

USDA Foreign Agricultural Service

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Global Agricultural Information Network

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## Indonesia

### Agricultural Biotechnology Annual

**2015**

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**Report Highlights:**

This report updates the Indonesian 2014 Agricultural Biotechnology Annual Report. Following reauthorization of the Indonesian National Biosafety Commission for Genetically Engineered Products (BCGEP) in June, 2014, Biosafety Commission members were appointed on October 19, 2015, through Presidential Decree No. 181/M/2014. Although the new administration has been slow to take action on biotechnology, Post remains optimistic that genetically engineered sugarcane and corn will be commercialized.

## **Section I. Executive Summary:**

The United States exported over \$1.420 billion of genetically engineered (GE) products to Indonesia in 2014, including Bt cotton, herbicide tolerant soybeans and meal, Bt corn and a variety of food products derived from GE crops.

At present, there are no imported or locally developed commercial GE seed varieties approved for planting in Indonesia. However, the Government of Indonesia (GOI) and local universities are extensively researching a number of GE varieties including virus resistance for tomatoes and potatoes, delayed ripening for papaya, sweet potato pest resistance, and drought tolerant rice. As well, some Indonesian researchers have begun to focus on GE animals for genotyping or genetic markers of Indonesian local livestock, such as poultry, Bali cattle and sheep. Any practical applications in Indonesia for GE animals and animal products are still very long-term.

The GOI's overarching policy on agricultural biotechnology is to "accept with a precautionary approach" with respect to environmental safety, food safety, and/or feed safety based on scientific approaches as well as taking into consideration religion, ethical, socio-cultural, and esthetic norms. Therefore, several regulations and guidelines have been issued to protect the public from the possibility of negative consequences of biotechnology utilization.

To date, eight GE corn varieties, four GE soybean varieties, and three GE sugarcane varieties have received food safety approval in Indonesia. In addition, two GE corn varieties have received feed safety approval. Three GE sugarcane varieties have received environmental safety and variety-release approvals from the Ministry of Agriculture. Post sources report that the National Biosafety Commission for Genetically Engineered Products (BCGEP) has provided its recommendation to the Ministry of Environment and Forestry for providing environmental safety approval to a GE corn event. In addition, two GE soybean varieties and two GE corn varieties are in the pipeline for food safety approval.

Under the new administration, the Ministry of Environment has been merged with the Ministry of Forestry. As a result, the secretariat for the Biosafety Commission has moved to a new location in the Ministry of Environment and Forestry (MOEF). Due to the new leadership's lack of knowledge on agricultural biotechnology in MOEF, the development of local GE seeds may be delayed. Other unscientific considerations, such as religious, ethical, socio-cultural, and esthetic norms could slow down agricultural biotechnology acceptance.

## **Section II. Author Defined:**

### **CHAPTER 1: PLANT BIOTECHNOLOGY**

#### **PART A: PRODUCTION**

##### **a) PRODUCT DEVELOPMENT:**

Indonesia continues to develop GE crops, such as: rice (nitrogen use efficiency), sugarcane (modification of high glucose content), cassava (modification of amylase), tomato (resistant to virus), and delayed ripening papaya, albeit at a relatively modest pace. Below, Table 1 indicates the list of some GE crops development in Indonesia.

