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CGIAR Fruit and Vegetables for Sustainable Healthy Diets

Initiatives on Indigenous Fruits in the Philippines: A Scoping Study

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The CGIAR Research Initiative on **Fruit and Vegetables for Sustainable Healthy Diets (FRESH)** aims to use an end-to-end approach to increase fruit and vegetable intake and in turn improve diet quality, nutrition and health outcomes while also improving livelihoods, empowering women and youth and mitigating negative environmental impacts.

The FRESH Initiative activities are bundled into six packages, namely:

- Work Package 1: Understanding and Influencing Consumer Behaviour
- Work Package 2: Biodiversity, genetic innovation, and seed systems
- Work Package 3: Safe and sustainable production systems
- Work Package 4: Post-harvest and inclusive markets
- Work Package 5: Food Environments
- Work Package 6: Strengthening the enabling environment.

To learn more about this Initiative, please visit:
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Initiatives on Indigenous Fruits in the Philippines: A Scoping Review

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Summary

Despite their potential to diversify diets and improve nutrition, little is known about the consumption and utilization of indigenous fruits (IFs) in the Philippines. This desk review compiles and analyses different initiatives targeting the conservation and promotion of these lesser-known fruits, based on secondary data that were gathered from published and unpublished literature between 2012 to 2022. Most of the literature gathered focused on the evaluation of the functional properties of IFs and product development. Initiatives are also present in germplasm collection and conservation of IFs, characterization and assessment of diversity, variety development, evaluation of nutritional quality, and various promotional activities to increase awareness of these fruits. This review led to the identification of some IFs for conservation, promotion and further studies based on their potential in contributing to health and wellness, as well as their market potential. It also identified several issues and knowledge gaps in initiatives and research on IFs that need further investigation to better incorporate IFs in the local food system.

Keywords

Indigenous fruits, genetic resources conservation, nutrition, resilience.

Contents

Tables

Figures

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Healthy Diets

1. Introduction

The World Health Organization recommends daily consumption of at least 400g of fruits and vegetables. Likewise, the 'Pinggang Pinoy' Program of the Department of Science and Technology–Food and Nutrition Research Institute recommends that a healthy food plate for Filipino adults contain 33% cereals and cereal products, 17% meat, 33% vegetables, and 17% fruits. Diverse diets from fruits and vegetables lead to higher micronutrient intake (Fulton et al., 2016), with reduced stunting rate (Green et al.,2016) and lowered risk of non-communicable diseases (Dauchet et al., 2005; He et al., 2007). Despite this, a Food Consumption Survey undertaken on Filipino adults aged 19-59 years old showed that the daily food consumption includes 49% cereals and cereal products, 20% meat, 9% vegetables, and 3% fruits of the total daily intake (DOST-FNRI, 2022). Eating a variety of food has been recognized as a key factor in providing high-quality diets with the premise that one or two food groups cannot provide the nutritional needs to satisfy and maintain optimal health (Nair et al., 2016).

Achieving dietary diversity requires an adequate supply and access to a wide range of food choices (Tontisirin et al., 2002). However, land conversion, natural calamities and extreme weather events, increasing pressure of pests and diseases, and lifestyle changes have contributed to the loss of agricultural biodiversity (www.cbd.int). The diversity of plant species cultivated in the Philippines has decreased over the years with 27-38% of food energy consumed being non-native to the region (www.croptrust.org). This paper focuses on the conservation and seed system of wild and native fruits, as well as native and underutilized fruits. As described by Coronel (2002), native fruits include introduced species from other tropical Asian countries prior to the Spanish invasion of the Philippines in 1521. These crops are grown in traditional food systems, are suited to local conditions and are closely linked with cultural heritage. The fruits are generally climate resilient and have low carbon footprints.

This paper reviews published and unpublished literature published in the last ten years and focusing on promoting the conservation and utilization of indigenous fruits. The aim of this scoping review is to bring together key research findings, identify knowledge gaps for further research, and identify fruit species that can be promoted and prioritized in different government programs.

2. Methodology

2.1 Identification and gathering of literature

The scoping review gathered information from academic and unpublished works, providing an overview of the current state of knowledge and gaps within the field of native and indigenous fruits. Research articles on indigenous fruits were collected from online databases such as Cabi, Google Scholar, Science Direct, Scopus, and PubMed. Keywords used in the article search include but are not limited to "indigenous crops", "indigenous plants", "indigenous fruits", "traditional fruits", "native fruits", "endemic fruits", and common names and/or scientific names of known indigenous fruits in the country. Online library searches such as the Integrated Library System of the University of the Philippines were used to maximize queries. Reference lists were also scanned to identify related articles about indigenous fruits.

The scoping review also included unpublished literature as a potential source of information. Unpublished works, such as non-peer reviewed journals, conference proceedings, unpublished manuscripts, government reports, websites, news articles, and magazines, are not readily discoverable

in mainstream databases. Furthermore, government and non-government institutions and state colleges and universities were contacted by emails, phone calls, and the Freedom of Information website (eFOI). Fruit names (scientific, local/ vernacular, English), complete citation, abstract/significant findings, type of publication, funding sources, implementing and collaborating agencies, and species distribution/collecting sites were compiled in an Excel database for screening.

2.2 Screening of literature

Fruits were included based on the following inclusion/ exclusion criteria:

1. Fruit indigenous/endemic to the Philippines,
2. Native fruit that was introduced from tropical Asia prior to the Spanish invasion of 1521 (Coronel, 2002).

A list of these fruits is included in Coronel (2011) and categorized as indigenous/endemic and introduced during the pre-Spanish era. Studies included in the review were strictly published between 2012 and 2022 except for studies that provided knowledge on species' identification.

