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Global Status of Commercialized Biotech/GM Crops: 2004

http://www.isaaa.org/kc/bin/cbtupdate/CBT_recent.htm

ISAAA Brief 32, released on 12 January 2005. Characterizes the global status in 2004 of commercialized transgenic or GM crops, now often called biotech crops. Brief 32 provides the most recent data on biotech crops globally for 2004, and confirms that the global biotech crop area continued to grow for the ninth consecutive year at a sustained double-digit rate.

- In 2004, the global area of biotech crops continued to grow at a substantial rate of 20%, compared with 15% in 2003.
- The estimated global area of approved biotech crops for 2004 was 81.0 million hectares, up from the 67.7 million hectares in 2003.
- In 2004, 5% of the 1.5 billion hectares of all global cultivable cropland was occupied by biotech crops.
- Biotech crops were grown by 8.25 million farmers in 17 countries in 2004, up from 7 million farmers in 18 countries in 2003. Notably, 90% of the beneficiary farmers were resource-poor farmers from developing countries, whose increased incomes from biotech crops contributed to the alleviation of poverty.

- The increase in biotech crop area between 2003 and 2004 of 13.3 million hectares is the second highest on record.

- In 2004, there were fourteen biotech mega-countries (countries growing 50,000 hectares or more, of biotech crops), compared with ten in 2003 - 9 developing countries and 5 industrial countries; they were, in order of area, USA, Argentina, Canada, Brazil, China, Paraguay, India, South Africa, Uruguay, Australia, Romania, Mexico, Spain and the Philippines.

- During the period 1996-2004 the accumulated global biotech crop area was 385 million hectares, equivalent to 40% of the total land area of the USA or China, or 15 times the total land area of the UK.

- The continuing rapid adoption of biotech crops reflects the substantial improvements in productivity, the environment, economics, health and social benefits realized by both large and small farmers, consumers, and society in both industrial and developing countries.

- During the nine-year period 1996 to 2004, global area of biotech crops increased more than 47 fold, from 1.7 million hectares in 1996 to 81.0 million hectares in 2004, with an increasing proportion grown by developing countries. More than one-third (34%) of the global biotech crop area of 81 million hectares in 2004, equivalent to 27.6 million hectares, was grown in developing countries where growth continued to be strong.

- The increased area and impact of the five principal developing countries (China, India, Argentina, Brazil and South Africa) growing biotech crops, is an important trend with implications for the future adoption and acceptance of biotech crops worldwide; Brief 32 has biotech overviews for each of the five countries. In 2004, the number of developing countries growing biotech crops (11) was almost double the number of industrial countries (6) adopting biotech crops.

- 2004 is the penultimate year of the first decade of the commercialization of biotech crops, during which double-digit growth in global area of biotech crops has been achieved every single year; this is an unwavering and resolute vote of confidence in the technology from the farmers, who are masters in risk aversion, and many of whom have consistently chosen to plant an increasing area of biotech crops year after year, during the period 1996 to 2004.

- The 10th anniversary in 2005, will be a just cause for celebration worldwide by farmers, the international scientific and development community, global society, and the peoples in developing and industrial countries on all six continents that have benefited significantly from the technology, particularly the humanitarian contribution to the alleviation of poverty, malnutrition and hunger in the countries of Asia, Africa and Latin America.

- For the future, there is cause for cautious optimism with the global area and the number of farmers planting biotech crops expected to continue to grow in 2005 and beyond. There were signs of progress in the European Union in 2004 with the EU Commission approving, for import, two events in biotech maize (Bt 11 and NK603) for food and feed use, thus signaling the end of the 1998 moratorium. The Commission also approved 17 maize varieties, with insect resistance conferred by MON 810, making it the first biotech crop to be approved for planting in all 25 EU countries. The use of MON 810 maize in conjunction with practical co-existence policies opens up new opportunities for EU member countries to benefit from the commercialization of biotech maize, which Spain has successfully deployed since 1998.

