

GLOBAL COMMUNITY

Virtual Sharing of Information

By Mariechel J. Navarro and Noel Amano Jr.

The mass media through the tri-media (print, radio, and television) as well as the Internet have made it easier to mainstream a lot of information for various audiences. People have a choice about accessing information in a preferred communication mode. While the tri-media help promote awareness, knowledge, and understanding of concepts and issues for a heterogeneous audience, the Internet also allows a more focused content for specialized stakeholders. Hence, together, these communication channels allow a broad base by which science-based information on crop biotechnology can be shared across geographical, political, cultural, and social barriers.

The use of the Internet has revolutionized the spread of information. As of June 2008, an estimated 1.5 billion or 22 percent of the total world population of 6.7 billion people use the Internet. This is a 305.5 percent growth since 2000 when only slightly more than 360 million people were using the

Internet. Asia accounts for almost 40 percent in terms of usage percentage of total world users, followed by Europe (26.3 percent), and North America (17 percent). North America remains to have the highest world Internet penetration rates among the geographical regions at 74 percent. However, the Middle East, Africa, and Latin America have had a usage growth rate of 1,176.8 percent, 1,031 per cent, and 669.3 percent, respectively, since 2000 (Internet World Stats, 2008). This means that the global community, particularly those from the developing world, is fast getting into the Internet bandwagon. Worth noting is that developing countries have the highest growth rates among Internet users, thus making information accessible to more people.

Hines (2007) notes that scientific controversies spread more widely now because the media is more developed and the "border-free, self-published attributes of the Internet only serve to speed up the tempo and breath of the debate."

As early as 1999 during the United Nation's Economic Commission for Africa, it was

stated that, "The future success factor for nations, organizations and individuals is not high-level technology, but rather innovative and well-managed content." Riggs (2003) adds that there should be more focus on "determining what content users truly need, and then adapting that content using the best technology to make it available in a given environment."

Salazar et al. (2003) argue that competitiveness of businesses depend on their ability to create and commercialize new knowledge as much as on their ability to produce new products. The strategic impact of Internet technology in the biotechnology and pharmaceutical industry, they aver, is based on three key dimensions: converting information into knowledge, redesigning the innovation process, and structuring knowledge-oriented organization. A competitive edge among organizations is the ability to manage information and make it available for decision-making by various stakeholders.

The International Service for the Acquisition of Agri-biotech Applications (ISAAA) uses the tri media and the Internet to reach its global stakeholders. ISAAA is closely identified with the annual report on the global status of commercialized biotech/GM crops. The availability of information about the report in various formats (full report, executive summary, press release, highlights, slides) and translations, makes it the most sought reference. It is thus considered an information niche of ISAAA. In addition, are other publications and videos developed/co-published by ISAAA that highlight technical as well as social dimensions of crop biotechnology. All these materials, except for a few, are made freely available to stakeholders, either in hard or electronic copies, to encourage the global sharing of information.

The Annual Global Status Report on Commercialized Biotech/GM Crops

The annual ISAAA Brief on the Global Status of Commercialized Biotech/GM Crops, authored by

Dr. Clive James, ISAAA's founder and chair, is regarded as the most authoritative single source of information and the most cited reference on the subject. It provides an in-depth analysis of global developments pertaining to biotech crops, distribution of biotech crops by country and crop, global adoption of the major crops, and status of regulatory approvals. The report is free of charge to eligible nationals of developing countries. The executive summary, highlights, Pocket K (knowledge) version, press release, PowerPoint slides of important figures, and report summary in video format are available also for downloading on ISAAA's website. The executive summary is translated into 17 languages: Arabic, Bahasa Indonesia, Bangla, Chinese, French, Hindi, Italian, Japanese, Korean, Portuguese, Spanish (Latin America), Spanish (Spain), Swahili, Thai, Turkish, Urdu, and Vietnamese. The highlights, on the other hand, is translated in 52 languages.

The report is presented in a global launch that includes a webcast and media teleconference originating from a specific country. India and the Philippines, countries in Asia which are already commercializing a biotech crop, were the venue for the launch in 2007 and 2008, respectively. The report's author along with a panel that includes key government and farmer representatives, discuss highlights and its implications for local stakeholders. The international media from North America, Latin America and Europe representing key print, news services, and electronic media such as the New York Times, Washington Post, Bloomberg, Reuters, Associated Press, and Wall Street Journal are invited to participate in the webcast and ask questions regarding the report. Other countries also hold their own media briefing and or seminar on the report that is facilitated by scientists or experts. BICs translate the executive summary and press release for distribution to stakeholders, organize the seminar briefings, and answer inquiries either through newspaper, radio or

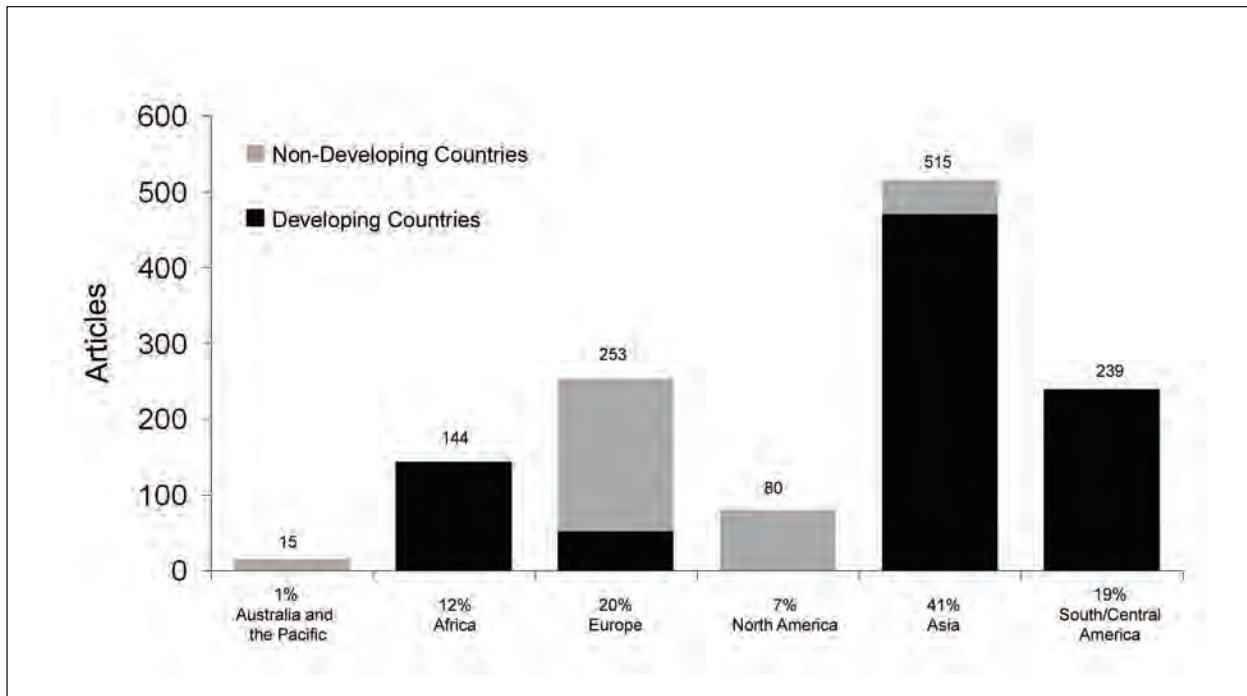


Figure 1. Distribution by region of articles on the 2008 global status report.

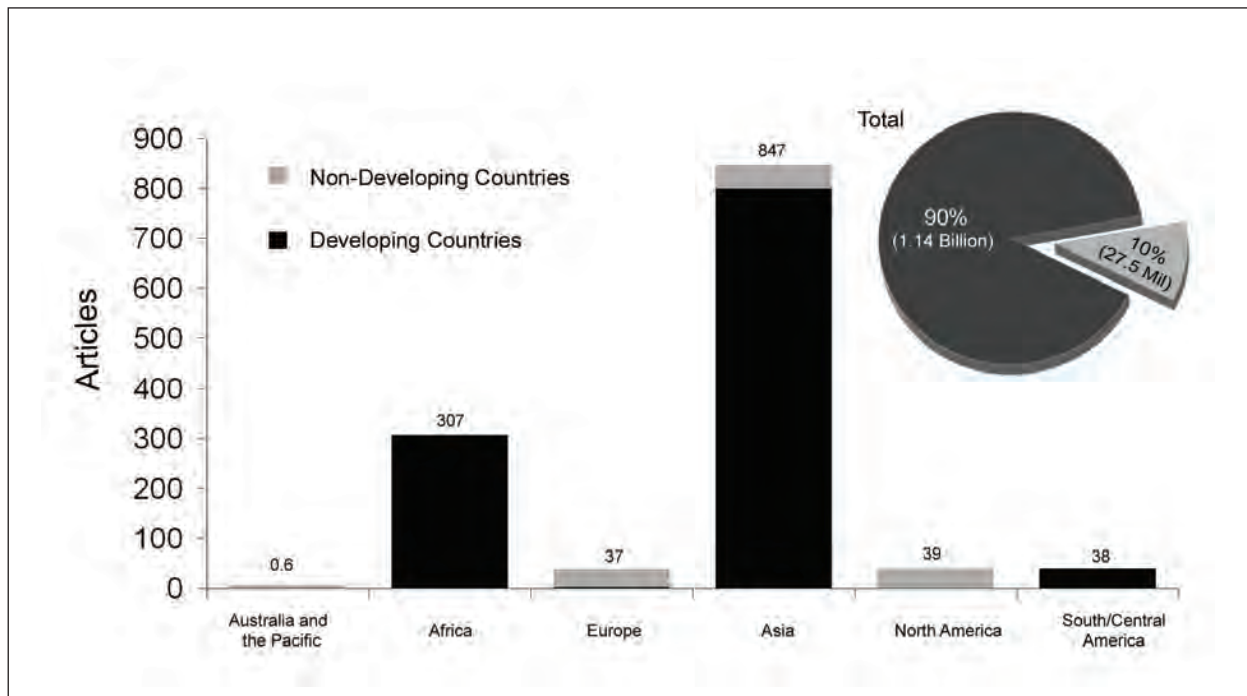


Figure 2. Impressions generated by the 2008 global status report by region.

television interviews. The international as well as key country launches generate a significant number of articles in newspapers, as well as radio and television spots.

