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Biotechnology hub could be investment lure: govt

Hugo Hagen, The Citizen, 13 Sep 04

Biotechnology could become a priority for attracting investment to South Africa, which is why the government is calling for biotech partners. There was a note of urgency in this call by Science and Technology Minister Mosibudi Mangena, as the government will be investing more than R450m in the next 2 years to create the infrastructure to support and drive the country's biotechnology activities.

"Biotechnology holds real potential for the production of new and better drugs for human health, the adaptation of crops to better suit the local environment, and making industry cleaner and greener," he said at the launch of his Department's strategic review and forecast of biotechnology platforms. Although the local biotechnology sector was dependent on imported technologies and products, it was essential SA develop relevant and globally competitive intellectual property in this arena.

"We require a movement towards a South African bio-economy, with specific tangible outputs such as biotech goods and services as well as new biotech companies. We need to recognise that while the government is committed to developing biotech for South Africa, it can only be done through meaningful partnership with our biotechnology stakeholders, and with industry," the Minister said.

New biotech policy launched for South Africa

AgBioView 17 Sep 04. <http://www.isaaa.org/kc> <http://allafrica.com/stories/200409090302.html>.

South African Science and Technology Minister Mosibudi Mangena has announced the launch of a new South African biotechnology policy describing biotechnology development needs and opportunities in areas such as human health, plant improvement, animal health, and industrial processes.

Mangena said that the launch of the policy "serves as a rallying call to industry to join us in developing a bio-economy" in South Africa. He said that the government recognizes the potential benefits of biotechnology, and, "Government is committed to creating the best possible climate, be it regulatory, political or commercial, for biotechnology investment."

The South African government has already invested US\$67.6 million in infrastructure to support biotechnology development, including setting up Biotechnology Regional Investment Centres (BRICs) to support and incubate research in the field. The three BRICs are the Western Cape Biotech Institute, the Lifelab in Durban, and Biopad, which covers research initiatives in the central and northern areas of the country. Included in the total budget of R450 million is R40 million that has been earmarked for funding the National Bio-Informatics Network - a Cray supercomputer based at the University of the Western Cape.

In a related report, Mangena also told a Johannesburg meeting on his department's strategic review and forecast on biotechnology platforms, that since implementing the country's National Biotechnology Strategy, the department has created five Trusts as agencies aimed with fast tracking the local biotech sector. "We need to recognise that, while the government is committed to developing biotech for South Africa, it can only be done through meaningful partnership with our biotech stakeholders, and with industry. We are determined to give the local sector every opportunity to mature - responsibly - as an African leader in biotechnology," the Secretary said.

New biotech lab for University of Namibia

Crop BiotechNet, 17 Sep 04

Namibia's first GMO testing, training, and research laboratory was launched on 13 Sep at the University of Namibia. Dr. Kandawa Schultz, chairperson of the National Biotechnology Alliance, said that the laboratory would play an important role in assisting the Namibian government and institutions interested in reinforcing and implementing Namibia's National Biosafety Framework. In addition to performing GMO testing, the lab will also carry out capacity building through training and research. According to Schultz, the idea for the creation of a biochemistry and biotechnology laboratory was first initiated in 1998, when it was recognized that Namibia needed an institution involved with the application of modern biotechnology techniques.

Visit the University of Namibia at www.unam.na. You can also view the National Biosafety Framework of Namibia at <http://www.dea.met.gov.na/met/programmes/biodiversity/biosafety.htm>

Nobody's afraid of GM Crops, it's all a media scare

The East African (Nairobi), 6 Sep 04, By BAMUTURAKI MUSINGUZI. From AgBioView 8 Sept 04
<http://allafrica.com/stories/200409071695.html>

Prof Bruce M. Chassy, executive associate director of the Biotechnology Centre at the University of Illinois in the, US, recently conducted a media discussion on biotechnology in Kampala. He talked to Special Correspondent Bamuturaki Musinguzi about the benefits of biotechnology to the African farmer.

What is biotechnology?

It is simply using living systems for useful outcomes. We manufacture a lot of antibiotics using micro-organisms. In homes, we use yeast to rise bread; that is biotechnology. There is a whole area that most people don't know about called cell culture and blood cell propagation where we grow cells, say for example blood cells, that we can give to people and use in plants. A lot of plants are propagated using micro propagation or cell techniques and that is biotechnology. Biotechnology also involves moving genes around between organisms to create transgenic organisms.

Why is biotechnology controversial?

Well, because there are some people in the world who think that we shouldn't interfere with nature, that nature knows best how to do things and that when man starts manipulating biology, he will make mistakes.

What other options do we have available in crop breeding?

I would call all crop breeding biotechnology because the objective is to change the genetic structure of a plant. So it's all biotechnology, but I think you are asking about the specific usiness of moving a gene from one organism to another, making a transgenic plant, what most people call a GMO or GM plant. There are a variety of other techniques to help improve breeding, one of which uses biotechnology but does not transfer genes the same way, it is called micro-assisted breeding and it is growing in popularity.

Would biotechnology reduce the impact of agriculture on the environment?

It can be used that way. It's always foolish to make sweeping generalisation, but our experience in the US has been that we use far less chemicals in agriculture and we don't have to plough our fields as much in many cases, so we have less erosion and a number of other benefits. But if you are not using chemicals, then that chemical reduction wouldn't be realised here.

Would it improve agricultural productivity in Africa?

It certainly can. I know that there have been experimental maize and cotton fields grown in a number of countries in Africa, there are probably other crops too that have done quite well. In South Africa, the experience in maize and cotton has been very good. I don't see any reason why it should behave any differently in Africa than it does anywhere else, this is all biology and it's all about the weather, soil and all the factors that go in agriculture.

What has been the role of the media in this controversy?

