

HIGHLIGHTS

International Conference on the Adoption of Biotech Crops in the Developing World: Case Studies of Farmers from China, India, and the Philippines

Hyatt Hotel, Manila and
Concepcion, Tarlac, Philippines
April 1-2, 2013



ORGANIZERS:

JOHN TEMPLETON FOUNDATION
SUPPORTING SCIENCE- INVESTING IN THE BIG QUESTIONS



A B I I S P

COLLABORATORS:



International Conference on the Adoption of Biotech Crops in the Developing World: Case Studies of Farmers from China, India, and the Philippines

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EXECUTIVE SUMMARY

Of the developing countries in Asia that grow biotech crops, China, India, and the Philippines have had the most extensive experience. They represent an unmatched wealth of critical information and insights towards a better understanding of the social environment that favors biotech crop adoption. Developing countries can learn from their experiences by knowing the adoptors of biotech crops, what factors influenced their adoption, and what significant changes have occurred in farmers' lives.

The John Templeton Foundation, International Service for the Acquisition of Agri-biotech Applications (ISAAA), the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), the National Academy of Science and Technology (NAST Philippines), and the Agricultural Biotechnology Support Project II (ABSP II) co-organized a conference to present key findings of the research project *Adoption and Uptake Pathways of GM/Biotech Crops by Small-scale, Resource-poor Asian Farmers in China, India, and the Philippines* and their implications to biotech adoption particularly in developing countries.

Key researchers from the Center for Chinese Agricultural Policy (CCAP) under the Chinese Academy of Sciences, the Indian Society of Cotton Improvement (ISCI), and the University of the Philippines Los Baños' College of Development Communication (UPLB-CDC); and farmers from each of the three countries discussed the highlights of the research results and shared experiences in growing Bt corn (in the Philippines) and Bt cotton (in China and India). Discussants from other developing countries provided their insights to validate the Asian experience. A workshop solicited policy recommendations to enhance biotech adoption in developing countries. Key recommendations in the three countries include the conduct of training programs for farmers on proper cultivation of biotech crops and farm operations; assistance from the government to support biotech crop farming; and policies to strengthen public-private partnerships on seed pricing and availability.

The conference also linked stakeholders through a network to encourage interaction even after the event. In addition, participants visited a biotech corn farm in Concepcion, Tarlac to enable them to interact with farmers.

International Conference on the Adoption of Biotech Crops in the Developing World

Conference participants included stakeholders in the agriculture arena represented by policy makers, scientists and researchers, media practitioners, extension workers, and farmers from the developing countries.

INTRODUCTION

The International Conference on the *Adoption of Biotech Crops in the Developing World: Case Studies of Farmers from China, India, and the Philippines* presented the key findings of the collaborative research project *Adoption and Uptake Pathways of GM/Biotech Crops by Small-scale, Resource-poor Asian Farmers in China, India, and the Philippines*. The collaborative project is being implemented by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) in collaboration with the Center for Chinese Agricultural Policy (CCAP) under the Chinese Academy of Sciences, the Indian Society of Cotton Improvement (ISCI), and the University of the Philippines Los Baños' College of Development Communication (UPLB-CDC). The conference was organized by the John Templeton Foundation, ISAAA, the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), the National Academy of Science And Technology (NAST Philippines) and the Agricultural Biotechnology Support Project II (ABSPII).

OBJECTIVES

The International Conference aimed to provide empirical basis for understanding farmer adoption of biotech crops in developing countries. Since 85% of farmers planting biotech crops are from China, India, and the Philippines, the case studies provide a wealth of experience, critical information and insights towards a better understanding of the social environment for GM crop adoption.

Presentations of these case studies were expected to generate interest among stakeholders involved in the decision making and policy formation in other developing countries. Moreover, the conference crafted policy recommendations generated from different agriculture stakeholders who participated in the said event. Continuous information exchange and sharing of ideas among the conference participants are also expected as ISAAA has created an interactive facility through an electronic group where participants can exchange ideas and strategies even after the conference as well as the possibilities to forge collaboration/partnerships.

PARTICIPANTS

The conference was attended by 131 participants from Bangladesh (1), Burkina Faso (1), Cambodia (1), China (5), Egypt (1), India (7), Indonesia (3), Iran (2), Kenya (2), Laos (1), Malaysia (4), Pakistan (1), Peru (1), Philippines (88), Thailand (6), Uganda (1), USA (1), and Vietnam (3). The conference participants were stakeholders in the agriculture arena represented by policy makers, scientists and researchers, media practitioners, extension workers, and farmers. Some of the participants were sponsored by CropLife Asia, SEARCA, and ABSP II.



A total of 131 participants from 18 countries attended the conference in Manila

PROGRAM

Day 1

Opening program. The program started with welcome remarks delivered by SEARCA's Deputy Director Virginia Cardenas. She expressed her hope that the conference would be a fitting venue to discuss relevant country experiences on the adoption of biotechnology in Asia as well as in Africa and Latin America. Likewise, she looked forward to the lessons espoused in the conference that may be translated into working policy recommendations to enhance the adoption process of biotech crops in other developing countries.



Dr. Virginia Cardenas



DA Usec Serrano

In a key message, Philippine Department of Agriculture Undersecretary for Policy and Planning Segfredo Serrano stressed the importance of modern biotechnology in providing stable food supply to a growing population like the Philippines, and to reduce hunger and poverty. He also narrated how the regulatory system was instituted in the Philippines 10 years ago to assess and manage the country's GM technology, which oversees the entire process of GM crops approval in the Philippines. Serrano guaranteed that the regulatory process in the country ensures that GM crops are safe for human consumption and to the environment. He further shared that his organization is looking for more immediate but strategic solutions to address food insecurity such as the development of biotech crops.

