls no punches in updating herself on the various advances in the field, and has no qualms in talking to regional experts to achieve such means. For example, she has listened to talks on biotech by Singaporean experts from the Nanyang Institute of Technology. Her dedication and resolve has earned her the respect of her peers as well as obtaining positive feedback from the various participants in such activities. She divulges that “Some of the teachers commented that their involvement in these activities contributed to their personal, intellectual and professional development and also to their practical capability in conducting classroom activities associated with biotech.” In turn, she believes that these activities also provide motivation for them to teach biotechnology effectively. “With the knowledge gained they (the teachers) are more confident to teach and now they can do something different in their classrooms like sharing knowledge and establish more practical hands-on activities.” According to Zaidah, participants hope that the Ministry of Education (MOE) and MABIC will continue their collaboration

in organizing more activities on biotech and also nanotechnology in the near future.

Keeping Abreast with Current Information

She has been actively using materials produced by ISAAA and MABIC as references and resources for the development and quality enhancement of the school science curriculum to meet current requirements and future trends. This in turn determines what other information could be included in biology, additional science and core science curricula. "From publications I've gotten from ISAAA and MABIC, it is easy to keep abreast of the myriad of current information and valuable knowledge in the field of biotechnology such as biosafety, and biotech crop utilization, which are not included in the current curriculum," she says. "Such knowledge is important and relevant."

Examples of the resource materials she has been referring to include *Biodiversity, biotechnology and biosafety: An Islamic perspective*; and the Global status of commercialized biotech/ GM crops. "Curriculum is dynamic," says Zaidah. "So much so that the content knowledge in S&T needs to be expanded and upgraded and value added when we review the curriculum."

For the near future, she sees the need to further educate and update herself on biotechnology. "I hope to actively participate in the promotion of this dynamic field to enable the younger generation to feel the progress and be prepared to see opportunities turn into business reality and success." □

SERUNJOGI LASTUS KATENDE

Making S&T Top Parliamentary Agenda

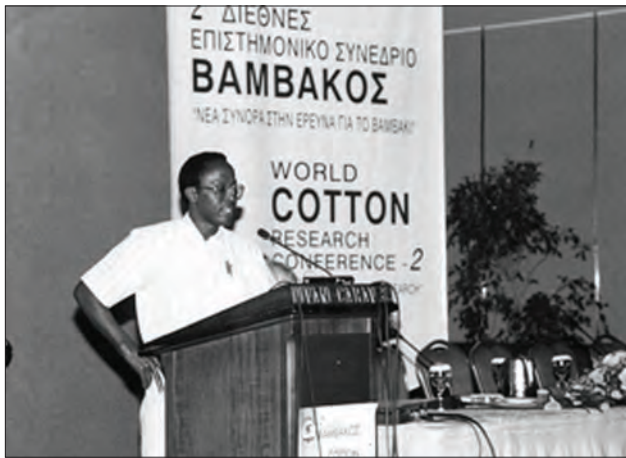
By Margaret Karembu and Daniel Otunge



They spend years in laboratories developing innovations with potential to improve livelihoods, only to be frustrated by lack of supportive policies from the legislative arm of Government. But having failed to convince parliamentarians, many of whom are non-scientists to

enact the necessary policies and legislation for facilitating speedy translation of their hard-earned innovations into products, some scientists are now considering it their responsibility to be part of the political process.

One such politician who has taken it up for the sake of fellow scientists and the greater public is Dr. Serunjogi Lastus Katende, Member of Parliament for Kiboga County, East Constituency in Uganda. "I was inspired into politics by the lack of competent and hardworking representatives from



Dr. Katende speaks at a conference on cotton.

my home area in Parliament and by what I felt was laxity by policy makers to actualize excellent policies especially on agriculture for the benefit of Ugandans,” states Hon. Katende.

What was even more compelling for the Ph.D holder in Plant Breeding and Seed Science from Ohio State University USA, was the fact that he had been involved in drafting some of those policy documents idling in Parliamentary shelves, which he considered critical for agricultural development in Uganda.

Indeed, besides being a member of the Institutional Biosafety Committee (IBC), he was a member of NARO’s (the National Agricultural Research Organization) task forces that drafted the Plant Variety Protection Bill, Biotechnology and Biosafety Policy, and the International Plant Genetic Resources for Food and Agriculture, of which none had seen the light of day at the time he joined Parliament in 2006.

Seeing Through Relevant Biotech Legislation

Dr. Katende believes he is making a difference. “The country’s Biotechnology and Biosafety Policy is already in place within the two years I have been in office and I am making all efforts to see the

relevant legislation for modern biotechnology - the Biosafety Law is enacted without further delay. We have already lost a lot of time since the drafting of this piece of legislation, which was done way back in 2004 during the first Phase of the United Nations Environment Programme- Global Environment Facility (UNEP-GEF) project,” he discloses.