Well, the media basically is a conduit of what they hear; they try to tell the public everything that they are hearing about a particular topic of interest. In this case, the opponents of biotechnology have persuaded the people not to use this technology through the media, which the media has done because it does not judge whether the technology is good or bad and the story is true or false. They just report the story. And that has certainly caused a lot of fear because people have said a lot of scary things about the technology using the media.

Consumers believe it's unsafe.

I don't think consumers believe it's unsafe. Its opponents have convinced some consumers of biotechnology products that they are unsafe, yet at least half of all consumers believe it's safe and are not concerned about it. If I did a poll asking people what they think is unsafe in the food supply, they would almost certainly never say it's biotechnology, but illness or food poisoning. So, I am not sure that biotechnology has scared consumers as much as you might think. If they can get good information and they are convinced that the particular product is really okay, they will accept it.

Would growing enough food fight hunger in the world, especially Africa?

I think growing enough food can help a great deal because in other places in the world, let's take for example China and India, smallholder farmers who couldn't feed their families in previous years can now do so. With the green revolution, they also produce excess crops, sell them and generate rural development and enterprises, and this has actually fuelled the development of the Chinese and Indian economies. That said, simply growing enough food doesn't guarantee that you will deal with issues of poverty, civil strife and diseases that may come to the plants. You have a variety of externalities that just having a good crop yield cannot deal with.

Syngenta back in GM seed business

Stewart Bailey, Business Report (South Africa), 23 Sept 04. From AgBioView 23 Sep 04.
<http://www.businessreport.co.za/index.php?fSectionId=561&fArticleId=2235136>

Syngenta, which competes with Monsanto in the market for GM seeds, has resumed selling to South African farmers after a voluntary halt of a month. Syngenta stopped selling mealie seeds to farmers on 23 Aug after Biowatch, an organisation opposed to gene-altered crops, appealed a government decision to allow Syngenta to sell seeds.

But a board of legal and agricultural experts convened by the high court dismissed Biowatch's appeal on Monday, said Ken Flower, the managing director of Syngenta's South African unit. Cormac Cullinan, a lawyer acting for Biowatch, said the decision was disturbing and declined to comment further until he had seen the reasons for it.

"We are now selling and distributing seeds as per our permit," Flower said. The Basel-based company, to comply with the appeal board ruling, would release a statement detailing "additional monitoring and research" of crops. Farmers in South Africa, usually one of the world's top 5 mealie exporters, will begin planting next month for the 2005 harvest.

Syngenta sells GM seed for yellow mealies, which account for 39% of the 8.7 million tons the SA Crop Estimate Committee has forecast commercial farmers would reap this year. The committee expects yellow mealie plantings to rise this season by 14% to 1.04 million hectares.

Coffee genetic code is cracked

Pacific Business News, 11 Sep 04. From AgBioView 13 Sep 04
http://pacific.bizjournals.com/pacific/stories/2004/09/06/daily61.html?jst=b_in_hl

Brazilian scientists have decoded the genome for coffee, the National Coffee Association USA reports. The trade group says the coffee bean's DNA has 35 000 genes and 200 000 DNA sequences that have been mapped by the Brazilian agricultural research agency Embrapa and Sao Paulo-based research foundation Fapesp worked after a two-year, \$2 million project. "We are going to create a super coffee that everyone can benefit from eventually," Brazilian Agriculture Minister Roberto Rodrigues says.

The average coffee tree has a productive life of 15 years, and the Brazilian researchers say they hope to double that. It is worth noting that Hawaii coffee growers have trees that produce beans much longer than 15 years and some of them believe that the natural productive cycle of the coffee tree can be much extended in the absence of predation by blights and pests. (Coffee trees can live for many generations but don't yield coffee cherries that long).

"The project will achieve these new varieties exclusively by cross-pollination and other natural measures," NCA says. "The genetic code will not be used to create genetically modified plants." Brazil, already the world's largest coffee producer, says it will restrict the use of the DNA database to Brazilian institutions for 5 or 6 years and then make it available to Brazilian private companies. Officials have not specified how many years it will take before the data are made available to other nations.

Monsanto's gene-modified cotton sales to India rise 5-fold

Economic Times, September 10, 2004, From AgBioView 13 Sep 2004 (shortened)
<http://economictimes.indiatimes.com/articleshow/846858.cms>

Monsanto, the world's biggest developer of GE crops, said its 2004 sales of modified cotton seed rose more than 5 fold in India, the company's third-largest market for the seed. Indian growers bought enough of Monsanto's Bollgard cotton seed to plant 1.3 million acres in 2004, up from 230 000 acres last year, spokesman Bryan Hurley said.

India, which first permitted gene-modified cotton in 2002, limits planting to the west and south in 6 of the nation's 29 states, Hurley said. Total land area planted globally with Monsanto cotton seeds,

which resist some insects, rose by 1.3 million acres, or 10%, to 14.3 million acres this year, largely because of India, Hurley said. US sales rose 2.9% to 10.5 million acres, and China fell 5% to 1.9 million acres, the St. Louis-based company said.

"The biggest driver, in India especially, is the benefit the farmer is seeing in reduced pesticide use and better yield," Hurley said. Monsanto's Bollgard cotton seeds contain a protein from a soil microbe called *Bacillus thuringiensis*, or BT, that protects the crop from bollworms. Global sales of all GM seeds this year rose 14% to 172.4 million acres, from 150.8 million last year, Monsanto said. Soybeans are the biggest market, with 105.3 acres planted this year, the company said.

