Voices of Change

ISAAA
International Service for the Acquisition of Agri-biotech Applications

The International Service for the Acquisition of Agri-biotech Applications (ISAAA) is a not-for-profit international organization that shares the benefits of crop biotechnology to various stakeholders, particularly resource-poor farmers in developing countries, through knowledge sharing initiatives and the transfer and delivery of proprietary biotechnology applications.

To complement its technology transfer program, ISAAA has an information network to facilitate knowledge sharing initiatives between and among countries. This network is composed of the Global Knowledge Center on Crop Biotechnology (KC) and Biotechnology Information Centers (BICs) and nodes in Africa, Asia, Europe, and Latin America.

ISAAA conducted case studies in Africa (Burkina Faso, Egypt, Ghana, Kenya, and Uganda) and Asia (Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand, and Vietnam), and an electronic survey on the global subscribers of its electronic newsletter, Crop Biotech Update. It sought to determine the impact of science communication efforts among various stakeholders (farmers, media practitioners, decision makers, academics and scientists, religious sector, and other partners).

Although the stakeholders were uniquely different in terms of culture, and separated by place and time, a common thread prevailed: they had similar experiences, face common problems, and share a hope for themselves and their respective countries in the use of modern technology. They are linked by a positive experience toward crop biotechnology, either as a farmer benefiting from higher yield and less pesticide use, a journalist or a parliamentarian actually seeing a farmers' biotech field, an academic having hands-on training on basic biotech techniques, and scientists being updated about developments in the field from various communication materials such as publications, videos and Internet-based modes. In addition, each stakeholder expressed a commitment to help others know more about the technology, echo the benefits of biotechnology, and influence others to change their perception and attitude due to misinformation. Together, they contribute toward realizing a collective voice of change.

Technology and Communication

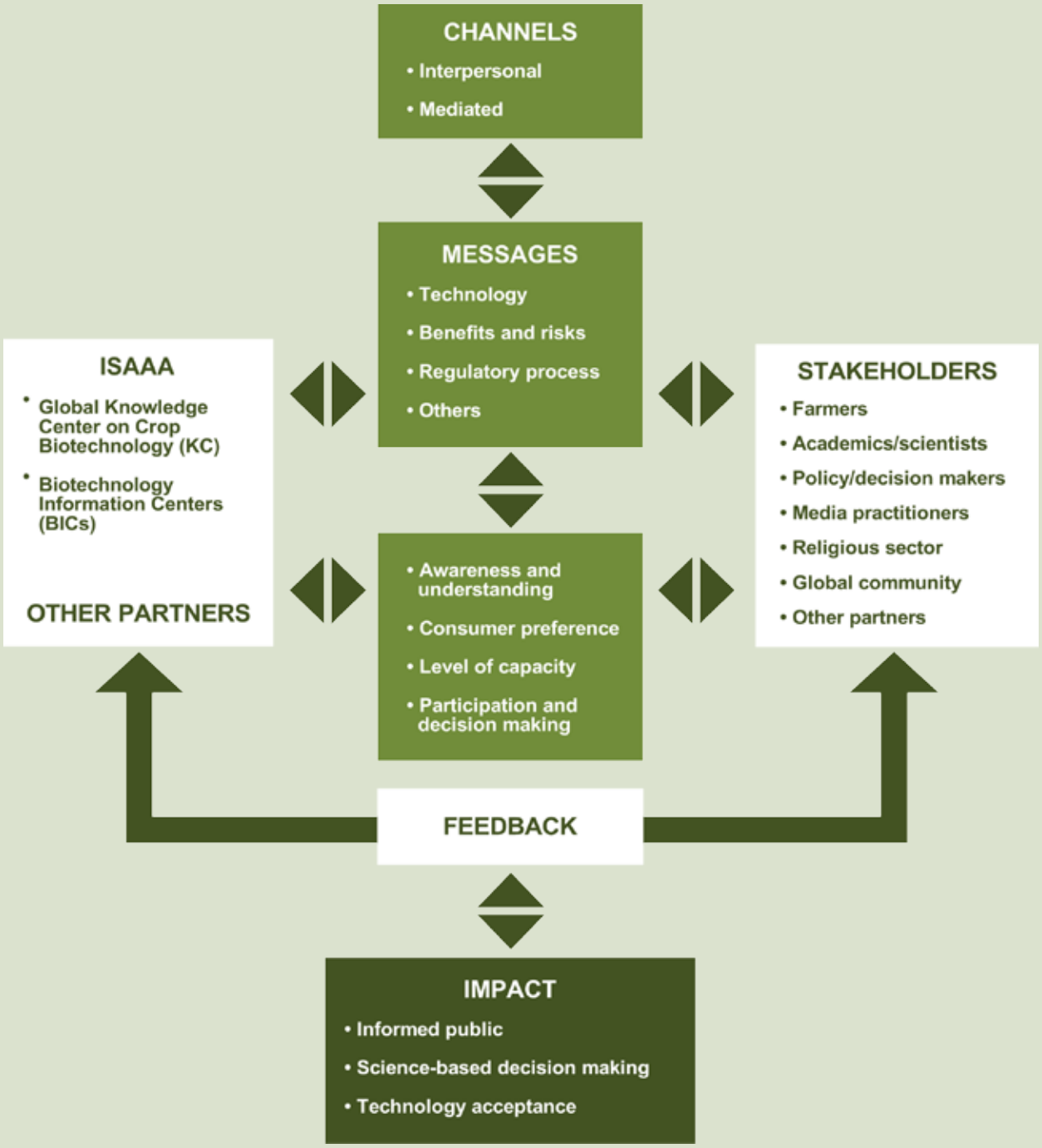
Crop biotechnology is one of several agricultural strategies to address problems of food and energy, poverty, and environmental degradation. This technological innovation has sparked worldwide interest, discussion and debate.

