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Report Highlights:

The Philippines is a regional biotechnology leader, highlighted by its passage in 2021 of Golden Rice for commercial propagation and Bt eggplant for direct use. This year also featured the Philippine Department of Agriculture inaugurating the Crop Biotechnology Center housed in the Philippine Rice Research Institute in the Science City of Munoz, Nueva Ecija. The modern facility was funded with PhP277 million (\$5.4 million) from the U.S. Public Law 480 program and is poised to be the country's hub for innovative plant research. Following passage of the National Committee on Biosafety of the Philippines Resolution No. 1, series of 2020, the Bureau of Plant Industry is nearing completion of implementing rules on the regulation of gene edited plants and plant products. Moreover, by early 2022 the Philippines is also likely to complete its revision of current biotechnology regulations embodied in the Joint Departmental Circular of 2016.

EXECUTIVE SUMMARY

The Philippines is a regional biotechnology leader, having been the first Asian country to allow the planting of a genetically engineered (GE) crop (Bt corn in 2003), and is moving forward on a regulatory framework for GE animals and products of innovative biotechnologies. Biotechnology is used as a tool to enhance crop production and performance, shorten crop varietal development, improve livestock production, and produce bio-fertilizers and biofuels from agricultural waste.

On July 21, 2021, the Philippine government approved the commercial propagation permit for Golden Rice after a comprehensive multi-agency review, which determined that Golden Rice is as safe as conventional rice. On the same day, the government also approved the permit for Bt eggplant's direct use as food and feed or processing. The Philippines is the first country to approve Golden Rice for propagation, and the second after Bangladesh to approve Bt eggplant for direct use. Currently, only GE corn is commercially propagated in the Philippines. Since its introduction, GE corn planted area has grown from 10,769 hectares in 2003 to nearly 677,544 hectares in 2020. Golden Rice requires varietal registration before the government can distribute seeds and farmers begin planting.

There have been no major trade disruptions involving GE crops, but there is a lengthy, multi-agency process for approving and renewing biotech events. Recognizing the need for improvement, the government is close to completing its revision of regulations embodied in the Joint Department Circular No. 1, Series of 2016 (JDC 1). The JDC 1 provides the regulatory policy for importation, handling and use, transboundary movement, release into the environment, and management of GE plants and plant products. The agencies involved in the JDC 1 are reviewing how to modernize and streamline the regulatory framework, making note to comply with the Ease of Doing Business law. The revised JDC may be finalized by early 2022. Parallel to this are efforts to have a regulatory framework covering GE animals, as well as policy governing plant breeding innovations (e.g., genome editing). Although both faced delays due to COVID-19, the latter is progressing after passage of the National Committee on Biosafety of the Philippines Resolution No. 1, series of 2020. With the Bureau of Plant Industry working on the draft implementing regulations, the policy is expected to be finalized by the end of 2021.

On September 30, 2021, the Philippine Department of Agriculture (DA) inaugurated the Crop Biotechnology Center housed in the Philippine Rice Research Institute (PhilRice) in the Science City of Muñoz, Nueva Ecija. The Center was funded with PhP277 million (\$5.4 million) from the U.S. Public Law 480 program and is poised to be the country's hub for innovative research for a variety of crops.

The Philippines was the tenth largest market for U.S. agricultural and related products with exports reaching \$3.2 billion in 2020, up seven percent from 2019. The country continues to be the largest U.S. soybean meal market (all of which is GE), with \$900 million in sales in 2020. Exports from the United States through August 2021 are up 16 percent year-over-year, on pace for a record high in 2021.

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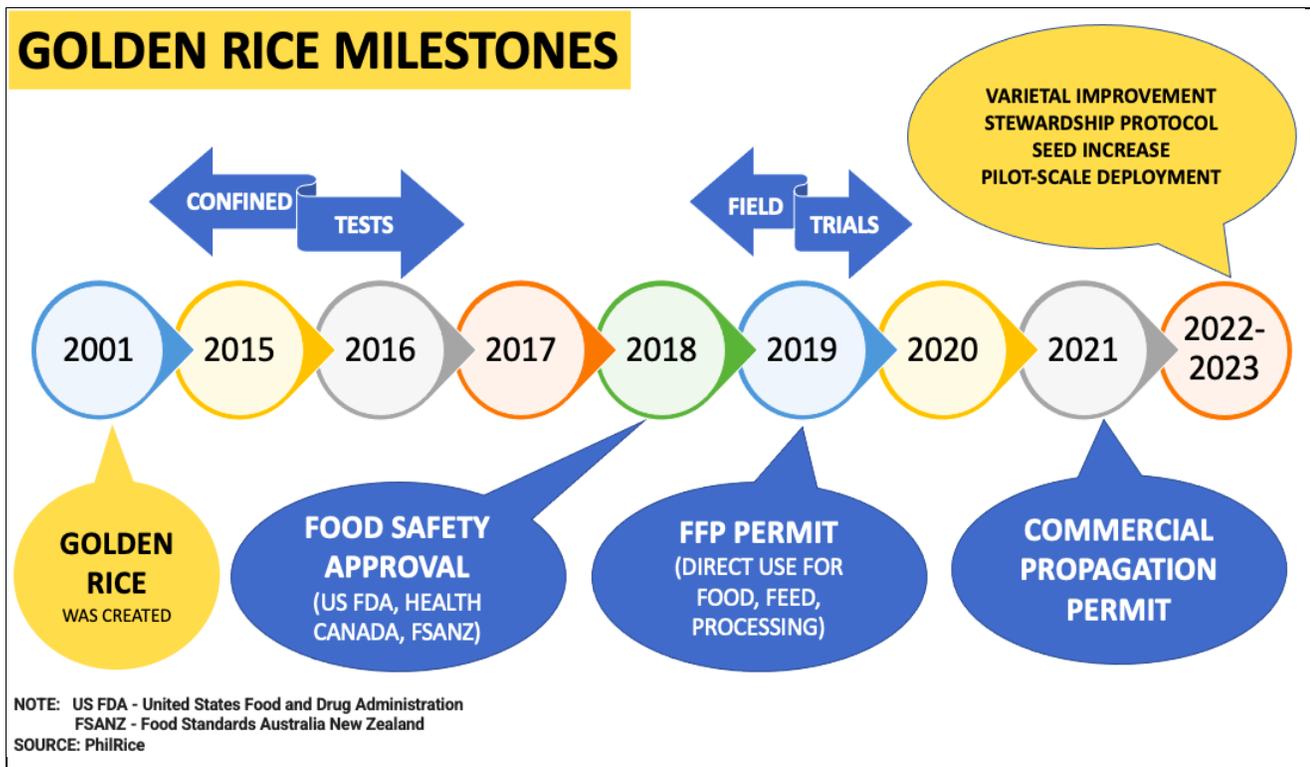
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CHAPTER 1: PLANT BIOTECHNOLOGY