- In the near term, the one single event that is likely to have the greatest impact is the approval and adoption of *Bt* rice in China, which is considered to be likely in the near term, probably in 2005. The adoption of biotech rice by China not only involves the most important food crop in the world, but the culture of Asia as well. It will provide the stimulus that will have a major impact on the acceptance of biotech rice in Asia and, more generally, on the acceptance of biotech food, feed and fiber crops worldwide. Taking all factors into account, the outlook for 2010 points to continued growth in the global area of biotech crops, up to 150 million hectares, with about 15 million farmers growing biotech crops in up to 30 countries.

Biotech crop planting expanding in developing countries

http://www.apec.umn.edu/faculty/frunge/globalbiotech04.pdf.

The direction of global plant biotechnology suggests that major expansion in biotech crop plantings will occur in developing countries, particularly in Asia, Latin America, and parts of Africa, according to a new study, The Global Diffusion of Plant Biotechnology: International Adoption and Research in 2004, conducted by C. Ford Runge, director of the Center for International Food and Agricultural Policy, University of Minnesota.

Apart from this expansion, the range of biotech crops approved commercially will continue to grow, resulting in new markets and opportunities, especially in developing countries. Biotech crops are now being grown in 18 countries, while another 45 countries are into research and development and field testing.

Twelve countries in the Asia-Pacific region are involved in some aspect of plant biotech research and development. The leading national programs are in Australia, China, India, Indonesia, and the Philippines. More modest plant biotech research activities are underway in Bangladesh, Japan, Malaysia, Pakistan, Korea, and Thailand.

“Perhaps the most significant single potential actor in Asia is China, which is aggressively engaged in biotech adoption and research. There is reason to expect China to emerge as an influential force in plant biotech in the years to come”, the study says. The study foresees that in the next 10 years, about half of China’s fields will be planted to biotech crops.

Countries with biotech crop research in Africa include South Africa, Kenya, Zimbabwe, Morocco, Tunisia, and Egypt. South Africa is taking the lead with commercial production of biotech maize, soybean, and cotton, all valued at $146.9 million.

Countries in Latin America and the Caribbean are aggressively adopting biotech crops and are poised to move to adopt more varieties in the near future. The adoption process is led by Argentina, with nearly 14 million hectares planted to biotech soybean, maize, and cotton. Brazil has 3 million hectares planted to biotech soybean.

Biosafety and PBS

http://www.ifpri.org/themes/pbs/pbs.htm

Biosafety systems are essential in responsible decision making regarding the use of genetically modified plants and other organisms. Appropriate use of the products of biotechnology may help countries, especially in the developing world, to meet national goals for agricultural production and food security, public health, biodiversity conservation and economic growth.

The Program for Biosafety Systems (PBS) supports partner countries as they develop the policy and legal framework, administrative procedures, technically qualified personnel and outreach mechanisms integral to their national biosafety systems. PBS work emphasizes sound science-based decision making and research, while also addressing socioeconomic considerations.

Countries may have diverse biosafety objectives and timeframes for implementing their biosafety systems. Available expertise and infrastructure may vary greatly from one country or region to another. Some will have to address regulatory requirements for biotech crops developed in their own national research systems; all will need to ensure the safety of biotech products developed elsewhere prior to importation.

PBS appreciates the diversity among countries, and works with each partner country and region to develop a program of activities tailored to biosafety needs identified by local collaborators. The scope of activities includes policy and regulatory development through stakeholder participation, technical training in environmental and food risk assessment, strategic planning for communications and outreach, grants for scientific research on environmental risk issues, and assistance with regulatory documentation for proposed field testing.

The Program for Biosafety Systems is supported by the U.S. Agency for International Development (USAID) which administers the U.S. foreign assistance program providing economic and humanitarian assistance in more than 80 countries worldwide.

GM crops pose no threat to wildlife

http://news.scotsman.com/international.cfm?id=1373122004

A new study recently released in Britain shows that GM crops do not pose any danger to the environment. Known as the Bright study, the four-year experiment conducted by the National Institute for Agricultural Botany, focused on herbicide tolerant sugar beet and winter oilseed rape.