Stakeholders or the so-called attentive publics are critically involved in framing the debate, shaping policy, influencing public opinion, and creating greater awareness and understanding of crop biotechnology. Together these stakeholders – farmers, media practitioners, policy makers, scientists, academics, religious leaders, industry sector representatives, students, and other partners, determine the direction and depth of the biotech debate, and ultimately the acceptance, adoption, and sustainability of technology.

A crucial role in science communication is to facilitate knowledge sharing among these stakeholders to build a collective voice on crop biotechnology. Key information providers and different stakeholders exist in a task environment and are affected by variables such as the biotechnology landscape, culture, socio-economic/ political milieu, and communication environment. These conditions influence and put pressure on how people provide, react and respond to information on crop biotechnology.

A combination of various communication strategies, both interpersonal and mediated forms, enable messages to be shared between and among the different publics. Clear and concise key messages are framed by and with stakeholders. These messages are a synthesis of experiences and science-based information generated, validated, and shared through networking. Messages are packaged through a strategic, appropriate and complementary combination of interpersonal and mediated channels based on best practices.

Science communication framework for crop biotechnology



Any deliberate communication act is rationalized by a specific or combination of objectives/purposes. These intentions are affected by awareness and understanding, consumer preference, level of capacity, and degree of participation and decision making. Increased awareness leads to information updating; consumer preference results in informed choices; level of capacity adds new skills and techniques; participation enhances deliberation and transparency of communication; and decision making leads to ability to influence policies. All these impact on the process through an informed public, science-based decision making, technology acceptance, and stakeholders with increased capability, equity, and empowerment.

Farmers:

Planting the Seeds of Empowerment

About 13.3 million farmers in 25 countries have planted biotech crops spread across 125 million hectares in 2008. Of these farmers, over 90 percent or 12.3 million are small and resource-poor farmers from developing countries such as China, India, Philippines, and South Africa. The high adoption rate, according to the International Service for the Acquisition of Agri-biotech Applications (ISAAA), reflects the fact that biotech crops have consistently performed well and delivered significant economic, environmental, health and social benefits to both small and large farmers.

Providing an environment where farmers can share information and experiences with other farmers about biotechnology is an important activity. The positive acceptance and/or adoption of a technology by farmers are a vindication of its contributory efforts at increasing awareness and understanding of biotechnology. In countries where biotech crops are already being commercialized, efforts are geared toward sustaining interest and use. In countries where they are not yet being grown, farmers are being oriented and updated on biotechnology developments with the hope that they would be positive to the idea of modern technology once commercialized in their own country.