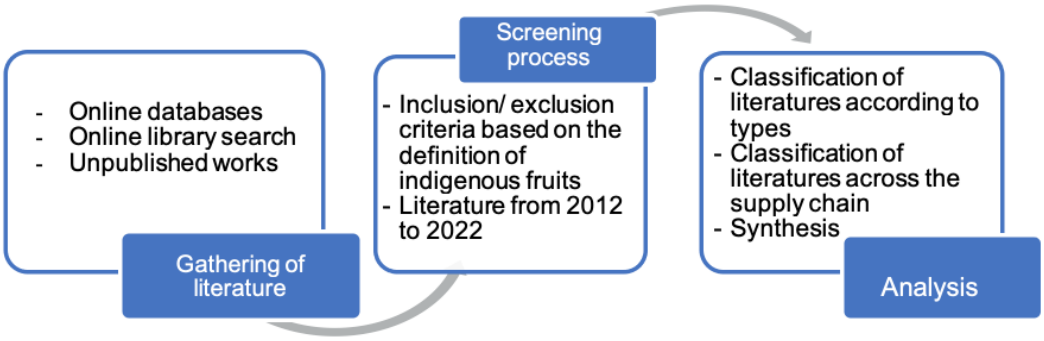
2.3 Classification of literature

Literature was categorized and sorted according to the following types: (1) refereed and non-refereed journal articles, (2) conference proceedings (including full papers and abstracts), (3) annual and technical reports, (4) newsletters and magazines, (5) Information, Education and Communication (IEC) materials (in the form of pamphlets, flyers, primers), and (6) websites of known institutions. Literature on fruit value chain components was divided based on value chain drivers such as: inputs, consumers, production, post-harvest and processing, market, as well as socio-economic policy and other related sciences.

2.4 Analysis

Graphs and charts were used to identify the types of literature per crop and the agencies involved in research and development on indigenous fruits. Several species were noted based on available literature to identify diversity. A synthesis of the existing community seed bank and community-based approaches based on the literature were also included in this report. Production and nutritional quality evaluations were downloaded from government websites where the data were publicly available. A summary of the methodology is illustrated in Figure 1.

Figure 1: The methods used in the scoping review on indigenous fruits



2.5 Limitations of the Study

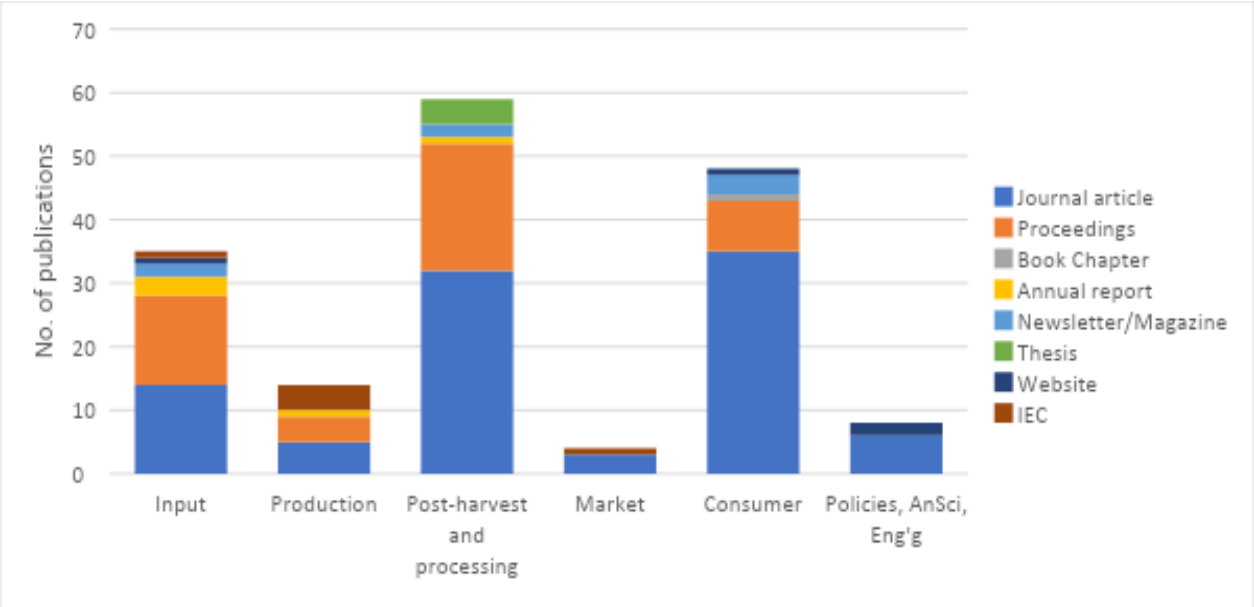
The literature review was limited to 2 months, from October to November 2022. Access to full-text papers was also limited in some cases due to copyright restrictions. Abstracts were only available for most scientific conference proceedings like the Crop Science Society of the Philippines conference and the National Academy of Science and Technology conference.

3. Results and Discussion

3.1 Scholarly Literature and Relevant Studies

A total of 168 studies on indigenous fruits from 508 reviewed works were included in the analysis after thorough screening and evaluation. The studies include journal articles (57%), conference proceedings (28%), IEC materials (4%), newsletters and magazines (4%) as well as annual reports, theses, websites, and book chapters (8%). Unpublished works were considered in this report and are treated as equally important sources of information. Furthermore, literature was grouped based on the identified value chain components and drivers: postharvest handling and processing (36%), consumer centered studies that analyzed their knowledge, feedback, and preferences (28%), inputs (21%), production (8%), policies (4%), and market (2%) (Figure 2). Most of the reviewed works focus on processing and consumption and less on production and economics/ marketing. Studies on processing and evaluation of functional properties are the most frequent in the literature. The follow-up activities on promotion were described in some literature and initiatives on commercialization and marketing and packages of technologies (POT) for cultural management and fertilizer/pest management recommendations are limited.

