Stakeholders' Interface on Genetically Modified Crops

PROCEEDINGS AND RECOMMENDATIONS

Traders Hotel, Manila Philippines
September 27, 2012

Organized by

Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)
Asia-Pacific Association of Agricultural Research Institutions (APAARI)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)

Supported by

International Service for the Acquisition of Agri-Biotech Applications (ISAAA)
Department of Agriculture – Bureau of Agricultural Research (DA-BAR)

Stakeholders' Interface on Genetically Modified Crops

Traders Hotel, Manila Philippines
September 27, 2012

PROCEEDINGS AND RECOMMENDATIONS

Edited by

J. L. Karihaloo, Asia-Pacific Consortium on Agricultural Biotechnology, New Delhi

Organized by

Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)
Asia-Pacific Association of Agricultural Research Institutions (APAARI)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)

Supported by

International Service for the Acquisition of Agri-Biotech Applications (ISAAA)
Department of Agriculture – Bureau of Agricultural Research (DA-BAR)

Published by

Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)
Asia-Pacific Association of Agricultural Research Institutions (APAARI)
NASC Complex, Dev Prakash Shastri Marg, Pusa, New Delhi 110012, India

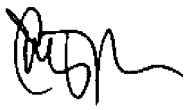
Contents

Foreword

GM crops have been in farmers' fields since 1996 and now cover nearly 170 million hectares in 29 countries. Half of this acreage exists in developing countries including Brazil, Argentina, India, China, and the Philippines, where farmers have benefitted through increased yields, less use of pesticides, better weed management, and ultimately, higher incomes and improved livelihoods. In Asia, India has experienced enthusiastic adoption of Bt cotton by both large- and small-scale farmers, the area in 2011 having reached 9.4 million hectares of the total 11 million hectares under cotton. In the Philippines, after the release of Bt corn in 2002, the area under GM corn has risen to 685 thousand hectares, with nearly 94% of this area being sown to stacked Bt and herbicide-tolerant corn. The high adoption of herbicide tolerance trait is ascribed to rapidly rising costs of manual weeding, which goes to suggest that such crops would have a similar level of positive acceptance in other developing countries.

Despite these gains, voices of opposition to GM crops have been raised from time to time on grounds of perceived environmental and health hazards, cost of technology, and actual benefits brought to the farmers. In fact, these concerns have been expressed since the development of the first GM crop, and many of those have been addressed through extensive experimental studies and nearly 20 years of safe use, a fact also verified by national regulatory agencies. Still, there have been such concerted opposition efforts that in India GM eggplant is under moratorium despite being cleared by regulatory and review committees.

Undoubtedly, GM products must be tested with the highest level of internationally prescribed standards. However, there is also a need to build confidence among technology users including farmers, consumers and the general public through discussion and debate. It is in this context that APAARI and PCAARRD have been organizing regular stakeholders' meetings on different aspects of agricultural biotechnology and biosafety. This "Stakeholders' Interface on Genetically Modified Crops", held on 27 September 2012 in the Philippines, was a continuation of the meeting on the same topic held in India in 2011. We hope that the recommendations of this meeting will help policy-makers, scientists, and farmers to take appropriate decisions regarding large-scale adoption of GM technology for the larger benefit of human kind.



Dr. Patricio S. Faylon
Executive Director
PCAARRD

Dr. Raj Paroda
Executive Secretary
APAARI

Acronyms and Abbreviations

ABSP	Agricultural Biotechnology Support Project
AO	Administrative Order
APAARI	Asia-Pacific Association of Agricultural Research Institutions
APCoAB	Asia-Pacific Consortium on Agricultural Biotechnology
BAFPS	Bureau of Agriculture and Fisheries Product Standards
BAI	Bureau of Animal Industry
BCP	Biotechnology Coalition of the Philippines
BPI	Bureau of Plant Industry
BPIU	Biotech Program Implementation Unit
CBC	Crop Biotechnology Center
CRD	Crops Research Division
CSO	Civil Society Organization
DA-BAR	Department of Agriculture – Bureau of Agricultural Research
DENR	Department of Environment and Natural Resources
DOH	Department of Health
DOST	Department of Science and Technology
FPA	Fertilizer and Pesticide Authority
GKCCB	Global Knowledge Center on Crop Biotechnology
GM	Genetically modified
GMO	Genetically modified organism
IPB	Institute of Plant Breeding
ISAAA	International Service for the Acquisition of Agri-Biotech Applications
MAHYCO	Maharashtra Hybrid Seed Company
NBF	National Biosafety Framework
NCBP	National Committee on Biosafety of the Philippines
PBG	Philippine Biosafety Guidelines
PCAARRD	Philippines Council for Agriculture, Aquatic and Natural Resources Research and Development

PCIEERD	Philippine Council for Industry, Energy and Emerging Technology Research and Development
PCMD	Policy Coordination and Monitoring Division
PHES	Potentially Harmful Exotic Species
PhilRice	Philippine Rice Research Institute
R&D	Research and Development
UNDP	United Nations Development Program
UPLB	University of the Philippines Los Baños

Stakeholders' Interface on Genetically Modified Crops

Traders Hotel, Manila, Philippines
September 27, 2012

Introduction

The last few years have seen a slowdown or even stagnation in crop productivity in several Asia-Pacific countries, leading to food shortages and spiraling food prices. The increasing diversion of food grains into livestock feed and the relentless population growth in some countries aggravate the already difficult food situation. Under prevailing conditions, most of the developing countries in the Region may not be able to meet the Millennium Development Goals (MDGs) of halving poverty and hunger by 2015. Accordingly, there is an obvious call for the second "green revolution", the technological component of which would be driven by new biology, especially biotechnology.

Genetic engineering, also called genetic modification technology, is globally recognized as a powerful means of improving productivity, profitability, and sustainability of farm production systems, including those of small farm holdings. Several studies made on the performance and impacts of genetically modified (GM) crops have shown that farmers, irrespective of their farm size, have benefitted through increased yield and reduced pesticide use.

Several developing countries in the Asia-Pacific support significant programs on GM-based improvement in a wide range of crops. Some countries have made policy statements asserting biotechnology as being integral to priority planning for agricultural and national development. However, only a few have been able to follow a policy of steady support to genetic modification technology. Perceived and often unsubstantiated adverse environmental and health impacts of genetic modification technology have influenced public opinion and decision-making, thus delaying the adoption of promising technologies that could address food security and sustainability issues.