**Table 1. GE crops development**

<b>Crops</b>	<b>Trait</b>	<b>Gene</b>	<b>Developer</b>
Rice	Nitrogen use efficiency	<i>CsNitr1-L</i>	ICABIOGRAD
Rice	Drought tolerant	<i>OsER1</i>	ICABIOGRAD
Rice	Productivity	<i>OsGS3; dep1</i>	ICABIOGRAD
Rice	Salt tolerant	<i>OsErf1;</i> <i>OsDREB1A</i>	ICABIOGRAD
Rice	Brown planthopper resistant		Padjadjaran University
Sugarcane	High glucose content	SoSUT & SoSPSSoSPS1	PTPN-XI/Jember University
Tomato	Viruses resistance (tomato yellow leaf curl virus and cucumber mosaic virus)	Coat protein	ICABIOGRAD/RIV
Tomato	Low seed content (parthenocarpy)	<i>defH9-iaaM and</i> <i>defH9-RI-iaaM</i>	ICABIOGRAD
Cassava	Low amylose content	<i>IRC-GBSS</i>	ICABIOGRAD/IIS
Papaya	Delayed ripening	<i>Antisense ACC</i> <i>Oxidase</i>	ICABIOGRAD
Potato	Resistance to Pytophthora infestans	<i>RB</i>	ICABIOGRAD
Tomato	Miraculin		University of Padjadjaran
Rice variety Rojolele	Yellow stem borer resistant	<i>Cry1Ab &amp; cry18-</i> <i>cry1Aa</i>	The Indonesian Institute of Science
Rice	Drought tolerance	<i>oshox6</i>	The Indonesian Institute of Science
Sugarcane	Availability of P	phytase	Bogor Agricultural University
Rice	Aluminum tolerant	<i>MaMt2, MmSOD,</i> <i>PaCS</i>	Bogor Agricultural University
Sugarcane	Drought tolerant	<i>P5CS</i>	Indonesian Research Institute for Biotechnology and Bioindustry

Source: FAS Jakarta from various sources (2015)

Post sources report that the food safety assessment application for GE late blight resistant potato has been submitted to the National Agency of Drug and Food Control (BPOM). It is expected that BCGEP will provide a food safety recommendation for the product to BPOM at the end of this year. In addition, its environmental safety assessment application will be submitted to the Ministry of Environment and Forestry in 2016. This GE product was produced through the Ministry of Agriculture - Agricultural Biotechnology Support Project phase II (ABSPII)/USAID - University of Wisconsin project. Unfortunately this collaboration was ended in December 2014, and the cost of the biosafety assessment process will be financed under the state budget. It is also reported that Golden Rice trial (IR-64 variety) (developed in collaboration between the International Rice Research Institute (IRRI) and the Ministry of Agriculture), have been suspended for unknown reasons. Finally, Arcadia Biosciences Inc. is collaborating with the Ministry of Agriculture under a

US AID grant to evaluate GE nitrogen use efficiency rice. This project is for research purposes only.

b) **COMMERCIAL PRODUCTION:**

Indonesia has not commercially cultivated any GE crops, including GE seed production. However, Post sources report that as soon as the three GE sugarcane varieties receive feed safety approval from the Ministry of Agriculture, PT Perkebunan Nusantara XI (a state owned company) will cultivate and market them to sugar mills for food consumption.

c) **EXPORTS:**

Indonesia does not export any GE crops to the United States or any other country.

d) **IMPORTS:**

Tempeh and tofu, which are soybean-based food products, are staple foods in Indonesia. Indonesian soybean consumption is growing in correspondence with population and economic growth. Total soybean consumption last year reached 2.7 million metric tons (MMT), which is mostly fulfilled by imports. The U.S. soybean trade is about 92% of the market share in Indonesia.

As the world's 9<sup>th</sup> largest textile exporter, Indonesian cotton consumption reached 675 MMT in 2014. Brazil is the largest cotton supplier to Indonesia.

The livestock feed industry determines the consumption of soybean meal and corn in Indonesia. 2014 soybean meal consumption was around 3.9 MMT and corn consumption was 7.4 MMT. Indonesia imported around 4.3 MMT of soybean meal in 2014. Argentina, Brazil, and China are the primary suppliers. Corn imports reached 3.5 MMT, of which Brazil held the largest market share. Other exporters include India, Argentina, and the United States. Soybean meal and corn from India are not GE products.

Please see GAIN Reports [ID1508](#), [ID1511](#) and [ID1512](#) for more information regarding the trade of soybean, soybean meal, cotton, and corn.

e) **FOOD AID RECIPIENT COUNTRIES:**

At present Indonesia is not a recipient of USDA-funded food aid.