Figure 2: The number of publications divided per value chain components and drivers in surveyed literature from 2012-2022



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3.2 Germplasm conservation

3.2.1 Genetic diversity

The Philippines is characterized by a rich diversity of fruits. In his book "Important and Underutilized Edible Fruits in the Philippines", Coronel (2011) lists more than 440 fruits. Approximately 173 species are endemic or indigenous (Appendix 1) and 73 species were introduced from Asia prior to 1521 and are now considered native (Appendix 2). A list of other species indicated as native from other references are listed in Appendix 3.

Diversity studies of indigenous fruits have been conducted in different parts of the country (Table 1). Shannon's diversity index for trees and shrubs in the Ifugao Province showed a relatively high diversity at 3.59 to 3.7, with 38 species identified as indigenous food plants (Taguiling, 2013). In the Bataan Peninsula, where the Aeta Magbukon tribe lives, 17 out of the 35 species surveyed were identified as indigenous food plants with edible fruits (David, 2021). 37 indigenous fruits are consumed by the Pala'wan tribe in Rizal and Quezon, Palawan (Bernadas and Peralta, 2017) and 19 traditional species are used by the Higaonon tribe in Bukidnon Province (Buenavista et al., 2022). Meanwhile, 36 indigenous fruits were identified in different communities in Benguet (Chua-Barcelo, 2014).

Aside from their use as food, indigenous fruits also serve as alternative medicine in different communities (Abe and Ohtani, 2013; Arquion et al., 2015; Balinado and Chan, 2017; Tantengco et al., 2018; Dapar et al., 2020a; Dapar et al., 2020b; Docot et al., 2022). These fruits can also serve as food for birds, monkeys, and other animals, as offertory in rituals, and as source of dye or ink (Chua-Barcelo, 2014).

Table 1: Indigenous fruits based on ethnobotanical studies conducted in various parts of the country.

Group/Place of study	Number of identified indigenous fruits	Reference
Echague, Isabela	21 species	Ramos and Tamanel, 2013
Ifugao Province	38 species	Taguiling, 2013
Benguet	36 species	Chua-Barcelo, 2014
Agusan del Sur	28 species	Arquion et al., 2015
Pala'wan tribe in Rizal and Quezon, Palawan	37 indigenous fruits	Bernadas and Peralta, 2017
Aeta Magbukon tribe in Bataan, Peninsula	Out of the 35 species of indigenous food plants identified, 17 bore edible fruits	David, 2021
Higaonon tribe in Bukidnon Province	19 species utilized as fruits out of 76 plant species	Buenavista et al., 2022
Calayan, Cagayan	18 species of fruits used as food	Docot et al., 2022

Most diversity studies were undertaken on *Artocarpus* spp. and on *Canarium ovatum*, pili. For jackfruit, *Artocarpus heterophyllus*, 20 accessions from Batangas, Laguna, Mindoro, and Cavite were evaluated. Morphological traits were assessed, and authors found out that the highest variation between the accessions is in fruit width (H'=0.80) and fruit length (H'=0.75) (Valencia & Alcasid, 2015). A separate study on 16 *A. heterophyllus* accessions and 5 related species using 28 simple sequence repeats (SSR) markers showed that 25% of the markers were stable, reproducible and highly polymorphic. The polymorphism information content (PIC) of banding patterns ranged from 0.73 to 0.89 showing a high genetic diversity (Timog et al., 2019).

Meanwhile, pili (*C. ovatum*) has its center of genetic diversity in the Bicol region (Coronel, 1996), and in the Leyte and Samar Islands (Endonela et al., 2023). Studies to assess diversity within the species were carried out using morphological and molecular techniques. A shape analysis tool (elliptic fourier analysis) was used to systematically characterize 53 pili accessions in terms of kernel shape variation (Gentallan et al., 2019). Further, SSR markers were used to differentiate 79 pili accessions and 7 National Seed Industry Council (NSIC) varieties. Researchers found that the markers used could detect genetic diversity as evidenced by its PIC values of 0.57 between the 79 accessions and 0.45 between the 7 varieties. Gene diversity was also high between the accessions and between the varieties possibly because of recombination by cross pollination (Sandoval et al., 2017).

3.2.2 Conservation sites and status

Indigenous fruits are known to have potential benefits for health and wellness and for addressing nutrient deficiency. However, some of these species are rapidly losing their genetic diversity as indicated in the Administrative Order 2017-11 of the Department of Environment and Natural Resources (Table 2). The species listed are considered endangered, vulnerable, and threatened. Indigenous and native fruits are slowly becoming extinct because of natural disasters, population growth, pollution, agricultural expansion, and replacement with more popular and introduced crops (Chua-Barcelo, 2014).