In view of these, a "Stakeholders' Interface on Genetically Modified Crops" was organized by the Asia-Pacific Association of Agricultural Institutions (APAARI), through the Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), and the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) to discuss all relevant issues related to the potential of GM crops in meeting food and nutritional needs vis-a-vis their economic, health, and environmental impacts.

Inaugural Session

Dr. Patricio S. Faylon, Executive Director, PCAARRD, welcomed the participants comprising biotechnologists from the Philippines and other countries, government policy-makers, and representatives from advocacy groups, the private sector, and farmers' associations.

He thanked Hon. Mario G. Montejo, Secretary, Department of Science and Technology (DOST), Philippines and Under Secretary Fortunato T. De La Peña, of DOST Scientific and Technological Services, for their support in promoting agricultural biotechnology R&D in the country. Dr. Faylon apprised the participants about the focus of PCAARRD in applying biotechnology for crop, livestock, and aquatic resources improvement, conservation of natural resources, and combating impact of climate change. To achieve the desired results, appropriate biotechnology agenda and road map have been developed which are being implemented through national and international collaborations involving both public and private sector agencies. The Philippines is encouraging regional and international partnerships for capacity building and knowledge generation. Dr. Faylon advised the participating farmers and other technology adopters to seek answers from the experts so that they are convinced about the technology and its potential to enhance food security in the Philippines, as well as in other countries of Asia-Pacific.

USec. Fortunato T. De La Peña, speaking on behalf of Sec. Montejo, conveyed warm welcome to all the international and national participants. He appreciated PCAARRD and APAARI for having brought together all the relevant stakeholders on the important topic of GM crops for the benefit of farmers and consumers. He mentioned that the response to GM crops in the Philippines has ranged from outrage to confusion and now, to acceptance. GM technology is actually an extension of modifications in the genome that has been happening in nature as well as at breeders' hands. He recalled that during the open forum discussion on UNDP Human Development Report 2000, it was pointed out that while numerous deaths have taken place due to starvation, nobody had died of eating GM food. DOST has a five-point program on biotechnology which includes support to agricultural biotechnology to meet the challenges of food security and sustainability. USec. De La Peña opined that introduction of GM products could be compared to that of drugs and vaccines, which though have associated risks, are released through proper screening and testing. Similar regulatory control is applied to GM products as well, which obviously must be efficient and transparent. There are also issues of declaration and labeling to be addressed. For DOST, GM technology has significant potential to increase agricultural production as has been demonstrated in maize and papaya. While supporting biotechnology research and development, the Philippines has also put in place an efficient biosafety system for confined field trials. There is a need to further deliberate on policy issues related to biotechnology and biosafety, and meetings like the present one provide opportunity for all stakeholders to interact and share information and opinion. USec. De La Peña expressed commitment of DOST to work with national and international organizations on biotechnology and biosafety to meet the global challenges of food security.

Dr. J. L. Karihaloo, Coordinator, APCoAB, while welcoming the participants on behalf of APAARI, appreciated the support of PCAARRD and DOST in organizing this event. He also read out the message of Dr. Raj Paroda, Executive Secretary, APAARI on this occasion.

Dr. Paroda recalled that GM crops have been in farmers' fields since 1996 and now occupy nearly 160 million hectares throughout the world. Farmers in US, Brazil, Argentina, China, India, Philippines, and 23 other countries have harnessed the benefits of GM technology by way of increased yields, less use of pesticides, and better weed management. However, there have been growing voices of concern, particularly about the possible environmental and health impacts of GM crops. Unfortunately, these concerns are being raised despite the

overwhelming scientific evidence about the safety of GM technology and the benefits it has brought. Hence, there is a need for further discussion and outreach efforts so as to convince the society on the basis of factual information and to address genuine concerns. Dr. Paroda hoped that this meeting would take stock of the impact of GM technology in agriculture and come out with recommendations that would help scientists, policy-makers, and farmers to take appropriate decisions regarding large-scale adoption of GM technology for the larger benefit of society.

Session 1: Status of GM Crops Adoption

Chair: Dr. Jocelyn E. Eusebio, Director, Crops Research Division (CRD), PCAARRD, Philippines.

Global status of adoption of biotech/GM crops – Dr. Randy A. Hautea, ISAAA, Southeast Asia Center, Philippines.

The rapidly increasing global population necessitates production of enough food to meet the expected needs of 9 billion people by 2050 on less land area, water, and nutrients. It is estimated that there would be a need for 70% increase over the current level of production in the face of declining trends during recent years. Biotech crops have been making prominent contribution to crop production since their introduction in 1996. In 2011, 29 countries had adopted biotech crops on 160 million hectares. For the first time, developing countries planted half of the global area involving approximately 15 million small farmers. Thirty-one countries, while not growing biotech crops, imported these. Bt and HT corn, HT soybean, and Bt and HT cotton are, by far, the most dominant crops, followed by biotech sugar beet, canola, alfalfa, squash, and papaya. From 1996 to 2010, farm income gains have totalled US$ 78 billion, 40% of which has been due to reduction in pesticide application. In terms of environmental impact, GM technology has resulted in reduction of 443 million kg of pesticide use. The biotech crops that are in the pipeline include stacked IR/HT soybean in Brazil, drought tolerant maize in US, rice in Philippines, omega-3 soybean in US, and drought tolerant sugarcane in Indonesia. Dr. Hautea commented that while Agenda 21 of UN Conference on Environment and Development emphasizes application of biotechnology for increasing availability of food, feed and renewables, current international debate is almost entirely focused on regulating biotechnology.

Status of GM crops in India – Dr. J. L. Karihaloo, APCoAB, APAARI, New Delhi. India.