"Updates about biotechnology are important because I am often asked about issues and concerns by colleagues," says Rosalie Ellasus, a biotech maize farmer from the Philippines and a much sought out resource person in local and international fora. "The principles and techniques for effective biotech communication I got from workshops proved useful in enhancing my interpersonal skills. I am now able to answer in a diplomatic way and not be antagonized by those who are anti-biotech." Raosahib Devrao Ingole, a cotton and vegetable farmer-leader from India, actively promotes the planting of Bt cotton among co-farmers stressing that they no longer "ask whether Bt cotton seeds are safe and will give more yield. We learned by experience." Similarly equipped with science-based information and first hand experience, El-Hadji Karim Ouedraogo from Burkina Faso, narrates that he has used his position as president of the Cotton Union in his province to reach out to more and more farmers. "I impart knowledge to other farmers and apply what I was taught in a seeing-is-believing traveling tour. My farm now serves as a classroom for other similar tours being organized by other stakeholders." While biotech crops are not yet being commercialized in Indonesia, Agusdin Pulungan, believes that "biotechnology is a potential opportunity for farmers." Having shared experiences with other farmers through technology and communication workshops, he is optimistic that farmers will be open to any technology that can improve productivity.

Media:
Spreading the Word

Few people have direct experience with agricultural biotechnology or interact with scientists and researchers working in the field. Hence, media experts play a crucial role in providing people with the information necessary to make decisions about technology options and their potential risks and benefits. Another important role for media is that they allow people to gauge the climate of opinion which in turn influence what people will think about a certain issue.

Through regular networking, media are provided news for possible articles. They are also invited to media workshops to be briefed on latest issues and concerns; get updates on local research and development efforts; visit laboratory, field trials, and farmers' fields; and share experiences in communicating biotechnology. Exchange visits of journalists are also facilitated where they interact with colleagues from other countries as they visit research facilities and farmers' fields.

"Science communication should be based on complete unbiased writing weighing the benefits and adverse impact of any technology. The media should be vigilant in all aspects," says Ashok Sharma, Indian journalist.

Lack of adequate capacity to comprehend biotech issues by both writers and editors have been a contributory factor to the low and oftentimes poor coverage of biotechnology. Hence, attendance in a seeing-is-believing tour of Bt cotton fields and hands-on capacity building expose participants to real products of biotechnology and forge linkages with researchers, farmers, and other stakeholders. This tour, according to Linda Asante Agyei, a journalist from Ghana, resulted in improved and balanced reporting of biotechnology in Africa, a significant move from someone who initially held negative views about the technology. Mohamed Elsaied Darwish Mostafa from Egypt who writes for Arabic readers, "sees myself as one of the key journalists explaining key issues" after his exposure to conferences and being aware of credible information sources for his articles.

The communication practitioner's role in the biotechnology arena is a significant one. Surveys show that much of the information that consumers have of science and to make sense of scientific breakthroughs is based on what they read in newspapers, watch on television, listen over the radio, and view on the Internet.

Wandera Ojanji from Kenya attributes his better understanding and increased reporting on biotechnology to the various capacity building activities he has participated in. As a result, "I have convinced my newspaper to create a special page on biotechnology and a special weekend pullout on science and technology."

The availability and translation of biotechnology publications into different languages have made the work of radio journalists like Hoang Minh Nhat of Vietnam easier. She says: "For a Vietnamese reporter to write an accurate science story, translation of news or publications from English to Vietnamese is important. The technology is a new field and readily available and easy to understand materials are needed." By translating biotech publications into Urdu, Hafsa Siddiqui of Pakistan, was able to clear perceptions about the technology. On her own initiative she searched for materials, gathered information and wrote articles for newspapers to promote greater awareness of biotechnology.

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.

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. Similarly, 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.

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.

At a time when Thailand approved a moratorium on field testing of biotech crops as a result of a cabinet decision, Dr. Thira Sutabutra, then Minister of Agriculture and Cooperatives and a supporter of the technology, formed an alliance with some cabinet members and submitted a reconsideration of the decision. Farmers who had undergone biotech workshops submitted a petition to the Prime Minister and cabinet members to allow field testing and planting of biotech papayas. Representatives from biotech groups testified at the Department of Agriculture on the benefits of biotech crops and received positive endorsement. All these efforts enabled the eventual approval of field testing of transgenic crops with restricted measures. The ban was eventually revoked. Dr. Serungjogi Lastus Katende, a parliamentarian from Uganda, says that “I am trying all I can to inspire fellow policy makers by educating them on the attributes of biotechnology and counseling them against their ‘fears’ of the technology as a result of gross misinformation.” Through attendance in seminars he has been exposed to new information which “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.”