Table 2: Conservation status of some indigenous/endemic fruits in the Philippines based on the Department of Environment and Natural Resources Administrative Order No. 2017-11 *Updated National List of Threatened Philippine Plants and their Categories.*

Species	Common name	Local name	Conservation Status
Mangifera odorata	Saipan mango	Huani	Endangered
Cubilia cubil	-	Kubili	Endangered
Mangifera laurina syn. *longipes*	-	Apali	Vulnerable
Mangifera altissima	-	Pahutan	Vulnerable
Mangifera monandra		Malapaho	Vulnerable
Litchee chinensis subsp. *philippinensis*	Lychee	Alupag	Vulnerable
Nephelium lappaceum var. *lappaceum*	Rambutan	Usau	Vulnerable
Nephelium ramboutan-ake	Pulasan	Kapulasan	vulnerable
Palaquium luzoniense	Red nato	Nato	Vulnerable
Palaquium philippense	Palacpalac	Malak-malak	Vulnerable
Canarium luzonicum	Elemi	Piling liitan	Other threatened species
Canarium ovatum	Pili	Pili	Other threatened species
Dacryodes rostrata	-	Lunai	Other threatened species

Dillenia reifferscheidia	Katmon kalabaw	Other threatened species

Conservation efforts play an important role in the preservation of plant genetic resources for future generations. Hence, *in-situ* and *ex-situ* conservation of indigenous fruits are being implemented by government institutions, academia, and private individuals and groups. For instance, the Department of Agriculture - Bureau of Agricultural Research (DA-BAR), which is the research arm of the Department of Agriculture, has supported thirteen (13) projects on indigenous fruits from 2011 to 2022 (JN Paller of DA-BAR, Personal Communication). Most of these projects were on product development and commercialization of *kalumpit* (*Terminalia microcarpa*), arius (*Podocarpus costalis*), *kamias* (*Averrhoa bilimbi*), *balimbing* (*Averrhoa carambola*), *batuan* (*Garcinia binucao*), breadfruit (*Artocarpus altilis*), and *katmon* (*Dillenia philippinensis*). Other projects were devoted to off-season production of jackfruit, control of *Phytophtora* disease, and DNA barcoding, georeferencing, morphological characterization and evaluation (jackfruit and relatives, *Artocarpus* spp.). DA-BAR funded projects on *ex-situ* conservation were initiatives of the National Plant Genetic Resources Laboratory (NPGRL) of the Institute of Plant Breeding, University of the Philippines Los Baños, Pampanga State Agricultural University (PSAU), and the Department of Agriculture - Regional Field Office IV-B (DA-RFO IV-B) in together with Western Philippines University (WPU).

The NPGRL initiated germplasm collections of various fruit tree species, including those considered endemic, indigenous, and native. NPGRL holds a collection of 393 accessions of endemic, indigenous, and native fruits (Appendix 4). The list excludes germplasm collections of major crops, although introduced during the pre-Spanish era, such as mango (*Mangifera indica*) and banana (*Musa* spp.). The field maintenance of the germplasm is funded by government projects such as the DA-BAR funded project "Safeguarding the Philippine Indigenous Fruits and Nuts at the National Repository through Conservation and Use", which focuses on the conservation, propagation, utilization and evaluation of the nutritional and functional properties of various indigenous fruits.

Other government agencies with initiatives on the conservation of indigenous fruits in the country are listed in Table 3. A collaborative project in Palawan was initiated by the DA Regional Field Office IV-B (DA RFO IV-B) and the Western Philippines University (WPU) for the *in-situ* conservation of indigenous fruit tree species. Additionally, the establishment of a 10–hectare field genebank is one of the objectives of an on-going project of the Pampanga State Agricultural University's (PSAU) for the collection, characterization, and conservation of native and indigenous fruits found in Central Luzon (JN Paller of DA-BAR, personal communication).

Table 3: Local agencies with conservation initiatives on indigenous fruits in the Philippines.

Province	Institutions
Palawan	Western Palawan State University (indigenous fruits)
Albay	DA Albay Experiment Station (AES), Tabaco, Albay, (Various Pili collections)
Davao	Bureau of Plant Industry (Indigenous Fruits)
Pampanga	Pampanga State Agricultural University (PSAU) (Indigenous Fruits)

The i*n-situ* conservation of indigenous plants on-farm or in home gardens can play a significant role in the protection and sustainable utilization of plant biodiversity, especially within the context of climate change. This type of conservation is highly strategic because it allows evolution to continue and contributes to landscape-level, ecosystem, and intra- and inter-specific conservation (Sthapit et al., 2009). Within the Philippines, the following *in-situ* conservation efforts are led by public institutions and private individuals:

- The RC Fruit Conservation Farm conserves and maintains 48 indigenous fruit tree species out of the 220 edible fruit species grown on-farm (Coronel, 2013). The farm serves as a demonstration plot for student education, research and development.
- The Unson Farm in Pagsanjan, Laguna holds and maintains indigenous fruit collections.
- The collection of rare and native fruit species in Kidapawan, North Cotabato was initiated by Dr. Alexis De Manuel, a medical doctor who devoted his time to planting.
- Oikos Peace and Wellness Garden in Bilar, Bohol conserves several indigenous fruits in their health and wellness garden.
- In Sta. Barbara, Leyte, people are using katmon (*Dillenia philippinensis*) to landscape the park while arius (*Podocarpus costalis*) is planted around government buildings and in kitchen gardens. The Rare Fruits Society of the Philippines and Philippine Native Tree Enthusiasts are among the supporters.
- The Mirisbiris Garden and Nature Center in Albay conserves a collection of indigenous plants. The owner, Ms. Glenda, loves to create recipes for the indigenous fruits planted in her 10-hectare garden (Bordado, 2019).