The study found that these herbicide tolerant crops, which were used in rotation, showed no evidence in reduction of weed seeds which provide food for insects and native birds. In addition, the study also showed potential benefits of herbicide tolerant GM crops in terms of reduced use of chemicals.

The research was sponsored by the Scottish Executive Environment and Rural Affairs Department, the Department for the Environment, Food and Rural Affairs and industry partners, and coordinated by Dr. Jeremy Sweet of the National Institute for Agricultural Botany.

"Our research indicated there was no long-term difference in weed population in fields using GM and non-GM crops. Growing herbicide-tolerant crops could provide farmers with the flexibility to improve plant diversity by only controlling weeds when they are competing with the crop", says Dr. Sweet.

South Africa uses biotech to develop HIV/AIDS vaccine

Engineering News, Vol. 24(47):16-17

In South Africa, efforts to find a vaccine are being spearheaded by the South African Aids Vaccine Initiative (SAAVI) operating on an annual budget of $15 million. The Initiative is based at the Medical Research Council (MRC) in Cape Town and is working with national and international partners to produce an affordable, effective and local-relevant HIV/AIDS vaccine in as short a time as possible, says SAAVI Director Dr. Tim Tucker.

Dr. Tucker explains that SAAVI is specifically focusing on the development of subtype C HIV/AIDS vaccines, as this subtype accounts for more than 90% of infections in Southern Africa. Most HIV/AIDS vaccines that have been tested globally have been developed for the subtype B virus.

The two current South African trial sites, enrolling only volunteers, are at the University of the Witwatersrand HIV/AIDS Vaccine Division of the Perinatal HIV Research Unit at the Chris Hani Baragwanath Hospital in Johannesburg and the SAAVI Clinical Trial Unit at the MRC in Durban.

The first trial is with the HVTN 040 vaccine. This candidate vaccine was developed by the biotechnology company AlphaVax in collaboration with scientists from the University of Cape Town. The vaccine is designed to affect certain cells that are involved in the immune response. The genetic material in the vaccine reproduces once it is in these cells, causing them to produce the same HIV protein carried by the vaccine. In animal experiments, production of this protein elicits both a humoral immune response (production of antibodies against the HIV protein) and cell-mediated immune response (the ability to kill HIV-infected cells). It is hoped that humans who receive this vaccine will respond in the same way as the animals and produce an immune response.

The second trial is with the MVA.HIVA Aids vaccine that was designed by the University of Oxford, the United Kingdom Medical Research Council and the Kenyan Aids Vaccine Initiative. The trial material was manufactured by Impfstoffwerk Dessau-Torau in Germany. MVA.HIVA is intended to induce cytotoxic T cells and other cell-mediated immune responses that are believed to be protective against HIV/AIDS.

If either vaccine proves successful, it will take at least another seven to ten years before it is available to South Africans.

BBI calls for research proposals for 2005

Agricultural crops improved through genetic modified offer important benefits, including the potential of enhanced agronomic, nutritional, and marketing qualities. These transgenic crops may also lead to potential positive changes in agricultural practices, such as changes in tillage practices, pesticide use, and land use. Similarly, genetically modified livestock and fish provide the potential for higher productivity, improved meat quality, and greater disease resistance. These genetic modified applications of biotechnology provide much promise, but some also raise safety concerns about their impact on human health and the environment.

While both areas of concern present several questions, many of those relating to environmental impact are more difficult to answer broadly. Data generated to evaluate concerns about the food safety of genetically modified products are generally applicable across countries. However, because cropping systems and indigenous flora and fauna differ between countries or ecological regions, the interactions between agriculture and wild biodiversity may vary. Therefore, scientific data that is necessary for assessing environmental risks and benefits of transgenic organisms may differ from one country or ecological region to another and should be evaluated on a case-by-case basis. Thus, the focus of the Biotechnology Biodiversity Interface (BBI) grant program is on the need to better understand the interaction among transgenic crops and animals, agriculture, and wild biodiversity.