India, along with several South Asian countries, faces the severe challenge of combating hunger and malnourishment. With growing demands, the country is likely to face shortfall in food supply in the next decade. Biotechnology R&D in public and private sectors gained momentum in India since the 1980's due to strong policy support. Bt cotton has been a phenomenal success with 9.4 million hectares under its cultivation in 2010-11, out of the total cotton area of 11 million hectares. After the introduction of the first Bollgard hybrid in 2002, 1,128 Bt hybrids were approved in May 2012 for commercial cultivation. As a result, overall cotton yields have increased by 40%, pesticide sprays reduced from 4.2 kg/ac to 2.6 kg/ac, farmers' profits have increased up to 120%, and the country's cotton export has increased from US$ 16.5 million in 2002-03 to US$ 2.6 billion in 2009-10. Bt eggplant (brinjal), after clearing the regulatory process, could become another success since shoot and fruit borer is

the most serious pest of eggplant in India. *Ex ante* studies suggest that Bt eggplant would provide a yield advantage of 40-60% over non-Bt form; insecticide usage would be reduced by 75%; and gross margins would increase by about Rs. 18,000/ac. The technology has been licensed by Mahyco, the private sector owner, to public sector organizations in India, Bangladesh, and the Philippines for wider adoption and availability to resource-poor farmers. A number of other GM products including, HT and IR cotton and maize, and Golden Rice are under trials. While these developments are appreciable, there have been hindrances by way of protests and court cases by environmental groups. Bt cotton faced a series of court cases from 1998 to 2003, and the process is being repeated with Bt eggplant. The latter has been subjected to technical reviews after the clearance by the regulatory authority but still stands withheld due to moratorium on its release.

Dr. Karihaloo also recounted the efforts made by APAARI in policy advocacy and information generation and communication so that the policy-makers and other stakeholders are adequately equipped to take informed decisions about adoption of GM technology.

Commercialization of GM crops in the Philippines: Industry perspective – Mr. Simeon A. Cuyson, CropLife Philippines.

The Philippines is ahead of a number of other countries in promoting agricultural biotechnology. It has a favourable policy environment, and a functional and science-based regulatory system. The scientists and academicians are enlightened and outspoken, and there is continuing activity on capacity building and consultation on biosafety decision-making process. The country has approved six events for insect resistance and herbicide tolerance in corn. In 2011, a total of 685,618 hectares were under these events, 93.9% of which was devoted to stacked Bt/HT corn. The extremely high adoption of HT corn can be ascribed to high labour costs involved in weeding. Other GM crops under field trial include insect-resistant eggplant, high beta-carotene rice, and delayed ripening papaya. World over, several other food crops are being modified for diverse traits including pest resistance, herbicide tolerance, increased yield, drought tolerance, nitrogen utilization, and nutrition quality improvement. These are expected to be under commercial cultivation in 5-7 years. A number of socio-economic impact studies made on Bt corn have shown significant increase in production and income experienced by technology adopting farmers. However, there are issues of stewardship with respect to long-term insect resistance and weed resistance management; advocacy for co-existence of organic and GM crops; and labeling.

NGO initiatives on GM crops: Stakeholder partnership for biotechnology and agricultural modernization - BCP experience – Dr. Nina G. Gloriani, Biotechnology Coalition of the Philippines.

During the 1990s and early 2000, advances in agricultural biotechnology were not fully exploited in the Philippines due to strong anti-biotech lobbying. Bt corn fields were uprooted and branded as toxic sites, and supermarkets foods were forcibly branded as biotech-containing, unhealthy, and poisonous. The Biotechnology Coalition of the Philippines (BCP) was formed in response to such misinformation and to counter it with correct information from the technology experts and champions. The BCP members are comprised of the science community, academic and research institutions, religious groups, media, civil society organization (CSOs), industry and

farmers' organizations. Partnerships have been created for: (i) capacity building for safe and responsible use of modern biotechnology; (ii) information, education and communication (IEC) activities for meaningful public participation and education; and (iii) evidence-based policy making. BCP has actively engaged with Filipino Muslim community, especially the Ulama, to address the issue of non-certification of biotech-derived food as halal. Seminars were organized on biosafety and ethical considerations of modern biotechnology and visits to biotech fields arranged for the Ulama. As a result, the 5th World Halal Forum concluded that biotech crops and products have undergone intensive food and environment safety tests, and are acceptable in the Islamic world as halal, provided the sources are halal.

Benefits of biotechnology to farmers – Ms. Rosalie M. Ellasus, PHILMAIZE and ASFARNET, Philippines.

PHILMAIZE is the culmination of years of struggle in the corn industry to consolidate all stakeholders and form a nationwide organization which will represent and defend the interest of Philippine corn farmers. The Asian Farmers Regional Network (ASFARNET), on the other hand, promotes active exchange of experiences and knowledge of modern farming among Asian countries.

Among the corn-producing provinces of the Philippines, Isabela stood at top with production of 835,002 metric tons in 2010. In this area, the yields have gone up from about 2 tons/ha in 1994 to more than 4 tons/ha in 2011. With the adoption of Bt yellow corn in 2003, the total area sown to yellow corn has increased from nearly 200,000 hectares to about 500,000 with a similar increase in yield. A detailed survey revealed that farmers made additional income of Php 10,132 (US$ 218) per hectare along with up to 60% reduction in insecticide use. The farmers, before, were faced with the challenge of growing corn in areas where Asiatic corn borer is endemic and destroys up to 80% of the crop, and where labour costs of weeding are very high. The use of Bt and HT corn has not only increased production and income of farmers, but also has provided them more time to engage in other activities since spraying, ploughing, and weeding were reduced. Farmers can afford to buy appliances, service vehicles, and invest in post-harvest equipment. With access to good-quality seeds, they can produce more and healthier food, better animal feed, fuel, and more fibre for the growing population. Biotech crops have been proven safe for human and animal consumption; Farmers can use the produce to feed their animals, and animal wastes' are good for vermicomposting.

Session 2: R&D and Regulatory Status

Chair: Dr. Leah J. Buendia, Director, Policy Coordination and Monitoring Division (PCMD), PCAARRD, Philippines.

The Philippine Regulatory System: From laboratory to confined trials – USec. Fortunato T. De la Peña, Scientific and Technological Services, DOST, Philippines.

In the Philippines, a Joint Committee to formulate guidelines for biotechnology R&D was constituted in 1987. Subsequently, a number of domestic instruments for regulating genetically modified organisms (GMOs) were approved including the Philippine Biosafety Guidelines 1991; 1998 NCBP Guidelines on Planned Release of GMOs; and Potentially Harmful Exotic Species (PHES); Department of Agriculture (DA) Administrative Order (A.O.) No.