3.2.3 Priority species

Several indigenous fruits require attention in research and development, but funding is limited. This study recommends seven (7) priority species for collection, conservation, characterization, evaluation, and improvement of the seed system (Table 4). Priority species are identified based on their conservation status, germplasm collection status within the NPGRL, nutritional quality and functional properties, and economic potential. The NPGRL has one (1) to seven (7) germplasm collections of these species. Collection and conservation are important in the endangered kubili (*Cubilia cubili*) (DENR, 2017) of which the NPGRL has only 3 collections in their field genebank. There are hardly any studies undertaken on kubili diversity, propagation, and nutritional quality hence the urgent need to collect and

conserve this fruit species. Huani (*Mangifera odorata)* is another endangered fruit species requiring conservation attention. Its potential for fresh consumption and processing was explored and packages of technologies for propagation and processing are being developed through a project of the Department of Agriculture-Zamboanga Peninsula Integrated Agricultural Research Center (DA-ZAMPIARC) (Brion, 2019). Other mango species such as pahutan (*M. altissima*) and apali (*M. laurina*) are vulnerable (DENR, 2017). With its high calcium, iron, and ascorbic acid content, and high phenolics and radical scavenging activity, pahutan (*M. altissima*) is nutritionally important (www.fnri.dost.gov.ph).

Katmon (*Dillenia philippinensis*), lipote (*Syzygium curranii*), hagis (*S. tripinnatum*), balig-ang (*S. polycephaloides*), and mabolo (*Diospyros blancoi*) have varieties registered via the Institute of Plant Breeding Germplasm and Technology Registration and Release Office (Table 5). This is well-defined germplasm that has undergone a series of field evaluations. These varieties will undergo multiplication and distribution, alongside collection, conservation, and evaluation of collected accessions.

Table 4: Indigenous fruits prioritized for conservation based on their conservation status, availability in germplasm collections, nutritional quality, functional properties, and economic potential.

Crop	Reason for conservation
Elephant apple Katmon (*Dillenia philippinensis*)	Native to the Philippines; only 7 accessions exist in the national genebank; production and processing technologies are in place; high nutritional quality and functional properties.
Rose apple (*Syzygium* spp.)	Includes lipote (*Syzygium curranii*), hagis (*S. tripinnatum*), tampoy (*S. jambos*), balig-ang (*S. polycephaloides*). Studies show that lipote and balig-ang have high antioxidant capacity (Gueco et al., 2017a) that can help neutralize free radicals and, thus, reduce the risk of many diseases.
Lychee Alupag, (*Litchi chinensis* subsp. *philippinensis)*	Native to the Philippines, its conservation status is vulnerable (DENR, 2017), with only 7 accessions at the NPGRL; the fruit has great economic potential for improvement and as alternative to lychee (*Litchi chinensis*).
Kubili (*Cubilia cubili*)	Native to the Philippines, its conservation status is endangered (DENR, 2017), with only 3 accessions at the NPGRL; limited studies undertaken in propagation, nutritional quality evaluation, etc.
Galo fruit (*Anacolosa frutescens*)	Only 3 accessions in the NPGRL collection; has high energy content and contains appreciable amounts of protein compared to other fruits.
Velvet Persimmon *Mabolo* (*Diospyrus blancoi*)	High functional properties like phenols, flavonoids (Recuenco et al., 2016), and antioxidants (Gueco et al., 2017a); only 16 accessions at the NPGRL; needs further evaluation to identify outstanding accessions; this species is distributed throughout Luzon, including Palawan.

Mango

(Mangifera spp.)

Huani *(Mangifera odorata)* is an endangered species with only 4 accessions at the NPGRL; pahutan (*M. altissima*) and apali, (*M*. *laurina* syn. *longipes*) are vulnerable (DENR, 2017) with only 6 accessions of *M. altissima* and 1 collection of *M. laurina* conserved at the NPGRL; *M*. *altissima* has high calcium content, iron, ascorbic acid, and functional properties including phenols and radical scavenging activity.

3.3 Seed system and varietal improvement

The National Seed Industry Council (NSIC) has approved the release of several indigenous fruits at a national level. The 'Orbase' *pili* and 'UPLB Seedless Red' *mabolo* were approved in 2012 while 'IPB Katmon' and 'IPB Hagis' were recently approved. Many other variety releases happened prior to 2012. For example, 14 *pili* (*Canarium ovatum*) varieties were released from 1991 to 2009, 1 *bignay* (*Antidesma bunius*) variety in 2002, 1 *bitungol* variety in 1995, 7 *santol* (*Sandoricum koetjape*) varieties from 1991 to 2001 and 1 *marang* (*Artocarpus odoratissimus*) variety in 1996, among others. The Institute of Plant Breeding (IPB), through the Germplasm and Registration and Release Office (GTRRO), has released several indigenous fruit varieties over the past 10 years (Table 5). These varieties are ready for commercialization and distribution to farmers. Included in the list are identified priority species for collection and conservation such as katmon (*Dillenia philippinensis*), lipote (*Syzygium curranii*), hagis (*S. tripinnatum*), balig-ang (*S. polycephaloides*).

The DA-BAR funded project "Efficient Propagation of IPB Indigenous Fruit Varieties for further Multiplication of DA Regional Field Offices and their Beneficiaries" produced a total of 3,600 well-established seedlings of the IPB-GTRRO registered indigenous fruits *balig-ang*, *hagis*, *katmon*, and *lipote*. An additional 2,600 well-established seedlings of other indigenous fruits were produced at the NPGRL Fruit Nursery (JN Paller of DA-BAR, Personal Communication, 2022).

Indigenous fruit varieties from the IPB are products of continuous evaluation and selection of outstanding genebank accessions. The promising varieties for direct utilization are evaluated through a series of on-site selections. For example, a table-type accession of jackfruit from Batangas was observed weighing an average of 9.50 kg, having a distinct taste and sweet fruits, with orange and thick fruitlets, strong aroma, very good eating quality and scanty latex (Valencia & Alcasid, 2015). A promising variety of seedless *batuan* was selected from the RC Conservation Farm in Calauan, Laguna (Guevarra et al., 2015).