Dr. Randy Hautea, ISAAA's Global Coordinator and SEAsia Director, presented the Global Status of Farmer Adoption of Biotech Crops and the overview of the conference. According to him, biotech crops, the fastest adopted crop technology in the world has reached another milestone for the year 2012. Citing the *Global Status of Commercialized Biotech/GM Crops: 2012* by Dr. Clive James, ISAAA's Chair, Dr. Hautea shared that two additional countries, namely Sudan and Cuba, have now joined the list of nations which are planting biotech crops. Hautea added that developing countries have already surpassed the industrialized countries in terms of global farm area usage for biotech crop cultivation. Developing countries now make up 52% of the global biotech area while developed countries make up the remaining 48%. Among the benefits of biotech crops are their contribution to global food security and sustainability, conservation of biodiversity, reduction of pesticide use, mitigation of climate change effects, and increased income among farmers. He also presented an overview of the conference noting that it attempts to describe the adoptors of the technology, the key factors that influence farmer adoption and the significant changes brought by biotech crop cultivation in farmers' lives.



Dr. Randy Hautea

Dr. Frank Shotkoski, ABSPII Director, spoke on the development of public sector biotech products. ABSPII, which is designed to complement national and regional efforts to develop and commercialize safe and effective genetically engineered crops in Asia and Africa, primarily aims to deliver the priority biotech products to resource-poor farmers. ABSPII activities also include socio-economic impact assessments of biotech products, communication and outreach, and capacity development in the approval and commercialization process of biotech crops. Among the products supported by ABSPII are fruit and shoot borer resistant eggplant, late blight resistant potato, disease and nematode resistant banana, ringspot virus resistant papaya, and drought and salt tolerant rice. Shotkoski added that ABSPII has actively participated in the development of biosafety guidelines in several countries by working within existing policy frameworks.



Dr. Frank Shotkoski

To segue into the presentations of the three-country representatives, a flash presentation on the key concerns of the conference was shown.

Presentations by researchers and farmers. Dr. Xiaobing Wang, Associate Professor of the Center for Chinese Agricultural Policy (CAAP) and one of the key researchers of the China study, started the presentation of the country's experience on Bt cotton adoption. The first Bt cotton varieties in China were developed by the Chinese Academy of Agricultural Sciences (CAAS) and the seed company Monsanto in 1997. Although many biotech crops have been approved for planting in China, Bt cotton is the most popular GM crop with 7.2 million Chinese farmers adopting it. CAAS also played an active role in the



Dr. Xiaobing Wang

extension of the technology by training local extension workers and agricultural traders to introduce Bt cotton to the farmers. In the late 1990s, seed companies in China became key players in the dissemination of Bt cotton. The farmers who first adopted the technology introduced Bt cotton to their fellow farmers, friends, and relatives. In some Chinese communities, the village leaders also played a critical role in influencing farmers to cultivate the crop. The most promising changes Bt cotton had brought to the farmers are the dramatic increase in yield and reduction of pesticide used compared to ordinary cotton.

Dr. Cheng Xiang, post-doctoral researcher at CAAP, shared the experience of a Bt cotton farmer in China, Kaibo Wang. Wang is a 57-year old farmer who is presently planting 15 mu (1 ha) of Bt cotton. He has been planting cotton for 40 years but started to plant Bt cotton in 1999. By 2002, all cotton planted in his farm is already Bt. The crop was introduced to him by a relative. After trying Bt cotton, he learned that it did not need much pesticide and that it had higher yield than its conventional counterpart. Adopting Bt cotton also resulted to less labor and thus made it easy for him to manage his farm. Wang also commended the good quality of Bt cotton which has better cotton fiber.



Dr. Chen Xiang

India's experience on Bt cotton adoption was presented by Dr. Charudatta Mayee, President of the Indian Society for Cotton Improvement (ISCI). Dr. Mayee revealed that most of the Bt cotton farmers in India are male, accounting for 97 percent of the total



Dr. Charudatta Mayee

number of Bt cotton adoptors. More than half of the farmers (55%) are about 21-40 years old while 38 percent are from 41-60 years old. Around 53 percent of the Bt cotton adoptors has been planting cotton for more than 20 years, 39 percent from 6-20 years, and 7 percent for 5 years or less. Among the factors considered by Bt cotton farmers in adopting the technology are the reduction in use of pesticides, high yield, better profit, excellent farm demonstrations, and friends' influence. Bt cotton farmers' main sources of information are the progressive farmers in the village, input dealers and seed companies, and the extension workers. Key recommendations of the Indian study include the call for the government to support the public private partnership (PPP) model of biotech development, approval, and commercialization in the current scenario; and the expansion of the adoption and uptake pathway study, which only covered three states in India, to all major nine states.

Dr. Ashok Dhawan of the Society for Sustainable Cotton Development in Punjab, India provided specific information on the adoption and uptake pathways of Bt cotton among farmers in Punjab, one of the three states where the team conducted their study. Bt cotton farmers in Punjab are young with an average age of 39 years (63% in age group of 21-40 years). The average Bt cotton farm size in Punjab is 3.05 ha. Farmers usually acquire their capital from banks and traders who also act as contract buyer of cotton seeds. Yield was initially high when Bt cotton was first introduced but is now declining because of non availability of high yielding hybrids, seed quality, and lack of timely and

adequate irrigation. There is also high incidence of jassid and whitefly because of susceptible hybrids.

Dhawan also revealed that majority of the farmers do not adopt the refuge system which is essential in a biotech farm. Major problems encountered in planting Bt cotton are high cost of seed, non-availability of hybrids, ineffective control of sucking pests, and low cotton price and returns. Among the recommendations in the Punjab case study include the need to address the high cost of Bt cotton seed in the state, keeping in view the seed rate used by farmers; review nutrient management issue for better understanding of current soil health in the farming communities; need to look at the resistance management strategies to enhance Bt technology as most of the farmers are not growing refugia; and the need for farmer-centric outreach activities to improve the adoptors output and education for non-adoptors of the benefits of Bt cotton.