8, S. of 2002: Field release and commercialization; use for food, feed and processing; and Executive Order (E.O.) 514: National Biosafety Framework 2006. The apex body, NCBP, is composed of the Department of Environment and Natural Resources (DENR) Biosafety Committee, DA Biosafety Committee, DOST Biosafety Committee, and the Department of Health (DOH) Biosafety Committee. Development and commercial release of GMOs require regulatory approvals at four levels: contained use; confined test; field tests; and propagation/ commercialization. The first two are monitored by the DOST Biosafety Committee, and the other two by DA, DENR, and DOH. Risk assessment of proposals for contained use takes into account transformation protocol; genetic and physiological analyses of donor and recipient organisms; adequacy of containment facility depending upon type of work to be conducted; and biosafety measures and material management. Confined trials are conducted in fields, with measures for isolation and material confinement in order to confine the experimented plant material and genes to the test site. GM crops eligible for confined tests include those i) with size and growth habits that require areas not afforded by standard screenhouse; ii) already commercially available in the country where they were developed, with sufficient information relevant to the Philippines; iii) locally developed GM crops with information generated in the laboratory/screenhouse which is sufficient for risk assessment; and iv) other crops and events that warrant limited release under contained/confined conditions as determined by the DOST Biosafety Committee.

The Philippine Biosafety Regulatory System: From multi-location field trials to commercialization – Dr. Clarito M. Barron, Bureau of Plant Industry (BPI), Philippines.

DA A.O. No. 8 Series 2002 provides regulation of import and release of GM crops into the environment. BPI, the Bureau of Agriculture and Fisheries Product Standards (BAFPS), Bureau of Animal Industry (BAI), and the Fertilizer and Pesticide Authority (FPA) are responsible for safety assessment and compliance with technical support from a pool of non-DA experts, accredited laboratories, and outside experts. Public consultations are held by inviting comments on the proposed use of specific GM applications through publication in newspapers and posting on barangay and municipal/city halls for specific periods. All GM crops intended for planting must undergo tests under contained conditions, and field trials. The steps involved in the introduction of GM plants from multi-location field trials leading to commercialization comprise of obtaining satisfactory results from confined trials; multi-location testing; food, feed, and environmental assessment; and propagation/general release/commercialization. Post-approval monitoring involves evaluation every five years for which period the approval is valid. The GM crops currently under multi-location field trials are Bt eggplant, Golden Rice, Bt cotton, delayed ripening papaya, and corn with stacked genes.

Biotechnology R&D Roadmap 2012-2018 – Dr. Cristina L. Guevara (represented by Engr. Nelson P. Beniabon), Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD), Philippines.

Fourteen agencies are involved in the Biotechnology R&D Roadmap. The research program was developed during a series of meetings from 2009 onwards. The priority areas identified were: agriculture (crops, livestock & poultry, aquatic, and marine bioresources, and microbials); energy (biofuels); industry and manufacturing (food ingredients, enzymes, microbial starter culture, natural products, specialty chemicals and products); environment and natural

resources (biodiversity conservation, bioremediation); and health (vaccines, drugs, diagnostics, bioinformatics). Improvement of endemic crops is undertaken for pest resistance, adaptation to adverse conditions, post-harvest quality, and other traits. Molecular markers for disease resistance in rice, corn, and banana; quantitative trait loci (QTL) for drought resistance in eggplant; GM mango for delayed ripening; and GM sweet potato for virus resistance are some of the priorities in biotechnology. Tissue culture for pharma products and neutraceuticals are projected among the future activities. Currently, characterization and development of molecular markers for hybrid testing and sex determination in papaya, bunchy top virus resistance in abaca, tungro virus resistance in rice, and development of improved biofertilizers, biopesticides and probiotics are under progress.

DA Biotechnology Roadmap: Positioning Philippine agriculture in the biotechnology century – Dr. Candida B. Adalla, DA Biotech Program Implementation Unit.

Although the Philippines established biotech research and regulatory framework quite early, it experienced slow progress in agricultural biotech R&D. The DA Biotechnology Roadmap was formulated in 2006 to position strategically Philippine agriculture in bio-enterprise. The roadmap thrust is to increase capacities to judiciously utilize modern biotechnology as a technology option for farmers, and to explore the rich Philippine biodiversity for natural ingredients to create bio-based industries and target the market for natural ingredients. The roadmap aims to ensure food and fiber security by improving competitiveness of Philippine agri-fisheries products through application of bioprocessing and modern biotechnology to improve productivity, product recovery, and quality. An enabling support system is being created through establishment of a science policy that provides a nurturing environment for a productive, competitive, and creative science community. Another is the setting up of the regulatory system for GM livestock, poultry and aquaculture species, and advocacy for government declaration on modern biotechnology, its application, and products as priority investment sectors with corresponding incentives. The DA biotech program currently undertakes projects in partnership with DA R&D agencies and other research institutions. The projects include DNA barcoding/fingerprinting for resource identification, conservation and protection; mass production of planting material using tissue culture technology; development of crops resilient to stresses and with improved nutritional quality through marker-assisted selection (MAS), and development of molecular markers for disease detection and purity testing.

ABSP II Project on Bt eggplant for South and Southeast Asia – Dr. Desiree M. Hautea, ABSP II - Southeast Asia, University of the Philippines Los Baños, Philippines.

Dr. Hautea introduced the Agricultural Biotechnology Support Project II (ABSP II) and gave details of the development of shoot and fruit borer-resistant eggplant in the Philippines under this project. ABSP is a consortium led by Cornell University to help scientists, policy-makers, farmers, and consumers in partnering developing countries to make informed choices about using agricultural biotech products. Through this project operating in Asia and Africa, benefits of the technology are attempted to be brought to small-scale and resource-poor farmers and consumers.

Resistance to fruit and shoot borer in eggplant, one such project in Asia (India, Bangladesh, and the Philippines), is at advanced stages of development. The Maharashtra Hybrid Seed

Company (Mahyco) has developed eggplant with introduced Bt gene which shows very good resistance to borer infestation. The latter is a serious problem in eggplant requiring the farmers in India to spray insecticides up to 35 times on their crop. ABSP-II is supporting Mahyco in gaining regulatory approval and transfer of technology to public institutions in India, Bangladesh, and the Philippines. In the Philippines, five open pollinated varieties with Bt gene are under consideration for regulatory approval. Bt varieties are estimated to give additional returns of P50,000 per hectare over non-Bt varieties. Farmers are expected to save 20% cost on pesticide use.