IITA trains Nigerian policy makers on biotech

CropBiotech Update, 24 Sept 04

About 100 Nigerian top civil servants from the Ministries of Agriculture and Rural Development, Science and Technology, and Environment participated in a biotechnology seminar organized at Abuja, by the International Institute of Tropical Agriculture (IITA), under the auspices of the Nigeria Agriculture and Biotechnology Project (NABP). The seminar aimed at assisting top government officials to make policy decisions on biotechnology. They were also enlightened on the contributions of biotechnology to the socio-economic development of Nigeria especially in health, medicine, agriculture, food security, human nutrition, and environmental protection.

In a message to the participants, Nigeria's Minister of Environment, Alhaji Bala Mande said food biotechnology offers a viable option for achieving food security. He remarked that despite the potentials of biotechnology, there was still some level of reluctance and hesitation to embrace it, adding that public education was an important strategy to achieve acceptability. He urged Nigerian biotechnology stakeholders to apply the best practices in the course of research and development on environmental considerations, while adhering faithfully to the Nigerian biosafety guidelines.

Dr. Christian Fatokun, IITA Cowpea Breeder, explained that among NABP's objectives are to build national capacity to conduct research and development for bioengineering of priority crops; develop the capacity of the national biosafety committee to review and approve applications for field testing and commercialization of bioengineered crops; and to develop public awareness and acceptance of the benefits of biotechnology through balanced dissemination of information on the benefits and possible risks. He said the project supports the Federal Government's policy to initiate appropriate steps to explore the use of biotechnology and ensure that Nigeria becomes a key participant in the international biotechnology enterprise within a decade.

For more information about the IITA workshop on biotechnology, contact IITA Taye Babaleye, Head, Public Affairs, at t.babaleye@cgiar.org.

ESOF provides forum for non-EU scientists

CropBiotech Update, 24 Sep 04

The EU must identify obstacles to global collaboration and address them, urged non-European scientists from Japan, the US, and South Africa, at The first EuroScience Open Forum (ESOF2004), held at Stockholm, Sweden, on August 25-28th 2004. More than 1,800 persons participated (of which 350 were international journalists), in the first pan-European scientific meeting staged to provide an interdisciplinary forum for open dialogue, debate, and discussion on science and technology in society.

Kiyoshi Kurokawa from the Science Council of Japan explained that in an increasingly global world that is experiencing dramatic advances in science and technology, 3 global issues need to be addressed: population growth; the stress on the environment due to population growth, and the North-South dichotomy. Presenting the view of the developing world, Khotso Mokhele from South Africa explained that the reality in developing countries is political indifference, or, at best, ambiguity towards science. 'We are counting a lot on the EU to change this state of affairs,' said Mokhele.

Responding to Mokhele's address, an EU official in the audience explained that only 17 million of a 32 million euro fund has so far been used, mainly because the projects presented by developing countries are often not up to the required standards. He also regretted the fact that European scientists are often unaware of this money and of the possibility of including developing countries in their consortium. He therefore called on EU scientists to include scientists from developing countries in their collaborative work.

Read the full article at http://dbs.cordis.lu/fep-cgi/srchidadb?CALLER=NEWS_ERA&ACTION=D&QM_EN_RCN_A=22542. Visit the official website of the ESOF 2004 Conference at <http://www.esof2004.org>.

USDA pushes biotech initiatives for Africa

CropBiotech Update, 24 Sept 04

The US Department of Agriculture Secretary Ann Veneman announced several initiatives that will be implemented in Africa to strengthen biotechnology research and development. In a keynote address during the 7th Annual AfriCANDO Trade and Investment Symposium held in Miami, Florida, USA, Veneman said a US private and public sector team of cotton experts will travel to West Africa to look into the cotton industry. The team will recommend how best West African cotton industries can become more efficient and competitive. This will serve as a model for cooperation in other parts of Africa.

A second activity will be a follow-up conference later this year in Mali to be hosted by West African countries that attended the Burkina Faso Ministerial. In addition, the US will help West Africa achieve its goal of creating a regional African Center of Excellence for Biotechnology. A variety of technical assistance, training, and cooperative research, exchange, and development programs will be provided to facilitate and accelerate the transfer and adaptation of biotechnology to the region. Guidance on establishing appropriate biotechnology standards and regulatory systems will be provided as well.

For the full transcription of Veneman's talk, visit <http://www.usda.gov/Newsroom/0398.04.html>

Nanotechnology: a food production revolution in waiting

Food Navigator 16 Sept 04. <http://foodnavigator.com/news/ng.asp?id=54760&n=dt260&c=raxfsnuwbtkgitg>

Nanotechnology offers food production many potential benefits, but its development must be guided by appropriate safety assessments and regulation if risks are to be minimised, according to a UK report. The study, commissioned by the UK government and carried out by the [Royal Society](#) and the Royal Academy of Engineering, considered current and future developments in nanotechnology. It identified a range of potential benefits to be gained from nanoscience and nanotechnologies including new materials, more powerful computers and revolutionary medical techniques.

This assertion is backed up by another recent study from [Helmut Kaiser Consultancy](#), which looked into nanotechnology in the food industry. The report estimates that the nanofood market will surge from \$2.6 billion today to 20.4 billion in 2010. Already, more than 200 companies around the world active in research and development. USA is the leader followed by Japan and China. Nanoscience and nanotechnologies involve the study and use of materials at an extremely small scale, at sizes of millionths of a millimeter, and exploit the fact that some materials have different properties at this ultra small scale from those at a larger scale.

In the future, the science may be used in food production, and to detect how fresh food is. Researchers in the UK were recently awarded a £1.4 million government grant to develop a new generation of micro Rheometers to help characterise and develop liquid based products. Furthermore, the Helmut Kaiser study, entitled "*Nanofood*," argues that in the future, food will be designed by shaping molecules and atoms. The study predicts that nanoscale biotech and nano-bio-info will have a major impact on the food and food-processing industries. The ability to manipulate the molecules and the atoms of food will allow the food industry to design food with much more capability and precision, and help lower costs, claims the study. This will make products cheaper, production more efficient and more sustainable through using less water and chemicals.