## **PART B: POLICY**

a) **REGULATORY FRAMEWORK:**

The GOI's policy on biotechnology is "accept with a precautionary approach" with respect to environmental safety, food safety, and/or feed safety based on scientific approaches as well as taking into considerations of religion, ethical, socio-cultural, and esthetical norms. A few regulations and guidelines have been issued to protect the public from the possibility of negative consequences of biotechnology utilization. More details on Indonesia biotech legislation can be seen at [the Indonesian Biosafety Clearing House \(BCH\)'s website](#). An expected draft guideline for feed safety assessment has not yet been published. It's not clear who is currently handling the draft at the Ministry of Agriculture and the guideline has not been issued.

The Ministers of Environment, Agriculture, Forestry, Marine Affairs and Fisheries, and the Head of BPOM are the authorities responsible for approving and releasing GE products. However, under new President Joko Widodo's leadership, the Ministry of Environment and the Ministry of Forestry have been merged. The table 2 shows respective roles of national competent authorities.

**Table 2. The National Competent Authority for GE Products**

No.	National Competent Authorities		Responsible for
	Ministry	Office	
1.	Ministry of Environment and Forestry	Directorate General for Conservation of Natural Resources and Ecosystem	Environmental safety
2.	Ministry of Agriculture		Feed safety
3.	Ministry of Agriculture	Center for Plant Variety Protection and Agricultural License	Seed imports permit
4.	Ministry of Agriculture	National Seed Agency	Crop variety release
5.	Ministry of Agriculture	Indonesian Agency for Agriculture Research and Development	Research permit
6.	Ministry of Agriculture	Indonesian Agency for Agriculture Quarantine	Plant and animal imports
7.	National Agency of Drug and Food Control (BPOM)		Food safety
8.	Ministry of Marine Affairs and Fisheries	Research Center for Marine and Fisheries Product Processing and Biotechnology	Fisheries products and fish feed
9.	Ministry of Environment and Forestry		Forestry plants

Source: Indonesia Biosafety Clearing House (2010) and FAS (2012)

The procedures for the approval of food, feed, processing and environmental releases are described in the diagrams below, as per government regulation No. 21, 2005.

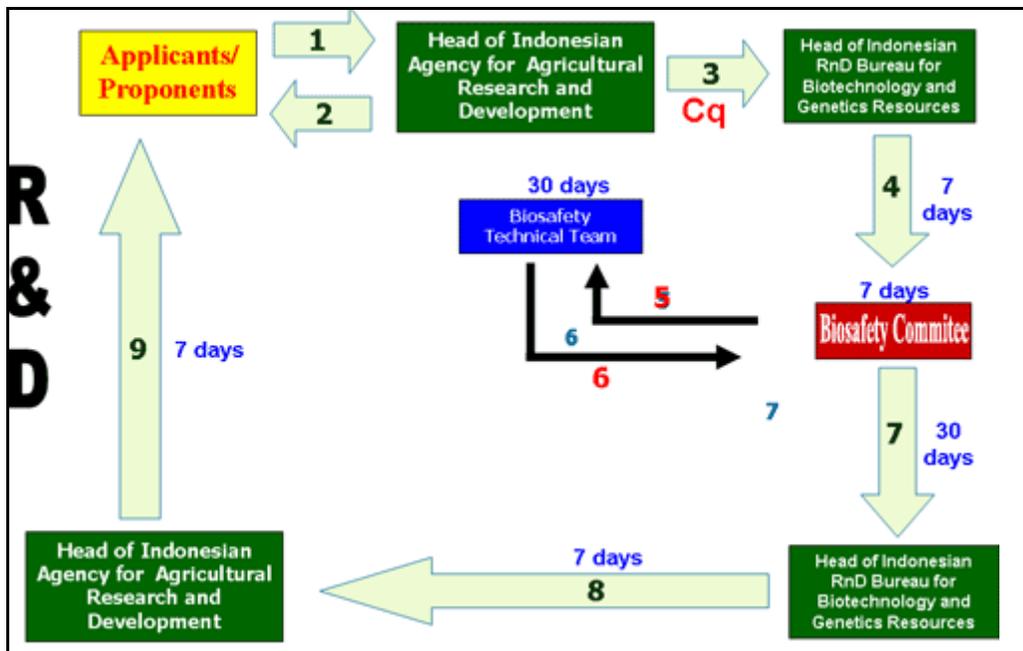


Figure 1. Procedure for Research and Development Based on Government Regulation No. 21/2005 (Source: Indonesia Bio-safety Clearing House, 2010)