Dr. Ashok Dhawan

Indian farmer Vijay Atmaram Ingle shared his experience in planting Bt cotton in his native dialect Marathi with Dr. Mayee providing the translation. Ingle is a third generation cotton farmer who was not able to finish his studies because his family did not have enough resources to send him to college. In 1976, he inherited a cotton farm of 14 acres (5.67 ha) where he was just harvesting 2.5 (0.25 ton) quintals of cotton per acre. In 1997-1999, he was one of the first farmers to conduct Mahyco's Bt cotton field trials. Today, his annual income from planting Bt cotton alone is about Rs. 12,60,000 (\$23,386.61). He was able to send his children to college. His son is currently studying agricultural biotechnology while his daughter has a degree in education. Being one of the first adoptors of Bt cotton, Ingles' farm received wide publicity from media, including local newspapers and farm magazines.

Among the benefits he gained from Bt cotton cultivation are the increase in his income which has tripled in the last ten years; improvement of his social status; ability to afford higher education for his children; acquisition of additional 8 acres of land in 2010; establishment of a dairy farm with 100 animals and other side businesses; and building a Pucca (cement) house. As a progressive Bt cotton farmer, Ingle also received several awards and recognitions such as Mahyco's Highest Yield Award in 2003, East India Cotton Association Award for best yield in 2005, and 'Lokmat' newspaper's (popular newspaper in Marathi language) Certificate of Merit for Best Exhibition in 2012. He also received several invitations from various organizations to share his Bt cotton story in India.



Farmer Vijay Atmaram (front)

The last case study presented was the Philippine experience on adoption of biotech corn by Dr. Cleofe Torres, professor from the College of Development Communication at the University of the Philippines Los Baños (CDC-UPLB). Torres revealed that the average age range of the Filipino biotech corn farmer is 41-60 years old. Most of them are male, married, and have either reached or finished high school. About 69 percent of the biotech corn farmers own 1-3 ha of land. The usual sources of capital are the individual

money lenders or financiers (50%), and traders (25%). Around 51 percent of the farmers plant biotech corn with stacked trait (insect resistance and herbicide tolerance), 34 percent adopt HT corn, and 11 percent cultivate insect resistant corn (Bt). The critical role of the financiers/traders in the scenario of biotech corn adoption in the Philippines is that they both serve as input dealers and market buyer of the crops. The average yield of farmers is 6 tons/ha and the selling price is PhP12.50/kg (\$0.31/kg), which will give a total sale of PhP 74,400 (\$1,860) per hectare. The farmer gets an average net income of PhP 30,342 (\$758.55) per hectare.

Among the benefits which became the main enabling factors for farmers to adopt biotech corn are higher income, pest-resistance of the crop, good grain quality, availability of financiers to those who will plant biotech corn, lesser production cost, and availability of seeds. In the Philippines, biotech corn cultivation is a family affair - the father plays the major role in all farm activities, the mother prepares the food and does the budgeting for the farm inputs while the children help and do minor roles in farm activities during holidays. Generally, farmers' income goes to the family's daily expenses, children's education, farm capital, and home amenities/utilities.



Dr. Cleofe Torres (left) and Mr. Rommel Daya (right)

Farmers' main sources information on biotech crops include the seed suppliers/traders, their fellow farmers, and the technicians coming from the Department of Agriculture. Asked if they will continue to plant biotech corn in the future, 93 percent of the farmers said they will continue to plant but they expressed their hope that support and services will be provided to them by the government like farm equipment, financial assistance, farm inputs, and price regulation.

Mr. Romel Daya of CDC-UPLB presented the Innovation Tree results noting the important role of seed company technicians, financiers, and co-farmers in farmer adoption of biotech corn.



Mr. Delson Sonza

Mr. Delson Sonza, a biotech corn farmer from Iloilo, Philippines shared his and his fellow farmers' experiences in growing biotech corn and the benefits that they obtained from its adoption. According to him, farmers from his province are one of the early adoptors of biotech corn. Iloilo is a mountainous province and some of its hilly grasslands are idle, thus there was a need to convert these grasslands to corn farms. He added that before biotech corn was commercialized in the country, farmers only earn during rice farming season (May-July), sugarcane planting season (October-January), and harvesting of rice and sugarcane (October to December). During the period of the year when there is no much income from farming, the crime rate in his community is high.

In 2005, when glyphosate tolerant corn was introduced in the Philippines, a number of dialogues with farmers in Iloilo were conducted to convert their grasslands into corn farms. With farmers convinced to adopt the biotech crop, technology transfer initiatives took place.

The adoption of biotech corn was able to uplift the lives of his fellow farmers. This gave them an income of roughly Php30,000 (US\$750) per hectare which is far higher than income derived from conventional corn. He added that they no longer need to plow and weed, hence, they have more time to find other means of livelihood. Because of higher income, farmers can now afford to buy appliances, renovate their houses from nipa hut to concrete shelters and acquire service vehicles like motorcycles or even a truck. Farmers can also send their children to school and they can even invest in post harvest equipment.

Discussants. After the three country presentations, Dr. Javier Verástegui, Board Member of PeruBiotech Association, and Dr. Margaret Karembu, Director of ISAAA AfriCenter in Kenya, served as discussants to validate the Asian experience and to provide insights from other developing regions' perspective.