Because of their novel chemical properties, the report recommends that nanoparticles and nanotubes should be treated as new chemicals under UK and European legislation, in order to trigger appropriate safety tests and clear labelling. Furthermore they should be approved, separately from chemicals in a larger form, by an independent scientific safety committee before they are permitted for use in consumer products. "There is a gap in the current regulation of nanoparticles," said Dowling. "They have different properties from the same chemical in larger form, but currently their production does not trigger additional testing. It is important that the regulations are tightened up so that nanoparticles are assessed, both in terms of testing and labelling, as new chemicals."

Bio-energy tapped from spinach

CropBiotech Update, 24 Sept 04. <http://web.mit.edu/lms/www/>

Another type of biotechnology is underway at the Massachusetts Institute of Technology, where Shuguang Zhang of the institute's Laboratory of Molecular Self-Assembly has integrated a protein complex, derived from spinach chloroplasts, with organic semiconductors to make a solar cell that can be combined with solid-state electronics: an electronic device that uses spinach to convert light into electrical charge. Inspired by the light transfer reactions that drive photosynthesis in plants, the device developed by Zhang uses the same process to feed electrons into organic semiconductors aligned on top of a layer of glass.

Zhang's team managed to artificially stabilize the protein complex at the heart of their system, comprised of 14 protein subunits and hundreds of chlorophyll molecules, using synthetic peptides to bind small amounts of water to it, within a sealed unit. The resulting cells are much thinner and lighter than existing solar panels and could eventually be used to make much more efficient panels, says Zhang. Although the prototype device can't rival commercial solar cells made of silicon, it demonstrates a new strategy for making longer-lasting photovoltaic cells. The system is far from perfect, however. The peptides used keep the protein complex stable only for about 3 weeks, and the cells convert only 12% of light to electrical charge. But Zhang says efficiency could be boosted dramatically by layering numerous cells on top of one another, as they will still let some light through.

Risk assessment

Paul Christensen, Iowa State University, Ames, Iowa 50011-3228. From AgBioView 17 Sep 04
intlcorn@iastate.edu (shortened)

Risk assessment combines existing information on hazards and exposure to create models of the risks associated with the use of technology. Such models are always incomplete as representations of reality, but offer insight into improvement that is need, and can be improved as scientific knowledge improves. Opponents of biotechnology are inclined to attack risk assessment because not all the possible experiments have been done, but the skepticism of the scientific community and acceptance of the universality of scientific knowledge moves these models toward sufficient specificity for decision making.

The following article provides an interesting example of how risk assessment is done:

Weed Science: Vol. 52, No. 5, pp. 834-844. A comparative ecological risk assessment for herbicides used on spring wheat: the effect of glyphosate when used within a glyphosate-tolerant wheat system Robert K. D. Peterson and Andrew G. Hulting

Glyphosate-tolerant spring wheat currently is being developed and most likely will be the first major GE crop to be marketed and grown in several areas of the northern Great Plains of the United States. The public has expressed concerns about environmental risks from glyphosate-tolerant wheat. Replacement of traditional herbicide active ingredients with glyphosate in a glyphosate-tolerant spring wheat system may alter ecological risks associated with weed management. The objective of this study was to use a Tier 1 quantitative risk assessment methodology to compare ecological risks for 16 herbicide active ingredients used in spring wheat.

The herbicide active ingredients included 2,4-D, bromoxynil, clodinafop, clopyralid, dicamba, fenoxaprop, flucarbazone, glyphosate, MCPA, metsulfuron, thifensulfuron, tralkoxydim, triallate, triasulfuron, tribenuron, and trifluralin. We compared the relative risks of these herbicides to glyphosate to provide an indication of the effect of glyphosate when it is used in a glyphosate-tolerant spring wheat system. Ecological receptors and effects evaluated were avian (acute dietary risk), wild mammal (acute dietary risk), aquatic vertebrates (acute risk), aquatic invertebrates (acute risk), aquatic plants (acute risk), nontarget terrestrial plants (seedling emergence and vegetative vigour), and groundwater exposure.

Ecological risks were assessed by integrating toxicity and exposure, primarily using the risk quotient method. Ecological risks for the 15 herbicides relative to glyphosate were highly variable. For risks to duckweed, green algae, groundwater, and nontarget plant seedling emergence, glyphosate had less relative risk than most other active ingredients. The differences in relative risks were most pronounced when glyphosate was compared with herbicides currently widely used on spring wheat.

Strict guidelines spell end of GM-free product claims

Simon Collins, New Zealand Herald, 16 Sept 04, AgBioView 16 Sep 04 (shortened)

<http://www.nzherald.co.nz/storydisplay.cfm?storyID=3591876&thesection=news&thesubsection=general>

New Zealand is unlikely to see claims of GM-free food after strict draft guidelines issued by the Commerce Commission yesterday. The new draft reaffirms the commission's longstanding policy that any claim that a product is "GM-free" will breach the Fair Trading Act if it contains any trace of GM products, or if any of its components have been made by a process involving genetic modification. Food and Grocery Council director Brenda Cutress said most food manufacturers would respond by simply not taking the risk of claiming their products were GM-free.

"It's very, very complex making sure, for the hundreds of thousands of ingredients that get used in food manufacturing, that nowhere in that supply chain has GM been involved," she said. But she said the commission had always taken the same "absolute stance", so GM-free claims were already rare. "What this paper does is create some certainty, and that's always a good thing."

Commerce Commission chair Paula Rebstock said the paper would feed into joint transtasman guidelines to be approved by the commission and Australia's Competition and Consumer Commission. The paper proposes that "GM" should mean not just a detectable trace of GM products but any ingredients that were made by GM processes. "Foodstuffs produced from GM soya or maize may contain neither protein nor DNA resulting from genetic modification in their final form," it says.