Biotechnology is one of the tools the Philippines uses to reach its food security goals and to modernize its food systems to meet the United Nations [Sustainable Development Goal](#) number 2 of zero hunger by 2030. Agricultural biotechnology is defined as a range of tools, including traditional breeding techniques, that alter living organisms, or parts of organisms, to make or modify products; improve plants or animals; or develop microorganisms for specific agricultural uses. Modern biotechnology today includes the tools of genetic engineering ([USDA Agricultural Biotechnology Glossary, n.d.](#)).

PART A: PRODUCTION AND TRADE

a) **PRODUCT DEVELOPMENT:** On July 21, 2021, the [Philippines approved Golden Rice](#) for commercial propagation. Spearheaded by the Philippine Rice Research Institute (PhilRice) in partnership with the International Rice Research Institute, the beta-carotene enriched rice aims to reduce vitamin A deficiency. The body converts beta carotene into vitamin A, which is particularly relevant for impoverished populations who rely on rice for their daily meals. While beta carotene is naturally available in fruits, vegetables, and whole grains, it is not present in milled rice. The project was supported by Bill and Melinda Gates Foundation, the Rockefeller Foundation, USAID, and the Philippine Department of Agriculture - Biotechnology Program Office (DA-BPO). PhilRice is now preparing for the required varietal registrations, followed by efforts to provide Golden Rice first to areas that have the greatest need to address vitamin A deficiency.



The Philippines has several genetically engineered (GE) crops in the research and regulatory approval pipeline:

The University of the Philippines - Institute of Plant Breeding ([UPLB-IPB](#)) is developing Bt Eggplant to address the major pest known as eggplant fruit and shoot borer. The Bureau of Plant Industry (BPI) issued a [biosafety permit](#) for direct use for food, feed, or processing for Bt Eggplant on July 21, 2021, determining it safe for consumption. [Earlier studies](#) conducted on the costs and benefits of Bt eggplant noted that the average potential net benefit of planting Bt eggplant is PhP272,000 (\$6,243) per hectare higher than conventional varieties in the province of Pangasinan and PhP120,000 (\$2,753) higher in Camarines Sur. This profit increase is due to higher marketable yield and reduced pesticide use. A team of researchers from UPLB projected a 48 percent reduction in pesticide application per hectare, which translates to 19.5 percent lower environmental footprint compared to conventional eggplant.

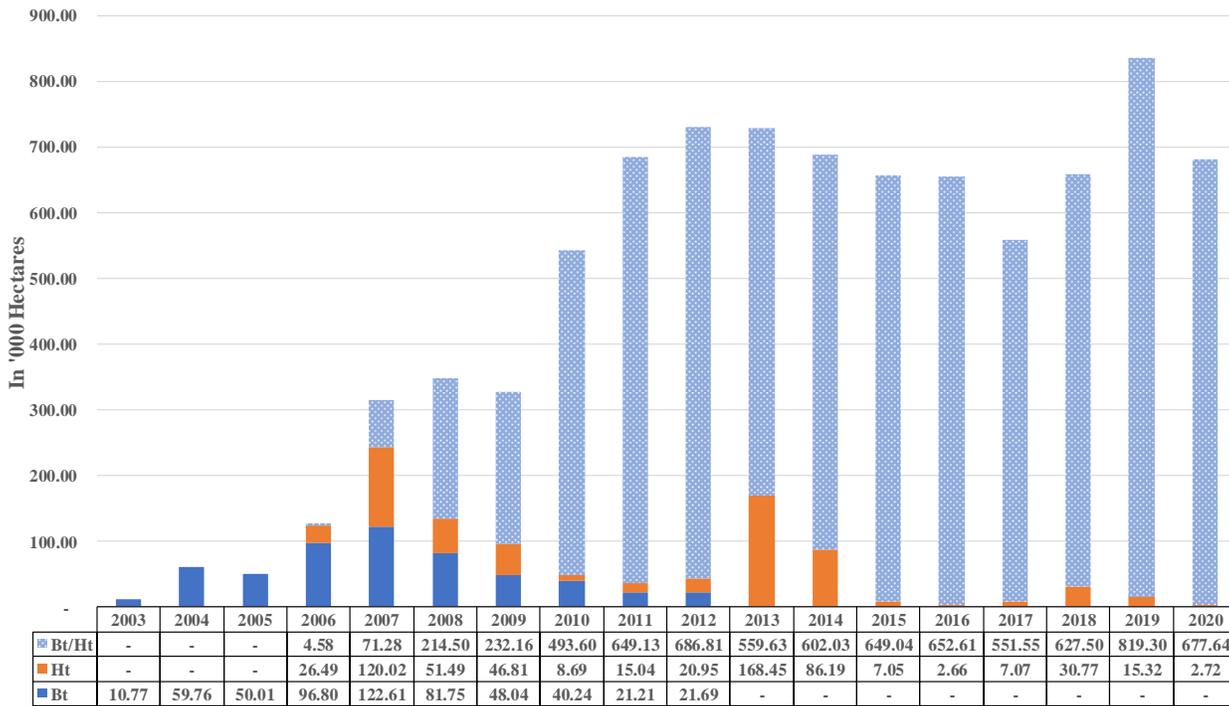
The Philippine Fiber Industry Development Authority ([PhilFIDA](#)) is promoting Bt Cotton as a solution to the challenges of cotton bollworm, although an application for commercial propagation remains forthcoming. Paired with the development of Bt cotton will be the promotion of heirloom and organic cotton production technology to revive the Philippine cotton industry. For more details, see the [GAIN Agricultural Biotechnology Annual 2020](#).