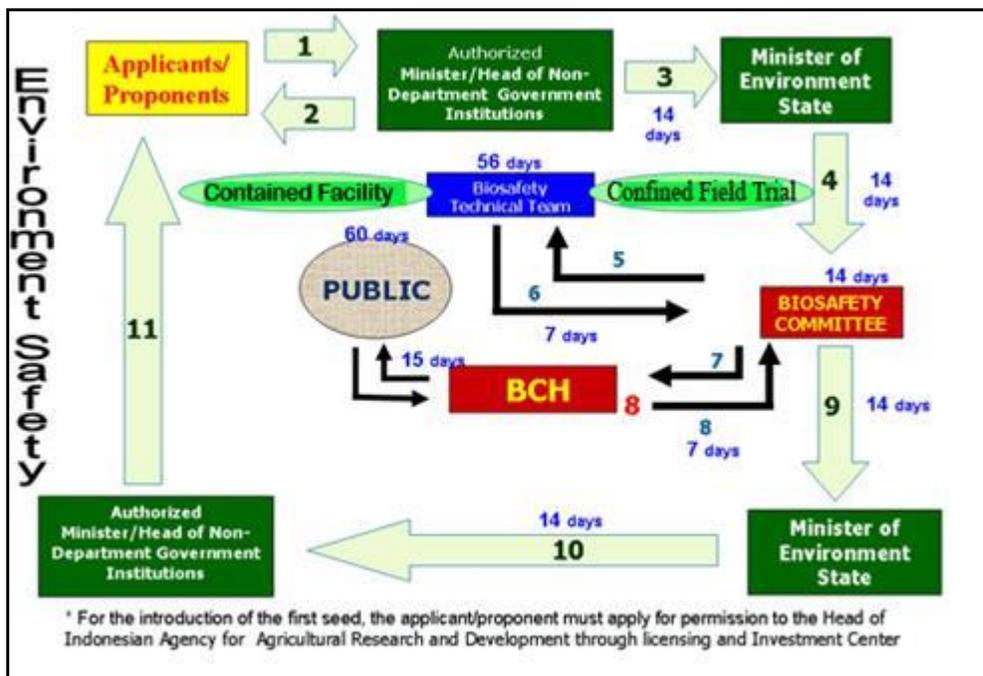


Figure 2. Procedure for Environment Safety Based on Regulation No. 21/2005 (Source: Indonesia Bio-safety Clearing House, 2010)



The National Biosafety Commission on Genetically Engineered Product (BCGEP) is responsible for providing biosafety recommendations, suggestions, and considerations of GE products to the authorized ministries. The BCGEP, which was established in 2010 based on Presidential Regulation No. 39/2010, had been inactive since June 15, 2013. On June 2, 2014, the previous president Dr. Susilo Bambang Yudhoyono reauthorized the commission through [the Presidential Regulation No. 53](#). The reauthorization contained two significant changes. First, the commission is reduced from 21 to 19 members, which will include members of government, the community, and academia. Of the 19 seats, five are newly reserved for members the Indonesian community at large. Second, academic and community membership is limited to four years with the possibility of one reappointment for an additional term. On October 19, 2014, President Yudhoyono signed the Presidential Decree No. 181/M/2014 appointing new members of NBCGEP and reactivating it.