Golden Rice: A potential tool to address vitamin A deficiency – Dr. Antonio A. Alfonso, DA – Crop Biotechnology Center, PhilRice, Philippines.

Vitamin A deficiency occurs widely in developing countries particularly among young children and lactating women. In Southeast Asia, more than 90 million children are deficient in Vitamin A. While diet diversification, supplementation and fortification have been attempted in the past, 10-20% of the Philippine population is still Vitamin A-deficient. Genetic incorporation of the nutrient in rice, the most widely grown cereal, is the most appropriate choice since it involves no extra cost to the farmer or consumer; the plant grows like any other rice variety with no need for additional inputs and can be re-grown, hence saving the farmer expenditure on fresh seed.

The first Golden Rice having beta-carotene in grain was developed by Dr. Ingo Potrykus and Dr. Peter Beyer in 2000. Together with Syngenta, a new version of Golden Rice was developed with even higher level of beta-carotene. Syngenta donated these materials to Golden Rice Network having membership of several rice-growing countries including the Philippines. In this country, PhilRice is conducting confined and multi-location field trials in accordance with the regulatory procedures. The first season data is being compiled and the full regulatory dossier is targeted to be submitted to the regulatory authorities by mid-2013.

Communication initiatives and challenges in crop biotechnology: The Asian perspective – Dr. Mariechel J. Navarro, ISAAA– Southeast Asia Center, Philippines.

There are several communication challenges to biotechnology including continued intervention of opposition groups; negative media coverage; conflicting and mixed messages; divergent information sources and issues (social consequences and morality concerns, institutional trust and credibility); and inadequacy of science communication practitioners. A survey in Asia indicates that there is low to moderate understanding and exposure to biotechnology but high interest in information. Mass media are the main sources of information regarding biotechnology developments and issues. Media is, thus, an important partner, and biotech communication through media needs to be nurtured. Also, there is a need to strengthen the role of academics and scientists in popularizing biotech information. Earlier, media has depicted biotech in different ways, sometimes in positive but often in negative light. However, more recently, there has been lesser tendency to amplify negative, non-science-based views; less use of exaggerated phrases; more open relationship between writers and scientists; and more visits of media to field trials, laboratories and farmers. Positive developments are taking place in China, Philippines, Indonesia and Malaysia. In India, though, there is still need to address issues of public confidence and trust.

Synthesis

Dr. Lily Ann D. Lando, Director, Applied Communication Division (ACD), PCAARRD, presented a summary of the proceedings and important points made by the participants.

Closing Remarks

Dr. Danilo C. Cardenas, Deputy Executive Director, Agriculture and Natural Resources, PCAARRD, in his closing remarks, opined that the same issues of acceptance, regulation, and safety that were raised several years ago and have been resolved are being continued by some groups. The Philippine biosafety regulatory system has been functioning very efficiently and is a model for other countries. Over the years, biotechnology has become an important tool in improving food production and nutrition. More efforts are, however, needed to communicate the benefits of the technology and convince the society fully. In this regard, this meeting is an important step forward.

Recommendations

Following recommendations were made by the participants during Open Forum discussions:

1. There is a need for partnership and unified direction among various stakeholders involved in development, commercialization, and promotion of GM crops.
2. The issues of ownership of technologies and products being developed through inter-institutional and international partnerships need to be resolved at the very beginning of initiating a project. Otherwise, heavy investments in product development and approval may not achieve the desired results.
3. Transfer of technologies to farmers' fields must be accelerated so that they can gain from the promised benefits of biotechnology and repose trust in it.
4. In order to take full advantage of the improved products of biotechnology, the farmers need better access to resources, markets and market information.
5. Affordability of GM is an issue which needs to be considered by public agencies, also keeping in view the proportionate economic gains.
6. Acceptability of GM crops as food is still being questioned by some groups. There is a need to inform the public about food safety of the crops as endorsed by the regulators.
7. There exist several legal challenges to the adoption of biotechnology and its products. These need to be addressed through active participation and intervention.
8. The knowledgeable public should become communicators for biotechnology to create wider and factual awareness.
9. Media has an important role in public information and advocacy. Scientists, institutions and policy-makers should utilize this source to reach wider audience.
10. The Philippine regulatory system should facilitate the process by granting event-based approval, and also on the basis of regulatory testing results of other countries. Such approach would also avoid wasteful expenditure of meager resources.

11. There is a need to prioritize targets of DA Biotechnology Roadmap vis-a-vis available resources and realistic time scale.

Conclusion

Based on the discussions, the broader issues on biotechnology and GM crops in the Asia-Pacific region were summarized as "POLE" – **p**ublic perception, **o**wnership, and **l**egal and **e**thical hurdles. These, however, could be addressed by "PAIR" – **p**artnership in all initiatives; **a**dvocacy and **i**nformation regarding rules and processes for intellectual property and licensing; and the **r**egulatory system.

Stakeholders' Interface on Genetically Modified Crops

Traders Hotel, Manila, Philippines
September 27, 2012

Program

08:00-08:30	**Registration**	
08:30-09:30	**Opening Ceremonies**	**Master of Ceremonies**
		Dr. Lily Ann D. Lando, Director, Applied Communication Division (ACD), PCAARRD
	Welcome Remarks	*Dr. Patricio S. Faylon*, Executive Director, Philippine Council for Agriculture, Aquatic and Natural, Resources Research and Development (PCAARRD)
	Message	*Hon. Mario G. Montejo*, (represented by *USec. Fortunato T. De La Pena*), Secretary, Department of Science and Technology (DOST)
	Message	*Dr. Raj Paroda*, (represented by *Dr. J .L. Karihaloo*), Executive Secretary, Asia-Pacific Association of Agricultural Research Institutions (APAARI)
09:30-09:45	**Group Photograph & Coffee Break**	

Session I:
Status of GM Crops Adoption

Chair: *Dr. Jocelyn E. Eusebio*, Director, Crops Research Division (CRD), and Focal Person for Biotechnology, PCAARRD

Rapporteurs*: PCAARRD-CRD staff*, PCAARRD-PCMD staff

09:45-10:05	Global status of adoption of biotech/ GM crops	*Dr. Randy A. Hautea*, Director and Global Coordinator, International Service for the Acquisition of Agri-Biotech, Applications (ISAAA) – Southeast Asia Center
10:05-10:15	Open forum	
10:15-10:35	Status of GM crops in India	*Dr. J. L. Karihaloo*, Coordinator, Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB), APAARI
10:35-10:45	Open forum	
10:45-11:05	Commercialization of GM crops in the Philippines: Industry perspective	*Mr. Simeon A. Cuyson*, Executive Director, CropLife Philippines, Inc.