A strong believer in science, technology and innovation as cornerstones for development in Uganda, Dr. Katende explains that this would only be achieved through propagation of technologies and innovations for production of crops and livestock, engineering prototypes and machinery for processing of agro-products, innovations in health and environmental protection, but most importantly facilitative policies and efficient legislative frameworks.

“The total contribution of science, technology and innovation will increase production, employment, household incomes and livelihoods for ordinary people and hence national economy,” he emphasizes.

Dr. Katende sees modern agricultural biotechnology as an application of new tools and techniques with huge potential to boost agricultural productivity. “Uganda should embrace agricultural biotechnology now as a means of increasing productivity of quality crops and livestock while minimizing use and costs of inputs such as pesticides which are detrimental to our environment,” argues Dr. Katende, but adds with caution, “Any new biotech entrant should be thoroughly tested for safety prior to commercial use.”

And he is confident that it is just a matter of time before commercialization of the technology in Uganda. “The future of agricultural biotech is promising,” states Dr. Katende noting that there are systems already in place to facilitate testing and adoption of the technology in the country.

“Modern biotech research laboratories and biosafety containment facilities are already in place at the NARO’s National Laboratories Research Institute (NALRI), Kawanda.” And he is proud of the country’s capacity – “Indeed NARO, our national research institution has some of the best well trained staff on biotechnology in the region. The private sector is already collaborating with NARO for utilization of biotechnology at commercial scale for instance, in rapid multiplication of clean planting material like bananas through tissue culture.”

He calls on researchers to embrace research programs that go beyond the lab to transformation of existing crop varieties as a way of combining the inherent attributes in the varieties with novel biotech traits and for enhancing nutritional traits of staple food crops.

Public Discourse on Biotech

For a man who had dedicated much of his life in science and arguably one of the most outstanding authorities in modern biotechnology in Uganda, Dr. Katende is not looking back. Having first got involved in biotech crops while working with NARO on cotton research, he has now joined politics to further exert public discourse for biotechnology.

“I see my role in biotech field now mainly as an advocate for its use and promotion in Africa. I will continue to give advice on policy formulation and even on technical issues such as opportunities and potential risks. I am trying all I can to inspire fellow policy makers by educating them on the attributes of biotechnology and counselling them against their ‘fears’ of the technology as a result of gross misinformation.”

It is a new agenda Dr. Katende has undertaken with the same zeal and enthusiasm he exhibited during his 33 years in the lab. Within the two years he

“My responsibility and focus as a Member of Parliament is the legislation of laws, offer professional advice on government policies, provide oversight roles on government programs and scrutinize national budgets especially for agriculture.”

has been in Parliament (from 2006), the scientist-cum-lawmaker has maneuvered his way into being in charge of some of the key science portfolios in parliament. He is the Vice-Chairman of the Parliamentary Agricultural Sessional Committee, having previously served as the Vice-Chairman of the Parliamentary Social Services (Health & Education) Sessional Committee from May 2007 to April 2008.

But while politics is often stereotyped as a dirty game, Dr. Katende wants to play it clean and professional, focussing on issues and not the games. “My responsibility and focus as a Member of Parliament is the legislation of laws, offer professional advice on government policies, provide oversight roles on government programs and scrutinize national budgets especially for agriculture,” states Dr. Katende.

Cotton as a Passion

And he is not limiting himself to Parliament. With a sentimental attachment to cotton, a crop he has researched on for the last 36 years, Dr. Katende has extended his responsibilities beyond Parliament to his constituents and the development of the cotton sector in general. He is an advisor on both conventional and modern biotech methods in cotton research and production to the Cotton Development Organization (CDO), a regulatory body under which he has previously served as a member of the Board of Directors from 2003 to 2005.



Biotechnology information corner in the Parliament library.

A cotton farmer himself, he has taken it upon himself to offer advice to his constituents on modern farming techniques and providing planting material through community-based nurseries. Besides cotton, Dr. Katende's agricultural activities extend to coffee, bananas and groundnuts, cattle, goats, pigs and poultry farming.

Dr. Katende's passion for cotton runs deep. Other than being a cotton breeder and having developed and released all cotton varieties now in production in Uganda, he is also the founding Director of the Uganda National Cotton Farmers' Federation (UNACOFFE). He served as the Director of Research at Serere Research Institute, Soroti Uganda from 2001 to 2005. He is likewise a member of the International Cotton Advisory Committee (ICAC), participating in the Technical Seminars on Biotechnology including presentations in international conferences of which his favorite topic is "Why Fear Biotechnology." He presented this topic in a technical seminar at the 63rd plenary meeting of ICAC, Mumbai, India in November 2004.

Other than preparing a Field Protocol for Biotech Cotton Confined Field Trials in Uganda, he now represents CDO at the forum preparing for confined

Biotech Cotton Field Trials. He could not hold his joy with the new development that NARO will soon start testing bollworm resistant cotton (BGII) and herbicide tolerant cotton, known as Roundup Ready Flex (RRF), in two major cotton growing regions of Uganda, one in the East and another in the West. "NARO, our public research institution, is partnering with the private company Monsanto to access modern cotton biotechnologies for the benefit of Uganda farmers," he reveals.

