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## PAPER 1: GOVERNMENT REGULATIONS AND INTERVENTIONS FOR THE PRODUCTION OF HIGH QUALITY TROPICAL FRUITS FOR EXPORT

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### ABSTRACT

The Philippines has a rich diversity of tropical fruits wherein more than 20 different species are cultivated in the entire archipelago. Production system ranges from backyard to highly integrated operation with the latter catering to the export market. In 2016, the total production of selected fruit crops reached 10,961,730.73 MT with a total area of 811,618 hectares. For export, the top four (4) fruit crops for 2015 are: Banana (2,663,230.041 MT), Pineapple (407,205.331 MT), Mango (14,563.7056 MT) and Papaya (2,287.5839). The High Value Crops Development Program (HVCDP) now under the Bureau of Plant Industry (BPI) has a major role in the implementation of programs and projects pertaining to fruit crops activities. Highlights and support for the industry were focused of Banana Fusarium Wilt, carabao mango exports, technology demonstrations for different pineapple varieties, distribution of good quality seedlings from accredited plant nurseries, and development of fruit standards for minor fruit crops.

**Keywords:** Philippines, fruit exports, government projects

### INTRODUCTION

The Philippines has a rich diversity of tropical fruits wherein more than 20 different species are cultivated in the entire archipelago. Production system ranges from backyard to highly integrated operations with the latter catering to the export market. Farms are generally small in size ranging from 1 to 5 hectares.

Major fruit species grown in the country are: a) banana (*Musa* sp.); b) pineapple (*Ananas comosus*); c) mango (*Mangifera indica*); d) papaya (*Carica papaya*); e) calamansi (*Microfortunella microcarpa*); f) durian (*Durio zibethinus*); g) jackfruit (*Artocarpus heterophyllus*); and h) lanzones (*Lansium domesticum*).

In 2016, the total production of selected fruit crops reached 10,961,730.73 MT with a total area of 811,618 hectares. For export, the top four fruit crops for 2015 are: banana (2,663,230.041 MT), pineapple (407,205.331 MT), mango (14,563.7056 MT), and papaya (2,287.5839).

The High Value Crops Development Program (HVCDP) now under the Bureau of Plant Industry (BPI) has a major role in the implementation of programs and projects pertaining to fruit crops activities. Highlights and support for the industry were focused on banana Fusarium wherein DA-HVCDP RFOXI organized Task Force Fusarium to make an action plan for information awareness campaign, mapping, and training of banana growers. Banana Giant Cavendish Tissue Culture Variant (GCTCV) 218 and 219 resistant varieties were developed.

The US Government declared the Philippines as mango pulp and seed weevil free on February 8, 2013. Export of mango can now be sourced from any province except Palawan. A trial shipment of carabao mangoes to Dubai, UAE was done by DA RFO 12 (AMAD and HVCDP) in 2015. This is one of the outputs of the DA's participation to the Middle East Natural and Organic Products Expo (MENOPE).

A techno demo for different varieties of pineapple particularly MD2, Ulam Pine, and local variety were conducted in the following areas: Lucena, Quezon; Daet, Camarines Norte; Calauan, Laguna; and Silang, Cavite. Ulam Pine, however is a variety that is protected under the Republic Act 9168, otherwise known as Plant Variety Protection Act of 2002.

In collaboration with the Bureau of Product Standards, PNS for rambutan and guava was approved by Secretary Proceso J. Alcala and submitted to DTI for registration aside from the seven fruit standards that were developed: avocado, breadfruit, dragon fruit, marang, soursop, and sugar apple.

BPI distributed a total of 333,943 pieces of assorted fruit seedlings to beneficiaries, farmers, walk-in clients, and students while certified parent, foundation, and scion trees totaled 2,423 and 172,585 certified seedlings for 2016, which is an increase of 186.48% from 2013 which was at 93,845 seedlings. Accredited plant nurseries for fruits totaled 88 fruit crop nurseries.

The BPI completed researches on fruits particularly banana, mango, and citrus conducted from BPI-Davao NCRPSC (15), Baguio-NCRPSC (3), and BPI-GNCRPSC.