11:05-11:15	Open forum	
11:15-11:35	NGO initiatives on GM crops: Stakeholder partnership for biotechnology and agricultural modernization – BCP experience	*Dr. Nina G. Gloriani*, President and CEO, Biotechnology Coalition of the Philippines (BCP)
11:35-11:45	Open forum	
11:45-13:00	**Lunch Break**	
13:00-13:20	Benefits of biotechnology to farmers	*Ms. Rosalie M. Ellasus,* Chair, San Jacinto KASAKALIKASAN Multi-purpose Cooperative
13:20-13:30	Open forum	

Session II:
R&D and Regulatory Status

Chair*: Dr. Leah J. Buendia,* Director, Policy Coordination and Monitoring Division (PCMD), PCAARRD

Rapporteurs: *PCAARRD-CRD staff*, PCAARRD-PCMD staff

13:30-13:50	The Philippine Regulatory System: From laboratory to confined trials	*USec. Fortunato T. De La Peña*, Undersecretary for Scientific and Technological Services, DOST
	The Philippine Biosafety Regulatory System: From multilocation field trials to commercialization	*Dr. Clarito M. Barron*, Director, DA – Bureau of Plant Industry (DA-BPI)
13:50-14:00	Open forum	
14:00-14:20	Biotechnology R&D Roadmap 2012-2018	*Dr. Cristina L. Guevara*, (represented by Engr. *Nelson P. Beniabon*), Executive Director, Philippine Council for Industry, Energy and Emerging, Technology Research and Development (PCIEERD)
14:20-14:30	Open forum	
14:30-14:50	DA Biotechnology Roadmap: Positioning Philippine agriculture in the biotechnology century	*Dr. Candida B. Adalla*, OIC Director, DA - Biotech Program Implementation Unit
14:50-15:00	Open forum	
15:00-15:15	**Coffee Break**	
15:15-15:35	ABSP II Project on BT eggplant for South and Southeast Asia	*Dr. Desiree M. Hautea*, Regional Coordinator, Agricultural Biotechnology Support Project II, (ABSP II) – Southeast Asia, Institute of Plant Breeding (IPB), University of the Philippines Los Baños (UPLB)

15:35-15:45	Open forum	
15:45-16:05	Golden Rice: A potential tool to address vitamin A deficiency	*Dr. Antonio A. Alfonso*, Chief Science Research Specialist, Plant Breeding and Biotechnology Division, and Director, DA-Crop Biotechnology Center, Philippine Rice Research Institute (PhilRice)
16:05-16:15	Open forum	
16:15-16:35	Communication initiatives and challenges in crop biotechnology: The Asian perspective	*Dr. Mariechel J. Navarro*, Manager, Global Knowledge Center on Crop Biotechnology, ISAAA – Southeast Asia Center
16:35-16:45	Open forum	
16:45-16:55	Synthesis	*Dr. Lily Ann D. Lando*, Director, ACD, PCAARRD
16:55–17:05	Closing Remarks	*Dr. Danilo C. Cardenas*, Deputy Executive Director for Agriculture and Natural Resources, PCAARRD

LIST OF PARTICIPANTS

ANA M. REGULACION (MS.)
Science Research Assistant
Policy Coordination and Monitoring Division (PCMD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor
Economic Garden, Bgy. Timugan,
Los Baños, Laguna
Philippines
E-mail: baby.reggy@yahoo.com

ANN LOPEZ (MS.)
DA - Biotech Program Implementation Unit
Department of Agriculture (DA)
Elliptical Road, Diliman,
Quezon City
Philippines
E-mail: biotechpiu@yahoo.com

ANTONIO A. ALFONSO (DR.)
Chief Science Research Specialist
Plant Breeding and Biotechnology Division and Director,
DA-Crop Biotechnology Center
Philippine Rice Research Institute (PhilRice)
Maligaya, Science City of Muñoz
Nueva Ecija 3119
Philippines
E-mail: tonyalfonso2002@yahoo.com

ARSENIO G. BARCELONA (MR.)
President
Harbest Agribusiness Corporation
3F ITX Building
No.5 Rosemarie Lane
Barangay Kapitolyo, Pasig City
Metro Manila
Philippines
E-mail: harbest@harbest.com.ph;
totobarcelona@yahoo.com.ph

BENIGNO PECZON (DR.)
Member, Board of Advisers, BCP
and Consultant for Biotechnology
PCAARRD
Rm. 303 Puno Bldg.
#47 Kalayaan Ave.
Diliman, Quezon City
Philippines
E-mail: biotechcoalition@bcp.org.ph

CANDIDA B. ADALLA (DR.)
Officer-in-Charge Director
DA-Biotech Program Implementation Unit
Department of Agriculture (DA)
Elliptical Road, Diliman
Quezon City
Philippines
E-mail: biotechpiu@yahoo.com;
aydsadalla@yahoo.com

CARLO CUSTODIO (MR.)
Management Specialist
Program for Biosafety Systems (PBS)
National Institute of Molecular
Biology and Biotechnology (BIOTECH)
UPLB, College, Laguna
Philippines
E-mail: carlo_pbsasia@yahoo.com

CECILLE C. OAMAR (MS.)
Administrative Officer III
Policy Coordination and Monitoring Division (PCMD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research
and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan
Los Baños, Laguna
Philippines
E-mail: ccoamar@yahoo.com

CHARINA OCAMPO (MS.)
Corporate Affairs Lead
Monsanto Philippines, Inc.
7th Ayala Life-FGU Center
Madrigal Business Park
Alabang-Zapote Road
(corner Acacia Ave.)
Alabang, Muntinlupa City
Philippines
E-mail: cgarrido_ocampo@hotmail.com