The BBI programme is a component of the Program for Biosafety Systems (PBS). The Biotechnology and Biodiversity Interface (BBI) competitive grants component is now calling for proposals for 2005 to fund research aimed at addressing the effects of agricultural biotechnology, particularly transgenic organisms, on natural biodiversity in developing countries. The geographic focus of the program is on all countries in Asia and Africa, excluding those that are not eligible for USAID funding.

For more information see http://www.ifpri.org/themes/pbs/pdf/BBI_RFA_2005.pdf

Genetic Resources - Improving access in Eastern and Central Africa

http://www.merid.org/newsletter.html or tbarker@merid.org

The importance of genetic resources has been recognized and codified in the Convention on Biodiversity and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). Developed and developing countries are now struggling to enact national policies to put these treaties into place and to establish mechanisms to conserve and use genetic resources to benefit their citizens.

Given the importance of this issue, Meridian facilitated a meeting to identify specific actions that can protect and enhance the ability of public-sector scientists in national and international agricultural institutions to access and exchange plant genetic material for use in crop improvement activities directed toward the poor. To ensure that participants could identify meaningful actions, the geographic scope of the discussions was focused on Eastern and Central Africa, specifically the Kenya Agriculture Research Institute (KARI) and the National Agriculture Research Organization (NARO) in Uganda. The meeting was held at the Rockefeller Foundation's Bellagio Study and Conference Centre in Bellagio, Italy.

The scientific, practical, and legal complexities of improving access to genetic materials necessitated that people from a variety of experiences and areas of expertise were invited, including: Kenyan and Ugandan plant breeders, KARI and NARO senior management, African policymakers, such as representatives from the New Economic Partnership for African Development (NEPAD), as well as international stakeholders representing donor agencies and international institutions, such as the United Nations University.

The meeting resulted in more than a dozen highly targeted and practical recommendations aimed at the national, regional, and international levels that will help to ensure continued access to the genetic materials needed by public-sector institutions in Kenya and Uganda. One of the most significant general conclusions from the meeting was that most restrictions of plant genetic material flows in the region can be attributed to reluctance among plant breeders to share material under their control. Recognizing the important role that breeders play, the group recommended that a

regional breeders' platform be established and strengthened. To address broad policy challenges, the group also recommended that NEPAD establish an African Working Group on Genetic Resources, which would concentrate initially on the material transfer negotiations under the ITPGRFA.

While the meeting was focused on two countries, participants believe the recommendations will be widely applicable and beneficial to numerous institutions throughout the world that are working on crop improvement for the benefit of poor people in developing countries.

Using issue mapping to understand difficult issues

http://www.merid.org/newsletter.html or mmayo@merid.org.

Meridian recently initiated an issue mapping process with the German Marshall Fund of the United States (GMF) to conduct extensive interviews with targeted individuals to support a new GMF program area designed to strengthen transatlantic cooperation on trade issues and to enhance opportunities for economic development and poverty alleviation in developing countries. The issue mapping process is intended to help the GMF to better understand the views of key players at the nexus of the agriculture, trade, and international development arenas and identify opportunities to make these generally uncoordinated national and international policy efforts more coherent and supportive of poverty alleviation. This analysis will help the GMF structure an interdisciplinary program that builds upon the collective wisdom of leaders in the three fields and creatively addresses the gaps that are impeding progress.

Issue mapping is a natural extension of the convening assessments (interviews, fact finding, research, etc.) that are conducted to determine whether an issue is "ripe" for a collaborative process and, if so, how to design a process in which participants can make progress on the issue. Issue mapping efforts are not tied to convening a specific process; rather, they provide strategic insights from a diverse set of stakeholders affected by the programs and policies of interest.