Dr. Margaret Karembu said that biotech research in Africa is also advancing but not as fast as the development in Asia. The region has four countries that grow biotech crops commercially. These are South Africa, Burkina Faso, Egypt, and Sudan. In addition, a number of countries in Africa are conducting field trials of different crops especially the top priority crops in the continent as far as food security is concerned. These include banana, cassava, sweet potato, cowpea, and sorghum. Unlike in the three Asian countries which grow biotech crops mainly to produce fiber and feed, Africa's top priority in using the technology is mainly for food security. Some of the lessons learned from the three country presentations are (1) farmers are the main drivers of the adoption of the technology, empowering and liberating them; (2) the farmer is the best judge in accepting the technology, and their influence on their fellow farmers is very evident as revealed by the three different case studies; and (3) the seed companies also play a significant role in biotech crop adoption as they are the main determinants of biotech seeds' access, availability, and quality.



Dr. Margaret Karembu

Dr. Karembu further opined that additional players are needed in the entire process of crop biotechnology adoption from seed production to farm, up to the marketing of the product for the effective delivery of the technology. If a certain biotech crop for example has no market, the adoption rate of this crop would likely be low. Thus, it is important to look at the entire value chain of crop biotechnology. Another key issue that needs attention is the farmer's record keeping. This is to give the farmers an idea of how much they should sell their harvested crops with corresponding profits based on the farm record that they keep.



Dr. Javier Verástegui

Dr. Javier Verástegui said that Latin America is the second region in the world with largest area of cultivated biotech crops. The region has a total of 66.7 M ha of biotech crop-occupied lands which is equivalent to 39.2 percent of the world's total area. Of the 16 countries in Latin America, 11 countries are growing commercial biotech crops. Five of these biotech crop growing countries (Brazil, Argentina, Uruguay, Paraguay, and Bolivia) are mega-biotech countries or are planting on more than a million hectares of biotech farms. Latin agricultural export was the main driver in the rapid adoption of GM crops in mega- biotech countries of Latin America. The farmers are the main actors in this process.

Verástegui added that GM crop research and development efforts to increase food security and quality are well advanced in Brazil, Cuba and Argentina. In Brazil, a GM virus-resistant bean variety developed by its government-operated research institution EMBRAPA has been approved in 2011 for commercial use. The legal prohibition in Ecuador will soon be lifted by the country's president as he publicly admitted his mistake of not allowing the technology to be cultivated in his country while the 10-year moratorium law in Peru is being contested by the farmers who appealed to the government for reconsideration.

The most widely grown biotech crops in Asia - Bt cotton and biotech corn, are also important crops in Latin America and policy makers must be convinced to encourage their large-scale cultivation. Unlike the Asian countries which need biotech crops mainly to meet domestic consumption for food and feed, the main driver in Latin America to grow biotech crops is the need to meet and expand export requirements.

Discussion on policy recommendations. Interaction among participants focused on generating policy recommendations through four key issues: (1) adoptors of the technology; (2) key factors that influence adoption; (3) significant changes brought by biotech cultivation in farmers' lives; and (4) innovation pathway of the adoption process from introduction, acceptance, and use.

Biotech crop adoptors. In the three countries (China, India, and the Philippines) biotech crop farmers were identified as smallholder farmers, predominantly male, with up to secondary education, but with ample knowledge on farming. However these farmers still lack sufficient knowledge on the use of the technology and government support in terms of capital, technical as well as information on current varieties and their accessibility. In the Philippines, farm equipment and infrastructure from



Mr. Popen de Guzman and Dr. Rhodora Aldemita facilitate discussion on policy recommendations

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planting to storage are still not sufficient which indirectly affect adoption. There is also localized GMO banning in the country. In India and China, there are no new approvals for biotech cotton traits (HR and stacked traits) and for other biotech crops and traits.

Suggested policy recommendations call on the government to play an active and supporting role in the continuous technical training on planting biotech crops for farmer groups that should include women – considered as new players in farming among the three countries. These trainings should be systematic, nationwide in scale, and evaluated regularly for content and effectiveness. An expeditious but science-based approval system for new biotech crops and traits was also recommended.

Factors influencing adoption. Three major factors that influenced adoption in the three countries were: excellent demo farms showcasing the quality and yield of biotech crop products; seed traders who became financiers and buyers of the products; and the benefits such as increased productivity and income, improved quality of the produce, and safety for environment and farmers health. Issues on high seed cost, availability of quality seeds, and the lack of government support in terms of technical training, capital, farm equipment and infrastructures were common in the three countries.

A policy that would strengthen public and private sector partnership that can oversee pricing and availability of quality seeds was foremost in the recommendations. Second is for the government to support farmers in the form of seed subsidy and fair credit system. In the Philippines, there is a need for a technical policy that would cover adoption of soil conservation measures in sloping/mountainous areas planted to corn.



An open discussion with the participants to solicit policy recommendations

Significant changes brought to farmers' lives. The most intangible but precious outcome of adopting biotech crops was of farmers having peace of mind and looking forward to a bountiful harvest with less production cost every planting season. Biotech crops have delivered increased productivity and income that improved their economic status enabling them to send children to schools; repair their houses and buy furniture and household appliances; rent or buy more farm lands and farming implements, and others. Issues on price fluctuations and availability of other biotech crops which can serve as alternate crop to prevent price dive of the major biotech crop product in times of abundant harvest, were foremost in the three countries. Insufficient technical guidance to farmers to implement insect resistance management and other pest management strategies to protect the existing biotech crops was identified as an issue. New pests and

diseases have been identified that requires development of improved traits in existing biotech crops.

Farmer adoptors have significantly improved their lives after several years of biotech crop adoption. To sustain this and influence other farmers to adopt, some policy recommendations were put forward including: government and private sector should work together to ensure that quality seeds are always available at reasonable price; implement an efficient and effective monitoring system for emergence of resistant and/or new pests; and efficient biotech crop approval system to increase farmers' biotech crop selections.