With assistance from the Agricultural Biotechnology Support Project (ABSP II), NARO negotiated an agreement under which it has gained access to privately-developed biotech cotton lines for testing under local conditions. The tests will evaluate the technology for its performance and environmental effects. Likewise, effects on social and economic factors will also be undertaken in later periods. All necessary regulatory and safety procedures have been observed and, in February 2009, NARO received an import permit for both the BGII and RRF transgenic cotton technologies.

Dr. Katende is arguably a well-informed and highly knowledgeable authority on issues of modern biotechnology. But his new role of advocacy demands more than information and knowledge to regular exposure on global trends and experiences from those commercially growing biotech products on a regular basis, good enough for policy influence.

And to him, the International Service for the Acquisition of Agri-biotech Applications (ISAAA) has been his fountain of such exposure and source of periodic updates on most recent developments in agricultural biotechnology that has kept him abreast on new and potential innovations. "The weekly Crop Biotech Update newsletter on global developments in the field of agricultural biotechnology is a *must-read*," confesses Dr. Katende.

"Through ISAAA, I have interacted with scientists from all over the world on issues of biotech cotton. I

learned lessons, understood better the opportunities and constraints therein from countries like India, South Africa and China, who are already producing biotech cotton on commercial scale. I am particularly amazed at the high adoption rates by Indian farmers for instance,” states Dr. Katende.

In 2008, a record five million small farmers in India planted Bt cotton on 7.6 million hectares, equivalent to 82% of 9.3 million total cotton area in that year. Total area on Bt cotton increased 150-fold in seven years between 2002-2008, which was four times faster than global adoption. On average, Bt cotton saved 39% of insecticides, increased yield by 31%, which translated into increased profitability by 88% or \$250/ha. In the same year, Bt cotton contributed \$2.0 billion to India’s national farm economy.

“Indeed, my attendance to seminars organized by ISAAA has exposed me to the most up-to-date statistics on the economics and adoption levels, global acceptance issues and trends in modern biotechnology. This has given me the confidence and ability to authoritatively discuss and share the socio-economic, policy and technical aspects of the technology in many fora. The National Assembly, Ministry of Agriculture and related agencies, do appreciate my knowledge and consult me regularly for advice on various biotech issues.”

Some of the activities the scientist-cum-lawmaker has participated in include: the ISAAA/NIGBE/CFC/ICAC Regional Consultation meeting on *Risk assessment for genetically modified cotton and opportunities for small-scale cotton growers* in Faisalabad, Pakistan in March 2007; the African Caribbean Programme on cotton with European Union in Ouagadougou, Burkina Faso in September 2008, and the monthly Open Forum for Agricultural Biotechnology in Africa (OFAB) – Uganda Chapter meetings. “The proceedings of all these meetings are helping me to shape and discuss programs on biotech cotton in Uganda. I

am using the proceedings as sources of information for discussions in Parliament and with other stakeholders including farmers,” he says.

“Another unique initiative by ISAAA *AfriCenter* that I find highly valuable is the starting up of a Biotechnology Information Corner in our Parliament’s library and stocking it with scientific journals and simplified biotech educational materials. This activity is timely and has responded to a recurrent expressed need from fellow parliamentarians for a mechanism that would facilitate quick access to reference materials on the subject for informing their debates and decision-making processes.”

Parliamentarians as Important Stakeholders

In fulfilling the knowledge and information-sharing mandate, ISAAA has recognized the important role played by parliamentarians in biosafety legislation and implementation of related policies. Lawmakers are therefore an important stakeholder group in all of the institution’s communication activities. The *AfriCenter* is responsible for sourcing, collating and stocking the Biotech Information Corner with the latest relevant information on the subject from credible sources, centers of excellence and partner institutions both nationally and internationally.

In addition to the information and knowledge-sharing service, Dr. Katende proposes that ISAAA establishes a mentorship program to support short-term courses on broader issues of modern biotechnology for upcoming young scientists in Africa and developing countries. And with the entry of two more African countries (Burkina Faso with Bt cotton) and Egypt (Bt maize) growing biotech crops commercially in 2008, there is much optimism that East Africa would follow by example. Lauding Kenya, immediate neighbor to Uganda for having already enacted a Biosafety Act, he says, “all these are good indicators that the continent is pooling up to the gene revolution.” □

HASSAN MAT DAUD

Playing a Major Role in Biotech

By Mahalechumy Arujanan and K. Cheng Liew



The International Service for the Acquisition of Agri-biotech Applications' (ISAAA) mission is to contribute to poverty alleviation by facilitating the transfer of agricultural biotechnology applications from industrial countries to developing countries. By increasing crop productivity and income generation through such means, resource-poor farmers and developing countries benefit greatly, particularly through the adoption of proprietary technology from various sectors. ISAAA was established under an initiative by scientists and policy makers from developing countries to bridge the technology gap between developed and developing countries. Among the many who pushed for the change was Dr. Hassan Mat Daud, who was then director of the Biotechnology Research Center of the Malaysian Agricultural Research and Development Institute (MARDI).