"For example, lecithin, a commonly used emulsifier made from soya, would contain no detectable levels of GM. "This would also be the case for many of the refined cooking oils." Testing for GM can be difficult but evidence can also be gathered through examining production records, correspondence and other documentation, enabling the commission to trace the use of GM "even where there is no detectable level of GM in the final product".

US, Sudanese officials discuss relief aid, GM food

BBC, 15 Sep 04. From AgBioView 16 Sept 04 (shortened)

The director of the US Agency for International Development (USAID), Andrew Natsios, began talks with the government in Khartoum. He had talks with the first vice-president and the minister of the humanitarian affairs. The talks touched on the Darfur issue and the future of peace process in southern Sudan following his talks with the (Sudan People's Liberation) Movement in Rumbek.

Natsios, who left for Darfur for a one day visit, held talks with UN agencies' officials, donor countries' and foreign organizations' representatives. The meetings discussed the efforts made by aid workers in Darfur, the humanitarian situation and means of providing further support. The minister of humanitarian affairs, Ibrahim Mahmud Hamid, said the meeting with USAID director discussed the humanitarian and security issues in Darfur. He pointed out that the meeting discussed future peace plans in the south by focusing on the means to reduce the costs of transport and improving sea and

railway transport, as well as demining.

The minister said that the government has asked the USAID to increase aid to other parts of Sudan which will help in combatting locust. He pointed out that an agreement had been reached on holding a special meeting on the issue of locusts with the minister of agriculture to discuss aid. He added that the USAID had promised not to bring in the controversial GM material, but at the same he affirmed that GM processed food has been brought in. He added, however, "The American aid (donors) have pledged that they would not bring in GM material. And if they did, it would be in processed food which does not harm the environment, such a (cooking) oils and maize flour which are not harmful to the environment.

Zimbabwe: All set for biotech meeting

The Herald (Harare), 17 Sept 04 From AgBioView 20 Sept 04. <http://allafrica.com/stories/200409170357.html>

Regional leaders and biotechnology scientists would be meeting in Harare for a conference on African Policy Dialogues on Biotechnology session. The Food, Agriculture, and Natural Resources Policy Analysis Network (FANRPAN), International Food Policy Research Institution (IFPRI) has organised the meeting in conjunction with New Partnership for Africa's Development (NEPAD). FANRPAN is an organ of the Southern African Development Committee.

The meeting to be held at a Harare hotel in September, would seek, among other things, to create dialogue on biotechnological issues with the aim of fostering a common regional stance on the contentious issues such as GM foods. The first such meeting was held in South Africa in April last year. The Minister of Science and Technology in the office of the president, Dr Olivia Muchena would grace the meeting. Delegates would be drawn from regional government officials, biotechnology groups, research scientists and the private sector.

At the meeting, the delegates would tackle the issue of demystifying the emerging industry and open it up to public debate. The dialogue would also seek to take the debate on biotechnology to the consumers. It would also deal with the issue of biosafety and intellectual property protection. Mr Julius Mugwagwa, the managing director of the Biotechnology Trust of Zimbabwe whose organisation would play a pivotal role at the meeting said this was part of regional efforts to educate the people about biotechnology.

"We are not saying people reject or accept biotechnology and its products. We are simply saying people must make decisions based on correct information," he said this week. Mugwagwa said there was need to take the debate to the public arena where people would be educated about the benefits and constraints of the industry. "There has been a lot of polarisation surrounding this issue of biotechnology and this is part of our regional effort to create dialogue."

He said the meeting was particularly important in light of the recurrent drought in the SADC region. "Because biotechnology might be an answer to our food problems in times of drought, I believe the southern region needs to establish a common understanding on Biotechnology products." A common stance would also make it easier to regulate the industry.

Sowing seeds of doubt - the GM food controversy

The African Scientist, January 2004 (Shortened) From AgBioView 23 Sept 04
http://www.africagenome.co.za/publications/African_Scientist_1_entire.pdf

Is GM maize the evil monster of food aid, or a goodwill offering bringing relief from starvation for millions of people throughout southern Africa? Many people would answer immediately and unequivocally. But the order of their "yes" and "no" depends entirely on who they are, what they know or believe, and more importantly, what their needs are. Whether it has merits or not, GM food is one of those things that divides people into "for" and "against" camps. And while their views may be clear-cut and absolute, the issue itself remains extraordinarily complex. The only thing that has been resolved in the GM food aid debate is the stance the 6 southern African beneficiary countries have taken on whether they will or will not accept GM maize.

While Zambia has banned GM maize in any form, Malawi, Zimbabwe, Mozambique and Lesotho are willing to accept it as long as it is milled. Swaziland has not set criteria. These countries are part of the World Food Programme's (WFP) southern African emergency operation. WFP information officer Richard Lee says governments insisting that maize donated by the US should be milled were concerned that local crops might be contaminated by the GM seeds. Their concerns are either that accidentally spilt maize would germinate or that people would hold back some of the maize to plant for themselves. Milling obviates these possibilities. The WFP, a UN body based in Rome, is the biggest distributor of food aid in the region and relies exclusively on donations, in cash or kind.

While the US is still donating maize from its surplus (largely due to subsidised farming), the WFP is purchasing a lot in the region, which is non-GM. Lee says they are currently meeting the need for food aid in southern Africa, but will be facing a crisis towards the end of the year and beginning of next year because there are not enough donations. "Overall, 540 000 tons is required from July this year to June next year. We're appealing for donations totalling \$308m. So far, we have received only \$102m."