To capture the global reach of the report, an independent body documents the number of articles written, as well as total impressions – an impression stands for each individual person who is likely to have come in contact with the media story about the report (Colleen Parr, personal communication, 2006). In 2008, a total of 1,596 media articles in 41 languages and reaching 72 countries, were published. These accounted for an estimated 1.108 billion impressions. A total of 1246 articles in 42 languages, reaching 71 countries were generated by the 2008 report as of April 2009. Total impressions were estimated to be an all time high of 1,273,420,000. Figures 1 and 2 show the distribution of articles and impressions by region. Developing countries contributed 73 percent of all media articles. Top countries with the most number of media articles generated were China (275), Brazil (153), India (102), USA (59), Egypt (36), Mexico (33), Poland (32), and United Kingdom (30). Developing countries also accounted for 90 percent of the total impressions suggesting that a substantial number of people from such regions as Africa (Burkina Faso, Ethiopia, Ghana, Kenya, Mali, Namibia, South Africa, Sudan, and Uganda), Asia (Bangladesh, China, India, Indonesia, Japan, Korea, Malaysia, Pakistan, Philippines, Singapore, Thailand, and Vietnam), and Latin America (Argentina, Brazil, Chile, Colombia, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, and Venezuela) were reached regarding the latest information about the global status of commercialized biotech/GM crops. In particular, Asian countries such as China and India topped the countries with the most number of impressions at 344 million and 340 million, respectively.

ISAAA Website

A major communication strategy for reaching a global community is through the Internet. ISAAA's website was developed in 2001 to address stakeholders need for information and updates about the objectives, programs, and activities of the organization. The site has gone through several revisions through the years in response to viewer feedback that information materials on crop biotechnology be readily available for downloading for instruction and briefing purposes. Hence, the home page presents two major programs of ISAAA (technology transfer and knowledge sharing initiatives), special projects, and then liberally displays information resources such as publications and presentations on the global status of commercialized biotech/GM crops report, ISAAA videos, the e-newsletter Crop Biotech Update, ISAAA in the News, and recommended reading fare. Many of the ISAAA publications, including archived materials, are available for downloading in various formats, video series can be viewed by streaming directly on screen; and flash papers (PowerPoint presentations) can be seen and used directly from the site. An online purchasing system is also available for those who wish to order hard copies of documents or videos. Using the Google translator, the website can be translated into 23 other languages of viewers, among them Chinese, Dutch, French, Italian, Korean, Portuguese, and Spanish.

The Global Knowledge Center on Crop Biotechnology (KC) site is integrated seamlessly within the ISAAA homepage. It includes various information resources on crop biotechnology and the network of Biotechnology Information Centers (BICs). The homepage highlights the different publications available for downloading, the most current issue of the e-newsletter Crop Biotech Update and the Biofuels Supplement, listing of upcoming biotech events, and a directory of links to various relevant institutions. Different



Figure 3. Homepage of the ISAAA website.



Figure 4. Website of the Global Knowledge Center on Crop Biotechnology.

translations of the newsletters are available in several languages as well as Google translations of the website itself. Details of the BICs such as contact persons and addresses are also available for viewing.

Major changes and improvements were done to streamline and improve the content and design of the ISAAA website to allow ease of navigation across sections, enable users to search the site, and benefit from an RSS page for its newsletters, which allows immediate notification of new items. Content of many materials such as ISAAA publications, features, acronyms, and glossary of biotechnology information, and biotech repository is strategically located.

Publications developed by the KC include the Pocket Ks (knowledge), a series of packaged information on crop biotechnology products and related issues. Topics include questions and answers on crop biotechnology, plant products of biotechnology, documented benefits of GM crops, contribution of GM technology to livestock sector, biofuels, biotech plants for bioremediation, biopharming, biotechnology for the development of drought tolerant crops, biotechnology and biofortification. Other topics deal with ethics, and communicating crop biotechnology. On the website, the series are arranged so that a viewer can use the index or search function to find a specific Pocket K of interest. A viewer also has the option of downloading either a document or foldable version. Other publications are monographs on public perception studies on biotechnology, communicating crop biotechnology, and biotechnology in agriculture, a book on reporting agri-biotech for journalists, brochure on myths and facts about biotechnology, and institutional write-ups.

Videos available for viewing on the website are documentaries on developing country stories on

developing and or using biotech crops – Bt corn in the Philippines, Bt cotton in India and China, tissue culture banana in East Africa, clonal forestry in East Africa, and biotech papaya in Southeast Asia. Story patterns on crop biotechnology experiences are discussed from the perspectives of different stakeholders such as farmers, regulators, policy makers, and scientists. For example, the China Bt cotton 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.

The collaborative efforts of various stakeholders and partners to develop papaya ringspot virus (PRSV) resistant papaya are captured in the papaya video. It 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. Another video documents the efforts of various stakeholders to introduce tissue culture banana in small farmers' farms in Kenya and Tanzania while the Bt corn video captures in 18 minutes the seven year process that it took for a genetically modified crop to be approved for commercialization in the Philippines. Other topics include a corporate video on ISAAA, and the Bt cotton trials in Burkina Faso.

ISAAA uses AWstats, a web statistics analyzer to determine the user profile of visitors to the website. Between June 2006 to December 2008, top visitors to the site were the U.S., Philippines, India, France, Germany, China, Australia, Canada, Japan, Great Britain, Italy, South Korea, Brazil and Taiwan. Interestingly, seven of the countries are from the Asia Pacific region which validates the Internet statistics about Asia increasingly contributing to total Internet usage in the world. Figure 5 shows the average monthly website visitors per country.

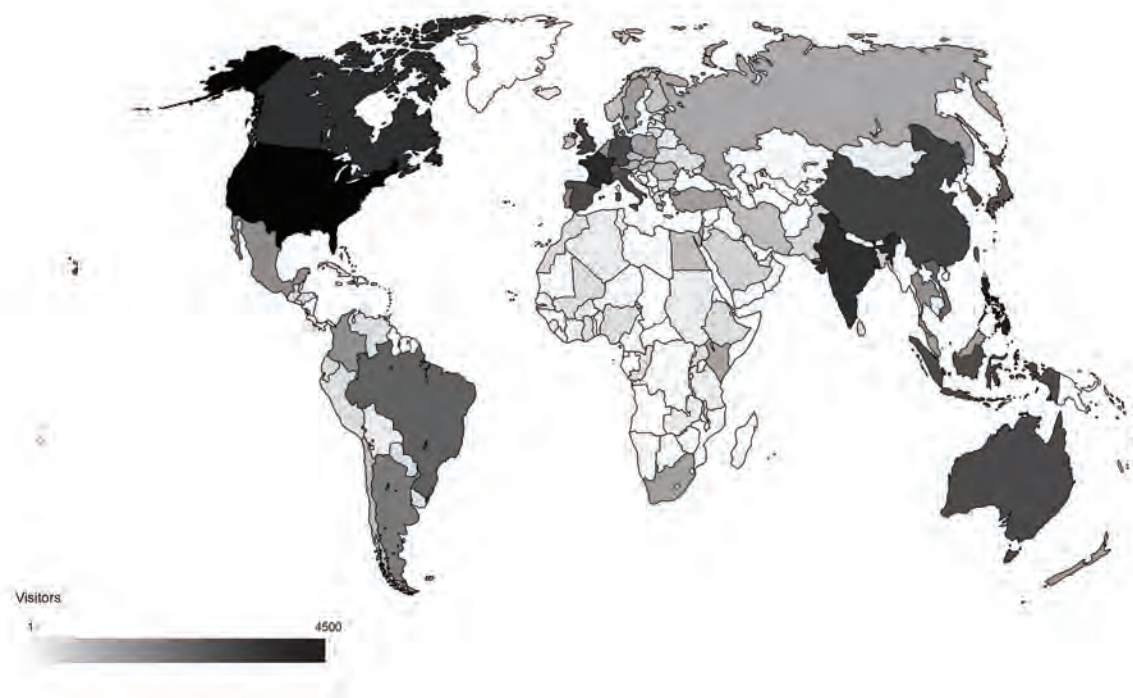


Figure 5. Average monthly website visitors (January-December, 2008)

From visitors mostly from the developed countries in the early 2000s, there has been a significant shift in those coming from the developing countries. The U.S., however, continues to generally account for 18-20 percent of total visitors.

AWstats reports the “number of visits”, which is the total number of visits by all visitors within a 1 hour cut-off time. There has been a steady increase in number of visits since June 2006 when AWstats was used (Webtrends, the web analyzer used previously, reported visits within a 30-minute cut-off time). The average monthly visits in mid-2008 is more than 30,000. The number of visits is higher in particular months, due primarily to the release of the global status report of commercialized biotech/ GM crops which is the most sought out document published by ISAAA.