CLARITO M. BARRON (DR.)
Director
DA - Bureau of Plant Industry (DA-BPI)
692 San Andres Street
Malate, Manila
Philippines
E-mail: cmbarron@ymail.com

DANILO C. CARDENAS (DR.)
Deputy Executive Director for
Agriculture and Natural Resources
Philippine Council for Agriculture, Aquatic and Natural Resources Research
and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan
Los Baños, Laguna
Philippines
E-mail: d.cardenas@pcaarrd.dost.gov.ph

DESIREE M. HAUTEA (DR.)
Regional Coordinator
Agricultural Biotechnology Support Project II (ABSP II) - Southeast Asia
Institute of Plant Breeding (IPB)
University of the Philippines
Los Baños (UPLB)
College, Laguna
Philippines
E-mail: dmh.uplb@gmail.com

EDWIN Y. PARALUMAN (MR.)
Chairman
Farmers Action Council
Purok 18, Lagao General Santos City
Philippines
E-mail: eparaluman@yahoo.com

ESTRELLA TORRES (MS.)
Columnist
Business Mirror
2nd Floor, Dominga Building
2113 Chino Roces
Avenue corner De la Rosa St.
Makati City
Philippines

FORTUNATO T. DE LA PEÑA
Undersecretary for Scientific and
Technological Services
Department of Science and Technology (DOST)
2nd Floor Main Building
DOST Complex
Gen. Santos Avenue, Bicutan
Taguig City
Philippines
E-mail: ftdp@dost.gov.ph

FRANCIS LUCAS (FR.)
Chairman
NGO Association for Agricultural
Research in the Asia Pacific (NAARAP)
Asian NGO Coalition for Agrarian
Reform and Rural Development (ANGOC)
73-K Dr. Lazcano St.
Brgy. Laging Handa
Quezon City 1103
Philippines
E-mail: angoc@angoc.org

JAWAHIR LAL KARIHALOO (DR.)
Coordinator
Asia-Pacific Consortium on Agricultural
Biotechnology (APCoAB)
Asia-Pacific Association of Agricultural
Research Institutions (APAARI)
NASC Complex, DPS Marg
New Delhi-110012
India
Email: j.karihaloo@cgiar.org

JAY MARTIN ABLOLA (MR.)
NAARAP ANGOC
73-K Dr. Lazcano St.
Brgy. Laging Handa
Quezon City 1103
Philippines
E-mail: angoc@angoc.org

JENNY A. PANOPIO (MS.)
Network Administrator and
Special Projects Coordinator
SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)
- Biotechnology Information Center (BIC)
Los Baños, Laguna
Philippines
E-mail: bic@agri.searca.org

JEZZEL R. JAO (MS.)
Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD)
4/F Philippine Science Heritage Center
DOST Compound,
Gen. Santos Avenue, Bicutan, Taguig City
Philippines
E-mail: pcieerd@dost.gov.ph

JOCELYN E. EUSEBIO (DR.)
Director, Crops Research Division (CRD) and Focal Person for Biotechnology
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan, Los Baños, Laguna
Philippines
Email: joycedee_5898@yahoo.com

JOHN FAJARDO (MR.)
Technology Development Lead
Monsanto Philippines, Inc.
7th Ayala Life-FGU Center
Madrigal Business Park
Alabang-Zapote Road
(corner Acacia Ave.)
Alabang, Muntinlupa City
Philippines

KATRINA KAE S. PRINCIPE (MS.)
Science Research Specialist II
Policy Coordination and Monitoring Division (PCMD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research
and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan, Los Baños, Laguna
Philippines
E-mail: kkprincipe@yahoo.com

LEAH J. BUENDIA (DR.)
Director
Policy Coordination and Monitoring Division (PCMD)
Philippine Cosuncil for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan , Los Baños, Laguna
Philippines
Email: leahb@pcaarrd.dost.gov.ph
leahbuendia@yahoo.com

LEILANI D. PELEGRINA (MS.)
Senior Science Research Specialist
Crops Research Division (CRD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan
Los Baños, Laguna
Philippines
E-mail: pcaarrd@pcaarrd@dost.gov.ph

LILY ANN D. LANDO (DR.)
Director Applied Communication Division (ACD)
Philippine Council for Agriculture Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan, Los Baños, Laguna
Philippines
E-mail: pcaarrd@pcaarrd@dost.gov.ph

MARIA THERESA T. BAUTISTA (MS.)
Senior Science Research Specialist
Policy Coordination and Monitoring Division (PCMD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor
Economic Garden, Bgy. Timugan
Los Baños, Laguna
Philippines
E-mail: bobot2000ph@yahoo.com

MARIECHEL J. NAVARRO (DR.)
Manager
Global Knowledge Center on Crop Biotechnology
International Service for the Acquisition of Agri-Biotech Applications (ISAAA) - Southeast Asia Center
C/o IRRI
Los Banos, Laguna
Philippines
Email: m.navarro@isaaa.org

MIN-TZE WU (DR.)
Senior Horticulturist and
Director
Biotechnology Division
Taiwan Agricultural Research Institute
Taichung County
Chinese Taipei
E-mail: wu@tari.gov.tw

NELSON P. BENIABON (ENGR.)
Chief
Emerging Technology Development Division (ETDD)
Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD)
4/F Philippine Science Heritage Center
DOST Compound
Gen. Santos Avenue, Bicutan
Taguig City, Philippines
E-mail: pcieerd@dost.gov.ph

NINA G. GLORIANI (DR.)
President and CEO
Biotechnology Coalition of the Philippines (BCP)
Room 303, Puno Bldg.
#47 Kalayaan Ave.
Diliman, Quezon City
Philippines
E-mail: biotechcoalition@bcp.org.ph

PATRICIO S. FAYLON (DR.)
Executive Director
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Department of Science and Technology (DOST)
Paseo de Valmayor, Economic Garden
Bgy. Timugan, Los Baños, Laguna
Philippines
Email: p.faylon@pcaarrd.dost.gov.ph;
psfaylon@yahoo.com

RACHELLE DP. ACDA (MS.)
Science Research Specialist I
Policy Coordination and Monitoring Division (PCMD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan
Los Baños, Laguna
Philippines
Email: rache.acda@yahoo.com