**Table 1. Production volume (in metric tons) of fruits (2012-2016)**

CROP	YEAR				
	2012	2013	2014	2015	2016
Cashew (ripe fruit with nuts)	132,541	146,289	170,853	205,531	216,398
Pili Nut (with shell)	7,933	8,243	7,316	7,362	7,291
Banana	9,226,768	8,646,417	8,884,857	9,083,929	8,903,684
Banana Cavendish	4,694,655	4,230,089	4,448,460	4,566,907	4,638,328
Banana Lakatan	942,938	930,032	954,856	970,496	898,515
Banana Saba	2,645,893	2,557,109	2,567,495	2,627,129	2,474,199
Calamansi	178,549	164,091	160,740	162,676	118,248
Durian	85,961	91,212	80,334	87,382	71,444
Lanzones	14,190	35,207	13,899	20,814	17,160
Mandarin Orange	16,755	15,287	14,045	14,064	13,243
Mango	768,410	816,378	885,038	902,739	814,055
Mango Carabao	630,596	671,929	730,140	740,239	659,014
Mangosteen	3,209	3,303	2,686	3,400	2,522
Orange	3,827	3,513	3,325	3,219	2,861
Papaya	164,913	166,336	172,628	172,650	162,481
Pineapple	2,397,745	2,458,528	2,507,098	2,582,699	2,612,474
Rambutan	7,189	7,440	6,479	8,723	7,668
Tamarind Fruit	7,921	7,782	7,558	7,436	7,128

Source: PSA, 2017

Banana is the number one fruit commodity in the Philippines, both in production and hectareage. The industry is divided into two distinct sectors namely those for the domestic market and those for the export market. For the former, the cultivars being grown are 'Lakatan', 'Latundan', 'Bungulan', and 'Saba'/'Cardaba'; while for the latter, it is the Cavendish-type cultivars ('Umalag', 'Grand Nain', 'Giant Cavendish', 'Dwarf Cavendish', etc). Pineapple production in the country is concentrated in a few provinces namely Laguna, Cavite, Camarines Norte, Southern Leyte, Bukidnon, Davao, and South Cotabato. The farms are generally small in size (1-2 ha) which

caters to the local market except for the farms managed by two multinationals (Del Monte and Dole) situated in Bukidnon, Davao, and South Cotabato, both for fresh fruit and processed products.

Mango cultivars grown are 'Carabao', 'Pico', and 'Katchamita' or popularly known as Indian. The latter cultivar is generally consumed as green mango. The industry is anchored on large backyard trees scattered in the various farms/regions of the country wherein minimal care is being done by farmers.

Papaya is grown in small farms (1-5 ha) with a productivity period of 3-4 years. The major varieties grown are 'Cavite Special', 'Sinta', and 'Solo' (yellow and red flesh). 'Sinta' is a popular variety being grown by farmers due to its moderate resistance to papaya ringspot which is prevalent in the growing areas in Luzon.

## EXPORTS

Banana, pineapple, mango, and papaya are the major fruit export commodities of the country both in fresh and processed forms.

**Table 2. Major fruit exports from 2011 to 2015 (in metric tons)**

Fruits	2011	2012	2013	2014	2015
Banana (Cavendish)	1,818,393.173	4,062,408.312	2,940,410.633	2,543,172.217	2,663,230.041
Pineapple	201,011.368	345,564.663	349,887.073	388,277.192	407,205.331
Mango	14,818.6554	15,316.7164	16,026.0025	14,366.7526	14,563.7056
Papaya	2,334.2060	4,208.2575	3,795.0515	18,294.2244	2,287.5839

Source: BPI-NPQSD

## A. BANANA

- In 2014, Giant Cavendish Tissue Culture Variant (GCTCV) 218 and 219 resistant varieties were developed by Bioversity International. These variants were found to be resistant against Fusarium wilt under Philippine conditions thus the mass production of such variety is continuously conducted. The distribution of planting materials is still on-going.
- DA-HVCDP RFO XI organized the Task Force Fusarium which came up with an action plan to addresses the following:
  - » Advocacy for the issuance of provincial/ municipal/ barangay ordinances for quarantine measures of the diseases
  - » Information awareness campaign
  - » Trainings for the prevention of the spread of Fusarium.
  - » Provision of disinfectants to affected small growers/ farmers
  - » Crop Rotation (corn after banana)
- Developed mapping of Fusarium wilt infestation in Region XI
- *"Mitigating Banana Fusarium Wilt TR4 through a Farmer Participatory Approach of Developing Disease Management Strategies"* A funded research activity on Fusarium was conducted in Davao Region. The activity was a three year project conducted with the Bureau of Agricultural Research and Biodiversity International.
  - » Established 20 farms planted with GCTCV 219 and Grand Naine as the control variety;