The most accessed pages on the website are the ISAAA home page, the Crop Biotech Update

(CBU) RSS, the weekly newsletter CBU online, Biofuels Supplement RSS, and the KC home page. Recipients using the RSS feature are provided automatic feeds or alerts through a web feed format that makes it possible for people to keep up with updates regarding the CBU/Biofuels Supplement in an automated manner. A significant number of RSS viewers attest to the increasing number of readers who subscribe to this alert feed feature or are keen on automatic updates of the CBU. Also worth noting is that a new feature, CBU Send to a Friend, which was started only in November 2007 has registered a significant number of visits proving that the CBU is interesting enough for readers to send articles to colleagues who in turn are potential subscribers of the newsletter.

Usability of the website can be gauged by the number of document downloads that visitors request from the site. Based on the most downloaded files, combined materials related

to the Annual Review (Briefs, slides, executive summaries) validated viewers interest in these materials. Brief-related materials were downloaded over 80,000 times of which the Chinese translation of the Executive Summary was the most sought material at 20,424. Individually, Brief 36 on *GM Crops: The First Ten Years – Global Socio-Economic and Environmental Impacts* totaled 21,499 downloads. Other popular downloads were the ISAAA brochure, the book *Genes are Gems: Reporting Agri-biotechnology*, the monograph *Crop Biotechnology and Biosafety*, and ISAAA strategic plan.

Crop Biotech Update

To offset the predominantly developed world clientele of the website, the KC has taken an active effort in reaching more stakeholders in the developing world through the Crop Biotech Update, a weekly e-newsletter. The Update summarizes global news with implications for developing countries, research highlights, documents, and announcements of events, and related topics. Stories are categorized as news (Global, Africa, Americas, Asia and the Pacific, Europe). Articles are sourced from primary journals, contacts, institutional websites, documents, published articles, and from the BICs. Articles are two to three paragraph summaries with a hyperlink to the original publication, or an email contact to the main author or correspondent. A supplementary e-newsletter on biofuels is published every two weeks highlighting major developments in the field, as well as announcements on events and other related issues. It basically follows the CBU format but articles are classified as news and trends; energy crops and feedstocks for biofuels program; biofuels processing; and biofuels policy and economics.

The articles published in the CBU are constantly being cited and used by other listservs or news sources like Agbios, Meridian, Seedquest,

Checkbiotech, and Biovalley News as well as those of the Biotech Knowledge Center by Monsanto, Kenya's Ministry of Science and Technology, Consortium for Improving Agriculture Based Livelihoods in Central Africa (CIALCA), Alltop Biotech News and the Agricultural Biotechnology Network in Africa (ABNETA). ABNETA, publishes only the Africa section of the CBU and allows the reader to rate the articles (on a scale of 1-5). Alltop Biotech News and CIALCA, on the other hand, syndicate the CBU RSS feed. CIALCA allows the readers not only to rate the articles but also post their comments. In contrast, Monsanto's Biotech Knowledge Center and Kenya's Ministry of Science and Technology provide the whole article in their sites. Kenya's Ministry of Science and Technology posts CBU articles under its Biosafety News section while the National Institute of Higher Education, Research, Science and Technology (NIHERST) of the Republic of Trinidad and Tobago posts the CBU under its on-line S&T News.

Both newsletters reach over 570,000 subscribers/ recipients (Figure 6) in 200 countries, with the Update translated into 11 other languages (Arabic, Bahasa Indonesia, Bangla, Chinese, French, Japanese, Italian, Portuguese, Spanish, Thai, and Vietnamese). The subscriber list is constantly updated through an active search by the Global Knowledge Center on Crop Biotechnology and the assistance of ISAAA's BICs. The list excludes subscribers of other listservs that pick up news from the Update. This network of subscribers is probably the largest of its kind, reaching 10 times more subscribers than that of similar services. Seventy-two percent of the recipients come from developing countries with almost half of the total recipients from East Asia and the Pacific (Figure 7). This recipient list offsets the predominantly developed country visitors to the website.

The KC conducts an annual e-survey of its subscribers to gather feedback on the newsletters.

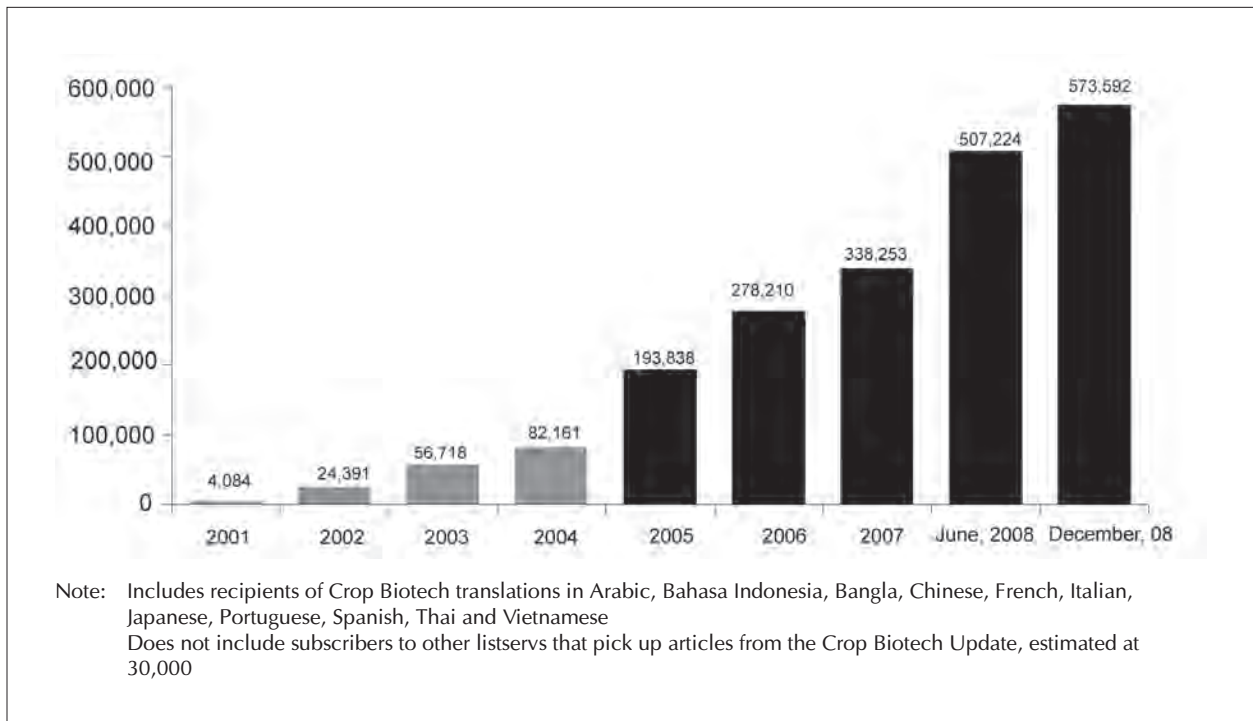


Figure 6. Crop Biotech Update recipients, 2001-2008

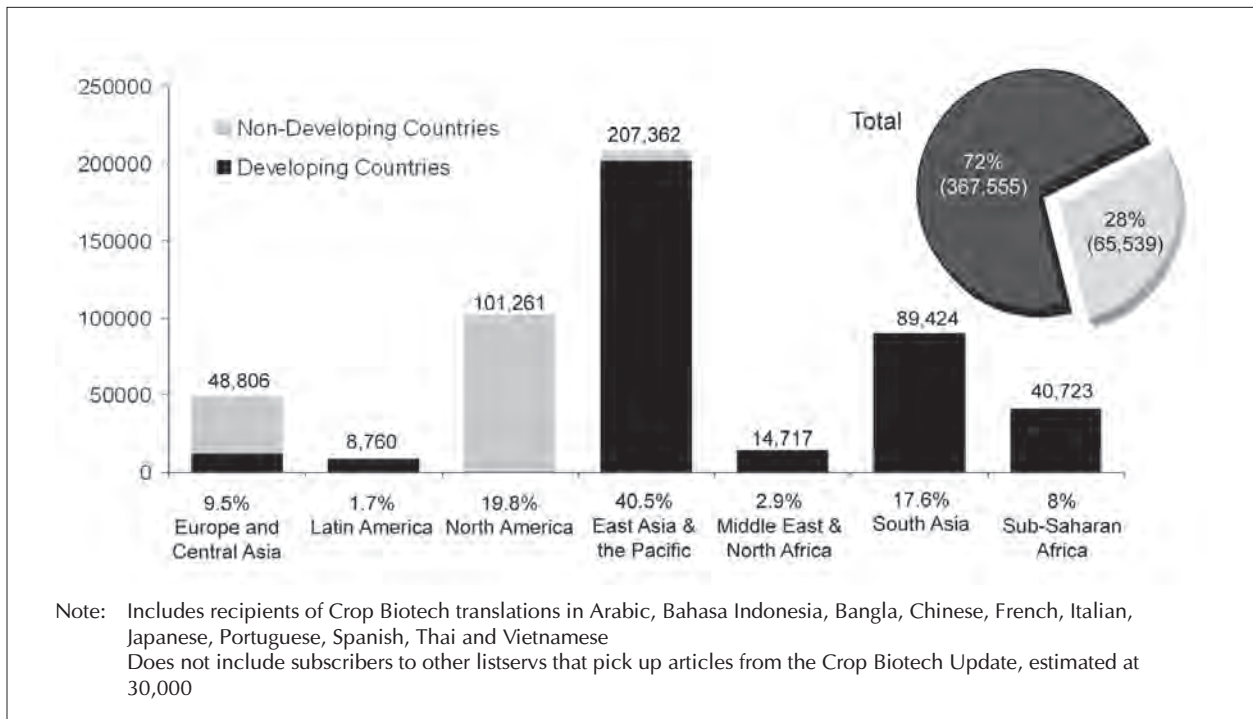


Figure 7. Distribution of CBU recipients by region (as of December 2008)

A short questionnaire is sent by email and respondents are asked to comment on why they read the CBU, what they find most useful, what they like about it, and suggestions for improvement. The questionnaire also provides a 'face' to subscribers as they give information about themselves, i.e. name, designation, and company. A total of 1,998 respondents answered the e-survey between 2006 to 2008. While the figure is small compared to total subscribers, it nevertheless provides a profile of actual users of the CBU and gives insights on what they think about the e-newsletter. This profile and feedback has helped the KC in redesigning the e-newsletter to better address the needs of the subscribers.