Dr. Charles Waturu Nderitu of an agricultural research institute in Kenya, avers that his positive stance on the technology was enhanced by videos and publications on the technology and regular contacts and participation in several activities such as a study tour to South Africa. “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 enthusiasm, the hope and excitement displayed by the farmers was incredible. If I had any doubt, it was completely cleared.” He adds that “parliamentarians are always wondering where all the negative talk about genetically modified crops comes from.”

Academics and Scientists:

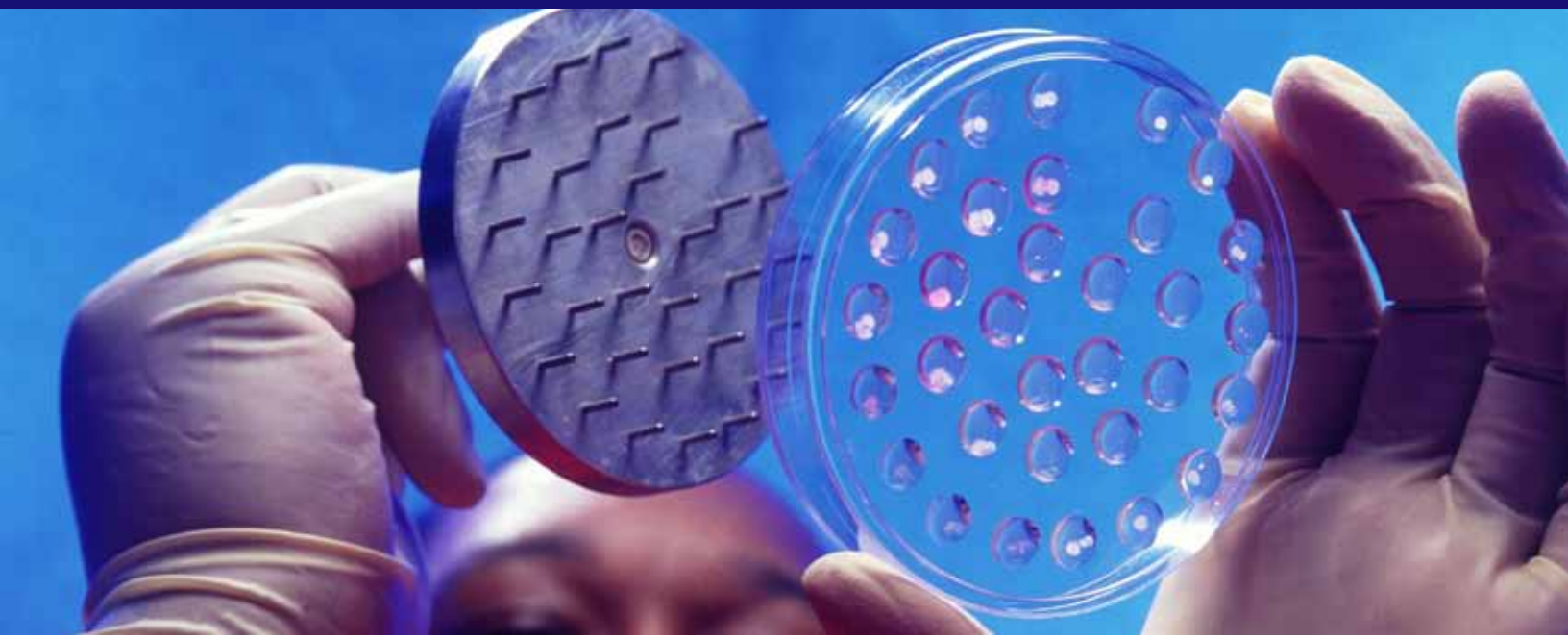
Raising Perception of Credibility

In the eyes of various stakeholders, university professors and public sector scientists are often perceived to occupy the highest rung on the credibility ladder and are identified to be among the most trusted and sought-after information sources. University scientists and research institutes are seen to be highly concerned about public health and safety issues and are deemed capable of assessing and managing benefits and risks.