Other products being developed include Papaya Ringspot Virus-Resistant (PRSV-R) papaya and Multiple Virus Resistant (MVR) tomato. PRSV-R Papaya was developed by UPLB-IPB with funding from the Department of Science and Technology – Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development ([DOST-PCAARRD](#)) and support from USAID. It completed its first field test in 2014 and a second trial in 2017. Preparations for further trials are underway. Meanwhile, MVR tomato is still being studied.

b) **COMMERCIAL PRODUCTION:** Corn is currently the only commercially propagated GE crop in the Philippines, although Golden Rice will soon be the second. The development of GE corn started in 1996 under a collaborative study of UPLB-IPB and Pioneer Overseas Corporation. The first GE corn was approved for commercial propagation in 2002. Since then, more corn transformation events in corn were accomplished by various companies and given biosafety permits.

There are two general traits developed for yellow corn: 1) insect resistance (Bt), which protects corn from pests, especially the Asiatic Corn Borer; and 2) herbicide tolerance, which allows the use of a single (instead of multiple) broad spectrum herbicide. Since the approval of Bt corn in 2002 and Roundup Ready (RR) or herbicide tolerant (HT) corn, companies also developed GE corn with stacked traits (Bt + HT), and the area planted with GE corn grew rapidly. Based on BPI data, GE corn area increased from 10,769 hectares in 2003 to 677,644 hectares in 2021. The growth is an indication of increasing acceptance of using GE corn. The drop from 2019's high may be explained by the logistical challenges due to the Covid-19 pandemic. Currently, nearly all planted GE corn is stacked. The current list of approved GE corn events for propagation are available [here](#).

PHILIPPINE GE CORN PLANTED AREA
In '000 Hectares



Source: DA-BPO

GE corn area would be higher if the use of counterfeit GE seeds were included. Sold as conventional seeds, counterfeit GE seeds are produced with Bt and RR traits. Although cheaper, they are inferior in quality and sold without proper stewardship measures. The same source estimates counterfeit GE seeds at around 10 percent of overall Bt corn seeds. Counterfeit seeds may be susceptible to pests and diseases, which will affect farmer incomes.

One example of a pest is the fall armyworm or FAW (*Spodoptera grugiperda*), which has been detected across the region. It was found two years ago in the Cagayan Valley region and has since spread throughout the country, according to DA. With its spread to rice farms, DA prepared the country’s rice research and development workers for the possible infestation. PhilRice tapped the [Centre for Agriculture and Biosciences International](#) (CABI) to conduct intensive training with technical workers in the country to prepare for possible FAW infestation. Working with CABI pest experts, PhilRice is crafting strategies in developing and disseminating pest management protocol for rice technicians and extension workers.

On March 31, 2021, the DA issued [Memorandum Order 26](#), establishing the Fall Armyworm Management Project. It entails the conduct of pest monitoring and surveillance and the distribution of interventions in managing FAW incidences in corn production areas. The direct interventions include the distribution of pheromone lures, pesticides, power sprayers, ICT equipment, and pest awareness materials.

The JDC 1 has time-bound the validity of biosafety permits for FFP and commercial propagation for five years, and requires constant renewals. One of the proposals under the revised JDC is to have biosafety permits no longer expire, so long as no new information is available that would prevent its continued approval.

c) EXPORTS: The Philippines exports no GE crops. Philippine corn is currently prohibited from being exported, although a local industry association has asked the government to lift the restriction when local corn prices are down.

d) IMPORTS: The Philippines imports a variety of GE crops, with approvals for direct use including soybean, corn, cotton, canola, potato, rice, eggplant, and alfalfa. Refer here for the [status of applications for direct use](#).

The following table shows U.S. exports of GE crops and byproducts to the Philippines. Soybean meal is the largest export, followed by feeds and fodders, and ethanol using corn as feedstock. In 2020, Philippine imports of GE crops and by-products from the United States increased by six percent to over \$1.2 billion.

U.S. EXPORTS TO THE PHILIPPINES (\$'000)			
Commodity	2018	2019	2020
Soybean Meal	883,779	787,800	899,997
Feeds, Ing. and Fodders	140,449	142,811	147,004
Ethanol (non-beverage)	125,258	94,038	64,314
Soybeans	65,903	51,695	54,291
Coarse Grains (incl. corn)	56,680	42,765	43,557
Grains Feed Misc	33,721	37,366	32,282
Sweeteners (Sugar and Honey)	18,681	14,278	11,235
Cotton	23,224	12,271	3,593
TOTAL	1,347,695	1,183,024	1,256,273

Source: U.S. Bureau of Census Trade Data

The table excludes exports of U.S. consumer-oriented products, many of which contain GE-derived ingredients. Sales of U.S. consumer-oriented products to the Philippines reached \$1.1 billion in 2020, flat from 2019.

Philippine regulations require shipments of various imported plant and plant products to be accompanied by a “Declaration of GMO Content” signed by one of the following: the responsible officer from the originating country, an accredited laboratory, the shipper, or the importer. In August of 2021, BPI issued a [memorandum](#) updating the list of commodities requiring the “GM” declaration, [expanding to more products beyond bulk commodities](#). Importers remain authorized to sign the “Declaration of GMO Content.”

Following is a sample form of this declaration:

Declaration of GMO Content

The shipment may contain a GM ingredient:
Yes _____ No _____

If yes, list the probable transformation events.

Present	<i>To be filled up by the PQS Officer</i>	
	In the Approval Registry	Not in the Approval Registry
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Signature]
Plant Quarantine Officer

[Signature]
Responsible Officer from the Country of Origin/Accredited Laboratory/Importer/Shipper

Source: Philippine Department of Agriculture

e) **FOOD AID:** The Philippines is a consistent food aid recipient through the USDA Food for Progress program (e.g., GE soybean meal). The importation of food aid commodities has been unimpeded by GE issues.

f) **TRADE BARRIERS:** Delays in the processing of biosafety permits have the most potential to disrupt U.S. exports of GE products, although there have been no trade disruptions so far.