Three Technical Teams for Biosafety (TTB) assist the BCGEP in conducting technical assessments and reviews for food, feed and environmental biosafety. The technical team for environmental safety is divided into four groups: a plant group, an animal group, a fish group, and a microorganism group. In addition to this team, in 2012 BCGEP completed their organization by establishing the Team of Legal, Economic, Social, and Culture Assessment (TLESCA). This team consists of five additional members. Following reauthorization of BCGEP, the Committee has assigned the previous TTB to continue carrying out their duties on document assessment of bio-safety testing until the new TTB is established.

b) APPROVALS:

Several GE plants have received food, feed, and/or environmental safety certificates from the GOI. However, due to incomplete biosafety assessments, no imported or locally developed GE plants have yet been commercialized. Please see the table below for the biosafety approved GE products.

**Table 3. GE products that have been approved**

<b>For Food Safety</b>		
<b>No.</b>	<b>Product</b>	<b>Applicant</b>
1.	Insect resistant corn event MON 89034	PT. Branita Sandhini
2.	Herbicide tolerant corn event NK 603	PT. Branita Sandhini
3.	Herbicide tolerant soybean event GTS 40-3-2	PT. Branita Sandhini
4.	Herbicide tolerant soybean event MON 89788	PT. Branita Sandhini
5.	Herbicide tolerant corn event GA21	PT. Syngenta Indonesia
6.	Insect resistant corn event MIR 162	PT. Syngenta Indonesia
7.	Insect resistant corn event BT 11	PT. Syngenta Indonesia
8.	Insect resistant corn event MIR 604	PT. Syngenta Indonesia
9.	Corn event 3272 (contained optimal alpha amylase enzyme for ethanol production)	PT. Syngenta Indonesia
10.	Drought tolerant sugarcane event NXI-1T	PT. Perkebunan Nusantara XI
11.	Drought tolerant sugarcane event NXI-4T	PT. Perkebunan Nusantara XI
12.	Drought tolerant sugarcane event NXI-6T	PT. Perkebunan Nusantara XI

13.	Insect resistant soybean event MON 87701	PT. Branita Sandhini
14.	Herbicide tolerant and fatty acid change soybean event MON 87705	PT. Branita Sandhini
15.	Herbicide tolerant and insect resistant corn event TC 1507	PT. DuPont Indonesia
<b>For Feed Safety</b>		
1.	Herbicide tolerant corn event NK 603	PT. Branita Sandhini
2.	Insect resistant corn event MON 89034	PT. Branita Sandhini
<b>For Environmental Safety</b>		
1.	Drought tolerant sugarcane event NXI-1T	PT. Perkebunan Nusantara XI
2.	Drought tolerant sugarcane event NXI-4T	PT. Perkebunan Nusantara XI
3.	Drought tolerant sugarcane event NXI-6T	PT. Perkebunan Nusantara XI

Source: Biosafety Clearing House (2015)

Post sources report that two GE soybean varieties and two GE corn varieties have passed public notification and are waiting for BCGEP's food safety recommendation.

c) **FIELD TESTING:**

Ministry of Agriculture regulation No. 61/2011 on the procedures for testing, evaluating, releasing, and withdrawing GE plant varieties speeds up the approval process, including aspects of the environmental safety approval process and field trials for GE crops. Under this regulation, limited field trials for the environmental safety assessment can be done in parallel with the adaptation trial for variety release. In addition, if the GE crop comes from approved conventional hybrids, that product will not require multi-location field trials and will only require one location field trial from one planting period.

d) **STACKED EVENT APPROVALS:**

Environmental safety approval for stacked events is similar to single event approval. GE crops must undergo laboratory and biosafety containment tests, confined field trial, as well as environmental risk analysis. However, the GOI has not decided yet whether the regulations for food and feed safety approval process of stacked event will be the same as for a single event.

e) **ADDITIONAL REQUIREMENTS:**

Post is not aware on the additional requirements of GE seeds registration.

f) **COEXISTENCE:**

Indonesia has no national policy on co-existence.

g) **LABELING:**

To implement the government regulation issued in 1999 that requires labels and special logos to be on packaging of food containing GE ingredients, BPOM issued the regulation on food labeling controls for GE products in March 2012. According to this regulation, the packaged food that contains at least five percent of transgenic product must be labeled and stated "Food Containing Genetically Engineered Material" on the label. This five percent threshold level is based on the

content percentage of Deoxyribo Nucleid Acid/DNA of GE product against the Deoxyribo Nucleid Acid of non GE product. Furthermore, the content percentage is calculated based on each GE product if food contains more than one GE product. This regulation can be also seen at GAIN Report [ID1217](#).