A genome sequencing study was headed by the Philippine Genome Center to aid molecular fingerprinting and breeding in pili, *Canarium ovatum*, and to isolate and characterize the full length cDNAs of 'Katutubo' *pili*. A 583 bp 3'-RACE product and a 187 bp 5'-RACE product were amplified, cloned, and sequenced (Manguiat et al., 2014). SSR markers were also used in identifying 7 NSIC-registered pili varieties. Specific DNA fingerprints were generated for the varieties 'Katutubo', 'Orolfo', 'Magnaye', 'Magayon', 'Laysa', 'Lanuza', 'Mayon'. SSR markers from papaya (*Carica papaya*), and *C. album* were used and a total of 36 polymorphic alleles were amplified (Sandoval et al., 2017).

Table 5: Indigenous fruit varieties released under the Institute of Plant Breeding – Germplasm and Technology Registration and Release Office (IPB-GTRRO) from 2012-2022.

Crop	Number of varieties	Variety name
Rose apple/*Balig-ang* (*Syzygium polycephaloides)*	1	'IPB Balig-ang'
Rose apple/*Hagis* (*Syzygium tripinnatum)*	1	'IPB Hagis'*
Elephant apple/*Katmon* (*Dillenia philippinensis)*	1	'IPB Katmon'*
Rose apple/*Lipote* (*Syzygium curranii)*	1	'IPB Lipote'
Batuan (*Garcinia binucao)*	1	'IPB Batuan'
Kydia, (*Garcinia* spp.)	1	'IPB Kydia'
Rose apple/*Tampoy* (*Syzygium jambos)*	1	'IPB Tampoy'
Kalumpit (*Terminalia macrocarpa)*	1	'IPB Kalumpit'
Velvet Persimmon/*Mabolo* (*Diospyrus blancoi)*	1	'IPB Mabolo'

* also approved by the National Seed Industry Council

3.4 Nutritional Value and Functional Properties

The Food and Nutrition Research Institute of the Department of Science and Technology (DOST-FNRI) provides nutritional information various food items including native and indigenous fruits. The data on proximate composition, vitamins and minerals data presented below are sourced from the Philippine Food Composition Tables Online Database (PhilFCT®) accessible on the DOST-FNRI website (i.fnri.dost.gov.ph). As reference crops, three (3) commercial crops are utilized: apple (*Malus domestica*), 'Lakatan' banana (*Musa x paradisiaca*), and calamansi (*Citrofortunella x macrocarpa*). These crops were chosen based on their widespread consumption as indicated by the 2018-2019 Expanded National Nutrition Survey conducted by DOST-FNRI in 2022.

3.4.1 Proximates and other carbohydrates

Among the fruits analyzed for energy (Table 6), pili nut has the highest content with 699 kcal per 100 g of its raw edible portion- that is a little over four and nine times higher than that of banana and apple (the reference crops), respectively. Other indigenous fruit species that have a higher energy content than banana include tamarind, galo fruit, durian and johey oak; while governer's plum, *Willughbeia* spp., jackfruit and avocado have a higher energy content than apple.

Pili nut also displayed the highest protein content (14.2 g) and total fat content (68.5 g). Its protein content is approximately 9 and 20 times higher than banana and apple, respectively. Other indigenous species with a higher protein content than apple (0.7 g) and banana (1.4 g) include galo fruit, white mango, breadnut fruit, breadfruit, tamarind and mangrove apple. Meanwhile, jackfruit has the same

protein content as banana. In terms of total fat content, avocado, *Syzygium polycephaloides*, galo fruit, kaffir lime, rattan fruit, durian, breadnut fruit and *Rubus moluccanus*, all have significantly higher amounts in comparison to apple (0.1g) and banana (0.2g).

The carbohydrate content of indigenous fruit species range from 61.1 to 4.3 g. Sugar palm has the lowest carbohydrate content while tamarind has the highest- containing twice as much carbohydrates as banana and four times as much as apple. Durian, *Anacolosa frutescens* and johey oak contain more carbohydrates in comparison to the reference crops.

Pili nut and tamarind have the highest total ash content with 2.9 g per 100 g, about 3 times as much as banana and 13 times higher than apple. Other species with a higher total ash content than the reference crops include rambutan, *Anacolosa frutescens*, *Terminalia macrocarpa,* white mango, jackfruit, breadnut fruit, pomegranate and mangrove apple.

Table 6: Nutritional content (proximates and other carbohydrates) of indigenous and native fruits based on the Philippine Food Composition Tables Online Database (PhilFCT®) (i.fnri.dost.gov.ph).