PART B: POLICY

a) **REGULATORY FRAMEWORK:** The Philippines continues to be a leader of biotechnology in Southeast Asia. It was the first in the region to have a regulatory framework on GE crops, the first in Asia to approve cultivation of a GE crop for food and feed, and the first in the world to approve Golden Rice for cultivation. Golden Rice and Bt Corn are currently the two crops that are allowed for commercial propagation in the Philippines.

In 1990, the National Committee of Biosafety in the Philippines (NCBP) was created as the policy-making body through Executive Order ([EO 430](#)), further strengthened by [EO 514](#), and chaired by the DOST Secretary. It evolved with Administrative Order No. 8 ([AO 8](#)) in 2009, and after the Supreme Court ruled that AO 8 was null and void in 2015, was replaced by the Joint Department Circular No. 1 ([JDC 1](#)) in 2016. For more details, see the [2020 Biotech Report](#).

The JDC 1 provides the regulatory policy for importation, handling and use, transboundary movement, release into the environment, and management of GE plants and plant products. The agencies involved in the JDC 1 are reviewing how to modernize and streamline the regulatory framework, making note to

comply with the Ease of Doing Business law. The revised JDC may be finalized by early 2022. Parallel to this are efforts to have a regulatory framework covering GE animals, as well as policy governing plant breeding innovations (e.g., genome editing). Although both faced delays due to COVID-19, the latter is progressing after passage of the National Committee on Biosafety of the Philippines Resolution No. 1, series of 2020. With the Bureau of Plant Industry working on the draft implementing regulations, the policy may be finalized by the end of 2021. Currently, the institutions involved in the regulation of biotechnology crops under the JDC 1 are as follows:

INSTITUTIONS IN CROP BIOTECHNOLOGY POLICY	
Regulations	Risk assessments and registrations
NCBP - mandated to formulate, review, amend the biosafety guidelines.	DENR - conducts risk assessment for impact of biotech crops on the environment
DOST-Biosafety Committee - processes applications for Contained use and Confined Test and issues Certificates of Completion.	DOH - conducts risk assessment for the impact of biotech crops as food on human health
DA-BPI and DA-BC - consolidate and evaluate the risk assessment reports. The BPI Director issues Biosafety Permit for applications for (Multi-location) Field Test, Commercial Propagation, and Direct Use for food, feed or processing	DA-BAI - conducts risk assessment for the impact of biotech crops as feed on animals DA-FPA - registration of plant incorporated protectants (PIP)

Note:

NCBP – National Committee of Biosafety in the Philippines

DOST – Department of Science and Technology

DA-BPI – Bureau of Plant Industry

DA-BC – Biosafety Committee

DA-BAI – Bureau of Animal Industry

DA-FPA – Fertilizer and Pesticides Authority

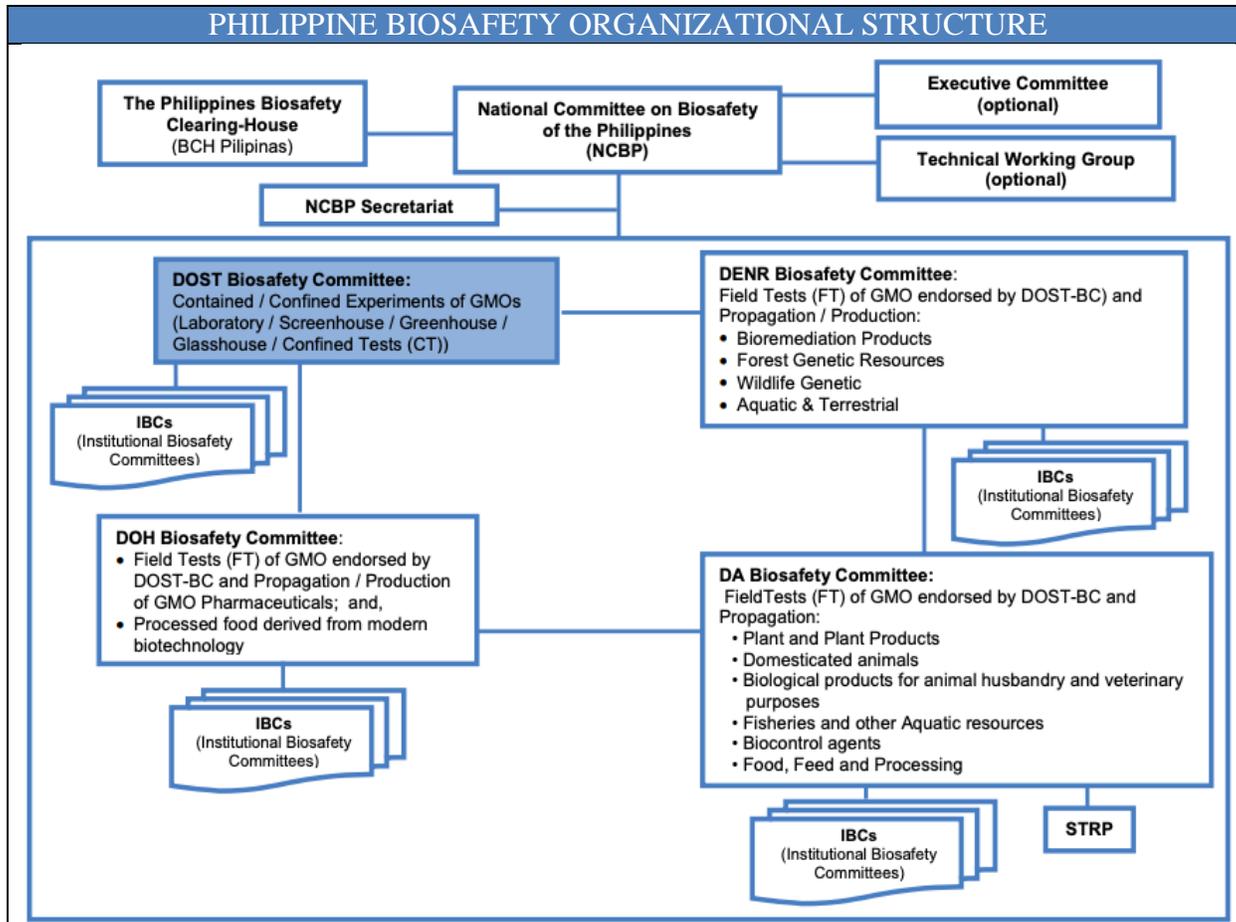
DENR – Department of Environment and Natural Resources