RANDY A HAUTEA (DR.)
Director and Global Coordinator
International Service for the Acquisition of Agri-Biotech Applications (ISAAA)
Southeast Asia Center
C/o IRRI
Los Banos, Laguna
Philippines
Email: rhautea@isaaa.org

ROSALIE M. ELLASUS (MS.)
Chair
San Jacinto Kasakalikasan
Multipurpose Cooperative
46 Sta. Maria, San Jacinto, Pangasinan
Philippines
E-mail: rmellasus@yahoo.com

RUDY A. FERNANDEZ (MR.)
Journalist
Philippine Star
Marymount Subd., Anos
Los Banos, Laguna
Philippines
E-mail: rudy2005fernandez@yahoo.com

RUEL S. PAGCALIWAGAN (MR.)
Science Research Specialist II
Applied Communication Division (ACD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor
Economic Garden, Bgy. Timugan
Los Baños, Laguna
Philippines
E-mail: pcaarrd@pcaarrd@dost.gov.ph

SHARIE AL-FAIHA A. ABUSTAN (MS.)
Science Research Specialist I
Crops Research Division (CRD)
Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Paseo de Valmayor, Economic Garden
Bgy. Timugan,
Los Baños, Laguna
Philippines
E-mail: pcaarrd@pcaarrd@dost.gov.ph

SIMEON A. CUYSON (MR.)
Executive Director
CropLife Philippines, Inc.
Unit 5E MAPFRE Bldg
Acacia Ave.
Madrigal Business Park
Ayala Alabang, Muntinlupa City 1780
Philippines
E-mail: ed_croplife@pldtdsl.net;
simcuyson@yahoo.com;
ea_croplife@pldtdsl.net

SOFIA MERCADO (MS.)
Information and Communication Assistant
SEARCA-BIC
Los Baños, Laguna
Philippines
E-mail: bic@agri.searca.org

SOLITA R. SICAT (MS.)
DA – Bureau of Plant Industry (DA-BPI)
692 San Andres Street
Malate
Philippines
E-mail: buplant@yahoo.com

VIOLETA N. VILLEGAS (DR.)
Biotech Affairs and Regulatory Manager
Syngenta Philippines, Inc.
12/F Two World Square
22 Upper McKinley Rd.
Fort Bonifacio,Taguig City
Philippines
E-mail: violeta.villegas@syngenta.com

Asia-Pacific Association of Agricultural Research Institutions

The Asia-Pacific Association of Agricultural Research Institutions (APAARI) was established in 1990 at the initiative of Food and Agriculture Organization of the United Nations and most of the National Agricultural Research Systems (NARS) of the Asia-Pacific region. Its mission is to promote the development of National Agricultural Research Systems in Asia-Pacific region through facilitation of inter-regional, inter-institutional and international partnerships.

APAARI's vision is that Agricultural Research for Development (ARD) in the Asia-Pacific region is effectively promoted and facilitated through novel partnerships among NARS and other related organizations so that it contributes to sustainable improvements in the productivity of agricultural systems and to the quality of the natural resource base that underpins agriculture, thereby enhancing food and nutrition security, economic and social well being of communities and the integrity of the environment and services it provides.

The overall objectives of APAARI are to foster the development of agricultural research in the Asia-Pacific region so as to:

- Promote the exchange of scientific and technical information
- Encourage collaborative research
- Promote human resource development and capacity building
- Build up organizational and management capabilities of member institutions
- Strengthen cross-linkages and networking among diverse stakeholders

To know more about APAARI, please visit: www.apaari.org

Asia-Pacific Consortium on Agricultural Biotechnology

The Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB) was established in 2003 under the umbrella of Asia-Pacific Association of Agricultural Research Institutions (APAARI). APCoAB has the mission to "harness the benefits of agricultural biotechnology for human and animal welfare through the application of latest scientific technologies while safeguarding the environment for the advancement of society in the Asia-Pacific Region". APCoAB's main thrusts are (i) to serve as a neutral forum for the key partners engaged in research, development, commercialization and education/learning of agricultural biotechnology as well as environmental safety in the Asia-Pacific region; (ii) to facilitate and promote the process of greater public awareness and understanding relating to important issues of IPR, sui generis systems, biosafety, risk assessment, harmonization of regulatory procedures, and benefit sharing in order to address various concerns relating to adoption of agricultural biotechnology; and (iii) to facilitate human resource development for meaningful application of agricultural biotechnology to enhance sustainable agricultural productivity, as well as product quality, for the welfare of both farmers and consumers.

To know more about APCoAB, please visit: www.apcoab.org

Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development

The Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) is one of the sectoral councils under the Department of Science and Technology (DOST). PCAARRD was established on June 22, 2011 through the consolidation of the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and the Philippine Council for Aquatic and Marine Research and Development (PCAMRD).

The Council formulates policies, plans and programs for science and technology-based research and development in the different sectors under its concern. It coordinates, evaluates, and monitors the national research and development (R&D) efforts in the agriculture, aquatic and natural resources (AANR) sectors. It also allocates government and external funds for R&D and generates resources to support its program.

PCAARRD is engaged in active partnerships with international, regional, and national organizations and funding institutions for joint R&D, human resource development and training, technical assistance, and exchange of scientists, information and technologies.

It also supports the National Agriculture and Resources Research and Development Network composed of national multi- and single-commodity and regional R&D centers, cooperating stations, and specialized agencies.

As such PCAARRD has been a potent arm in catalyzing the Philippine AANR sectors toward self-sufficiency and global competitiveness.

Vision

Sustained dynamic leadership in science and technology (S&T) innovation in the agriculture, aquatic and natural resources (AANR) sectors.

Mission

Provide strategic leadership in promoting S&T as a platform for AANR products innovation and environment resiliency.

Mandates

- Formulate policies, plans, projects, and strategies for S&T development in the agriculture, forestry, aquatic and natural resources sectors.
- Program and allocate government and external funds generated for R&D efforts in the agriculture, forestry, marine and natural resources sectors.
- Monitor research and development (R&D) projects.
- Generate external funds for its R&D activities.

For copies contact :

Asia-Pacific Consortium on Agricultural Biotechnology (APCoAB)
C/o ICRISAT, NASC Complex, Dev Prakash Shastri Marg,
Pusa Campus, New Delhi - 110 012
Tel. : +91-11-32472305, Fax : +91-11-25841294
Website : http://www.apcoab.org