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- » Results showed positive response wherein GCTCV 218 and 219 resistant varieties developed by Bioversity International were found to be resistant against Fusarium wilt under Philippine conditions thus the mass production by the BPI of such variety will be continuously conducted and the seedlings produced distributed
  - » For 2015, the DA allotted funds to step up control measures of Fusarium wilt in Region XI. The following were the activities:
    - Eradication of disease thru the production of GCTCV 219
    - Crop shifting (cacao-coffee-cassava-corn-vegetables)
    - Trainings (GAP banana, GCTCV 219 production and management of Fusarium wilt)
    - IEC campaign
    - Reward dystem
    - *Trichoderma* production and utilization
    - Monitoring (Ten plant pathologists were deployed in different provinces to work with LGU technicians for the implementation of the Fusarium Management Program)
  - In 2012, when several restrictions were imposed on the exportation of Philippine horticultural products due to the scale insect which was found during inspection for China market, DA-HVCDP XI has identified the need to upgrade banana packinghouses to meet the requirements for accreditation of affected small banana exporters and conform with the standards of the General Administration of Quality Supervision, Inspection, and Quarantine of the People's Republic of China. The upgrading of these facilities did not only address this problem but also serves as a long term strategy to expand the markets for Philippine Banana thus, HVCDP provided ₱20M for the following:
  - Two units of standard packinghouses for Cavendish banana were established at Brgy. M. Guinga, Tugbok Davao City and Brgy. Casig-ang, Sto. Tomas, Davao del Norte
  - Four units of standard packinghouses were rehabilitated wherein the Mindanao Banana Farmers Exporters Association (MBFEA) are the beneficiaries located at the following :
    - » Brgy. New Bantayan, Asuncion, Davao del Norte
    - » Prk. 3 Brgy. Kimamon, Mun. of Sto. Tomas, Davao del Norte
    - » Brgy. Mamacao, Mun. of Kapalong, Davao del Norte
    - » Brgy. Tamugan, Calinan District, Davao City
  - Exportation: Philippine highland bananas to reach US shores. Eight years after requesting for market access for Philippine bananas, the Department of Agriculture (DA) through the Bureau of Plant Industry-Plant Quarantine Services (BPI-PQS) exported the country's initial shipment of 6.561 metric tons of highland bananas to the United States of America at the Mindanao International Container Terminal in Tagoloan, Misamis Oriental in September 2013.

## B. MANGO

- Developed module and conducted trainings regarding mango classifiers. This training ensures that mangoes heading for both international and domestic markets are properly classified to meet existing quality standards for mango. These trainings were conducted in Abra, Ilocos Norte, Nueva Vizcaya, Zambales, Tarlac, Antique and Iloilo, Pangasinan, La Union, Batangas, Davao del Norte, and Davao del Sur
- Exportation: The US Government declared the Philippines as mango pulp and seed weevil free on February 8, 2013. Exportation of mango can now be sourced from any province except Palawan. Trial shipment of carabao mangoes to Dubai, UAE was done by DA RFO 12

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(AMAD and HVCDP) in 2015. This was one of the outputs of the DA's participation to the Middle East Natural and Organic Products Expo (MENOPE).

### C. PINEAPPLE

- In partnership with BPI, an on-going techno demo for different varieties of pineapple particularly MD2, Ulam Pine, and local variety were conducted in the following areas: Lucena, Quezon; Daet, Camarines Norte; Calauan, Laguna; and Silang, Cavite. Ulam Pine and MD2 are varieties planted in Mindanao. Ulam Pine however, is a variety that is protected under the Republic Act 9168 otherwise known as the Plant Variety Protection Act of 2002. The project aims to:
  - » Identify and document agronomic/horticultural characteristics of different varieties of pineapple particularly MD2 and Ulam Pine;
  - » Identify farmers/co-operators who will venture into planting new varieties
  - » Introduce and commercialize 2 varieties that can be planted in Luzon

#### BICOL

- » Planted in a research outreach station of the Department of Agriculture in Daet, Camarines Norte
- » Pineapple fruits were harvested in March 26, 2015
- » Three varieties were planted: Ulam Pine, MD2, and Queen (farmers' variety)
- » A taste test was undertaken and the results were: 70% preferred the taste and texture of Ulam Pine; the local variety was the least preferred variety in terms of taste and texture