The subscriber-respondents come from 118 countries in Africa, Asia and the Pacific, Latin America, North America, and Europe. Thirty-five percent of the respondents were either scientists or researchers while 31 percent were from the academic sector as either faculty or academic staff. About 18 percent were administrators or managers, while 5 percent were represented by media or communication persons. Decision makers exemplified by designations such as consultant, advisor, and policy maker made up 6 percent while the rest were either regulator, student, from industry, or a development/extension worker (Figure 8).

In terms of organizational affiliation, 36 percent were affiliated with universities, 18 percent from national research organizations, 15 percent from private companies, and 11 percent from government exemplified by Ministries or Departments of Agriculture, and Environment. Others are from international organizations such as the United Nations, and Food and Agriculture Organization (7 percent), nongovernmental organizations (5 percent), and media companies (5 percent) (Table 1 and Figure 9).

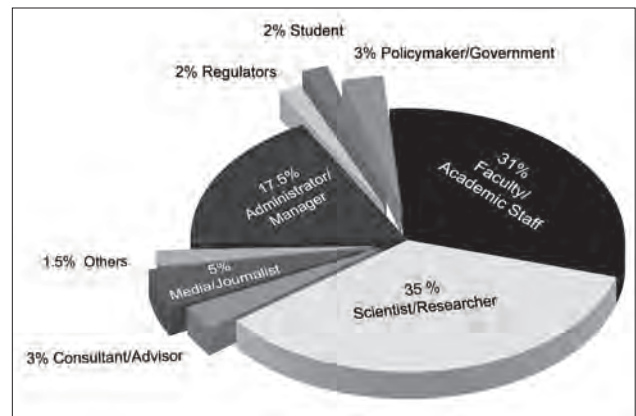


Figure 8. Designation of the CBU survey respondents

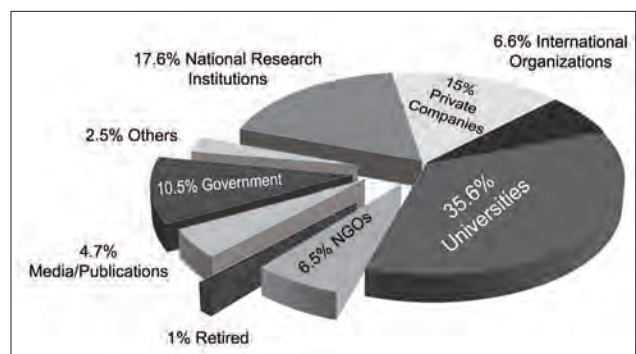


Figure 9. Organizational affiliation of the CBU survey respondents

Subscribers read the CBU to get the latest information on crop biotechnology. "It is the most up to date on-line information source in the field of agricultural biotechnology. It covers a wide spectrum of issues from technical/scientific, to legal, economic, and social," says George Sakellaris, scientist at the National Hellenic Research Foundation in Greece. Clifford Keil of the Pontifical Catholic University of Ecuador notes that he "finds the news articles essential to stay updated in a rapidly changing field." This view was also reiterated by Suwanna Kijparkom of Chulalongkorn University, MTK Gunasekane of the Sri Lankan Tea Research Institute and Ambonesigwe Mbwaga from Tanzania's Uyole Agricultural Research

Institute. John Komen from the Program for Biosafety Systems of the International Food Policy Research Institute comments that CBU's coverage is balanced and from trusted sources. "I also like the mixture of news items, research and development highlights and alerts to documents and upcoming meetings." Darmono Taniwiryo, administrator of the Indonesian Biotechnology Research Institute of Estate Crops, notes that the CBU is his main source of global information on biotechnology. Jozef Simuth of the Slovak Academy of Sciences appreciates the e-newsletter for an "express overview on GMO." For Abisai Mafa, the head of the National Biotechnology Authority in Zimbabwe, the CBU gives "the latest global and regional updates on biotechnology research, development, commercialization, and regulation." Angela Sessitsch, administrator of the Austrian Research Centers GmbH finds "valuable information which is difficult to get by other means."

Academics make up a substantial bulk of subscribers. They are mostly faculty and academic staff of public and private universities and colleges exemplified by the University of Dschang in Cameroon, University of Tasmania in Australia, Shandong University in China, University of Talca in Chile, University of British Columbia in Canada, University of Minnesota in the U.S., and Ghent University in Belgium. Subscribers say they use the CBU as materials for instruction and as a source of current information on crop biotechnology. Faculty members add that they made the CBU required reading for their students. Colin Birch of the University of Tasmania says that the newsletter "is used in support of teaching in agricultural systems, agronomy and in gaining understanding that is broadly relevant to research activities in agriculture." She also states that she uses the CBU as a reference in teaching and in her research. Esteban Hopp of the Instituto de Biotecnologia INTA Castelar in Argentina adds that he subscribes

to the CBU because he "works with GMO and receives frequent consultations from the press." David Gidoni of the Israel Ministry of Agriculture is also a professor and organizes group discussion on these items to keep up with new developments in the field and to learn reactions of the world press to new technologies. Zoran Zgaga of the University of Zagreb in Croatia teaches molecular genetics and genetic engineering, hence the CBU provides up to date information about GMOs in food production. Eufemio Rasco, Jr. of the University of the Philippines Mindanao finds the CBU useful for teaching a course on biotechnology and society.

The scientific community uses the CBU for research update and to give them idea on the emerging biotech subfields. Scientists and researchers hail from various research and development institutions such as the Empresa Brasileira de Pesquisa Agropecuaria in Brazil, Institute of Crop Science of the China Academy of Agricultural Sciences, International Center for Tropical Agriculture in Colombia, and Central Tuber Crops Research Institute in India. "My research work involves biotechnology approaches," says Jose Casaretto of the Instituto de Biología Vegetal y Biotecnología in Chile. "I am interested in being informed of current developments in agri-biotech (research, policies, and trends)." Ebenezer Laing of the University of Ghana comments that the "overview of progress in biotechnology leads to interesting details of theory that I can follow up." S.M. Balachandr of the Directorate of Rice Research in Rajendranagar, India notes that the information saves him a lot of time in looking for the latest information, as he is actively involved in GM research. Jayanta Bhattacharya of the Indian National Science Academy says that "it takes into account many well researched facts to which researchers usually don't have any access." Faculty-researcher Rafiqul Islam Sarker of the Bangladesh Agricultural

Table 1. Profile of subscribers' country and organization that provided feedback about the CBU.

| | Organization/Company |
|------------------------------|--|
| AFRICA | |
| Universities | Benin: University of Benin; Cameroon: University of Dschang; Ghana: University of Ghana; Kenya: Kenyatta University, Mavoko Secondary School, University of Nairobi; Malawi: University of Malawi; Nigeria: University of Agriculture, Federal University of Technology, University of Nigeria, University of Ibadan, University of Agriculture Abeokuta; South Africa: Stellenbosch University, University of the Witwatersrand, Mangosuthu Technikon, University of Johannesburg, University of Technology; Sudan: Gezira University; Syria: Aleppo University; Tanzania: Sokoine University of Agriculture; Uganda: Makerere University; Zambia: University of Zambia |
| Research Institutions | Benin: Institut National des Recherches Agricoles du Benin; Burkina Faso: EIER-ETSHER, Institut de l'Environnement et de Recherches Agricoles; Congo: Centre de Recherches Agronomiques de Loudima, Directorate General des Recherches Scientifiques et Techniques; Egypt: Agricultural Research Center; Ethiopia: Ethiopian Agricultural Research Institute, Institute of Biodiversity Conservation; Ghana: Council for Scientific and Industrial Research Crops Research Institute, Science and Technology Policy Research Institute; Kenya: Kenya Agricultural Research Institute, Kenya Forestry Research Institute, Kenya Medical Research Institute; Libya: National Gene Bank; Niger: Institut National de l'Recherche Agronomique; Nigeria: National Root Crops Research Institute, Department of Horticulture Technology, National Horticulture Research Institute; South Africa: Forestry and Agricultural Biotechnology Institute, Makana Biodiversity Centre, National Innovation Centre for Plant Biotechnology, South African Sugarcane Research Institute; Tanzania: Ukiriguru Agricultural Research Institute, Selian Agricultural Research Institute, Uyole Agricultural Research Institute, Livestock Training Institute; Zimbabwe: Scientific and Industrial Research and Development Center (SIRDC)-Biotechnology Research Institute, Scientific and Industrial Research and Development Center, Forest Research Center |
| Private Companies | Ethiopia: Makobu Enterprises, Pioneer Hi-bred Seeds, Ethiopian Seed Enterprise; Kenya: Agro-Irrigation and Pump Services Ltd, Amaranth International Ltd., Monsanto Kenya, Freshco Seeds Ltd., Homegrown Kenya Ltd.; South Africa: Pioneer Hi-Bred, Hans Lombard Public Relations, Microbial Solutions Pty. Ltd., Woolworths, Pannar Seed Pty. Ltd., Starke Ayres Ltd., Dr. Bernard Cole Technical Services; Swaziland: New Dawn Engineering; Tanzania: Mount Elgon Seed Company Ltd.; Zimbabwe: Seed Co., Ltd. |
| Government | Kenya: Kenya National Assembly, Horticultural Crops Development Authority, National School of Feeding Council; Nigeria: Department of Horticulture Technology; South Africa: Department of Agriculture; Tanzania: Ministry of Agriculture, Food Security and Cooperatives; Uganda: Uganda National Council for Science and Technology, National Agricultural Research Organization; Tonga: Ministry of Agriculture, Forestry and Food; Zambia: National Agricultural |