Indigenous and native fruits		Food Composition per 100g raw edible portion (Proximates and other carbohydrates)						
Food name and description	Scientific name	Energy, calculated (kcal)	Protein (g)	Total fat (g)	Carbohydrate, total (g)	Ash, total (g)	Fiber, total dietary (g)	Sugars, total (g)
Apple, red[1/]	*Malus domestica*	**67**	**0.7**	**0.1**	**15.8**	**0.2**	**2.6**	**12**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**126**	**1.4**	**0.2**	**29.6**	**0.8**	**3.3**	**15.6**
Calamansi[1/]	*X Citrofortunella microcarpa*	**44**	**0.4**	**1**	**8.3**	**0.5**	**2.4**	**1.5**
Galo fruit, whole	*Anacolosa frutescens*	165	3.9	1.8	33.4	1.3	-	-
Bignay	*Antidesma bunius*	35	0.7	0.8	6.3	0.6	3	2.6
Sugar palm	*Arenga pinnata*	19	0.1	0.2	4.3	0.1	0.8	0.6
Breadfruit	*Artocarpus altilis*	65	2.4	0.5	12.8	0.7	2.7	6.1
Breadnut fruit	*Artocarpus camansi*	55	2.5	1.1	8.7	0.9	2.2	4.9
Jackfruit	*Artocarpus heterophyllus*	111	1.4	0.4	25.4	1	1.6	20.3
Johey oak	*Artocarpus odoratissimus*	128	1	0.4	30	0.8	1.8	23.1
Bilimbi	*Averrhoa bilimbi*	23	0.7	0.2	4.5	0.3	1.9	2.6
Starfruit	*Averrhoa carambola*	39	0.5	0.7	7.7	0.4	3	4.3

Indigenous and native fruits		Food Composition per 100g raw edible portion (Proximates and other carbohydrates)						
Food name and description	Scientific name	Energy, calculated (kcal)	Protein (g)	Total fat (g)	Carbohydrate, total (g)	Ash, total (g)	Fiber, total dietary (g)	Sugars, total (g)
Apple, red[1/]	*Malus domestica*	**67**	**0.7**	**0.1**	**15.8**	**0.2**	**2.6**	**12**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**126**	**1.4**	**0.2**	**29.6**	**0.8**	**3.3**	**15.6**
Calamansi[1/]	*X Citrofortunella microcarpa*	**44**	**0.4**	**1**	**8.3**	**0.5**	**2.4**	**1.5**
Rattan fruit	*Calamus ornatus var. philippinensis*	88	0.6	1.2	18.6	0.6	-	-
Pili nut	*Canarium ovatum*	699	14.2	68.5	6.4	2.9	-	-
Kaffir lime	*Citrus hystrix*	42	0.6	1.3	7	0.3	2.2	1.3
Philippine dillenia	*Dillenia philippinensis*	33	0.3	0.2	7.4	0.4	-	-
Velvet apple	*Diospyros blancoi*	88	0.6	0.3	20.8	0.6	4.1	14.2
Durian	*Durio zibethinus*	163	2	1.2	36.1	0.8	4.4	25.1
Madagascar plum	*Flacourtia indica*	118	0.6	0.6	27.6	0.6	3.9	21.7
Batwan, immature fruit, raw	*Garcinia binucao*	53	0.6	0.1	12.4	0.2	4.7	1.8
Kandis[2/], flesh	*Garcinia lateriflora*	65	0.3	0.5	14.9	0.2	4.6	2.8
Kandis[2/] pulp	*Garcinia lateriflora*	60	0.3	0.2	14.3	0.3	1.6	6.3
Mangosteen	*Garcinia mangostana*	84	0.7	0.8	18.6	0.2	1.8	-
Lanzon	*Lansium domesticum*	64	1	0.3	14.2	0.6	2.7	-
Mango, *paho*, unripe	*Mangifera altissima*	74	0.7	0.6	16.4	0.5	1.8	6.5
Mango, *bauno, unripe*	*Mangifera caesia*	74	3	0.7	13.9	1.2	5.6	5
Rambutan	*Nephelium lappaceum*	87	1.2	0.9	18.6	1.7	0.9	-
Maraitum	*Nephelium* sp.	92	0.5	0.2	22	0.5	0	18.9
Bush passion fruit	*Passiflora foetida*	62	0.6	0.5	13.7	1	6.1	6.5

Indigenous and native fruits		Food Composition per 100g raw edible portion (Proximates and other carbohydrates)						
Food name and description	Scientific name	Energy, calculated (kcal)	Protein (g)	Total fat (g)	Carbohydrate, total (g)	Ash, total (g)	Fiber, total dietary (g)	Sugars, total (g)
Apple, red[1/]	*Malus domestica*	**67**	**0.7**	**0.1**	**15.8**	**0.2**	**2.6**	**12**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**126**	**1.4**	**0.2**	**29.6**	**0.8**	**3.3**	**15.6**
Calamansi[1/]	*X Citrofortunella microcarpa*	**44**	**0.4**	**1**	**8.3**	**0.5**	**2.4**	**1.5**
Avocado, green	*Persea americana*	101	0.9	6.2	10.5	0.6	4.8	2.1
Avocado, red	*Persea americana*	100	0.9	7.6	7	0.6	4.3	1.8
Malay gooseberry	*Phyllanthus acidus*	40	0.8	0.7	7.7	0.6	3.5	-
Pomegranate	*Punica granatum*	64	0.7	0.4	14.5	0.9	3	10.2
Sapinit	*Rubus moluccanus*	76	1.2	1.1	15.2	0.5	8	6.6
Coton fruit, *santol*	*Sandoricum koetjape*	67	0.7	1	13.8	0.7	0.2	13
Mangrove apple, raw	*Sonneratia caseolaris*	72	1.6	0.5	15.2	0.9	12.1	2
Hog plum, ripe	*Spondias pinnata*	51	0.8	0.1	11.7	0.6	2.6	7.7
Hog plum, unripe	*Spondias pinnata*	40	0.8	0.1	8.9	0.3	3	2.7
Black/Java plum	*Syzygium cumini*	71	0.8	0.4	16	0.6	-	-
Philippine cherry, *lubeg*	Syzygium lineatum	50	1.2	0.2	10.8	0.8	-	-
Malay apple	*Syzygium malaccense*	44	0.5	0.2	10	0.3	1.7	7.9
Lipote	*Syzygium polycephaloides*	77	0.7	2.5	12.9	0.5	-	-
Java apple	*Syzygium samarangense*	34	0.4	0.1	7.8	0.2	1.3	6.1
Tamarind, ripe	*Tamarindus indica*	258	2	0.6	61.1	2.9	5	37.7
Kalumpit	*Terminalia microcarpa*	77	1.3	0.4	17	1.3	2.4	14.4
Susong-kalabaw	*Uvaria rufa*	39	0.7	0.4	8.1	0.6	-	-