The important role of universities and research institutes in the development of agricultural biotechnology is highlighted by the fact that they become key sources of public information regarding the technology. Universities are tapped for reassurances and reliable information about the benefits and risks of technological development, are often called upon to testify at government proceedings, and are the most likely to be quoted or cited by the media.

Interestingly, studies confirm that trust as an attribute of credibility is related to acceptance of technology with trust being more primary than information. The fact that university professors/scientists are rated highly as information sources, and that the trust attributed to them can be even more important than information itself show their crucial role in the biotechnology debate.

In many academic settings, professors also fulfill other tasks such as research and extension. In addition to teaching basic science courses and supervising students, they conduct research activities, popularize science-based information through presentations in lectures, seminars and workshops; conduct quiz contests for students; and write publications. They spearhead efforts to enhance the science curriculum by institutionalizing a general education biotechnology course in universities, and prepare a teacher's manual for teaching biotechnology. Professors and full time scientists engage the media through interviews and article rebuttal, participate in capacity building efforts, answer queries of non-technical audiences, and apply risk communication



principles with clients. To do all these tasks require up-to-date science-based information obtained from publications, websites, and videos, as well as participation in seminars and workshops.

Annie Clara Arokiasamy of Malaysia notes that “It is a positive move for teachers to be educated about biotech first hand.” Having attended a biotechnology workshop for teachers where they were provided with resources to improve their teaching, she says that this is the first time she was exposed to scientific techniques after learning the basics only from books. Philippine professor Cynthia Hedreyda thinks that biotech materials such as semi-popular publications and videos help in her popularization campaigns with students and teachers and in spearheading the institutionalization of a general education biotechnology course at the college level. “While there is unlimited information on biotechnology, there is not enough popular awareness on the subject,” she adds. Indonesian lecturer and researcher Sony Suharsono appreciates the availability of translated materials to better understand the technology. Through risk communication workshops “I learned how to react to negative newspaper articles on crop biotech, handle media interviews, and deal with non-government organizations that have different views.” This view is also advanced by Dr. Charles Mugoya from Uganda who notes that he “learned a lot about mass media operations and how to package my messages for impact. Interacting with media experts enriched my understanding of how to address tough questions from journalists. I acquired skills in public relations, networking and partnerships.”

Zhengbin Zhang, a Chinese researcher, gets updates from the Chinese translation of a biotech e-newsletter to provide him comprehensive information. He believes this information is an important source for students and staff of Ministries. M. Shahidul Haque of Bangladesh relies on reports on the global status of commercialized biotech crops as well as related documents such as slides for presentations and lectures to enhance his teaching and advocacy on crop biotechnology.

Religious Sector:
Keeping Faith in the Technology

The efforts of science particularly when their use for humanity is discussed inevitably involve the realm of ethics. Questions about values are often outside the domain of scientific knowledge and rely on a cultural diversity of personal and introspective perceptions. As science enters value-laden areas, stakeholders need to be engaged in the ethical, legal and social implications of science and technology or biotechnology in particular. Considerations of the moral and ethical issues make a significant contribution to building trust in science policy.

Shaikh Mohd Saifuddeen Bin Shaikh Mohd Salleh, Malaysian Islamic scholar, says that Islamic scholars who are highly regarded in the Muslim community "can play a role in disseminating a better understanding of biotechnology (in particular on its permissibility) to the society as they are highly regarded in the Muslim community." By creating more dialogue, increased avenues involving various stakeholders can provide a comprehensive and encompassing view of the science. Fr. Emmanuel Alparce, a Roman Catholic priest from the Philippines, asserts that "the key to realize the promises of biotechnology is information, publication and the media so that people can fully understand the technology and eventually use it."

Other Partners:

Broadening Links in Knowledge Sharing

The participation of different “publics” in the transparent debate on biotechnology contributes to its greater awareness and understanding. It also helps bridge the gap caused by the tensions between science and society. Each stakeholder contributes to the debate such that a “public voice” leads to the formative stages of decision-making. Allowing diverse publics to contribute to discussions on biotechnology democratizes decision making. In the process, divergent interpretations of scientific phenomena and nontechnical concerns can be dealt with.