While there is clearly a need for food aid, there are various layers to the issue of GM food aid. The political layer focuses on international policies and trade relations, the power play between countries, and the control held by big corporates. Scientists and others touting the merits of GM foods (including many farmers), versus watchdog organisations and NGOs who are against it, or at least say the "precautionary principle" should be applied until more is known about the health effects (and others) of GMOs.

Those almost invisible in the debate are the people not only dependent on food aid, but on the decisions their governments take on the GM issue. Anti-GM activists and NGOs are quick to point out that even starving people want and deserve a choice about whether they consume GM food or not, like their richer counterparts. WFP spokesperson Mike Huggins says: "We don't force any government to accept any food aid. Also, we don't dictate to donors what they should give us. We adhere to the UN food safety guidelines, and would prefer not to take a position on whether GM food is good or bad. The reality is that 800 million people in the world don't get enough to eat each day."

And on the statement that Africans would rather have monetary donations than GM maize, Huggins says: "Donors have to be careful about giving money because it's often misappropriated. It's important for humanitarian agencies to take charge of donations given by governments to keep track of the beneficiaries." One of the issues that elicits strong responses from various quarters is corporate control of GM seed patents.

Professor Mark Swilling, of the Sustainability Institute at Stellenbosch University's School of Public Management and Planning, says: "The key point is that no matter the virtues of the science of GM, the intellectual property is owned by large corporations which means farmers must forever buy seed from the corporations. Farmers all over the world are going organic and using their own seed. Why do they need to be beholden to the large corporations?" Bobby Peek, director of Groundwork NGO, agrees. "It's about corporatisation, and the implications of maintaining local economies once GM technology has entrenched itself," he says. Professor in the University of Cape Town's department of Molecular and Cell Biology, Jennifer Thomson, says farmers are not stupid. They can choose to plant whatever they want. She explains that part of the reason multinationals such as Monsanto have patents on GM seed is that they can afford the enormous regulatory costs, estimated to be about \$10m, in bringing new seeds to market.

In addition to the above concerns, Haidee Swanby, education and media officer for watchdog environmental NGO Biowatch, highlights the issues of health and the environment. She says there is insufficient research to prove that GMOs are safe for human consumption and that they do not damage the environment - for example, by killing insects other than the ones for which the crop might contain an insecticide gene. Thomson disputes this, saying GM crops are the only foods in history to have been tested. "They are treated as toxins and subjected to predictive toxicological tests, which of course can't predict 100%, but we have more information about GM foods than conventional foods." She uses peppadews as an example: "This is a previously unknown crop. We love eating them, but they haven't been tested." She adds there is not a single shred of evidence found by the World Health Organisation, or anyone else, that there is anything unsafe about eating

GM foods.

Asked if the pesticide gene in GM maize, for example, isn't harmful to humans eating the product, Thomson says absolutely not. "It binds to the lining of an insect gut and we don't have the lining of an insect gut. There are 500 different toxins, each with a different specificity. None can act on the lining of any mammal gut." While the debates continue, there are still millions of starving people in Africa who need food and food security. In the short-term, food aid will continue to be distributed in accordance with governments' policies. The long term solution, however, is sufficient local production to feed farmers' families and consumers in their immediate environment. Export is a larger goal. Thomson concurs, and adds: "GM technology gives the advantage of producing greater yields right where people live and work. Food security is a complex problem. Though it can help, GM is only one of the solutions." No doubt, this will be the subject of ongoing debate.

GM omega-3 source to reach market?

Food Navigator. 20 Sept 04

Ingredient enjoying strong growth as industry ups demand for use in food products could be more easily accessible for food developers as scientists succeed for the first time in genetically modifying an oilseed crop, linseed, to boost its levels of very long chain poly-unsaturated fatty acids (PUFA), acids associated with a raft of health-promoting properties, writes Lindsey Partos.

A raft of well-documented research over the past few years has pointed to the health benefits, from anti-cancer and arthritis protection to heart health and brain development, of omega-3 PUFA, most commonly sourced from fish oils. But scientists at the University of Hamburg in Germany report this month in *The Plant Cell* that they have managed to design linseed plants that accumulate significant levels of PUFA. They claim that their findings could not only help to relieve pressure on diminishing fish stocks, and ultimately problems of sourcing, as demand rises for edible oils that are low in saturated fats and high in poly-unsaturated fats, such as fish. But in addition, certain fish stocks have been associated with contamination of pollutants, such as heavy metals and dioxins, potentially harmful to human health. "The production of these oils in plants may reduce environmentally and economically unsustainable pressures on both wild and farmed fisheries," say the scientists led by Ernst Heinz.

But a clear resistance to market growth for the GM linseed will be the consumer's current suspicion of GM foods, particularly in Europe. Fatty acids, long straight chains of carbon atoms, are essential components of the membranes of all living organisms and PUFA are increasingly recognised as important components of a healthy human diet. Parallel to the consumer's growing awareness of PUFA benefits, the food industry is increasingly turning to such ingredients to provide health value to their end food products. A recent report from market analysts Frost & Sullivan stated that of all the functional food ingredients currently available, the future for omega-3 polyunsaturated fatty acids looks the most promising. Growing consumer demand for fortified foods has helped foster a European market worth \$195 million (€161m) for omega-3 PUFAs, accounting for 28% of the global market volume.

While the annual growth rate for the total European omega-3 PUFA market in 2003 was 11%, it is likely to stabilise at a lower rate of 8% in the coming years. Europe is a more mature market compared to the US where some market participants are experiencing growth rates of over 20%. Oilseed crops, such as canola, safflower, and linseed, typically accumulate a high proportion of C18 PUFA such as linoleic acid and alpha-linoleic acid in their seed. These are called "essential" fatty acids for humans, because they are not synthesised in the human body and must be obtained from dietary sources. Once consumed, they may be metabolised into very long chain (C20 and C22) PUFA in the human body. This process is slow and inefficient compared to the direct consumption of C20 and C22 PUFA that may be obtained from fish oils. "Oilseed crop species contain all of the proteins and enzymes necessary for the biosynthesis of the range of fatty acids present in seed oil, but they lack the few additional enzymes (certain fatty acyl desaturases and elongases) necessary for the biosynthesis of very long chain PUFA," say the researchers.