Examples of issue mapping work include:

- For the Rockefeller Foundation's Global Inclusion and Food Security Programs, Meridian provided a detailed picture of the issues that need to be addressed globally and regionally to help people make decisions on the appropriate role of agricultural biotechnology in enhancing food security. The Foundation, based on the issue mapping, launched several global and Africa-focused dialogues on biosafety, liability and redress, and new approaches to intellectual property rights to enhance agricultural research and food security programs for resource-poor farmers. (www.merid.org/MappingSummaryFinal001116.pdf.)
- For the International Maize and Wheat Improvement Centre (CIMMYT), Meridian helped the staff and Board of Directors better understand the global trends affecting CIMMYT's ability to develop and deliver sustainable crop technologies to resource-poor farmers. (www.merid.org/showproject.php?ProjectID=9207.0)

The Christmas tree's promise

"Phenolic Extractives from the Bark of Pinus sylvestris L. and Their Effects on Inflammatory Mediators Nitric Oxide and Prostaglandin E2," at http://pubs.acs.org/journals/jafcau/index.html.

Phenolics are a class of plant compounds that have found many a therapeutic use, and now, scientists have found them in the Scotch Pine, widely used for Christmas trees. This time, the phenolics found can be developed into food supplements or drugs for treating arthritis and pain. The findings were scheduled to appear in the Dec. 29, 2004 issue of the Journal of Agricultural & Food Chemistry.

Researchers studied several different preparations of pine bark extract taken from the Scotch pine (*Pinus sylvestris*) and identified up to 28 compounds through nuclear magnetic resonance and mass spectrometry. Some of the fractions obtained already had previously studied biological activity, including ferulic acid, vanillin, and matairesinol.

They then tested the extracts against mouse macrophages, which produce nitric oxide and prostaglandin E2. Both compounds are produced in excess amounts during disease or injury, and

are linked to arthritis, circulatory problems, and pain. Treating the cells with highly purified bark extract resulted in lower nitric oxide production by 63%, and prostaglandin production by 77%.

Research has shown that pine bark, long used as folk medicine to treat coughs and wounds, also has the potential to relieve high blood pressure, asthma, heart disease, and skin cancer. Researchers caution, however, that the extract used in the study has not yet been tested in animals or humans.

Prof. Jennifer Thomson among 2004 Technology Awards Finalists

http://www.scidev.net

In the biotechnology category, Prof. Jennifer Thompson of the University of Cape Town, South Africa, was nominated for her research into genetically modified maize. "Maize is the staple diet of many Africans, often being eaten three times a day," says Thompson. "Two of the greatest scourges of maize in sub-Saharan Africa are the maize streak virus, and stresses such as drought and heat." Thompson's team is developing GM maize able to resist the virus which can wipe out entire crops and plants able to tolerate environmental stresses such as drought.

South African plant extract to counter obesity

IFT Newsletter December 15, 2004

Phytopharm plc. announced that it had granted an exclusive global license to its *Hoodia gordonii* extract to Unilever plc, the global consumer products company and owner of a number of the world's leading brands. As part of the agreement, Unilever will commit to initial payments totaling approximately $12.5 million out of a potential total of $40 million in payments to Phytopharm. In addition Phytopharm will receive an undisclosed royalty on sales of all products containing the extract.

The extract of *Hoodia gordonii*, a South African plant, was licensed exclusively by Phytopharm from the South African Council for Scientific and Industrial Research in 1997. Phytopharm has been actively developing the extract for incorporation into weight loss products.

NOTICEBOARD

5TH TO 7TH March 2005 - WORKSHOP ON ROLE OF BIOTECH IN 2005. A workshop on The Role of Biotechnology for the Characterization and Conservation of Crop, Forestry, Animal, and Fishery Genetic Resources is planned for the 5th-7th of March, 2005, in Villa Gualino, Turin, Italy. Organized by the FAO Working Group on Biotechnology, the Fondazione per le Biotecnologie, the ECONOGENE project, and the Società Italiana di Genetica Agraria, the workshop includes sessions on the status of the world's agro-biodiversity; the use of biotechnology for conservation of genetic resources; and genetic characterization of populations and its use in conservation decision-making. For more information, visit http://www.fobiotech.org/FAO_2005.htm