The tasks involved in knowledge and information sharing are best accomplished through networks and partnerships, and in the collective efforts of different groups. The end goals are attained faster, individual efforts complement and add to the greater good, and resources are shared across sectors.

The Global Community:
Virtual Sharing of Information

The use of the Internet has revolutionalized the spread of information. There has been a 305.5 percent growth since 2000 when only slightly more than 360 million people were using the Internet. Eight years later, it is estimated that 22 percent of the total world population now access the Internet. The developing countries have the highest growth rates among users, thus making information accessible to more people.

Scientific developments have spread more widely because the media is more developed and immediate. Biotechnology websites with its virtual library and downloadable materials in the form of e-newsletters, publications, documents, videos, flash presentations, and slides are available for various stakeholders. An e-survey conducted by ISAAA to determine profile of users and their usage of e-newsletters reveal the importance of biotech information for instruction, updating, networking, report preparation, write-ups for newspapers, policy analysis, and decision-making. Scientists/researchers who form the bulk of readers require research updates and to give them ideas on the emerging biotech subfields. Faculty/academic staff uses the e-newsletter for instruction and research and as a source of current information on crop biotechnology. The articles are required reading for students. Policy makers/government sector, and consultants/advisors use information for analysis and decision making, awareness of new trends in the field, and for report writing. Information is also used to collect worldwide data that enables administrators to negotiate and communicate with the public and opposition groups. Information provided to media practitioners is used for print articles and radio broadcasts, and serves as backgrounders for media stories.

The virtual sharing of information, in the words of Olukayode Oyeleye of Nigeria, has enabled him to have "better insights on various aspects of biotechnology so as to put the issues in clear and better perspectives for (specific) audiences." Clifford Keil of Equador adds that information is "essential to stay updated in a rapidly changing field." More specifically, Takeshi Uchudia of Japan notes that he is able to obtain worldwide information that enable him "to negotiate and communicate with the public and opposition groups."

Towards a Collective Voice

Crop biotechnology has been lauded as playing a significant and contributory role in improving agricultural productivity, particularly in developing countries. Yet at the same time it continues to spark worldwide debate. The common ground is that of stakeholders engaging in a science-based, transparent debate to tackle relevant issues and concerns provided by credible information sources. The collective efforts of different stakeholders engaged in science communication are the key to greater awareness and understanding of crop biotechnology across the different regions of the world.

Information Resources

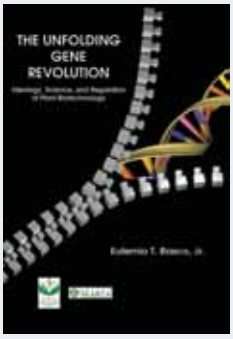
www.isaaa.org

ISAAA Briefs
Major papers reviewing current developments in international biotechnology, sustainable agriculture, and technology transfer. The annual Brief on the Global Status of Commercialized Biotech/ GM Crops is considered the most authoritative source on the subject.

Crop Biotech Update
A weekly summary of world developments in agri-biotech for developing countries.

Also includes **Biofuels Supplement**, a bi-weekly summary on biofuels.

Pocket K
Pocket Ks are Pockets of Knowledge, packaged information on crop biotechnology products and related issues available at your fingertips. (Available in 20 languages)

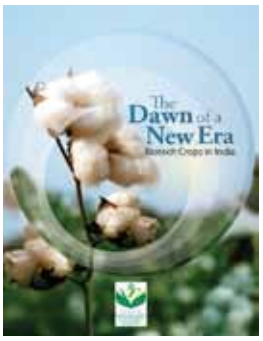


The Unfolding Gene Revolution: Ideology, Science, and Regulation of Plant Biotechnology
The book unravels the development of plant biotechnology, specifically genetic engineering. It reviews the basic sciences relevant to biotechnology and the art and science of genetic engineering in a simple, non-technical and humorous way.

Genes are Gems: Reporting Agri-Biotechnology
This publication is a collection of knowledge and wisdom gained from media workshops organized by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and supported by ISAAA and the United Nations Educational, Scientific and Cultural Organization (UNESCO). (Also available in French)

Bridging the Knowledge Divide: Experiences in Communicating Crop Biotechnology
This handbook is ISAAA's contribution to the field of science communication in general, and biotechnology communication in particular. It distills ISAAA's experiences in communicating crop biotechnology and theoretical perspectives of science communication experts. (Also available in French)

Trust in the Seed
This brochure highlights the significance of the seed and new crop technologies. It captures the experiences of three key developments in Indian agriculture that sustained growth in agriculture, contributed to increased food production and the alleviation of poverty and hunger.