Innovation pathway of adoption. Adoption of biotech crops had a similar start in the three countries, where excellent seed company demo and trial farms, witnessed by farmers and farmer leaders triggered adoption. Seminars and technical briefings were also held by seed industries in strategic farming communities. Farmers with very minimal technical knowledge disseminated the information to co-farmers, and with the presence of seed traders cum financiers, immediately adopted the technology. Farmers sharing with farmer relatives within the area followed by farmers in adjacent communities became the pathway to expanding adoption in the three countries. Government institutions as well as village leaders had minimal role in the dissemination. Some issues raised are related to the insufficient technical knowledge of farmers in planting biotech crops such that some farmers plant the second generation seeds and still apply pesticides.

For continuous expansion of the technology, the three countries recommend that government should be visible and influential in disseminating knowledge on the technology. Partnerships between the government and the private sector should be most needed in extreme conditions in India and the Philippines. Information on commercialization of new biotech product should be disseminated and promoted by both the government and the private sector. Introduction of new biotech products should be accompanied with adequate and easy to follow technical information. In areas where natural calamities affect farmer's productivity, government support should be extended to the farmers.



Dr. Evelyn Mae Mendoza

Closing program. Dr. Evelyn Mae Mendoza, Academician and Secretary of the National Academy of Science and Technology (NAST), gave the closing message. She said that one of the activities of NAST was to give consultations on the biosafety regulatory guidelines which contributed to the establishment of the National Committee on Biosafety in the Philippines. NAST is active in information dissemination on modern biotechnology to various sectors such as legislators, religious sector, and the media. Dr. Mendoza noted that the conference presentors shared both favorable and unfavorable experiences in growing biotech crops. She stressed the need for the research information to be made available in Dr. peer-reviewed journals so that it may have a greater reach.

Day 2

Field Tour. Participants visited a biotech corn farm in Concepcion, Tarlac, where they were able to interact with extension workers and farmers. The field tour was divided into four main stations - the first station consisted of both GM and hybrid corn that a seed company is developing; the second was a plot showing how the refuge system works; the third station consists of varieties that are already in the pipeline; and the final station was where farmers spoke on their experiences with biotech corn. Participants found the visit very informative since they had an overview of the different stages of pre-commercialization; had a chance to interact with farmers; and learned of the benefits of biotech crops on farmers and their community.



Participants get briefing from technicians and farmers

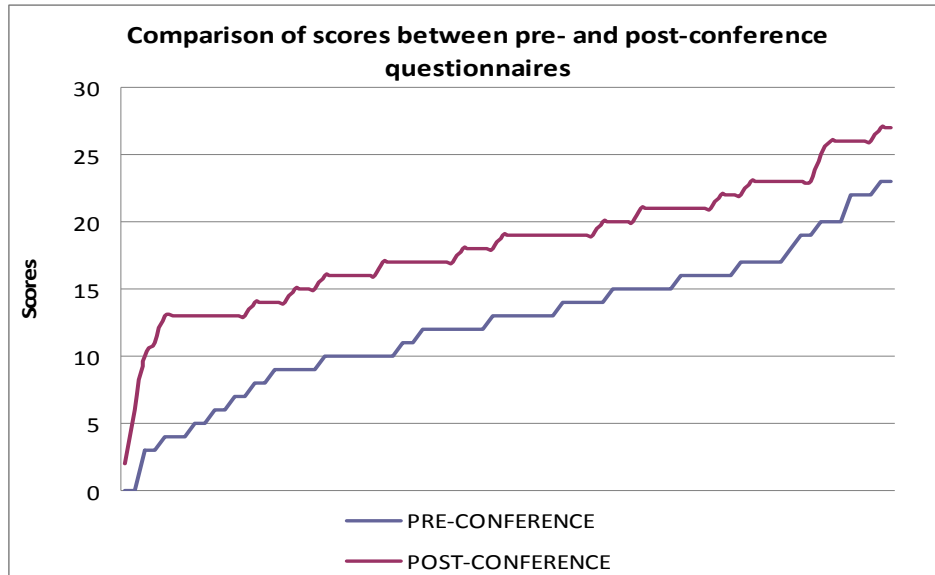


Participants of the biotech farm tour

Pre- and Post- Conference Questionnaire. Participants were asked to answer a pre- and post- conference questionnaire to determine knowledge gain from the conference. The questionnaire asked nine questions on general items about biotech crop adoption particularly in the three countries: crop being cultivated; benefits accrued from planting biotech crops; people who influenced farmers to plant; sources of information; and future

biotech crops. Highest possible score was 28. A sample of 78 participants answered both questionnaires. Figure 1 shows a comparison of the pre- and post-conference questionnaire scores. The average score in the pre-conference questionnaire was 12.51. This increased to an average of 18.27 after listening to the speakers. This represents a 46% gain in knowledge.

Figure 1. Comparison of pre- and post-conference questionnaires' scores



Conference Evaluation. A total of 71 participants evaluated the conference by giving their personal impression (strongly agree/agree/neutral/disagree/strongly disagree) regarding the presentations, information conveyed, program, speakers, venue and logistics, and overall impact. The participants “strongly agreed” on the conference’s relevance, knowledge level of speakers, knowledge gain, overall conference impact, and proper organization of the venue and logistics. Table 1 is a summary of the conference evaluation.

Comments and suggestions were also solicited from the participants. They said the conference was informative and provided a venue for discussion of topics on farmer adoption. The policy recommendations were very helpful and a request was made to circulate them among the participants. The organizers were praised for doing a good job in organizing the event. Participants voiced the need to have similar activities in the future. It was suggested that future conferences should involve more farmers to enable them to share their experiences in planting biotech crops.