h) **TRADE BARRIERS:**

Environmental requirements for event approval may impede the importation or development of local commercial GE seeds. In addition, other unscientific considerations, such as: religion, ethical, socio-cultural, and esthetical norms could slow down the agriculture biotechnology acceptance. Post expects that Indonesia's capacity to commercialize GE seeds once again will be pushed back until at least 2016.

Food registration procedures require a Genetically Modified Organism (GMO) or non-GMO statement for food containing potatoes, soybeans, corn, and their derivative products. This sometimes confuses BPOM officials when approving entry permits for these types of food. For example, BPOM regulations require that product derivatives which have undergone further refining processes to the point where the GE material cannot be identified (to include but not limited to oils, fats, sucrose, and starch) do not require any non-GMO statements. However, BPOM frequently requires additional GE testing when importers provide a GMO statement.

i) **INTELLECTUAL PROPERTY RIGHTS (IPR):**

Law No. 14/2001 on the Patent Act and Law No. 19/2009 on the Copyright Act address IPR. Law No. 29/2000 on the Plant Variety Protection regulates the intellectual property of new plants varieties. The Center of Plant Variety Protection and Agricultural License has responsibility to manage new plant variety registration.

j) **CARTAGENA PROTOCOL RATIFICATION:**

In 2004 Indonesia ratified the Cartagena Protocol through Government Regulation No. 21/2004 concerning Bio-safety to the Convention on Biological Diversity. As a Cartagena Protocol ratification country, Indonesia has:

- assigned the Ministry of Environment as the National Focal Point of Cartagena Protocol;
- appointed the Ministries to be the National Competent Authority of Cartagena Protocol;
- published Government Regulation No. 21/2005 concerning the Biosafety of Genetically Engineered Product;
- established the Biosafety Clearing House (BCH)

More details can be found at [the Indonesia BCH's website](#).

k) **INTERNATIONAL TREATIES/FORA:**

Indonesia is a member of the International Plant Protection Convention (IPPC) and the Codex Alimentarius (Codex). However, Indonesia hasn't taken any significant positions pertaining to biotechnology in these fora. Indonesia actively participates in the APEC High Level Policy Dialogue on Agricultural Biotechnology (HLPDAB). Indonesia was the host-venue of the 2013 APEC annual meeting, including the APEC HLPDAB. In addition, Indonesia has participated in the Global low level presence (LLP) Initiative fora. Since the ASEAN Secretariat is located in Indonesia, Indonesia representatives have actively involved in ASEAN Genetically Modified Food (GMF) Testing Network.

l) RELATED ISSUES:

Not applicable

m) MONITORING AND TESTING:

Although Government Regulation No. 21/2005 on Biosafety of Genetically Engineered Products also regulates monitoring systems for GE products, the guidelines for the monitoring mechanism are still in draft.

n) LOW LEVEL PRESENCE POLICY:

LLP is still a pending issue in Indonesia. The Ministry of Agriculture indicates that Indonesia would endorse the International Statement on LLP and fully support the initiative to develop approaches to manage LLP.

### **PART C: MARKETING**

a) MARKET ACCEPTANCE:

Indonesian farmers are open to new using technologies including biotechnology. There is broad support for the technology from farmer organizations in Indonesia. Post expects that the technology will be rapidly adopted following commercialization.

Due to a lack of information and general knowledge about biotechnology, consumers are more hesitant if they know their food contains GE products. Nonetheless, Indonesians have widely consumed GE soybean derived tempeh and tofu for the last three decades.

b) PUBLIC/PRIVATE OPINIONS:

Several Indonesian non-governmental organizations (NGOs) occasionally oppose the production and use of GE plants, although actually their intended targets are usually the multi-national companies (MNC) behind the technology.