The combined research programme between BASF Plant Science in Germany, Rothamsted Research Station in the UK, and Kansas State University in the US, produced linseed *Linum usitatissimum* and

tobacco (*Nicotiana tabacum*) plants that synthesise very long chain PUFA in their seed by introducing genes for fatty acyl desaturases and elongases in genetic transformation experiments. First, protein sequences for fatty acyl desaturases and elongases were analysed from a variety of organisms that produce very long-chain PUFA, including a fungus (*Mortierella alpina*), alga (*Phaeodactylum tricorutum*), moss (*Physcomitrella patens*), nematode (*Caenorhabditis elegans*), and another plant (*Borago officinalis*).

DNA coding sequences for these genes were then introduced into linseed and tobacco plants, and expression of the proteins directed into the seed with the use of seed-specific gene promoter sequences. "The best results were obtained with the use of the plant and algal gene sequences. These transgenic plants accumulated significant levels of very long chain PUFA in their seed," report the scientists. Not only targeted at human consumption, the researchers claim that their work could lead to the production of high quality animal feed that could improve the PUFA content of animal products such as meat, eggs, and dairy foods.

This latest research could also breath new life into Europe's flagging linseed industry that has been knocked in recent years by increasing production of rape seed, easier to grow and currently achieving higher market prices. The UK market reflects the overall pattern in Europe. In 1999 linseed production in the country peaked 300,000 tons, but in the last couple of years this figure has slipped to between 30 000 and 60 000 tons each year, Josh Dadd at the UK's Home Grown Cereals Authority told FoodNavigator.com. The UK has one linseed crushing facility, compared to 3 plants for rape seed. Used primarily for industrial purposes, the biggest global supplier of linseed is Canada, also known as flaxseed, which produced nearly 1 million tons last year. Global production is around the 2 million ton mark. Full findings of the GM linseed study are published in [The Plant Cell](#).

GM linseed produces healthier omega 3 and 6 fatty acids

American Society of Plant Biologists, [www. aspb.org](http://www.aspb.org), http://www.innovations-report.com/html/reports/life_sciences/report-33745.html From AgBioView 20 Sep 04. (Shortened)

Improved production of polyunsaturated fats in oilseed crops will benefit human health and the environment. In research reported this month in *The Plant Cell*, scientists succeeded in producing GM linseed plants that accumulate significant levels of very long chain poly-unsaturated fatty acids (PUFA) in seed. This is the first report of the successful engineering of very long chain PUFA into an oilseed crop, and is an excellent example of how genetic engineering of agronomically important species can provide real benefits to human health and nutrition and the environment.

Ernst Heinz at the University of Hamburg (Germany) and colleagues succeeded in producing GM linseed plants that accumulate significant levels of very long chain poly-unsaturated fatty acids (PUFA) in seed. The work is the result of an international collaboration between scientists at several research institutions in Germany (University of Hamburg, BASF Plant Science GmbH and Forschungszentrum Borstel), Rothamsted Research Station in the UK, and Kansas State University in the US As demand rises for edible oils that are low in saturated fats and high in poly-unsaturated fats, in particular very long chain omega 3- and omega 6-poly-unsaturated fats, the production of these oils in plants may reduce environmentally and economically unsustainable pressures on both wild and farmed fisheries.

Fatty acids are essential components of the membranes of all living organisms. Fatty acid chains that are linked by single bonds between carbon atoms are said to be "saturated" by hydrogen atoms, whereas the introduction of double bonds between carbon atoms leads to correspondingly fewer bonds to hydrogen atoms along the chain, and such fatty acids are said to be "unsaturated". A "mono-unsaturated" fatty acid contains a single double bond within the carbon chain, whereas "poly-unsaturated" fatty acids contain two or more double bonds.

Increased consumption of PUFA has been linked to a decreased risk of heart disease, and also to a variety of other health benefits, including protection against inflammatory diseases such as arthritis, irritable bowel syndrome and some cancers, and the promotion of healthy brain and eye development in infants. Scientists have been working on engineering the production of the very long chain PUFA in plants, because increased consumption of fish and fish oils is associated with other nutritional and environmental problems. First, it is recommended that consumption of many types of fish be limited due to widespread contamination with pollutants, such as heavy metals and dioxins.

Second, world wide fish stocks are being rapidly depleted, and fish farming is associated with its own set of environmental issues. Therefore, engineering the production of very long chain PUFAs into oilseed crops could confer significant advantages in terms of both human nutrition and the environment.

Oilseed crops, such as canola, safflower, and linseed, typically accumulate a high proportion of C18 PUFA such as linoleic acid and alpha-linoleic acid in their seed. These are called "essential" fatty acids for humans, because they are not synthesized in the human body and must be obtained from dietary sources. Once consumed, they may be metabolized into very long chain (C20 and C22) PUFA in the human body. However, this process is slow and inefficient compared to the direct consumption of C20 and C22 PUFA that may be obtained from fish oils. Oilseed crop species contain all of the proteins and enzymes necessary for the biosynthesis of the range of fatty acids present in seed oil, but they lack the few additional enzymes (certain fatty acyl desaturases and elongases) necessary for the biosynthesis of very long chain PUFA.

In addition to the possibility of providing healthier, more nutritious oils for human consumption, this work will lead to the production of high quality animal feed that could improve the PUFA content of animal products such as meat, eggs, and dairy foods.