Dr. Hassan remains to be a prominent figurehead in the Malaysian biotechnology scene. He is currently the director general of the Agro-Biotechnology Institute Malaysia (ABI) which he joined after his stint at MARDI. He spearheads the growth of the budding institute. Dr. Hassan has gone far since his early days in MARDI as a research assistant during the 1970s. He obtained a BSc and MSc in Genetics at the University of Illinois. With his academic degrees, he continued as a research officer at MARDI and began basic genetic research on rice. Upon obtaining a Ph.D in biotechnology, he returned to the country and served as a research officer at MARDI, dealing with molecular markers for crop improvement and DNA fingerprinting. When he was appointed Director of the Biotechnology Research Center in MARDI (BRCM), despite the busy schedule, he coordinated research on cloning the papaya ringspot virus protein gene for transformation purposes. Today, he is in

charge of establishing ABI as one of the nation's foremost research institutes for agro-biotechnology.

"Being appointed as director-general, I was given the responsibility by the leadership (in the Government) to get the institute up and running," says Dr. Hassan. "I take charge of implementing and monitoring the whole progress of the institute, including the infrastructure, human resource, and R&D programs. At the moment we are up-to-date with our aims and are well ahead of our schedules for our projects. We are filling in gaps with expertise from other institutions, and have just concluded recruiting research officers for some of our projects."

However, the hurdles and challenges of establishing a research institution, especially on the scale of government aspirations are numerous. At the moment, there is no infrastructure in place to serve as the location of the institute; however this is overcome through collaborations with various other established institutes and universities including MARDI which hosts its research officers. By being able to access other labs and operate within and outside of the respective institutes, ABI research officers are generally given the keys to resources they need.

Communicating Science

Dr. Hassan has been instrumental in communicating science to the public for many years. Being a respected scientist in the region, he has been training and educating new scientists in the country. Being part of the initiative that established ISAAA, Dr. Hassan can be said to be the father of science communication in Malaysia. In his days as Director of BRCM, he attended and organized various conferences and seminars, disseminated science

information through TV programs, stimulated young minds by giving talks in schools, and sharing information to the public. "I remember the establishment of ISAAA was borne out of the necessity for researchers and the public to understand issues. However, at that point in time, it was the scientists who were bombarded by the press. For example, one major issue then was the utilization of GM soya beans mixed with non-GM soya. We were swamped by queries and bombarded by everyone, while lacking in sufficient information ourselves. To get the true story, who could we turn to? Also, there were gaps in information and links to the various stakeholders of agro-biotechnology that needed to be addressed. Hence, ISAAA was established, and the Global Knowledge Center on Crop Biotechnology (KC) and Biotechnology Information Centers (BICs) were formed to help us link up with scientists and on-goings in the scientific world."

Malaysian Biotechnology Information Center (MABIC) is one of the many organizations under the KC umbrella. Being connected to the various information centers of ISAAA, MABIC has been banking on its international connections to provide the Malaysian stakeholders with the latest updates on science as well as opinions from the various experts around the region. Dr Hassan



Dr. Hassan explains biotechnology concepts at a stakeholders' meeting.

was instrumental in bringing MARDI and MABIC together for various collaborations in organizing seminars and workshops being a distinguished fellow of MABIC.

"With the help of MABIC, we were able to get greater inputs from various experts in the region and the West," says Dr. Hassan. "ISAAA, through MABIC, has contributed much guidance and ideas in promoting biotechnology in Malaysia, especially to entrepreneurs. They have been crucial in assisting us with project management input and advice while keeping a hand on the pulse of the industry."

Now and Beyond: Peering into the Future

Dr. Hassan mentions that he is a man running out of time, as the average age of retirement for government servants is 58. He is 56 years old today, and still has two years to achieve whatever he has planned for ABI and the scientific community in Malaysia. "I am running out of time. Biotechnology is about to take off, and I hope to be able to play a major part in it before I leave (ABI). I have two years in the government, and I will strive to do my best to accomplish as much as possible," he says determinedly. "I hope to implement what I have planned for ABI as much as possible, especially in commercialization and R&D. We have to start the ball rolling, as this opportunity that has been given by the government is not easy to come by."

"On the other hand, I hope to see greater inroads being forged by ISAAA, MABIC and all the BICs," he continues. "They have done a lot in promoting biotechnology especially in agri-biotechnology in the region. However, I do hope that they would be more active in participating in national initiatives, as they have the background and knowledge capacity which will be beneficial for all parties involved. ISAAA and the BICs should also find new areas to implement its capabilities to the maximum, like continuing projects similar to the papaya ringspot virus resistance gene project if there are sufficient resources." □



JANE OTADOH

Helping to Realize Kenya's Biosafety Law

By Margaret Karembu and Daniel Otunge

Very few people live to realize their childhood dreams, and live them passionately. Jane Otadoh, an assistant director of agriculture, in Kenya's Ministry of Agriculture is indeed one of the few who have realized their childhood dreams. As a child, Jane grew up admiring her grandfather who was among the first colonial extension workers. "I was always fascinated by his work and by plants," says Jane. "My dream was to serve the public and more so in the agricultural field just like my grandfather."