DOH – Department of Health

Source: JDC 1

The Philippine government created the [BPI Biotech Core Team](#) (BPI-BCT) in 2017 to assist in the implementation of biotechnology activities. A new [composition](#) of the BPI-BCT was implemented in June 2021.

Under the JDC 1, the DOST and DA lead the implementation of biosafety guidelines. The other agencies involved are DOH, DENR, and DILG. Every stage of the research and development of GE crops is regulated until reaching the commercialization phase. For ease in compliance, the DOST published the [biosafety guidelines](#).



Source: [The Philippine Biosafety Guidelines for Contained Use of GMOs: Revised Edition, 2014](#)

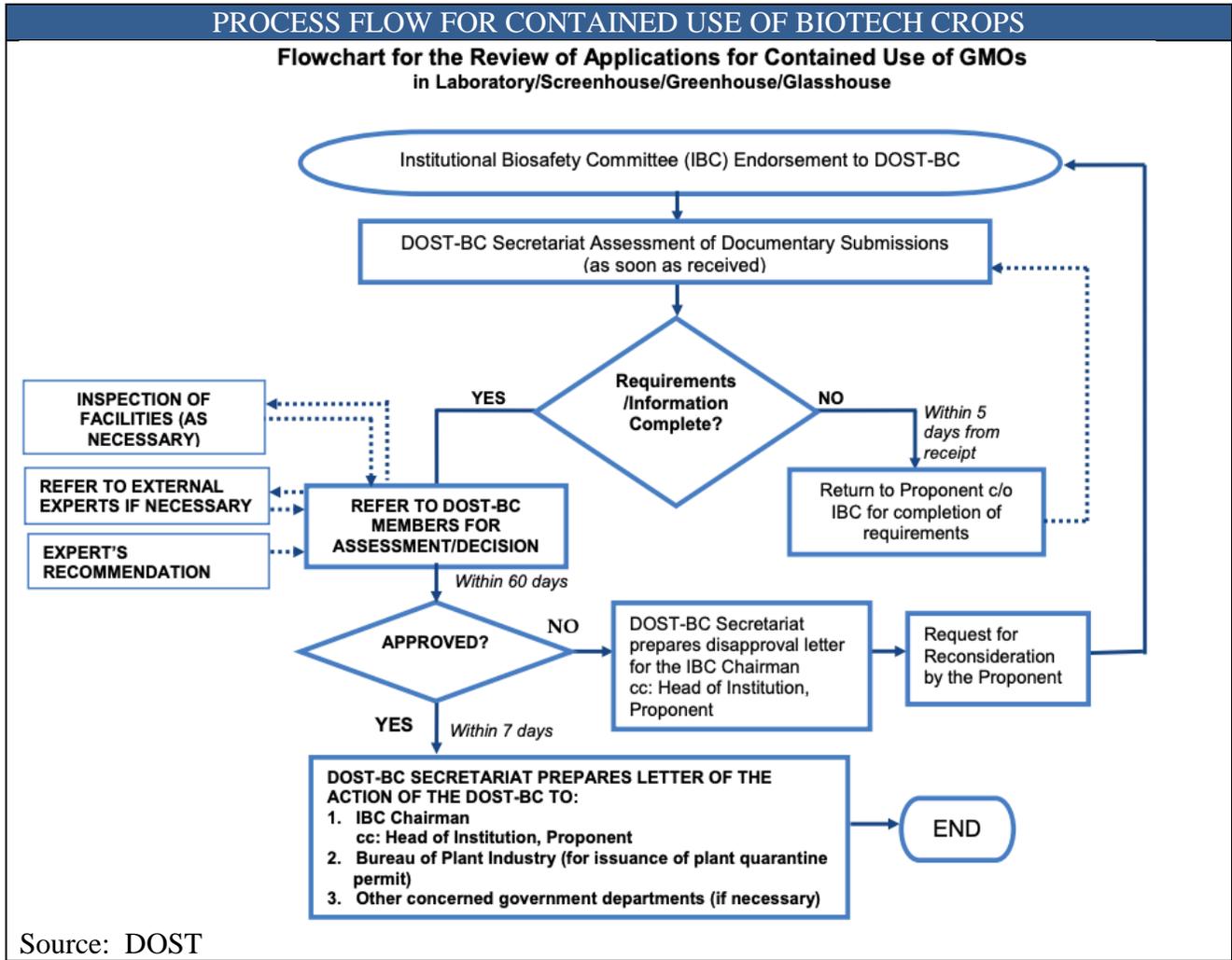
GE crops developed locally and intended to be commercially grown in the Philippines must undergo four regulatory processes following the guidelines set forth under the JDC 1. The process flow is presented [here](#). Each of the processes is estimated to take 85 days to complete, but industry sources note it can take much longer. Only after a biosafety permit is issued with the satisfactory completion and approval of Commercial Propagation application can the GE crop be registered with the National Seed Industry Council. Under the Plant Variety Protection Act (PVPA), GE developers reserve the right to give exclusive contracts to seed companies for the multiplication and distribution of seeds to retailers and ultimately sell to the farmers.

b) APPROVALS: The status of applications for [direct use](#), [field trial](#), and [propagation](#) are listed on the [DA BPO website](#).

c) STACKED or PYRAMID EVENT APPROVALS: For GE Corn in the Philippines, recent varieties generally have stacked traits, a combination of Bt (insect resistance) and HT (herbicide tolerance). Stacked event crops composed of approved individual events must reapply under the current JDC 1, but this may be streamlined under the proposed revised JDC.