#### LAGUNA

- » Planted in Calauan, Laguna through a Farmer co-operator scheme
- » Pineapple fruits are to be harvested this April 24, 2015.
- » Three varieties were planted: Ulam pine, MD2 and Calauan variety (farmers' variety)

#### QUEZON

- » An area of approximately more than 2,000 square meters in Domoit, Lucena City was planted with 3 varieties of pineapple
- » The pineapple fruits were harvested in January 14, 2015
- » A taste test was undertaken and the results were: 75% preferred the taste and texture of Ulam Pine; the local variety was the least preferred variety in terms of taste and texture
- » Planting materials augmentation of Ulam Pine variety through micro section planting was undertaken

### D. OTHER FRUITS

- Development of Philippine National Standards (PNS)
  - » PNS for rambutan have been approved by the Secretary on November 18, 2013. The approved standards have been forwarded to the Bureau of Product Standards of the Department of Trade and Industry, as the national repository agency, for registration as "Rambutan for PNS/BAFS 124:2013".
  - » PNS for guavas have been approved by the Secretary on November 18, 2013. The approved standards have been forwarded to the Bureau of Product Standards of the Department of Trade and Industry, as the national repository agency, for registration as "Guavas for PNS/BAFS 122:2013".
  - » This is in addition to the previously developed PNS for high value crops, seven PNS were developed for CY 2012 namely : PNS for avocado, breadfruit, dragon fruit, marang, soursop, and sugar apple

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## E. CUT ACROSS COMMODITIES

- » HVCDP supported the conduct of the supply/value chain study (benchmarking) for the 11 selected agricultural commodities (mango, chili-red/hot, green mongo beans, peanut, shallots, tamarind, saba banana, garlic, lanzones, and mangosteen). The study aims to support and strengthen the development of competitive agricultural products that meet specific market demands and identify ways and means to improve the local value/supply chain of selected agricultural commodities.
- » Assisted in the certification of GAP farms for fruits. There are fourteen approved GAP certified farms: three for banana; two for pineapple; two for dragon fruit; six for mango; and one for other types of fruits.

## REGULATIONS

The Bureau of Plant Industry is also mandated to undertake regulatory activities for the fruit crop plant nursery operators to produce quality planting materials for distribution to our stakeholders. The first regulatory activity is the plant nursery accreditation program wherein plant nurseries will apply and if the requirements are met, they will be given certificates and they are given priorities in government procurements.

The other activity is the Plant Material Certification program wherein foundation trees, scion trees, clonal trees, and budwood trees are subject for certification to ensure that all are of true-to-type of the varieties and of clean material. There are a total of 172,585 seedlings certified and 2,924 trees certified.

The GAP certification program is administered by the Department of Agriculture-Bureau of Agriculture Fisheries Standards (DA-BAFS) since 2005. Pursuant to the Food Safety Act of 2013, the PhilGAP certification program is currently on transition period to the DA-Bureau of Plant Industry (DA-BPI) with the full implementation starting 2017. The standards, guidelines, protocols, and code of practices are developed and aligned to the international norms and best practices. The elements of the PhilGAP program are anchored to the ASEAN GAP. It contains four modules, namely on: (1) food safety; (2) produce quality; (3) environmental management; and (4) workers' health, safety, and welfare. Among the relevant developed PNS are code of practices for fruits and vegetable farming, corn, mango, onion, banana, rice, papaya, coffee, and cassava. As of July 2016, there are a total of 82 GAP certified farms for various crop commodities covering 22,595 hectares.

## MAJOR ACCOMPLISHMENTS OF BPI-NATIONAL PLANT QUARANTINE SERVICES

1. The Australian Government recognized the Philippines as a country free from mango pulp and seed weevils.
2. DA-BPI exported the initial shipment of 6.561 MT highland bananas to the U.S.A. at the Mindanao International Container Terminal in Tagoloan, Misamis Oriental in September, 2013.
3. BPI-Davao NCRPSC under the leadership of Dr. Lorna E. Herradura recommended resistant somaclones for planting in Fusarium-infested areas. This came from selections out of the field trials conducted in Davao region. Selections were based on good horticultural characteristics, early maturation, and with high to moderate resistance to Fusarium disease.
4. BPI-Davao remains to be the source of disease-free pummelo plant materials and pre-immunized budlings primarily for the use of the citrus rehabilitation program of the region and of the country as well.