It is a dream Jane has taken to another world of more responsibilities and challenges, a world of modern biotechnology. Jane has risen through the ranks to take charge of the Biotechnology and Biosafety branch in the Ministry of Agriculture. Her grandfather might not have lived to understand issues of modern biotechnology. But Jane has lived to be one of the pioneer Ministry of Agriculture officials to steer the country on matters of modern biotechnology. First exposed to issues of modern biotechnology through an introductory short course on plant biotechnology in Japan, and two follow-up trainings in the U.S., Jane is now fully entrenched in modern biotechnology work.

After training exposures in the subject, Jane was charged with the responsibility of establishing the Biotechnology and Biosafety branch in the Ministry of Agriculture. "I was the first officer to head this branch," states Jane. The core responsibility of the branch is to coordinate technical issues on biotechnology, communicate biotechnology issues to extension officers and create public awareness on biotech issues in the country through liaison with

relevant stakeholders. It is a position that Jane has rightly earned. A firm believer in science and technology, Jane has vigorously fast tracked and continues to pursue scientific knowledge and build her professional career as a modern agriculturist.

Jane studied agriculture for her undergraduate study at the Baraton University of East Africa in Kenya. She is currently undertaking a Masters degree in Plant Biotechnology at the University of Nairobi's Center for Biotechnology and Bioinformatics. In addition, she has undertaken several specialized short training courses with relevance to biotechnology such as seed management and organization in Sweden; introductory gene manipulation for agriculture in Japan; biotechnology and food safety in the U.S.A.; gene detection, biotechnology and biosafety policy analysis, Biosafety Clearing House, and risk assessment and management in Kenya.

"Science and technology is about innovation of technologies, discoveries of new ideas. We are in a world that is dynamic and almost every thing is evolving," says Jane. "We can not keep up with the changes if we do not embrace science and technology." In agriculture, modern biotechnology tools are required for this country to attain food security and economic development in general. Modern biotechnology, she explains, complements traditional methods of introducing new varieties since it has the potential to address some issues that are beyond conventional breeding techniques. "However, the choices should be those that are applicable and relevant to our situation. In addition,

“We are in a world that is dynamic and almost everything is evolving. We can not keep up with the changes if we do not embrace science and technology.”

the products must be confirmed safe to human beings and the environment.”

In her coordination role at the Ministry, Jane works very closely with other stakeholders. However, she singles out the International Service for the Acquisition of Agri-biotech Applications (ISAAA) as an organization that has greatly contributed to her success, particularly in the area of communication of biotechnology issues and public awareness and sensitization.

Risk Communication Training

“ISAAA has trained me on risk communication,” says Jane. “In 2007, I was among five Kenyans selected to participate in a sub-regional Risk Communication Training Course in Arusha, Tanzania. The three-day workshop titled *Enhancing communication skills on modern biotechnology issues in Eastern and Central Africa: Approaches and methods of risk communication* was sponsored by the U.S. Grains Council and organized by ISAAA AfriCenter in conjunction with the Tropical Pesticides Research Institute (TPRI) of Arusha, Tanzania.”

The workshop aimed at training specialized communicators well versed with risk communication principles that would influence public acceptance of modern biotechnology in the region; provide participants with an opportunity to share experiences on different strategies and approaches of communicating perceived high-risk issues; develop messages, strategies, and organizational policies responsive to audience concerns on biotechnology products; and,

positively influence and catalyze enactment of facilitative biosafety legislations for promoting research, deployment and trade on biotech products.

Over 50 high-level biotechnology stakeholders, drawn from Ethiopia, Kenya, Malawi, Tanzania and Uganda, participated in the highly interactive workshop. Key trainers were two internationally renowned agricultural biotechnology risk communication experts Prof. Eufemio T. Rasco, Jr. of the University of the Philippines and Dr. Willy de Greef of Belgium. They were complemented by a team of resource persons drawn from each of the participating countries.

“The workshop participants were a rich mix of parliamentarians, journalists, researchers, farmer leaders, academicians, development experts, government officials, seed traders, civil society representatives, and regulators. This one course has greatly contributed to my success in subsequent tasks at the Biotechnology and Biosafety branch of the Ministry. My communication skills were sharpened and I have been able to develop my day-to-day biotech messages. We were taught how to prepare an effective communications strategy



Workshop participants learn about risk communication principles.

and approaches for reaching out to different categories of stakeholders. And, it is such skills that helped us engage parliamentarians during the legislative process of debating the Kenya Biosafety Bill 2008. The Bill was finally approved into law by Parliament and assented to by the President as an Act – the Kenya Biosafety Act in February 2009.”