Worldwide demands require plant biotechnology - Bayer

<http://www.agbiotechnet.com/> From AgBioView 20 Sep 04.

The worldwide demand for food, feed, and modern textile fibres can only be met in the future with the help of plant biotechnology. This is the assessment of Bernward Garthoff, Member of the Board of Management of Bayer CropScience AG, responsible for research and development: "Bayer CropScience is committed to plant biotechnology, which today aims at improving the quality of agricultural products and producing entirely new high-value products in plants. Examples range from bio-engineered plastics to plant-made pharmaceuticals," Garthoff emphasized at Bayer CropScience's second annual Science Forum. It focused on "Biotechnology in Agriculture: Shaping the future" and took place on September 17, 2004 in Gent, Belgium.

Bayer CropScience has created the Science Forum as an event to foster scientific dialog and promote open discussion with all the partners. This year's forum was held in combination with the official inauguration of its new 20 million euro innovation center for plant biotechnology in Gent.

Friedrich Berschauer, Chairman of the Board of Management of Bayer CropScience AG, underlines the importance of Bayer's plant biotechnology strategy: "Plant biotechnology has the potential to open up whole new business areas that will totally redefine the current market scope and perception. Novel plant based products for health, nutrition, fibres and other industrial uses to meet the demand for new solutions using renewable resources are some of the projects currently envisaged".

David Baulcombe of the John Innes Center (UK) held the keynote speech on RNA interference, a technology only recently discovered to be naturally occurring in cells. Researchers from Bayer CropScience complemented this by illustrating how the technology is used in today's molecular biology as a valuable tool in the discovery process of novel crop protection products as well as in crop improvement.

There was agreement among the participants, that the safety aspects of new technologies are an important factor to observe for all involved in innovation. Dr. Herman Koëter of the European Food Safety Authority addressed the issue from a European regulatory perspective. Cotton served as a vibrant example of the various aspects involved in growing, producing and improving an agricultural crop. External and internal experts discussed ways and methods of applying plant biotechnology to a crop and the multitude of opportunities it holds in creating tangible benefits.

Berschauer clearly stated the company's objective of open and structured debate on the scientific, economic, social and ethical dimensions of plant biotechnology: "I am convinced that open dialogue with the public and all stakeholders is one of the key requirements our industry must meet in driving plant biotechnology forward and making the potential of this cutting-edge area of innovation transparent."

Meetings/Exhibitions

Until 15 Nov 04: AgriAhead – Virtual Agricultural Exhibition. The first-ever agricultural exhibition on the Internet, open 24 hours a day 7 days a week, the trade show is open for worldwide visitors. Categories are: irrigation, mechanization technologies, cultivation technologies, fertilizers, chemicals and insecticides, greenhouse cultivation, R&D, packaging, organic agriculture, seeds, gardening and more. The Virtual Exhibitions is planned to look like a "conventional" agricultural fair, enabling each exhibitor to present his products and carry out a discussion with visitors using special communication software that was developed for this exhibition which will also enable visitors to 'participate' in conferences, seminars and discussions to be held during the exhibition.

Visit AgriAhead at: <http://www.agriahead.com>

2 - 3 Nov 04: Bio2Biz SA 2004 conference. Gallagher Estate, Midrand, South Africa. Book today & qualify for early bird discount - don't delay! Early bird deadline: 30 Sept 04. Five International Speakers have confirmed their participation in the Bio2Biz SA 2004 Conference. They are:

- Dr Abraham Karpas : Assistant Director of Research; University of Cambridge
- Dr Simon Pimstone: President & CEO; Xenon Pharmaceuticals
- Dr Henry Daniell : Pegasus Professor & Trustee; University of Central Florida
- Prof Marcel Mongeon: Mc Master University, Canada
- Prof Richard Mahoney: Research Professor; Arizona BioDesign Institute

For the next few editions of the Bio2Biz SA 2004 Conference Newsletter, we will introduce the speakers to you, and give you a sneak preview of their topics to be presented at the Conference.

Introducing www.sabiotechcareers.co.za

The National Digital Recruitment and Career portal dedicated solely to the Biotechnology and Life Sciences Industry in South Africa. This Internet portal has been spearheaded by Cape Biotech in conjunction with Human Alliance, to stimulate careers in order to assist the South African Biotechnology and Life Sciences Industries in identifying, attracting and retaining exceptional people.

The SA Biotech Careers Portal service is delivered via a dedicated Website on the Internet and is therefore accessible 24x365 by Organizations and Browsers. This Portal is also linked to the "Careers Button" on the Industry's Website's (four BRIC's). The SA Biotech Careers Portal was launched on 1 March 2004 and the current Phase 1 of the project provides the functionality of digital recruitment. Further functionality is being developed under Phase 2 and depending on support from industry, expected to be online from October 2004. The other functionalities include career-pathing, subject choice advice, how to prepare CV's, how to prepare for an interview and which companies to approach for career opportunities.

EDITOR CHANGES

Muffy Koch, Midrand, 24 Sept 04

After 4 years and 65 issues it is time for a change in editorship for **BioLines**. Editing this e-news update has been a most enjoyable and challenging task. Each month as I selected articles I often would have specific readers in mind, based on the feedback you took the time to send me or give me when I bumped into you all over Africa. Thank you for your readership. The new editor is Dr David Keetch, already much more experienced than I am and a very capable organiser. I wish him as much enjoyment with this job as I have had. Also, a very special thanks to Michael Koch who helped me set up the early process, to Remi Akanbi who has the task of distribution to over 3000 readers, to Vanessa Reid for endless patience and skill in getting the final format just right and to my very good friend, Jocelyn Webster, for ongoing support and encouragement. Now I will become an eager subscriber to BioLines - please add me to the list, Remi!