Modeled on the success of the Biotechnology Coalition of the Philippines, a pro-biotech advocacy association, the Society of Indonesian Agricultural Biotechnology (previously named the Indonesian Coalition on Agricultural Biotechnology (ICAB)) was formed in Lombok, West Nusa Tenggara on July 4, 2012, during the 5<sup>th</sup> Indonesia Biotechnology Conference for supporting the adoption of agriculture biotechnology in Indonesia. More information regarding ICAB can be seen at GAIN Report [ID1226](#). In addition, the Indonesian farmer association KTNA indicated their strong support for planting GE crops, as they believe the technology can greatly improve the livelihoods of their families.

c) MARKETING STUDIES:

There are no recent studies on marketing of GE plants and their products. However in 2006 there was a survey to determine the Indonesian public's willingness to accept GE products. The survey targeted students at a well-known agricultural university in Indonesia. The research showed that the students lack knowledge of GE foods, although they had a class in biology. The study also found that students: (1) are somewhat willing to consume GE food if these GE products reduce the amount of pesticides applied to crops, (2) are very willing to consume GE food if the food were more nutritious than non-GE food, (3) will avoid consuming GE food if the food posed a risk of causing

allergic reactions for some people, (4) consider ethical and religious concerns as very important to purchasing decisions, (5) had mixed reactions on the importance of price when making the decision to purchase GE food, (6) feel labeling of GE food should be mandatory even though it will affect the price, and (7) think that existing governmental regulations on food safety remain poor. Post also reports that an association of seed industries in Indonesia has planned to conduct a socio-economic study on agricultural biotechnology in the 2015/16.

## **PART D: CAPACITY BUILDING AND OUTREACH**

### **a) ACTIVITIES:**

Following is the list of the activities for capacity building and outreach on biotechnology through Cochran Fellowship Program, USDA biotech fund, FAS' Emerging Markets Program, State Department, etc. over the past two years.

#### **Sponsored by USDA**

- APEC Workshop on Fostering the Benefits of Innovation in Plant Breeding and Science Communication, June 8 – 12, 2015, in Manila, Philippines (jointly organized by the International Service for the Acquisition of Agri-Biotech Application (ISAAA), APEC Secretariat, and US-APEC Technical Assistance to Advance Regional Integration (US-ATAARI) project).
- Biotech Literacy Project Boot Camp, May 31 – June 3, 2015, in Davis, CA (jointly organized by the University of California Davis and Genetic Literacy Project).
- APEC Workshop on Plant Biotechnology Life Cycle, September 14 – 15, 2014, in Beijing, China (jointly organized by ISAAA, APEC Secretariat and US-ATAARI project).
- Seminar on Socio-economic Considerations on Agricultural Biotechnology, August 27, 2014, in Bogor, Indonesia (jointly organized by ISAAA and Business School of Bogor Agricultural University).
- Regional Asian MOP-7 Preparatory Meeting, August 25 – 26, 2014, in Bogor, Indonesia (jointly organized by ISAAA and Indonesian Biotechnology Information Center (IndoBIC)).
- Workshop on Agricultural Biotechnology, June 9 – 13, 2014 in Bogor, Indonesia (jointly organized by ISAAA, Michigan State University, and Southeast Asia for Food, Science and Technology (SEAFST) Center).
- 12<sup>th</sup> APEC High Level Policy Dialogue, June 27, 2013, in Medan, Indonesia.
- Workshop on Regulatory Issues on Emerging Market, June 25 – 26, 2013, in Medan, Indonesia (jointly funded and organized by ISAAA, APEC Secretariat, and Program for Biosafety System (PBS)).
- Communication Workshop on Agricultural Biotechnology, May 16, 2013 (jointly organized by the International Food Information Council (IFIC) IndoBIC).
- Media Workshop on Communicating Food Science, May 15, 2013, (jointly organized by IFIC and IndoBIC).