Table 1. Conference Evaluation Results

(N=71)	Mean	Mode	Interpretation
1. The presentations and discussions dealt with relevant and important issues.	1.43	1.00	strongly agree
2. The information and ideas conveyed were clear and concise.	1.69	2.00	agree
3. I will be able to apply what I learned from the conference.	1.68	2.00	agree
4. The program or flow of activities was logical and easy to follow.	1.61	2.00	agree
5. The venue and logistics were properly organized for the occasion.	1.49	1.00	strongly agree
6. The speakers demonstrated knowledge on the subject matter.	1.39	1.00	strongly agree
7. The speakers presented with clear voice and understandable words.	1.83	2.00	agree
8. Screen texts and graphics were clear and effectively aided the oral presentation.	1.51	1.00	strongly agree
9. My participation to this conference has increased my knowledge on biotech crop adoption.	1.35	1.00	strongly agree
10. Overall the conference was worth my time and effort.	1.33	1.00	strongly agree

Media Impressions of the Conference. A total of 108 articles about the conference were written in daily newspapers and posted in different websites worldwide as of November 25, 2013 (see Tables 2 and 3). The news articles were written in five languages namely Chinese, English, Persian, Spanish, and Filipino and were released in 15 countries - China, India, Philippines, Australia, Canada, Czech Republic, Egypt, Germany, Iran, South Korea, Spain, United States, United Kingdom, and Vietnam (for sample articles about the conference, see Figure 2). Based on the circulation of the newspapers and daily unique visitors of the online news portals which picked up news about the conference, the event has a total of 26, 197, 617 media impressions (the estimated number of people who may have encountered the news).

Table 2. Summary of the Conference’s Media Impressions.

Number of Articles	108
Number of Countries Reached	15
Number of Languages	5
Impressions	26,197,617

Table 3. Summary of the Conference's Media Impressions (by country)

Country	Number of Articles	Media Impressions
India	16	23,741,020
Philippines	32	1,556,039
United Kingdom	7	350,338
United States of America	22	325,026
Vietnam	5	90,002
Malaysia	3	95,000
China	10	39,669
Spain	2	512
Egypt, Arab Rep.	4	4
Iran, Islamic Rep.	2	2
Australia	1	1
Canada	1	1
Czech Republic	1	1
Germany	1	1
Korea, Rep.	1	1
Total	108	26,197,617

Figures were sourced from news outlets; published media kits and rate cards; PR agencies; or from published reports of media impact measurement bodies. A default of 1 was given to each news article with no available media impressions figure.

Figure 2. Sample clippings of news articles about the conference

Farmers flocking to GM crops
Study in India, China, Philippines Underlines Widespread Adoption Of Bt Cotton, Corn

He's the pioneer of Bt cotton in India

BIO-TAKE AWAY

- Bt cotton cultivation fastest adopted crop technology in world in 17 years
- 100-fold increase in area under GM cultivation from 1.7 million ha in 1996 to 200.3 million ha in 2012
- Double digit growth in past 12 years, growth rate of 6% from 2011 to 2012
- 17.3 million farmers in 28 countries cultivated 179.3 million hectares (439 million acres) biotech crops in 2012
- 98% of global biotech area is in developing countries, 48% in industrial countries
- Steady rise in accumulated global area of biotech crop from 200 million ha from 2005 to 2012
- Of 28 countries growing biotech crops, 8 are developed or industrial and 20 developing countries
- Growth rate of developing countries much higher than developed (11% or 6.7 Mha versus 7% or 1.6 Mha of developed countries)
- 50% reduction in cost of production from 2006-2011 and 27% in 2012, in the form of saving cost, lower pesticides and less labour
- In 2012, 1.3 million farmers each in China and India took biotech crop on 15 million hectares
- Philippines has 1.7 lakh small farmers growing 1.6 lakh hectares of biotech GM crop
- 85% of small scale farmers planting biotech crops belong to China, India and Philippines

GROWING GOLD

7347 Bt II and Btosa 9800 rice Bt II varieties of Malawi, and produced 709 quintals from 14 acres, earning Bt II a total of 20.1 quintals per acre. In Malawi, he shared his experience with scientists and experts from 19 countries. Beginning with 2 acres in 2001, he today grows cotton on 14 acres.

After initial support by seed company, dealers and irrigation companies, and varieties and government departments too are now providing information.

"India 2,000 acres is under Bt cotton in my village and nearby areas," he said.

"After trials over three seasons, when Dr MS Swaminathan called us in 2001 whether the technology was worth it, we had said yes. Today Bt cotton has increased my family's land holding from 14 acres to 88 acres," he says.

Times of India

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Farmer-leader backs wider propagation of biotech corn

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Written by Marvyn N. Benaning / Correspondent



THE Philippines continues to be a leading player in the full commercialization of biotech food crops, beating such giants as China and India, both of which are promoting the cultivation of *Bacillus thuringiensis* (Bt) corn.

At the International Conference on Adoption of Biotech Crops in the Developing World: Case Studies of Farmers from China, India and the Philippines, held at the Hyatt Hotel in Manila on Tuesday, farmer-leader Delson Sonza of Sara town, Iloilo province, said more and more Ilonggo farmers are planting Bt corn because of its enormous economic benefits and less environmentally destructive "no-tillage system," which was introduced in 1998.

The two-day conference was organized by the John Templeton Foundation, the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (Searca), the National Academy for Science and Technology, the Agricultural Biotechnology Support Project II and the International Service for the Acquisition of Agri-biotech Applications.

Searca Director Dr. Gil C. Saguiguit Jr. told participants from China, India, North and South America, Africa and Europe that the conference was crucial in learning how the world has taken biotech crops seriously and why certain countries are advancing and defending their food sovereignty and security, while others lag behind.

"As a regional center for agriculture, Searca looks at biotechnology as an important tool to increase food production in light of the [current] concerns of the region on food security and a growing population," Saguiguit said.