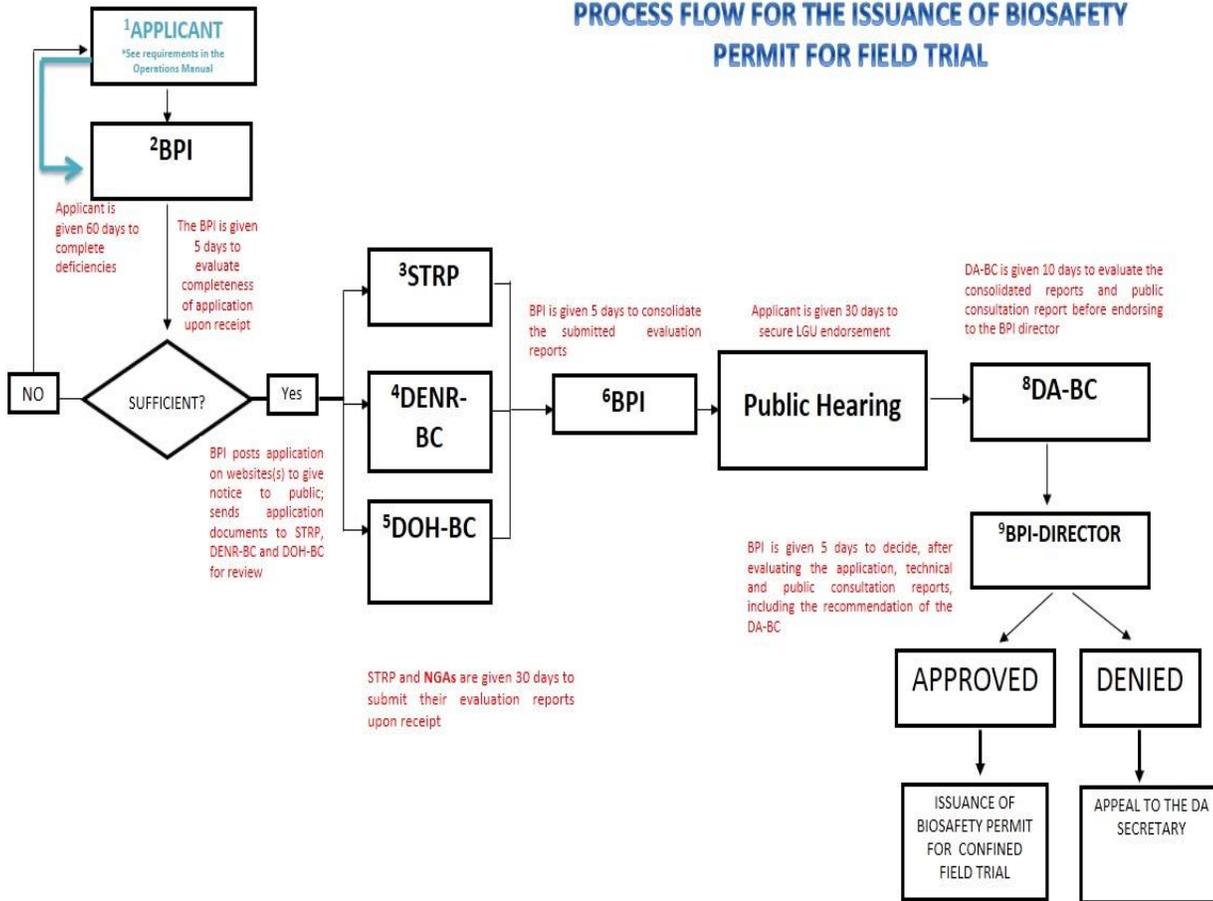
d) FIELD TESTING: Field test applications are required to undergo public hearings in coordination with the concerned local government unit prior to its endorsement. The data from

Contained Use/Confined Trial are used in the application for Confined Field Trial. These applications are submitted to the BPI for review. Below is the process and the regulatory institutions involved. A field trial to generate data for environmental biosafety risk assessment of Golden Rice was conducted and [approved on May 20, 2019](#), the only field trial application so far under the JDC 1.



PROCESS FLOW FOR FIELD TRIAL

PROCESS FLOW FOR THE ISSUANCE OF BIOSAFETY PERMIT FOR FIELD TRIAL



Source: [DA-BPO](#)

e) **INNOVATIVE BIOTECHNOLOGIES:** The Philippines is nearing a regulatory framework to govern genome editing of plants and plant products. As stated in the [NCBP Resolution No. 1 Series of 2020](#), the NCPB found that Plant Breeding Innovations (PBIs) are a new set of molecular, genomics and cellular tools that enable the targeted and efficient development of new varieties of crops with desired traits in a way that is faster and more precise than conventional plant breeding techniques. The resolution declared that products from BPIs may be classified as GE if they “contain a novel combination of genetic material obtained through the use of modern biotechnology,” defined as not being possible through conventional breeding. Otherwise, products from BPIs would be classified as non-GE or conventional “if they do not contain a novel combination of genetic materials.”

Following passage of the NCBP Resolution, BPI is drafting implementing regulations that once finalized, will set the rules and procedures for plants and plant products using PBIs. Sources expect the policy to be completed in late 2021.