“Another area where I fully applied the skills learned at the Communications’ course was during the drafting of the National Biotechnology Awareness Creation Strategy, BioAWARE, an initiative of the Ministry of Agriculture and key biotech stakeholder groups in the country,” remembers Jane. The Strategy, whose objective is to improve public awareness on all aspects of biotechnology and biosafety through participatory generation and dissemination of accurate information, was officially launched by Kenya’s Agriculture Minister Hon. William Ruto in September 2008. It is envisaged that successful implementation of the Strategy will lead to better public understanding of biotechnology and its applications, and hasten knowledge-based decision making processes. It is also an important policy document outlining the measures and guidelines on coordination of biotech communication and knowledge-sharing efforts in the country. All biotech communication activities will now be channelled through the BioAWARE secretariat that has fully embraced partnerships and stakeholder participation.

Networking with Stakeholders

“I have worked closely with ISAAA in the planning and organization of the monthly Open Forum for Agricultural Biotechnology in Kenya. OFAB, a monthly lunch meeting that takes place every last Thursday of the month, provides an opportunity for key agri-biotech stakeholders to network, share knowledge and experiences, and, explore new avenues of collaboration in bringing the benefits of

science and technology to the African agricultural sector.” The OFAB-Kenya is a collaborative initiative between ISAAA *AfriCenter* and the African Agricultural Technology Foundation (AATF). The forum (in Kenya) was launched by the then Minister for Science and Technology, Hon. Noah Wekesa in 2006. ISAAA *AfriCenter* serves as Chair of the Kenya Programming Committee. OFAB members have hailed the forum as ideal for networking and for tangible outcomes such as collaborative projects and new linkages (OFAB Kenya).

Jane says her involvement with ISAAA has helped her gain better knowledge on current global issues in modern biotechnology. “I have participated in all the annual launches done in Kenya over the last four years on the global status of commercialized biotech/GM crops which I have found most useful. I use the reports as reference materials and also share with senior government officials and extension staff whom I interact with frequently. I particularly use these materials to respond to various parliamentary questions, contribute to speeches on biotechnology for my bosses, and in preparing for workshops for various interest groups as they arise,” says Jane.

“Together with ISAAA, we developed information, education, and communication materials such as posters and fact sheets for use by parliamentarians and the public. I use most of these materials when preparing for talks on biotechnology to interested parties and distribute others at stakeholder fora such as agricultural exhibitions and the Annual Nairobi International Trade Fair. Inclusion of tangible data on different aspects of biotechnology has been most attractive. People want facts that relate to the real world, not generalizations of either benefits or risks. Politicians will always ask you, “What is there for my country and constituents in the village?” And, sharing the figures on global trends, number of countries and rising number of farmers adopting the technology quell their curiosity,” Jane emphasizes.

“I have gained vast knowledge and experience which I will fully utilize to reach out to the public and also in helping address the myriad of concerns from our stakeholders particularly farmers and civil society groups.”

She singles out ISAAA Pocket Ks (fact sheets) and videos documenting technology transfer processes for the tissue culture technology on banana in Kenya and Bt cotton in India as resources that are very enlightening. However, she feels that some of these materials need to be tailor-made to target different groups according to their need and understanding of the subject.

Jane’s work with ISAAA has not gone unnoticed. She receives a lot of requests for more information, collaborations, and facilitation of workshops at different levels, with farmers groups, extension staff and non-government organizations topping the list. “And unlike in the past when I would shy away, I readily accept the offers having the resources, the knowledge and skills to interact with these groups.”

For Jane, realization of her dream has just begun. “I have gained vast knowledge and experience which I will fully utilize to reach out to the public and also in helping address the myriad of concerns from our stakeholders particularly farmers and civil society groups.” □

CHARLES WATURU NDERITO

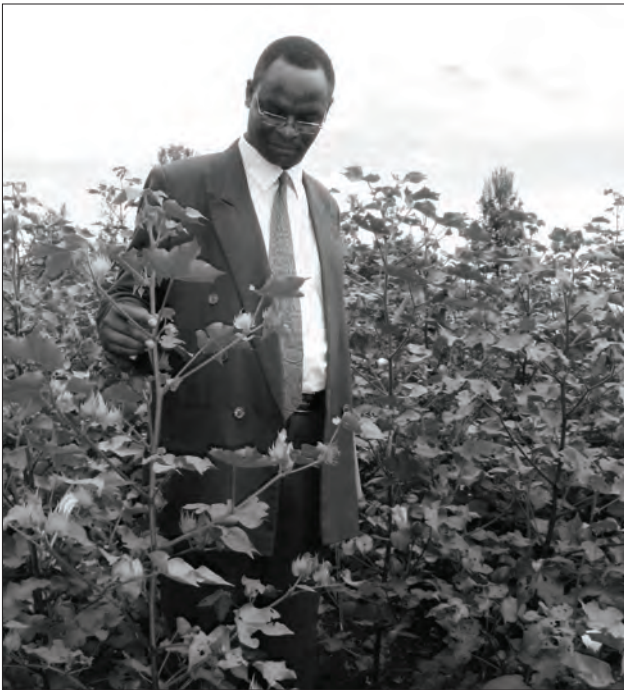
Playing A Lead Role in Biotech Development