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| | Information Services; Zimbabwe: National Biotechnology Authority, Seed Co., Ltd., Biosafety Board of Zimbabwe |
| International Private and Non-for-Profit Organizations | Benin: International Center for Soil Fertility and Agricultural Development; Botswana: United States Agency for International Development (USAID); Ethiopia: International Livestock Research Institute, Ghana: USAID; Kenya: United Nations Environment Programme, UN Food and Agriculture Organization, Consultative Group on International Agricultural Research (CGIAR) Gender and Diversity Program, International Livestock Research Institute (ILRI), The African Centre for Technology Centre Studies, Center Internacional de Mejoramiento de Maiz y Trigo (CIMMYT), African Technology Policy Studies Network, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Maendeleo Agricultural Technology Transfer Fund, Eastern Africa Farmers Federation, USAID; Malawi: Biotechnology- Ecology Research and Outreach Consortium, International Institute of Tropical Agriculture (IITA); Mali: International Center for Soil and Agricultural Development, USAID, ICRISAT; Morocco: International Center for Agricultural Research in the Dry Areas (ICARDA); Mozambique: Sasakawa Global 2000; Niger: ICRISAT; Nigeria: IITA, International Rice Research Institute (IRRI), Senegal: United Nations Development Program (UNDP); South Africa: Food Agriculture and Natural Resources Policy Analysis Network, AfricaBio, Pharmaceutical Manufacturers Association of South Africa, IITA; Swaziland: International Centre for Agricultural Research in the Dry Areas; Tanzania: IITA, Tanzania Home Economics Association; Uganda: Eastern Africa Farmers Federation, USAID; International Potato Center; Togo: IFDC Africa Division; Zimbabwe: Center for International Forestry Research (CIFOR), Biotechnology Trust of Zimbabwe |
| Media/Publications | Ethiopia: Ethiopian Environmental Journalists Association; Kenya: National Media Group, Janak Communications, Kenya News Agency, The Standard Group, Radio Lake Victoria, Royal Media Services Ltd., Kenya Broadcasting Corp.; Nigeria: Guardian Newspapers Ltd.; South Africa: AgriPress Communications for Agriculture, Landbou Weekblad, Green Ink Publishing Services Ltd.; Uganda: The New Vision Publishing and Printing Co., Ltd., The Farmers Voice Newspaper |
| ASIA AND THE PACIFIC | |
| Universities | Australia: University of Tasmania, University of New England, University of Sydney, University of Wollongong, University of Queensland, Australian National University, Curtin University of Technology; Bangladesh: Bangladesh Agricultural University, Khulna University; China: South China Agricultural University, Shandong University, Zhejiang University, Huazhong University of Science and Technology, Fudan University, Northeast Normal University, Hong Kong: The Chinese University of Hongkong; India: University of Pune, Tamil Nadu Agricultural University, Panjab University, Geetanjali Institute of Technical Studies, Jawaharlal Nehru College of Agriculture and Research Institute, Apollo College of Veterinary Medicine, University, Kerala Agricultural University, Indira Gandhi Agricultural University, Rajendra Agricultural University, University of Delhi, Maharashtra Animal and Fishery Sciences University, Anna University, Biotech Park Lucknow, Cochin University of Science and Technology, Doon University, University of Agricultural |

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| | <p>Sciences Bangalore, Bose Institute, CCS Haryana Agricultural University, Madurai Kamaraj University, University of Hyderabad, Acharya N.G. Ranga Agricultural University, Banaras Hindu University, Mahatma Phule Agricultural University, Banaras Hindu University, University of Agricultural Sciences and Technology Banaras Hindu University, University of Agricultural Sciences and Technology of Kashmir; <i>Indonesia</i>: Sebelas Maret University Surakarta, Universitas Bangka Belitung, University of Indonesia; <i>Iran</i>: Razi University, University of Tehran, College of Agriculture Kemanshah; <i>Iraq</i>: Basrah University; <i>Israel</i>: Hebrew University of Jerusalem, Tel Aviv University, Hebrew University of Israel, The Tel Aviv Yaffo Academic College, Gedera Ben Gurion University; <i>Japan</i>: Osaka University, Kinki University, Tottori University, Tokyo University, University of Tsukuba, The University of Shiga Prefecture, Meiji University, Kobe University; <i>Jordan</i>: University of Jordan; <i>South Korea</i>: Chung-Ang University, Soonchunhyang University, Chonbuk National University, Daegu University, Chungbuk National University; <i>Kuwait</i>: Kuwait University; <i>Malaysia</i>: International Medical University, University Putra Malaysia, Universiti Tunku Abdul Rahman, Universiti Malaysia Sabah, National University of Malaysia; <i>Mauritius</i>: University of Mauritius; <i>New Zealand</i>: Lincoln University, University of Otago; <i>Palestine</i>: An-Najah National University; <i>Philippines</i>: University of the Philippines, Mindanao Polytechnic State College, Bicol University; <i>Singapore</i>: National University of Singapore, Nanyang Technological University; <i>Sri Lanka</i>: University of Colombo; <i>Taiwan</i>: Taiwan National University, Mingdao University; <i>Thailand</i>: Bangkok School of Management, Kasetsart University, Rajamangala University of Technology, Chulalongkorn University, Chiang Mai University, Silpakorn University, Ubon Ratchathani University; <i>Uzbekistan</i>: University of Agriculture; <i>Vietnam</i>: Nong Lam University</p> |
| <p>Research Institutions</p> | <p><i>Australia</i>: CSIRO, Australian Center for Plant Functional Genomics, ARC Centre of Integrative Legume Research; <i>Bangladesh</i>: Bangladesh Rice Research Institute; <i>China</i>: China Academy of Agricultural Sciences, China National Rice Research Institute, Biotechnology Research Institute, China National Center for Biotechnology Development, Institute of Crop Sciences, Shanghai Academy of Agricultural Sciences; <i>India</i>: Directorate of Rice Research, Institute of Genomics and Integrative Biology, Indian Council for Agricultural Research, National Dairy Research Institute, National Research Centre for Groundnut, Central Tuber Crops Research Institute, Central Tuber Crops Research Institute, National Bureau of Plant Genetic Resources, National Research Center on Plant Biotechnology, Central Rainfed Upland Rice Research Station, Central Institute of Medicinal and Aromatic Plants, India Institute of Hygiene and Public Health, Centre for Cellular and Molecular Biology, National Bureau of Plant Genetic Resources, Birla Institute of Scientific Research, Nimbkar Agricultural Research Institute, National Dairy Research Institute, National Botanical Research Institute; <i>Indonesia</i>: Indonesian Biotechnology Research Institute for Estate Crops, Indonesian Center for Agriculture Biotech and Genetic Resources Research and Development; <i>Iran</i>: Iranian Plant Protection Research Institute, Institute for Green Rural Advancement, Rice Research Institute of Iran, National Institute for Genetic Engineering and Biotechnology, Cotton Research Institute; <i>Israel</i>: The Volcani Center, Weisman Institute of Science, J. Blaustein Institute for Desert Research; <i>Japan</i>: National Institute of Health Sciences, National Institute of</p> |