Business Mirror Online (Philippines)

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促进发展中国家种植转基因作物国际会议召开

http://www.stdaily.com 2013年04月17日 来源: 中国科技网 作者: 马爱平

中国科技网讯 2013年4月1日-3日, 促进发展中国家种植转基因作物国际会议在菲律宾举行, 会议介绍了“中国、印度和菲律宾小型、资源匮乏的农户采用和接受转基因/生物技术作物的途径”的研究结果, 以及应用生物技术, 尤其在发展中国家中的应用情况。

据悉, 该会议由约翰·邓普顿基金会、国际农业生物技术应用服务组织 (ISAAA), 东南亚农业高等教育与研究区域中心 (SEARCA)、国家科学技术科学院 (NAST菲律宾) 和农业生物技术支持项目 II (ABSPII) 联合主办。

4月2日, ISAAA东南亚中心主任Randy Hautea首先概括了会议的主要议程和全球农民种植转基因作物的概况。来自中国的王晓兵和项诚、菲律宾的Cleofe Torres和印度的Charudata Mayee和AshokDhawan, 分别就介绍了所在国家种植转基因作物的农民对待转基因作物的态度, 并分享了在菲律宾种植Bt玉米、在中国和印度种植Bt棉花的经验。秘鲁生物技术协会的董事会成员Javier Veróstequi, 肯尼亚ISAAA非洲中心主任Margaret Karembu就其他发展中地区发展转基因作物、借鉴亚洲经验提出意见。公开讨论会征求了各国科学家关于加强生物技术在发展中国应用的政策建议。4月3日, 与会者参观了马拉维塞普西翁的一个生物技术玉米农田, 与农民进行互动。

参与研究的人员介绍了在中国、印度、菲律宾三个国家的小农户或者资源匮乏农户采用和种植转基因作物的情况, 包括转基因技术的采用者是谁, 影响农民采用生物技术的主要因素有哪些, 种植生物技术作物给农民生活带来哪些重要变化, 农民通过什么样的途径了解、接受并开

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Appendix 2. Speakers' Profile

Virginia Cardenas

Dr. Virginia Cardenas is the Deputy Director for Administration of the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). She holds a Doctorate degree in Extension Education from the University of the Philippines Los Baños, where she also earned her Master's and Bachelor's degrees in Applied Nutrition and Home Technology, respectively. Her fields of specialization include local governance and rural development, health and applied nutrition, education, institution building and capacity development, gender and development, agricultural knowledge management, and information systems assessment.

Rommel Daya

Mr. Rommel Daya is an assistant professor at the College of Development Communication (CDC), University of the Philippines Los Baños. He finished his BS and MS degree in Development Communication from the University of the Philippines Los Baños. He is concurrently the chair of CDC's Department of Educational Communication. His major fields of specialization include educational communication, community development, basic and adult literacy, and participatory communication.

Ashok Dhawan

Dr. Ashok Dhawan is a professor from the College of Agriculture in Punjab Agricultural University (PAU) in India. He is concurrently the general secretary of Indian Ecological Society and Society for Sustainable Production and the Managing Editor of *Indian Journal of Ecology*. He has won several awards including the Indian Council of Agricultural Research Team Award in Insecticide Resistance Management in cotton, the National Award for Dissemination of Integrated Pest Management Technology through Street Play in 2004, and PAU's Role of Honour and Best Extension Worker Award in 2008 and 2010.

Randy Hautea

Dr. Randy A. Hautea is the Global Coordinator of the International Service for the Acquisition of Agri-biotech Applications (ISAAA) and the Director of its Southeast Asia Center. Prior to joining ISAAA, he served as Director of the Institute of Plant Breeding, University of the Philippines Los Baños. He completed his Ph.D. in Plant Breeding from Cornell University, and his M.Sc. and B.S. degrees in Agronomy and Plant Breeding from the University of the Philippines Los Baños. He was also a Visiting Scientist in Agronomy and Plant Genetics at the University of Minnesota.

Vijay Atmaram Ingle

Mr. Vijay Ingle is a Bt cotton farmer from Chitalwadi Village, Telhara, District of Akola in Maharashtra, India. He has been farming for 40 years. The crops that he plants include cotton, pigeon pea, fruits, and vegetables. As one of the pioneer adoptors of Bt cotton in India, he received several awards and recognitions such as Mahyco's Highest Yield Award in 2003, East India Cotton Association Award for best yield in 2005, and 'Lokmat'

newspaper's (popular newspaper in Marathi language) Certificate of Merit for Best Exhibition in 2012.

Margaret Karembu

Dr. Margaret Karembu is the Director of the International Service for the Acquisition of Agri-biotech Applications' (ISAAA) *AfriCenter* based in Nairobi, Kenya. She holds a PhD in Environmental Science Education from Kenyatta University and has over 10 years of experience in university teaching. She also oversees ISAAA's Africa-based Biotechnology Information Centers in East and Central Africa (Kenya), Francophone Africa (Mali/Burkina Faso), and Egypt.

Charudatta Mayee

Dr. Charudatta Mayee is the President of Indian Society of Cotton Improvement based in Nagpur, Maharashtra, India. He is an outstanding agricultural scientist honored by several organizations with distinguished national awards. He is a fellow of Maharashtra Academy of Sciences and distinguished fellow of the Alexander von Humboldt Foundation in Germany. He obtained his B. Sc. and M. Sc. in agriculture from Nagpur University; and his PhD from Indian Agricultural Research Institute in New Delhi. His basic research contributions have been on epidemiology and management of crop diseases, molecular approaches to pest and disease management and crop biotechnology.

Evelyn Mae Mendoza

Dr. Evelyn Mae Mendoza is the Secretary of the Philippine National Academy of Science and Technology (NAST). She is a research professor of biochemistry at the Institute of Plant Breeding, University of the Philippines Los Baños. She obtained her BS degree in Chemistry from Mapua Institute of Technology in the Philippines and her MS and PhD in Biochemistry from the University of Massachusetts in the USA.