By Margaret Karembu and Daniel Otunge

“We have no choice but to embrace biotechnology. We either formally embrace it or it will finally find its way into the country through the backdoor.” This message is not surprising coming from a man who has spent much of his life in research, a man who sees science and technology as the engine to drive Kenya through Vision 2030. Vision 2030 is the new development blueprint (2008-2030) that aims to make the country a newly industrializing “middle income country” by the year 2030 through among other things promoting an innovative, commercially-oriented and modern agricultural sector. “There is no development without science

and technology. No country in the world ever developed without embracing science and technology and Kenya will not be an exception,” states Dr. Charles Waturu Nderito.

Dr. Waturu is director of the National Horticultural Research Center (NHRC) of the Kenya Agricultural Research Institute (KARI). The NHRC focuses on research in horticultural crops including vegetables, fruits, flowers and macadamia nuts. Under fruits, the priority commodities are banana, mango, papaya, avocado and passion fruit. Vegetable commodities include cabbage, tomato, onion, French bean,



Dr. Waturu at a cotton field in Kenya.

snow pea, sugar snaps, African leafy vegetables, Asian vegetables, herbs and spices. The major flower crops are lilies (oriental, Asiatic and Easter lilies), alstroemeria, gerbera, anthuriums, gladiolus, tuberose, eryngium, morbydick and arabiucum.

He is also the principal investigator of the Bt cotton research project in Kenya. Research focuses on the trial release of transgenic cotton, which is active in controlling a number of bollworms of the lepidopteran family. The aim is to establish the efficacy of the gene (Cry IAc protein) on these insects under field conditions where pest pressures are experienced. It is expected that as with other cotton growing countries such as India, China, and United States, the cotton varieties carrying this gene will exhibit resistance to the bollworm complex of the cotton.

Indeed, Dr. Waturu's conviction on the strategic importance of modern biotechnology in driving Kenya's economy to greater heights is not based

on emotions. These are informed beliefs from a seasoned researcher and a firm believer in science. He takes issue with those opposed to the technology being introduced in Kenya accusing them of not being sincere in their arguments as to why Kenya should be an exception to embracing modern biotechnology yet other scientists globally are very busy innovating new biotech products. "What is special about Kenya that it cannot develop and apply modern biotechnology?" he asks.

Dr. Waturu warns that Vision 2030 will remain a pipe dream unless the government seriously invests in science and technology. "The country must be ready to develop and acquire new technologies for development, and particularly so in the field of agriculture. With the sector being the driver of the economy, the country needs all available and proven tools including modern biotechnology to boost agricultural productivity and consequently revitalize the economy. On its part, the government must devote reasonable resources for science and technology through budgetary allocations, and not rely on donor money alone for research and development."

"It is this belief in the technology," Dr. Waturu continues, "that drove me into seriously pursuing the introduction of transgenic cotton as a way of fighting the cotton bollworm, one of the most destructive cotton pests in the country. The Government has identified the cotton sub-sector as vital in the revival of the economy and views introduction of the transgenic Bt-cotton as one of the ways to awaken the subsector. And, as demonstrated elsewhere in other countries such as South Africa which commercialized transgenic cotton in the late nineties, expected benefits to farmers include increased yield and net return due to reduced use of chemical insecticides saving in spraying time, reduced risks to the farmer's health and cleaner environment. The technology will help to manage one of cotton growers'

biggest production challenges in the country – the lepidopteran insects. Transgenic Bt cotton protects the plant from insects that are resistant to chemical insecticides, provides season-long protection and allows beneficial insects to survive thus improving the state of the environment. It has been shown in communal growers' fields in Makhatini flats in South Africa for example that there is yield increase of up to 453 kg per hectare which translates into 33.4% increase in value and a saving of six sprays per season."

Passion for Biology

Dr. Waturu traces his love for science right from high school where he chose to pursue science subjects, with a passion for biology. "I was always interested in scientific discoveries, and as fate would have it, I finally ended up with my dream profession of being a scientist. After high school, I joined the University of Nairobi, from where I graduated with a B.Sc in Botany and Zoology in 1981. I later went to the University of Reading, (United Kingdom) for my M.Sc. and Ph.D in Crop Protection.

Aware of the environmental concerns on the introduction of transgenic crops, Dr. Waturu is also involved in baseline biodiversity impact studies of transgenic Bt cotton on wild ecosystems in the East African region. The project aims to assess the impact of the introduction and use of transgenic Bt cotton on the native cotton species biodiversity and arthropod biodiversity in the Eastern African region. The objectives are two-fold: to study and evaluate the ecological consequences of gene flow between transgenic Bt cotton and feral cotton populations and wild cotton relatives in Kenya, Tanzania and Uganda; and, assess the impact of transgenic Bt cotton on arthropod biodiversity in the three countries.