The [Philippine Genome Center](#) was launched in 2011 under the University of the Philippines system. PGC is involved in a variety of genomics research, with [agriculture projects](#) including coconut, shrimp, coffee, abaca, banana (saba), sugarcane, pili, and dairy cattle. Other focus areas are development of diagnostic kits for identifying disease and genetic diversity of livestock, crops, forest trees, fish, and food. [UPLB](#) research also supports studies on these crops.

f) COEXISTENCE: There are no rules in place or proposed on coexistence.

g) LABELING and TRACEABILITY: Currently there are no labeling requirements for GE food products. The most recent GE labeling bill filed under the 18th Philippine Congress is [House Bill 6411](#) known as “The Philippine GMO Labeling and Regulation Act, The Right-to-Know Act” which would require the mandatory labeling and regulation of food containing GE ingredients or derived from GE. There has been little development since the 2020 report.

h) MONITORING AND TESTING: Monitoring of GE crop propagation is handled by BPI’s Post Approval Monitoring group. The permit to propagate GE crops carries a stipulated provision that requires the technology developer to undertake insect resistance management practices (if the approved event is Bt) and/or weed resistance interventions if the event involved is glyphosate-tolerance. The monitoring and testing process follows the process as presented in the field trials above and the below process for the review of application. Details on testing, monitoring, and reporting requirements are included in the [biosafety guidelines](#).

i) LOW LEVEL PRESENCE (LLP) POLICY: In early 2009, the DA approved Administrative Order No. 1 (DA-AO No. 1) adopting Annex 3 of the Codex Plant Guideline i.e., “Food Safety Assessment in Situations of Low-Level Presence of Recombinant-DNA Plant Material in Food” for the conduct of food safety assessment in situations of LLP of recombinant-DNA plant materials in food and feed. DA-AO No. 1 directs the DA Policy and Regulatory Office to clarify issues and formulate guidelines to implement the LLP policy. To date, no implementing guidelines have been issued.

j) ADDITIONAL REGULATORY REQUIREMENTS: In October 2020, all technology developers filing GE applications were required to submit [two studies](#) to hasten the biosafety approval process and information on the changes on the product.

After an application is approved, seed registration is still required with the [National Seed Industry Council](#) under BPI.

k) INTELLECTUAL PROPERTY RIGHTS (IPR): There are no plant patents in the Philippines. The country achieved compliance with its obligations under the World Trade Organization Trade Related Aspects of Intellectual Property Rights Agreement on June 11 2007 with the passage of Republic Act 9168, otherwise known as the [Plant Variety Protection Act of 2002](#) (PVPA).

Under the PVPA, holders of Plant Variety Protection certificates have the right to authorize the production, reproduction, export, and import of the varieties that they have developed. These rights extend to harvested material from the unauthorized use of their protected varieties – except if the use is by small farmers. Their rights also cover derived varieties (or those varieties predominantly derived from the initial variety under protection). Provisional protection is provided to breeders, entitling them

to some remuneration from the time the application is published until the granting of the certificate of PVP.

In cases of infringement, the holder of the PVP certificate may petition the regional trial court for relief. As with other intellectual property rights laws, the local courts are relied on for enforcement. Under the PVPA, farmers are accorded the traditional right to save, use, exchange, share, or sell their farm produce of a protected variety, except when the sale is for the purpose of reproduction under a commercial marketing agreement. The exchange and sale of seeds among farmers is allowed on the condition that these are reproduced and replanted on their own lands.

l) **CARTAGENA PROTOCOL RATIFICATION:** The Philippine Senate on August 14, 2006 adopted Senate Resolution No. 92 or the “Resolution Concurring in the Ratification of the Cartagena Protocol on Biosafety (CPB) to the UN Convention on Biological Diversity.” The CPB ratification followed the March 2006 issuance of [Executive Order No. 514](#), adopting the National Biosafety Framework (NBF), which was the interim implementing mechanism of the CPB. The NCPB oversees the implementation of the NBF and coordinates the implementation of decisions made under the Conference of Parties serving as Meeting of Parties (COP-MOP) in fulfilling the country’s international obligations as Party to the Cartagena Protocol on Biosafety.

m) **INTERNATIONAL TREATIES and FORUMS:** The Philippines actively participates in international forums, including Codex Alimentarius as well as related activities of the Asia Pacific Economic Cooperation (APEC).

n) **RELATED ISSUES:** Additional information and updates on related issues can be accessed on the DA’s [biotech website](#).

On September 30, 2021, the Philippine Department of Agriculture inaugurated the Crop Biotechnology Center housed in the Philippine Rice Research Institute (PhilRice) in the Science City of Muñoz, Nueva Ecija. The Center was funded with PhP277 million (\$5.4 million) from the U.S. Public Law 480 program and is poised to be the country’s hub for innovative research for a variety of crops.

The Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress ([NKLSP](#)) which was finalized in 2010 and put into force in 2018 has not been ratified in the Philippines, despite being one of the negotiators. In 2016, the NCBP Technical Working Group (TWG) assessed the country's preparedness in implementing the NKLSP and tackled existing laws and policies that would address the damage. Key findings indicated the lack of a unified operational definition of damage to biological diversity. Furthermore, the administrative nature of the NKLSP would require an agency authorized for its implementation.

The UP Law Center carried out a project on [developing a framework to implement the NKLSP](#) should the country decide to accede to the Protocol. A TWG was also created for the project composed of representatives from different competent agencies. The TWG identified the DENR to implement the NKLSP, since it has the responsibility over the conservation and sustainable use of biodiversity.

PART C: MARKETING

a) **PUBLIC/PRIVATE OPINIONS:** Support for GE products remains strong among local corn farmers, hog and poultry raisers, feed millers, food processors, academe, and other end users. Although supportive, large domestic food and agribusiness companies that are already using GE products prefer to remain silent on the issue. On the other hand, non-governmental organizations (NGOs), including environmental groups, organic agriculture advocates, and other civil society groups represent vocal opposition to agricultural biotechnology. The majority of Filipinos remain indifferent.

The much-publicized Supreme Court ruling in December 2015, as well as the ensuing JDC public consultations in 2016, brought the GE debate into the limelight. It raised public curiosity and interest in GE. Many policy makers, including Philippine legislators and members of the judiciary, have expressed increased interest in obtaining current information on GE crops and products.

A prevailing issue to the developers of GE corn is the perceived prevalence of counterfeit GE corn seeds. Companies argue that farmers' purchase of counterfeit GE seeds is bad not just for their business but also for the corn farmers' income, corn supply, and insect management resistance.

b) **MARKET ACCEPTANCE/STUDIES:** Despite the established safety of GE products, increased market acceptance is dampened by the misinformation campaign by anti-GE advocates. One indicator of market acceptance, however, is the growth in GE corn area from just 10.7 hectares planted in 2003 to nearly 700,000 hectares in 2020.