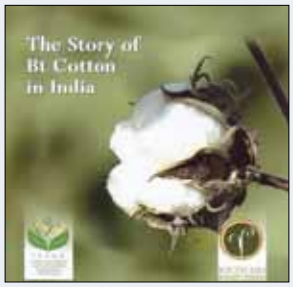


The Dawn of a New Era
This publication aims to provide a comprehensive and up-to-date status of the field trials and commercialization of biotech crops in India in 2008. It also includes the most authoritative coverage and statistics of Bt cotton, including hectarage of Bt cotton hybrids planted in India, numbers of farmers growing hybrids and approval of different events and hybrids in India from 2002 to 2008.

Asia's First: The Bt Corn Story in the Philippines
A video documentary that captures in 18 minutes the seven year process that it took for a genetically modified crop to be approved for commercialization in a developing country.

Also includes **More Choices: The Lagao Farmers' Story**

Fruits of Partnerships
A 20-minute video that documents the efforts of various stakeholders to introduce tissue culture banana in small farmers' farms in Kenya and Tanzania.



The Story of Bt Cotton in India
This video documents the process that it took for India's first genetically modified crop, Bt Cotton to be approved for commercialization. (Available in 7 Indian languages and French)

Seeing is Believing - The Bt Cotton Trials in Burkina Faso
A 19-minute video that documents the "Seeing is Believing" visit to the Burkina Faso Bt cotton field trials. The workshop was held in November 2006. (French)

Nurturing the Seeds of Cooperation: The Papaya Network of Southeast Asia
A 17-minute video that documents the collaborative efforts of various stakeholders and partners to develop Papaya Ringspot Virus (PRSV)-resistant papaya. The video highlights public-private partnerships and how countries in Southeast Asia have benefited through the network's capacity building efforts and technology and information sharing initiatives.

Silver Fields of Gold: The Story of Bt Cotton in China
This video documents cotton cultivation in China and how Bt cotton eventually became the first biotech crop to be cultivated widely in the country. Various stakeholders who made this a reality - scientists, government officials, farmers and the private sector - share their experiences and thoughts about this technology. (Also available in Mandarin)

Restoring Lost Cover
The video documents efforts of the Tree Biotechnology Programme-Trust (TBP-Trust) to meet the growing demand for quality trees and tree products in the Eastern & Central Africa region through a South-to-South, public-private technology transfer of the proven clonal eucalyptus from South Africa.

ISAAA Corporate Video
The visions, strategies, programs, and projects of ISAAA, a not-for-profit organization that delivers the benefits of new agricultural biotechnologies to the poor in developing countries, are succinctly presented in an 18-minute video format.

Global Status Summary Report
This ISAAA video presents the major findings of the Global Status of Commercialized Biotech/ GM Crops and addresses the growing interest biotech crops have experienced in the past years.
(The abridged version is also available in Arabic, Bahasa Indonesia, Bangla, Chinese, Farsi, French, Hindi, Hungarian, Japanese, Malay, Portuguese, Russian, Spanish, Swahili, Tagalog, Thai, Urdu and Vietnamese)

Q & A with Clive James
This video provides an opportunity for the viewers to know more about ISAAA, its mission and who funds ISAAA and its global report on biotech crops.

Dr. Clive James also answers some of the most frequently asked questions on the role of biotech crops.

http://www.isaaa.org

Latest Publications

Biotechnology in Egypt
This book includes key definitions of agricultural biotechnology and provides answers to questions on the safety of biotech crops. Likewise, it highlights the role of biotech crops in the developing world particularly India, China, Argentina and Brazil. (Arabic)

Biotech Crops in Africa- The Final Frontier
This booklet narrates notable scientific breakthroughs, political support, policy formulation, capacity building and awareness creation on agricultural biotechnology in Africa. It highlights activities in three African countries that have commercialized biotech crops and are now experiencing socio-economic benefits as well as improved environmental conservation.

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