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| | <p>Agrobiological Science, Forestry and Forest Products Research Institute, National Institute for AgroEnvironmental Sciences, Kihara Institute for Biological Research; <i>South Korea:</i> National Horticultural Research Institute, National Institute of Crop Science, LCC Life Environment Institute, National Institute of Agricultural Biotechnology; <i>Malaysia:</i> Malaysian Agricultural Research and Development Institute, Agriculture Research Centre (Sarawak), Forest Research Institute Malaysia, Guthrie Biotech Laboratory; <i>Mauritius:</i> Mauritius Sugar Industry Research Institute; <i>Pakistan:</i> Institute of Agri Biotechnology and Genetic Resources, Pakistan Agricultural Research Council; <i>Philippines:</i> Ecosystems Research and Development Bureau, Philippine Council for Agriculture, Forestry and Natural Resources Research and Development, Philippine Rice Research Institute, Fiber Industry Development Authority; <i>Sri Lanka:</i> Plant Genetic Resources Center, Tea Research Institute of Sri Lanka, CIMMYT, Coconut Research Institute; <i>Taiwan:</i> Taiwan Institute of Economic Research, National Science and Technology Program on Agricultural Biotechnology, Taiwan Agricultural Chemicals and Toxic Substances Research Institute, The World Vegetable Center, Institute of Molecular Biology, Academia Sinica; <i>Thailand:</i> Thailand Development Research Institute, Chum-Phae Rice Research Institute, Field Crops Research Institute; <i>Vietnam:</i> Institute of Agricultural Science for Southern Vietnam, Institute of Biotechnology, Institute of Agricultural Genetics</p> |
| <p><i>Private Companies</i></p> | <p><i>Australia:</i> Florigene, Innovation Dynamics Pty, Ltd, SGA Solutions Pty., Ltd., Farmacule Bioindustries Pty., Ltd., Kraft Foods, BSES Ltd., Monsanto Australia, Innovation Dynamics, HortResearch Pty Ltd.; <i>China:</i> Novozymes China, Dupont China Holding Co. Ltd., China National Seed Group Corp.; <i>India:</i> Syngenta, Bayer Crop Science, Ayurved Limited, Bioseed Research India Pvt., Pandit NRI Agritech Private Ltd., Maple Biosys Ltd., Nunhems India Pvt. Ltd., Maharashtra Hybrid Seeds Co., Krishidhan Research Foundation, Pvt. Ltd., Atash Seeds Pvt Ltd., Reliance Life Sciences, Dow Agrosciences, Pioneer Overseas Corporation, Krishidhan Seed Ltd, Mahyco, Bioseed Research India Pvt., Ltd., Global AgriSystem Private Ltd., Sudarhan Chemical Industries Ltd., Namdhari Seeds Pvt. Ltd., Nestlé India, Cargill India, Vibha Agrotech, Clause Tezier India Pvt. Ltd., Metahelix Life Sciences, Proagro Seed, Seminis Vegetable Seeds (India) Ltd., Jain Irrigation Systems, Reliance Life Sciences; <i>Indonesia:</i> Barcon PT, PT Nestle Indonesia, Syngenta, Monsanto; <i>Israel:</i> Zeraim Gedera; <i>Japan:</i> Suntory Ltd., Plant Genome Center Co., Cosmo Public Relations Corp., Kirin Brewery; <i>Malaysia:</i> Ainaacom System Sdn (Agro Bio), Publicis Malaysia, Celadon Capital Sdn Bhd, Chemtron Biotechnology Sdn Bhd., Cryocord Sdn., Bhd; <i>New Zealand:</i> PGG Wrightson Seeds, Crop and Food Research Institute, Horizon2, New Zealand Agriseed Ltd., Genetic Technologies, Ensis, Dunbier and Associates Ltd.; <i>Pakistan:</i> Pioneer Pakistan Seed Ltd., Auriga Seed Corp.; <i>Philippines:</i> Pioneer Hi-Bred, Development Alternatives, Inc., Lapanday Group, Syngenta Philippines, Coca-Cola Export Corporation, Dole Philippines, Petbowe Chemtrade Corp., Cargill Philippines, Christman and Cua Associates, San Miguel Corp., Monsanto; Singapore: Asia BioBusiness Pte. Ltd., Monsanto, Bayer; <i>Thailand:</i> Monsanto, Syngenta; <i>Vietnam:</i> Vietnam Cotton Co.</p> |

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| Government | <i>Australia:</i> Department of Water, Land and Biodiversity Conservation, Plant Biosecurity Australia, Department of Primary Industries and Fisheries, Department of Environment, Australian Government; <i>Cambodia:</i> Ministry of Environment; <i>China:</i> State Tobacco Monopoly Administration; <i>India:</i> Indian Council for Agricultural Research, Defense Research and Development Organization, National Academy of Customs Excise and Narcotics; <i>Indonesia:</i> Ministry of Agriculture; <i>Israel:</i> Ministry of Agriculture; <i>Philippines:</i> Bureau of Internal Revenue, City Government of Davao, Department of Agriculture, Bureau of Animal Industry, Department of Agriculture, Philippine Coconut Authority; <i>Taiwan:</i> Department of Health; <i>Thailand:</i> Department of Agriculture, Office of the National Economic and Social Development Board; <i>Vietnam:</i> Ministry of Agriculture and Rural Development |
| International Private and Non-for-Profit Organizations | <i>Afghanistan:</i> USAID; <i>Australia:</i> Melbourne Biotechnology, Plant Health Australia; <i>Bangladesh:</i> The Swallows, Grameen Shakti, International Rice Research Institute; <i>Fiji:</i> Secretariat of the Pacific Community; <i>India:</i> ICRISAT, Center for Science and Technology of the Non-aligned and Other Developing Countries, International Center for Genetic Engineering and Biotechnology, Confederation of Kisan Organizations, CropLife Asia, M.S. Swaminathan Research Foundation, US Grains Council, Swiss Agency for Development and Cooperation, International Life Sciences Institute; <i>Indonesia:</i> Asian Farmers Regional Network (ASFARNET), Agency for the Assessment and Application of Technology; <i>Japan:</i> Japan Bioindustry Association; <i>Myanmar:</i> United Nations Office on Drugs and Crime; <i>Nepal:</i> International Centre for Integrated Mountain Development; <i>New Zealand:</i> NZBio; <i>Philippines:</i> International Rice Research Institute, Biotechnology Coalition of the Philippines, UN Food and Agriculture Organization; <i>Thailand:</i> UN Food and Agriculture Organization, CropLife Asia |
| Media/Publications | <i>Bangladesh:</i> The Daily Jugantor; <i>India:</i> The Financial Express; <i>Philippines:</i> Business Mirror |
| LATIN AMERICA | |
| Universities | <i>Argentina:</i> Universidad Nacional de Rosario, University of Buenos Aires; <i>Brazil:</i> Universidad Federal do Rio de Janeiro, University of Brasilia, Sao Paulo University; <i>Chile:</i> University of Talca, Catholic University of Valparaiso, Universidad de Concepción; <i>Colombia:</i> Pontificia Universidad Javeriana; <i>Cuba:</i> University of Havana; <i>Ecuador:</i> Pontifical Catholic University of Ecuador; <i>Mexico:</i> Universidad Americana de Acapulco, Faculdade de Estudios Profesionales Iztacala Unam, Universidad Nacional Autonoma de Mexico, Universidad Autonoma Chapingo, University of Guadalajara; <i>Nicaragua:</i> National Agrarian University; <i>Peru:</i> Universidad Nacional Agraria La Molina, University of Trujillo; <i>Venezuela:</i> Universidad de Oriente |
| Research Institutions | <i>Argentina:</i> Instituto de Biotecnologia, Centro de Estudios Fotosinteticos y Bioquimicos; <i>Brazil:</i> EMBRAPA Environment, Brazilian Agricultural Research Corporation, Instituto Agronomico do Parana (IAPAR), Escola Superior de Agricultura Luiz de Quieroz (ESALQ/USP); <i>Chile:</i> Center for Advanced Studies in Arid Zones; <i>Costa Rica:</i> Centro Agronomico Tropical de Investigación Enseñanza, Tropical Agriculture Research and Development; <i>Cuba:</i> Instituto de Biotecnologia de las Plantas; <i>Dominican Republic:</i> Instituto Dominicano de Investigaciones |

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| | Agropecuarias y Forestales; <i>Guatemala:</i> Guatemalan Sugarcane Research and Training Centre <i>Mexico:</i> Instituto Nacional de Investigaciones Forestales Agricolas y Pecuarias (INIFAP), Centro de Investigacion y de Estudios Avanzados (CINVESTAV), <i>Uruguay:</i> Instituto Nacional de Investigacion Agropecuaria |
| <i>Private Companies</i> | <i>Argentina:</i> McCain Argentina, Relmo S.A., Bayer CropScience, Nidera SA; <i>Brazil:</i> Paraiso Farming Ltd., DuPont, Syngenta, BASF; <i>Chile:</i> Semillas Seminis Sudamerica S.A.; <i>Dominican Republic:</i> Bayer CropScience; <i>Mexico:</i> Monsanto; <i>Panama:</i> Phytoclones; <i>Peru:</i> Agro Consult Internacional <i>Uruguay:</i> Calagua |
| <i>Government</i> | <i>Brazil:</i> National Institute for Industrial Property, Civil House of the Republic Presidency; <i>Costa Rica:</i> Ministry of Agriculture and Livestock; <i>Dominican Republic:</i> Dominica Export Import Agency; <i>Panama:</i> Consejo Nacional de Ciencia y Tecnologia, Ministry of Agricultura |
| <i>International Private and Non-for-Profit Organizations</i> | <i>Barbados:</i> Inter-American Institute for Cooperation on Agriculture, <i>Bolivia:</i> Foundation for Andean Crops, Bolivian Association on the Political Economy of Globalization, Promocion e Investigacion de Productos Andiros (PROINPA) Foundation; <i>Colombia:</i> HarvestPlus, Bill and Melinda Gates Foundation, International Center for Tropical Agriculture; <i>Guatemala:</i> The Nature Conservancy; <i>Honduras:</i> Inter-American Institute for Cooperation on Agriculture (IICA), USAID; <i>Mexico:</i> CGIAR Generation Challenge Program, Agro Bio Mexico, CIMMYT; <i>Paraguay:</i> Iniciativa para la Investigacion y Transferencia de Tecnologia Agraria Sostenible, INTTAS <i>Peru:</i> International Potato Center; <i>Trinidad and Tobago:</i> Caribbean Agricultural Research and Development Institute |
| <i>Media/Publications</i> | <i>Trinidad and Tobago:</i> CAB International |
| NORTH AMERICA | |
| <i>Universities</i> | <i>Canada:</i> University of British Columbia, University of Victoria, University of Guelph, University of Ottawa, University of Saskatchewan, Nova Scotia Agricultural College, McMaster University; <i>United States:</i> University of California, West Virginia University, Rockefeller University, Tufts University, University of Kentucky, Cornell University, University of Delaware, Montana State University, University of Minnesota, Southern Connecticut State University, University of New Hampshire, California State University, University of Idaho, University of Nevada, South Dakota State University, Case Western Reserve University, Kansas State University, University of Georgia, University of Illinois, Miami University, Michigan State University, Auburn University, Colorado State University, University of Illinois, Louisiana State University, North Carolina State University, University of South Carolina, University of Wisconsin, North Dakota State University, City College of New York, University of Nebraska, Purdue University, Dartmouth College, Brigham Young University, University of Georgia, Whitman College, Oregon State University, The City University of New York, Stanford University, University of Wisconsin, Mississippi State University, Indiana University, University of Connecticut, University of New Hampshire, Ohio State University, Iowa State University, Auburn University, |