Preliminary findings from one Singapore-based research group in 2021 found that many Filipino consumers are unaware of what GE products are in the market and unsure if they are consuming them. The study noted a plurality of consumers (33 percent) were undecided whether they would consider GE foods in the future, compared to 21 percent very likely/likely and 41 percent who responded they were very unlikely/unlikely.

In 2009, students from the Asian Institute of Management conducted market research on Golden Rice to identify attitudes and perceptions pertaining to diet and nutrition. Their [final report](#) and [presentation](#) found that in general, despite the different color and being a GE crop, results showed high acceptability for Golden Rice but noted respondents had little knowledge on several key factors such as those pertaining to genetically engineered crops, vitamin A deficiency, and proper nutrition.

CHAPTER 2: ANIMAL BIOTECHNOLOGY

PART D: PRODUCTION AND TRADE

a) **PRODUCT DEVELOPMENT:** According to the Livestock Biotechnology Center (LBC) artificial insemination (AI) is the most widely applied animal biotechnology, particularly in combination with cryopreservation, allowing significant genetic improvement for productivity with other technologies such as monitoring reproductive hormones, oestrus synchronization, and semen sexing for AI efficiency.

Except for AI, the above are all at the research stage and not yet at a commercial level. There are no GE or genome-edited animals or clones under development. LBC notes that animal biotechnologies in the Philippines are in the development of rapid animal disease test kits, reproductive biotechnologies, and product development.

The Philippines is still at the stage of [DNA barcoding](#) for livestock and poultry. The UPLB College of Agriculture and Food Science did a study on [genotyping dairy cattle](#) but stopped at Phase 1.

b) **COMMERCIAL PRODUCTION:** Not applicable.

c) **EXPORTS:** Not applicable.

d) **IMPORTS:** Not applicable.

e) **TRADE BARRIERS:** There are no biotechnology-related trade barriers that negatively affect U.S. animal biotechnology exports.

PART E: POLICY

a) **REGULATORY FRAMEWORK:** There is currently no legislation or regulations in place covering the development, use, import, or disposal of livestock clones, GE animals, or products derived from these animals or their offspring in the Philippines.

The DA is working on a regulatory framework for GE animals, including insects such as silkworm. Officials from LBC note it is important to develop biosafety measures for transgenic animals to prepare for possible future production and imports in a safe, science-based way. Post expects GE animal policy to be finalized after the revised JDC and implementing regulations for Plant Breeding Innovations.

b) **APPROVALS:** Not applicable.

c) **INNOVATIVE BIOTECHNOLOGIES:** Animal products are not covered in the ongoing development of regulations for plant products of genome editing (i.e., NCBP Resolution No. 1, Series of 2020). Animals made with innovative biotechnologies would likely need to be covered by a separate policy.

d) **LABELING and TRACEABILITY:** Not applicable.

e) **ADDITIONAL REGULATORY REQUIREMENTS:** Not applicable.

f) **INTELLECTUAL PROPERTY RIGHTS (IPR):** Not applicable.

g) **INTERNATIONAL TREATIES and FORUMS:** The Philippines is a member of the Codex Alimentarius and the World Organization of Animal Health and joins the discussions on agricultural biotechnology.

h) **RELATED ISSUES:** The DA's Livestock Biotechnology Center opened in 2014 and coordinates and monitors livestock biotechnology research and development in the Philippines.

PART F: MARKETING

a) **PUBLIC/PRIVATE OPINIONS:** Public awareness of GE animals is low. According to a report by a study group contracted by the DA, the regulatory issues associated with transgenic animals include food safety, environmental safety, ethical concerns, such as animal welfare, product efficacy, and effectiveness and socioeconomics.

b) **MARKET ACCEPTANCE/STUDIES:** Not applicable.

CHAPTER 3: MICROBIAL BIOTECHNOLOGY

PART G: PRODUCTION AND TRADE

a) **COMMERCIAL PRODUCTION:** No information is available regarding whether the Philippines produces food ingredients from microbial biotechnology.

b) **EXPORTS:** Not applicable.

c) **IMPORTS:** Not applicable.

d) **TRADE BARRIERS:** Not applicable.

PART H: POLICY

a) **REGULATORY FRAMEWORK:** The Philippines currently does not have a regulatory process for the commercial production, use, and trade of biotech-derived microbes or microbial biotech-derived food ingredients. Post is not aware of any discussions pertaining to the drafting of regulation or trade policies on microbial biotech.

[Executive Order No. 514, S. 2006](#) established the National Biosafety Framework and does not mention GE microbes or how they would be regulated. However, EO 514 does specify that all

research and development applications, regardless of life form or intended use, shall be regulated by the Department of Science and Technology Biosafety Committee. There have been previous experiments using GE microorganisms, as noted [here](#).

The Philippine Biosafety Guidelines for Contained Use of Genetically Modified Organisms (GMOs), Revised Edition, September 2014 stipulates that the guidelines will apply to all biotech applications under “contained use (i.e. laboratory, screen house, glasshouse, greenhouse) and confined test.” The guidelines cover plants/crops, pharmaceutical plants, animals, forest trees, and microorganisms. The full guidelines can be found [here](#). The policy and procedures to apply for a contained use experiment of biotech microbes are listed on page 56 of the Biosafety Guidelines.

- a) APPROVALS: Not applicable.
- b) LABELING and TRACEABILITY: Not applicable.
- c) MONITORING AND TESTING: Not applicable.
- d) ADDITIONAL REGULATORY REQUIREMENTS: Not applicable.
- e) INTELLECTUAL PROPERTY RIGHTS (IPR): Not applicable.
- f) RELATED ISSUES: Not applicable.

PART I: MARKETING

- a) PUBLIC/PRIVATE OPINIONS: Public awareness of microbial biotech is very low.
- b) MARKET ACCEPTANCE/STUDIES: Not applicable.

Attachments:

No Attachments