Segfredo Serrano

Dr. Segfredo Serrano is the Undersecretary for Policy, Planning, and Research of the Philippine Department of Agriculture. He obtained his Bachelor's degree in Agriculture, Master's and PhD in Agricultural Economics from the University of the Philippines Los Baños. He also taught economics and agricultural economics in Pampanga Agricultural College and was a chief science research specialist at the Philippine Rice Research Institute for six years.

Frank Shotkoski

Dr. Frank Shotkoski is currently the Director of the Agriculture Biotechnology Support Project II (ABSPII), a USAID/Cornell University cooperative effort with a mandate to introduce agriculture biotechnology to developing countries. He has a postdoctoral experience from the Department of Entomology at the University of Wisconsin. His Ph.D. is from the University of Minnesota and his Master of Science and undergraduate work

was done at the University of Nebraska. He has 20 years of academic and industrial experience in both agriculture and medical biotechnology.

Delson Sonza

Mr. Delson Sonza is a farmer-businessman from Iloilo, Philippines. He is one of the earliest adoptors of biotech corn in his province. He finished BS Agriculture from West Visayas State University. He is among the awardees of Best Ilonggo Entrepreneurs, an award given to outstanding businessmen in his province.

Cleofe S. Torres

Dr. Cleofe Torres is a professor from the College of Development Communication, University of the Philippines Los Baños. She earned her BS and MS degree in Development Communication from the University of the Philippines Los Baños and her PhD in Extension Education from the same university. Her major fields in development communication include science communication, development journalism, social marketing, social mobilization, environmental communication, and biotech communication.

Javier B. Verastegui

Dr. Javier Verástegui is the Director of Science and Technology at the National Council of Science, Technology and Innovation (CONCYTEC), in Lima, Perú. He holds BS in Industrial Engineering degree at the University of Engineering, and BS degree in Chemical Engineering at the University of San Marcos, both in Lima, Peru. From 1969 to 1973 he pursued graduate studies at the University of Paris VI (Pierre et Marie Curie) in Paris, France, where he obtained the degrees of D.E.A. (M.Sc.) and Ph.D. in Analytical Chemistry. He has over 20 years of experience in the assessment and management of international S&T cooperation projects.

Xiaobing Wang

Dr. Xiaobing Wang is an associate professor at the Chinese Academy of Sciences' (CAS) Center for Chinese Agricultural Policy (CCAP). She obtained her PhD from Martin-Luther University in Germany in 2007. She was a research associate in Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO), Germany from 2007 to 2009. Her research focuses on the development of labor market, poverty, and productivity analysis in China and other transition countries.

Cheng Xiang

Dr. Cheng Xiang is post-doctoral researcher at Chinese Academy of Sciences' (CAS) Center for Chinese Agricultural Policy (CCAP). She received her PhD in Agricultural Economics from CCAP in 2012. Her research interests are on low-carbon agriculture and rural finance.

Appendix 3. Conference Program

Tuesday, 2 April 2013

8:00 AM Registration

Master of Ceremony: Ms. Luningning Domingo, Executive Director, NAST

Opening Program

9:00 - 9:15	Welcome Remarks	Dr. Gil C. Saguiguit, Jr. <i>Director, SEARCA</i>
9:15 - 9:30	Message	Dr. Segfredo R. Serrano <i>Undersecretary for Policy and Planning, Department of Agriculture, Philippines</i>
9:30 - 9:55	Conference Overview and Status of Farmer Adoption of Biotech/GM Crops	Dr. Randy A. Hautea <i>Global Coordinator and SEAsiaCenter Director, ISAAA</i>
9:55 - 10:20	Overview of Public Sector Biotech Product Development	Dr. Frank Shotkoski <i>Director, ABSPII</i>
10:20 - 10:35	Snacks	
10:35 - 10:40	Flash Presentation	

Moderator: Dr. Maria Celeste H. Cadiz, Program Head, KMD, SEARCA

10:40 - 11:25	Bt Cotton Adoption: The China Experience	Dr. Xiaobing Wang <i>Associate Professor, Center for Chinese Agricultural Policy (CCAP), Chinese Academy of Sciences (CAS)</i>
		Dr. Cheng Xiang <i>Post-Doctoral Researcher, CCAP, CAS</i>
11:25 - 11:35	Open Forum	
11:35 - 12:25	Bt Cotton Adoption: The India Experience	Dr. Charudatta Mayee <i>President, Indian Society of Cotton Improvement (ISCI)</i>
		Dr. Ashok Dhawan <i>Professor, Punjab Agricultural University</i>

International Conference on the Adoption of Biotech Crops in the Developing World

Vijay Atmaram Ingle
Farmer, Maharashtra

12:25 - 12:35 Open Forum

12:35 Lunch

Moderator: Dr. Mariechel J. Navarro, Director, KC, ISAAA

(2-minuter video loop)

1:30 - 2:10	Biotech Corn Adoption: The Philippine Experience	Dr. Cleofe Torres <i>Professor, Department of Development Communication, UP Los Baños</i>
	Mr. Delson Sonza	<i>Farmer, Iloilo, Philippines</i>
2:10 - 2:25	Open Forum	
2:25 - 2:45	Discussants' Forum	Dr. Margaret Karembu <i>Director, ISAAA AfriCenter, Kenya</i>
		Dr. Javier Verastegui <i>PeruBiotec, Lima, Peru</i>
2:45 - 3:30	Discussion: Policy Recommendations on Farmer Adoption	Dr. Rhodora R. Aldemita <i>Senior Program Manager, ISAAA</i>
3:30 - 3:45	Closing Message	Dr. William G. Padolina <i>President, National Academy of Science and Technology, Philippines</i>
3:45 - 4:00	Snacks	
4:00 - 4:30	Evaluation/Post-Conference Questionnaire	

Wednesday, 3 April 2013

7:00 Departure for Concepcion, Tarlac
(Biotech corn field visit)

10:00 – 12:00 Biotech corn farm tour