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| | Salisbury University, Pittsburg State University, West Texas A&M University, University of Oklahoma, University of Hawaii, University of Wyoming, University of Nebraska, Texas A&M University, Rutgers University, Michigan State University, Colorado State University, University of Florida, University of Tennessee, University of Arkansas, University of Houston, Oklahoma State University, State University of New York College of Environmental Science and Forestry, University of Maryland, University of Kentucky, Louisiana State University, Pittsburg State University, University of Wyoming, New York State University, Virginia Tech |
| Research Institutions | Canada: National Research Council Industrial Research Assistance Program, Institute for Aerospace Research, Plant Biotechnology Institute, National Research Council Canada; USA: Donald Danforth Plant Science Center, the Boyce Thompson Institute for Plant Research, National Renewable Energy Laboratory |
| Private Companies | Canada: Bayer CropScience, Conscience Biotechnologique Inc., Solanum Genomics Int. Inc., BioAtlantech, Ray Mowling and Associates; USA: Hubbard Feeds, Inc., Nitrate Elimination Co., Pioneer/DuPont, Pennington Seed Inc., Syngenta Seeds, Delfino Nutrition and Management, Inc., Novus International, Novozymes Biologicals, Inc., Kitchen Culture Kits, Inc., Monsanto, Seminis Vegetable Seeds, Garrett Ag. Farms, Grove Scientific and Engineering Company, Vita Plus, Syngenta Associates, BioCognito, Tyson Foods, FibroGen, Investigen, Crop Technology Consulting, Eversole Associates, Oxford Farms, Americot, Inc., Stonebridge International, BioAbility, H.E. Butt Grocery Company, Acala Partners, Inc., Battelle, ADM Alliance Nutrition, Inc., Bayer Corp., Eurofins-GeneScan, Vesperat Consulting, Smithfield Foods, Seminis, Crop Technology Consulting |
| Government | Canada: Ministry of Forest and Range, New Brunswick Government, Department of Agriculture and Aquaculture, National Research Council of Canada, Environment Canada, Government of Canada, Canadian Grain Commission, Agriculture and Agrifood Canada, Canadian Forest Service, New Brunswick Agriculture, Fisheries and Aquaculture, Justice Department, Canadian Food Inspection Agency, Alberta Agriculture, USA: Department of Agriculture, National Institute of General Medicine Sciences, Environmental Protection Agency, US Patents and Trademark Office, Indiana Department of Natural Resources, National Academies Board on Agriculture and Natural Resources, Department of State, US National Academy of Sciences, National Science Foundation, Maine Forest Service |
| International Private and Non-for-Profit Organizations | Canada: Secretariat of the Convention on Biological Diversity; USA: International Food Policy Research Institute, World Bank, CropLife Africa, Bill and Melinda Gates Foundation, Samuel Roberts Noble Foundation, Rockefeller Foundation, USAID, International Foundation for the Conservation of Natural Resources, USAID Africa, The Nature Conservatory |
| Media/Publications | Canada: AgBios; USA: Kiplinger Agriculture, Seed Today, Nutrition Edge Communications |

| EUROPE | |
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| <i>Universities</i> | <p><i>Austria:</i> University of Natural Resources and Applied Life Sciences, <i>Belgium:</i> Ghent University, Virje Universiteit Brussel, Katholieke Universiteit Leuven, Gembloux Agricultural University, Universiteit Antwerpen, University of Liege; <i>Czech Republic:</i> Charles University; <i>Denmark:</i> University of Aarhus, University of Copenhagen, University of Southern Denmark, Royal Veterinary and Agricultural University; <i>Finland:</i> University of Joensuu, University of Helsinki; <i>France:</i> Universite Louis Pasteur, University of Dijon, Universite Pierre Mendes, Blaise Pascal University; <i>Germany:</i> University of Applied Sciences at Eberswalde, Justus Liebig University, University of Hannover, University of Jena, University of Rostock; <i>Greece:</i> Aristotle University; <i>Hungary:</i> Szent Istvan University; <i>Ireland:</i> UCD University, Dublin University; <i>Italy:</i> University of Milan, Marche Polytechnic University, University of Tuscia, University of Pisa, Università Degli Studi di Milano, University of Parma, University of Rome, University of Perugia, Università Cattolica del Sacro Cuore, University of Bari, University of Naples, University of Florence, University of Bologna, University of Torino; <i>Latvia:</i> Latvia University of Agriculture; <i>Netherlands:</i> University of Amsterdam, Leiden University, Wageningen University, Utrecht University, University of Technology (Delft); <i>Norway:</i> University of Stavanger; <i>Portugal:</i> University of Lisbon; <i>Slovakia:</i> Slovak Agricultural University, <i>Spain:</i> Technological University of Catalonia, University of Barcelona, University of Cordoba, University of Valencia, University of Lleida, Universidad Politecnica de Madrid; <i>Switzerland:</i> Swedish University of Agricultural Sciences, University of Basel, University of Zurich; <i>United Kingdom:</i> University of Greenwich, University of Oxford, University of Reading, University of Sheffield, University of Warwick, Newcastle University, University of York, University of Glamorgan, University of Wolverhampton, King’s College, University of Southampton, University of Leeds, University of Wales, University of London, University of Nottingham, Lancaster University, Queen’s University, University of Exeter, University of Dundee</p> |
| <i>Research Institutions</i> | <p><i>Austria:</i> Federal Research Centre for Forests, Austrian Research Centers GmbH; <i>Belgium:</i> Central Laboratory of General Ecology, <i>Bulgaria:</i> Agricultural Experiment Station, Central Laboratory of General Ecology; <i>Denmark:</i> Danish Plant Directorate, Danish Institute for Food Research, <i>Finland:</i> VTT Technical Research of Finland; <i>France:</i> CIRAD, National Institute for Agronomic Research; <i>Germany:</i> Max Planck Institute for Plant Breeding Research, GSF, Julius Kuhn-Institut, AlPlanta Institute for Plant Research, Federal Biological Research Centre for Agriculture and Forestry, Leibniz Institute of Plant Biochemistry; <i>Greece:</i> National Hellenic Research Foundation, <i>Hungary:</i> National Institute for Food Safety and Nutrition, Biomi Ltd., Agricultural Biotechnology Center, <i>Ireland:</i> Marine Institute, <i>Italy:</i> Institute of Biology and Agricultural Biotechnology, Adriano Buzzati Traverso Consiglio Nazionale delle Ricerche, Institute of Biology and Agricultural Biotechnology, Research Institute for Vegetables Crops, Ordine Nazionale dei Biologi, Istituto di Virologia Vegetale, <i>Poland:</i> Plant Breeding Institute, <i>Portugal:</i> Instituto de</p> |

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| | <p>Educacion Basica el Tenam (IBET/ITQB); Romania: Agricultural Research and Development Station Turda; Russia: Centre Bioengineering of Russian Academy of Sciences, Institute of Nutrition; Serbia: Institute of Molecular Genetics and Genetic Engineering, Institute of Field and Vegetable Crops; Slovakia: Institute of Molecular Biology of the Slovak Academy of Sciences, Institute of Botany; Spain: International Reciprocal Trade Association (IRTA), Instituto Nacional de Investigaciones Agrarias y Alimentarias; Sweden: Swedish Institute for Food and Agricultural Economics; Switzerland: Agroscope Reckenholdz Tanikon Research Station; Ukraine: Institute of Food Biotechnology and Genomics; UK: Scottish Crop Research Institute, Agri-Food and Biosciences Institute, Rothamsted Research, Broom's Barn Research Station</p> |
| Private Companies | <p>Belgium: Pioneer Hi-Bred International, Inc.; Czech Republic: Selgen, Monsanto; Denmark: Aresa AS; France: Geves, Limagrain, Bayer CropScience, Biogemma, Syngenta, Monsanto, Biologos, Phylum, Florimond Desprez, Sepant, Germany: RLP AgroScience, Planta GmbH, BASF, Pioneer Hi-Bred International, TransGen, McDonald's QA Europe, Saaten Union Resistenzlabor, Munich Re, Greece: Biomi Ltd.; Italy: Tempestini Group, Oxon Italia; Netherlands: Keygene N.V., Plant Research International, Europoint B.V., SVS Holland B.V., Plantum NL, Schenkelaars Biotechnology Consultancy, Barenbrug Holding; Norway: Graminor AS; Romania: Syngenta; Russia: Monsanto Europe; Spain: Global Bionanomics; Sweden: AK Consulting BioAgri AB; Switzerland: Syngenta, InterNutrition, CPW-Nestle; UK: Oxitec, Ltd., Advanced Technologies Cambridge, Research Information Limited, Toxicological Consulting Ltd., Withers and Rogers LLP, Research Information Ltd., McCain Foods Ltd., Milmo Associates, Monsanto</p> |
| Government | <p>Austria: Federal Research Centre for Forests, BFW Department of Genetic; Belarus: National Coordination Biosafety Centre of the Republic of Belarus; Belgium: Department of Agriculture and Fisheries; Denmark: Danish Veterinary and Food Administration, Danish Plant Directorate; Finland: Ministry of Social Affairs and Health, Ministry of Agriculture; France: French Department of Agriculture, Museum d'histoire Naturelle, CNRS; Germany: Federal Office for Consumer Protection and Food Safety, Federal Ministry of Food, Landesumweltamt Nordrhein-Westfalen, Bavarian State Ministry for Agriculture and Forestry; Italy: Italian National Research Council, Consiglio Nazionale delle Ricerche; Lithuania: Ministry of Agriculture; Netherlands: Dutch Ministry of Agriculture; Slovakia: Ministry of Environment; Slovenia: Ministry of the Environment and Spatial Planning, MESP; Sweden: Swedish Gene Technology Advisory Board; UK: Natural England</p> |
| International Private and Non-for-Profit Organizations | <p>Albania: USAID; Austria: Dialog Gentechnik; Belgium: International Center for Soil Fertility and Agriculture Development (IFDC); France: Bioersity International, Euro Information Centre, Organization for Economic Cooperation and Development, International Fertilizer Industry Association; Italy: International Center for Genetic Engineering and Biotechnology (ICGEB), Food and Agriculture Organization, Societa Produttori Sementi, CGIAR; Netherlands: International Food Policy Research Institute, Niaba, Secretariat Product Boards Working Group Biotechnology, Royal</p> |