South Africa Tour

Dr. Waturu's strong conviction on the positive contribution of biotechnology in boosting agricultural activities has been further enhanced by what



Dr. Waturu in South Africa with parliamentarians and Makhatini cotton farmers.

he acknowledges as his regular contacts and participation in several activities organized by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) *AfriCenter*. He particularly cites a study tour to South Africa in 2006. "Besides learning from fellow researchers and policy makers, I had the opportunity to visit and see farmers growing and harvesting Bt cotton and maize. The difference between the Bt maize and conventional maize was like black and white. The cotton fields were magnificent with no pest attacks. The enthusiasm, the hope and excitement displayed by the farmers growing the genetically modified (GM) crops was incredible," states Dr. Waturu. "If I had any doubt, it was completely cleared. What was even more mesmerizing was the fact that what the farmers were leaving in the field as waste when harvesting the cotton was like what our farmers harvest in a good year!"

The study tour to South Africa was among a series of similar activities conducted by *AfriCenter* in partnership with AfricaBio (South Africa) and the African Biotechnology Stakeholders Forum (ABSF) that were aimed at exposing legislators to real biotech products in the field and also interact with local and regional scientists conducting research

“The enthusiasm, the hope and excitement displayed by the farmers growing the genetically modified (GM) crops was incredible.”

on the same. The overall goal was to support enactment of biosafety laws for safe and responsible adoption of the technology in Africa.

“Through these kinds of activities, ISAAA played a very important role in addressing myths and concerns through “seeing-is-believing” by this very important category of stakeholders. It also helps in getting the needed political support for enabling policy implementation. This is a clear demonstration of ISAAA’s commitment as an organization to facilitate the adoption of GM technologies and safe applications in a commercial set up,” says Waturu.

Empowered to Influence Other Scientists and Stakeholders

He feels that his close interaction with ISAAA has greatly empowered him to influence other fellow scientists and Kenyans in general on the importance and need for the commercialization of biotechnology crops and products in Kenya. He is now involved in various advocacy and public awareness programs.

Courtesy of ISAAA *AfriCenter*, many stakeholders, including legislators and other policy makers have visited KARI-Mwea where the Bt cotton trials are being conducted. “Whenever, they come, we explain to them what we are doing and the advantages of the new technology,” notes Dr. Waturu. “To many, it is usually an eye opener and an opportunity to get to see and touch the transgenic cotton as well as getting facts right about GM crops. The response is usually very positive, and parliamentarians in particular are

always left wondering where all the negative talk about GM crops comes from. They even demand that the seeds be made available without further delay unaware of their responsibility in putting a regulatory system in place. Some of the stakeholders wonder when the GM cotton seeds would be available so they can also plant. Thanks to the positive impacts of these efforts, a Biosafety Act is now in place.”

“I have gone a step further in the public awareness campaigns by being very open and closely working with the mass media in the country and region. Several stories have been aired and published on the project.”

“Further, my involvement with ISAAA as an Associate of the *AfriCenter* has helped me make contributions that have helped shape the destiny of other countries. For example, I was part of the team that was invited to Nigeria to advise the authorities on the introduction of modern biotechnology as an ISAAA representative. Nigeria has since approved confined trials of transgenic cowpea.”

“Besides these activities, ISAAA has a lot of other resources – particularly videos and publications, that I find very useful and which I regularly refer to whenever seeking new data or information on biotech crops or the technology itself. The videos on Tissue Culture Banana and Bt Cotton in India for instance are very educational and entertaining, so is the one on Biotechnology Capacity in the country. The annual updates by Dr. Clive James on the status of biotech crops are a very good source of information and data on adoption trends globally. Another publication that I recommend to key stakeholders as a “must read” is the *Status of Biotechnology in Kenya – A Handbook for Policy Makers*. These videos and publications have the necessary information that stakeholders require for successful commercialization of GM crops,” states Dr. Waturu.

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Not just a passive consumer of ISAAA publications, Dr. Waturu is also a contributor. For instance, he has contributed to the publication of ISAAA facts sheets and message maps on Bt cotton. He is currently preparing a Q&A book on Bt cotton. However, he feels that ISAAA needs to produce more publications and materials targeting farmers and politicians.

Awards and Inquiries

Dr. Waturu’s work in the field of biotechnology has not gone unnoticed. His Bt Cotton Project was voted the best overall KARI research project during the KARI Bi-annual scientific congress in 2008.

Other than the award, Dr. Waturu states that the profile of the Bt cotton work is very high. “There are a lot of inquiries about it and when the transgenic cotton will be out in the market virtually from all players in the cotton industry – from farmers to ginnery owners to politicians,” states Dr. Waturu.

To Dr. Waturu, his ultimate goal and to which he is now dedicating all his efforts to is to play a leading role in the development and commercialization of Bt cotton in Kenya. “And with the newly enacted legislation, the Biosafety Act 2009, this will now facilitate the roll-out and commercialization of the Bt cotton and other GM crops under development in Kenya. Hopefully, the other East African countries will follow suit and join Burkina Faso’s example,” he concludes. □

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