#### **Funded under USAID through PBS**

- International Training Course: “Developing and regulating Ag. Biotech Products: sharing expertise from Australia and South East Asia”, June 10 – 13, 2014, in Canberra, Australia (organized by PBS/IFPRI, OGTR Australia, and Crawford Foundation).
- Forum Group Discussion on Environmental Safety Assessment, March 11, 2014.
- Forum Group Discussion on Food Safety of Stacked Gene Transgenic Products, March 10, 2014.
- Workshop on “Basic Biotechnology for High School Biology Teacher, Yogyakarta, July, 3 – 5,

2013.

- University Outreach in the University of North Sumatera, June 24, 2013 in Medan, Indonesia.
- Workshop on “Socio-Economic and Legal Aspect of GMO Assessment”, February 18 – 19, 2013 in Jakarta, Indonesia.
- Workshop on “Process Management Mapping for Stakeholders”, February 4 – 8, 2013 in Jakarta and Bogor, Indonesia.

**Funded under Biotech Outreach Fund, Bureau of Economic, Energy, and Business Affairs (EEB), U.S. Department of State**

- Biotechnology Conference, October 10 – 13, 2013, in Surabaya, Indonesia (jointly organized by University of National Development (UPN Veteran) East Java and Consulate General Surabaya).
- Workshop on The Role of Agricultural Biotechnology in Food Security and the Sustainable Use of and Conservation of Biodiversity, September 3, 2013, in Jakarta, Indonesia (jointly organized by FAS Jakarta and Bogor Agricultural University).

**b) STRATEGIES AND NEEDS:**

Indonesia has significant capacity to promulgate but limited capability to enforce regulations with respect to biosafety of GE products. Reportedly, Indonesia has specific needs in raising the capacity of this country to apply transparent and science-based regulations to plant biotechnology, such as: knowledge improvement of technical team through biosafety training on stacked event of GE products, finalizing the guideline for research and development of transgenic products in the laboratory, biosafety containment, and confined field, as well as developing food safety and feed safety assessment guidelines for stacked event, and monitoring program.

Although the GOI has admitted that biotechnology is one of the possible tools to increase Indonesia’s food production capacity, it hasn’t been confident enough to adopt the technology. In addition, some of the new administration’s leadership may have little or no knowledge of biotechnology. Therefore, Post will continue to actively support the activities on advocating the positive roles of agriculture biotechnology in supporting food security in Indonesia and increasing farmers income.

**CHAPTER 2: ANIMAL BIOTECHNOLOGY**

**PART E: PRODUCTION AND TRADE**

**a) PRODUCT DEVELOPMENT:**

Some research institutions and universities have reportedly conducted studies on molecular marker, such as: research on local genetic cow, bull, and chicken using gene markers, identification of animal characteristics to heat tolerance and feeding utilization, and GE chicken (resistant to New Castle disease) using simple breeding method.

**b) COMMERCIAL PRODUCTION:**

There is no commercial production of GE animals in Indonesia.

**c) EXPORTS:**

Not applicable

- d) **IMPORTS:**  
Not applicable

**PART F: POLICY**

- a) **REGULATION:**  
Although the GOI have several regulations to legalize animal biotechnology, there are no clear guidelines to assess and approve it.
- b) **LABELING:**  
Not applicable
- c) **TRADE BARRIERS:**  
Not applicable
- d) **INTELLECTUAL PROPERTY RIGHTS (IPR):**  
Not applicable
- e) **INTERNATIONAL TREATIES/FORA:**  
Not applicable

**PART G: MARKETING**

- a) **MARKET ACCEPTANCE:**  
Not applicable
- b) **PUBLIC/PRIVATE OPINIONS:**  
Not applicable
- c) **MARKET STUDIES:**  
Not applicable

**PART H: CAPACITY BUILDING AND OUTREACH**

- a) **ACTIVITIES:**  
Indonesia participated in the 2nd International Workshop for Regulation of Animal Biotechnology in Brasilia, Brazil on August 18 – 21, 2014. This event marks Indonesia's debut in animal biotechnology regulatory framework analysis.
- b) **STRATEGIES AND NEEDS:**  
Not applicable