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| | NL Academy; <i>Poland:</i> Polish Academy of Sciences; <i>Spain:</i> Consejo Superior de Investigaciones Cientificas (CSIC); <i>Sweden:</i> International Union for Conservation of Nature (IUCN), United Nations Environment Program; <i>Switzerland:</i> Syngenta Foundation for Sustainable Agriculture; <i>UK:</i> FARM-Africa |
| <i>Media/Publications</i> | <i>Denmark:</i> Engineering Weekly; <i>Germany:</i> Springer Verlag; <i>Italy:</i> National Italian Television and Radio, Agrimpresa Magazine, Orsa Maggiore, Edizioni Elsevier Masson, L'Informatore Agrario; <i>UK:</i> Green Ink Publishing Services Ltd, SciDev Net, Commodities Now Magazine, New Scientist |

University says that the CBU helps him identify people involved in crop biotechnology.

The CBU is also used as an information source for analysis and decision making by administrators and policy makers. "I need to know the trends in the field," explains Patrick Ayiecho Olweny of the Kenya National Assembly. "As a policy maker I have a major say in decisions for adoption of modern technology in our country." Alan Brown, scientist of the National Research Council for Industrial Research Assistance Program in Canada says "that the newsletter provides up to date advisory on technical issues for firms in Canada." Mary Taylor of Fiji's Secretariat of the Pacific Community has the responsibility of circulating agbiotech information to the Secretariat's biotechnology working group. And for this task, she uses the CBU. "I was amazed at the amount of information I had on biotech compared with other participants," recalls John Ugolo of the United Nations Environment Program in Kenya when he attended an international workshop. "This is because of the consistency in which I received the newsletter and the usefulness of the information."

Marie Nyman, manager of the Swedish Gene Technology Advisory Board notes that the CBU helps her write a yearly report as she has to follow research and development trends regarding gene technology. Audia Barnet from Jamaica's Scientific Research Council says that as a scientist with a strong interest in biotechnology

and as an administrator of a research and development institution she needs information on current developments on biotechnology. The CBU enables her to satisfy this need. Takeshi Uchudia, administrator of the National Institute of Agrobiological Science in Japan says he is able to collect worldwide information that enables him to negotiate and communicate with the public and opposition groups. As an administrator at the Ministry of Agriculture, Ivan Branzovsky of the Czech Republic's Ministry of Agriculture explains that the "news from around the world is very important for making objective reports, statements, advices for government and parliament." Farmer leader Chebet Maikut of the Eastern Africa Farmers Federation and Anil Kumar Epur of the Confederation of Kisan Organizations in India use information from the CBU for dissemination to stakeholders.

Media practitioners from the tri media are also subscribers to the CBU. Lyn Resurrecion, science writer of the Business Mirror, a national daily in the Philippines, says that she "uses its relevant stories" for articles. Maja Tumpej, a communication person from Dialog Gentechnik in Austria, explains that she needs to be up to date about biotechnology because she writes articles, manages projects, organizes events/discussions/lectures, and produces information materials about different biotechnology topics. Argaw Ashne Sahle of the Ethiopia Environmental Journalists Association requires latest information in his career and the

CBU provides access to institutions engaged in biotechnology.

A media practitioner from the Kenya News Agency, Nancy Juddy Njambi Mathu comments that “crop biotechnology is a relatively new concept to her and that CBU gives a journalistic angle where I can get well researched articles and materials for publication in the print media” while colleague Ann Mikia uses the articles in her radio program to complement information obtained from the field. Wisdom Changadeya of the Biotechnology Ecology Research and Outreach Consortium in Malawi adds that CBU articles are used in their own newsletter *Biotechnology Update* while Nazimi Acikgoz of Ege University Turkey cites the CBU in their monthly bilingual online agricultural biotechnology newsletter. Girolamo Mangano of the National Italian Television and Radio writes and broadcasts news picked up from the CBU. Nigerian journalist Olukayode Oyeleye says that by being abreast of new developments, he can have “better insights on various aspects of biotech so as to put the issues in clearer and better perspectives for the audience.”

IBERCIB-Spain’s Center for Biotechnology Information

Aside from the ISAAA website, several BICs have their own websites. To illustrate the reach of these country-based websites, the case of Ibercib is discussed. Ibercib (El Centro de Información en Innovación Biotecnológica, www.ibercib.es) was born from the collaboration between ISAAA and the social and cultural division of the Spanish savings bank Ibercaja. Ibercib aims to disseminate the latest information on agricultural biotechnology and biofuels and encourage informed discussion among public interest groups, the biotechnology industry, policy makers and other stakeholders. Ibercib publishes Spanish translations of educational materials provided by the Global Knowledge Center on Crop Biotechnology. These



Figure 10. Homepage of the Ibercib website.

include the annual global status update of GM crops, the Crop Biotech Update and its Biofuels Supplement.

The website attracts some 27,000 annual unique visitors viewing 65,219 pages. The average visitors Ibercib receives has more than tripled since it officially started in October 2007. From its average annual visitors of 35,000, around 65 percent are from Spain (Figure 11). The site also attracts visitors from other parts of Europe, the U.S. and most importantly from countries in Latin America particularly Mexico (4,700 unique visitors per month), Colombia (2,630), Peru (2,200), Argentina (2,000) and Chile (1,200). This large number of website visitors makes up for the relatively low hits the ISAAA website receives from Spanish-speaking South American countries. In Spain, most website visitors are from Madrid, followed by Zaragoza, Barcelona, Sevilla, Valencia and Pamplona (Figure 12).

The Spanish translation of the Crop Biotech Update and the Biofuels Supplement is being distributed to a list of some 2,500 subscriptions. This does not include subscribers of other listservs that pick up news from the Update. Most subscribers are from universities, research institutions and private companies. There has also been an increase in the number of Crop Biotech and Biofuels RSS subscribers.

In addition to boasting a new look, the Ibercib website has undergone recent changes to improve its functionality and usability, making the site even more user friendly and easier to navigate. Ibercib now allows its users to search for articles using keywords. These changes, in addition to publicity campaigns both via the internet and in print, are expected to significantly increase Ibercib's website traffic and newsletter subscribers.



Figure 11. Average annual Ibercib website visitors.

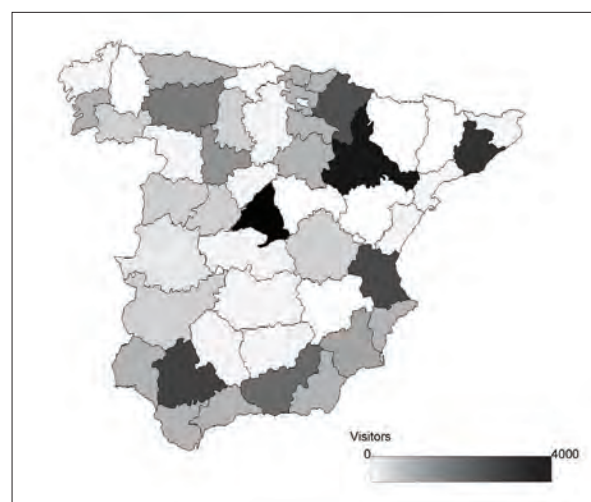


Figure 12. Average annual website visitors from Spain.

In September 2008, Ibercib conducted an e-survey to gather feedback on its e-newsletters. The survey was designed to gauge the newsletters' effectiveness, the relevance of its content as well as to determine the informational need of the subscribers. A questionnaire was sent by email and the subscribers were asked to rate the content, layout, timing and usefulness of the newsletter. Subscribers who responded to the survey were mainly from Spain, Mexico, Argentina, Peru, Colombia and Venezuela. The respondents' designation is shown in Figure 13. Thirty percent were administrators, particularly from private companies, 24 percent were from the government, and 19 percent were scientists.

The responses were generally favorable, with more than 84 percent of the subscribers rating the e-newsletters good or excellent. When asked for suggestions for improvement, responses included:

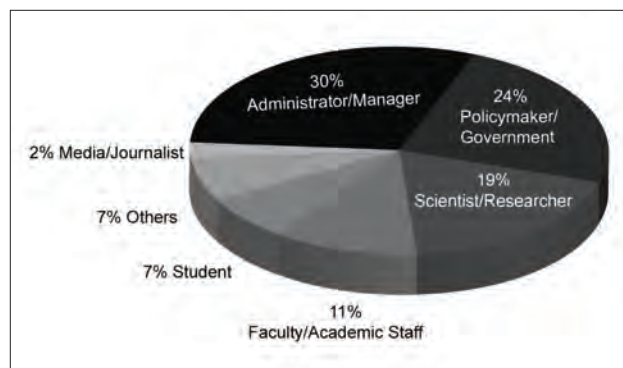


Figure 13. Designation of the Ibercib survey respondents.

wider coverage of agbiotech topics, more frequent updates, improvement in layout, more details on research news, and links to open-access research papers. Majority of the respondents found the research articles particularly useful. □

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