Indigenous and native fruits		Food Composition per 100g raw edible portion (Proximates and other carbohydrates)						
Food name and description	Scientific name	Energy, calculated (kcal)	Protein (g)	Total fat (g)	Carbohydrate, total (g)	Ash, total (g)	Fiber, total dietary (g)	Sugars, total (g)
Apple, red[1/]	*Malus domestica*	**67**	**0.7**	**0.1**	**15.8**	**0.2**	**2.6**	**12**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**126**	**1.4**	**0.2**	**29.6**	**0.8**	**3.3**	**15.6**
Calamansi[1/]	*X Citrofortunella microcarpa*	**44**	**0.4**	**1**	**8.3**	**0.5**	**2.4**	**1.5**
Palau-biyok	*Willughbeia* sp.	115	0.6	0.3	27.5	0.2	0.3	23
Tabo	*Willughbeia* sp.	110	0.4	0.2	26.7	0.4	4.4	18.5

[1/] reference fruits, included in the commonly consumed fruits based on the 2018-2019 Expanded National Nutrition Survey (DOST-FNRI, 2022)

[2/]Here, flesh refers to the pericarp that is immediately after the fruit's skin and pulp refers to the arils which is the soft flesh around the seed.

*When available, the English common name of the indigenous and native fruits has been used in this table. Local names used have been italicized and other common local names can be found in Annex 1, 2 and 3.

Key: Highest value in category Significant value in category

Mangrove apple has the highest fiber content (12.10 g), followed by *Rubus moluccanus*, bush passion fruit, white mango, tamarind, avocado, *Garcinia binucao*, *Garcinia lateriflora*, durian and *Willughbeia* spp.- all of these have more fiber than the reference crops.

For total sugar, tamarind tops the list with 37.70 g per 100 g of raw edible portion, which is twice as much as banana (15.6 g) and three times as much as apple (12 g). Indigenous species that have a higher total sugar content than both apple and banana are durian, johey oak, *Willughbeia* spp., governer's plum, jackfruit and *Nephelium* sp. *Terminalia macrocarpa* and velvet apple have lower amounts than banana but higher than apple.

3.4.2 Minerals

As seen in Table 7, pili nut has the highest calcium (135mg), phosphorus (520mg) and iron (2.6 mg) content among the indigenous fruits and even in comparison to the reference fruits. Other indigenous fruits with notable calcium contents include *Terminalia macrocarpa* with 118 mg, *Mangifera altissima* with 95 mg, tamarind with 94 mg, and *Syzygium polycephaloides* with 93 mg. Species with calcium contents ranging from 40 to 56 mg include breadnut fruit, velvet apple, Philippine cherry, governor's plum, breadfruit and *Rubus moluccanus.*

Pili nut's phosphorus content is 15 times higher compared to banana, 64 times higher than apple and 6 times higher than tamarind. Other species with phosphorus contents higher than the reference crops include *Anacolosa frutescens*, durian, breadnut fruit, pomegranate, *Rubus moluccanus* and *Willughbeia spp.* While pili nut's iron content is well over triple the iron contents of banana (0.8 mg) and apple (0.2 mg), other species with notable iron contents include johey oak (1.8 mg), *Anacolosa frutescens* (1.7 mg),

rattan fruit (1.7 mg), breadfruit (1.3 mg); governor's plum, mango (*Mangifera altissima*) and cotton fruit (1.2 mg each); and jackfruit and durian (1.1 mg each).

The highest amount of sodium among the fruits evaluated is found in mangrove apple at 156 mg. The other species with higher quantities of sodium compared to banana (2 mg) and apple (2 mg) were durian (28 mg), ripe hog plum (26 mg), *Nephelium* sp. (24 mg), rambutan (18 mg), *Willughbeia* spp. (16 mg and 11 mg), *Garcinia lateriflora* pulp (15 mg), white mango (15 mg) and mangosteen (12 mg).

For potassium and zinc contents, only ten native fruits were assayed (without comparative species). Among them, *Rubus moloccanus* has highest content of potassium with 674 mg. Other species with high potassium content include mangrove apple (330 mg), ripe hog plum (221 mg), *Nephelium sp.* (147 mg) and *Willughbeia* sp. (135 mg). The other five species have values ranging from 42-79 mg potassium. The zinc content of these fruit species ranged from 0-0.4 mg with *R. moloccanus* and mangrove apple having the highest values.

Table 7: Nutritional content (minerals) of indigenous fruits based on the Philippine Food Composition Tables Online Database (PhilFCT®) (i.fnri.dost.gov.ph).

Indigenous and native fruits		Food Composition per 100g raw edible portion (Minerals)					
Food name and description	Scientific name	Calcium, Ca (mg)	Phosphorus, P (mg)	Iron, Fe (mg)	Potassium, K (mg)	Sodium, Na (mg)	Zinc, Zn (mg)
Apple, red[1/]	*Malus domestica*	**9**	**8**	**0.2**		**2**	
Banana, Lakatan[1/]	*Musa x paradisiaca*	**21**	**34**	**0.8**		**2**	
Calamansi[1/]	*X Citrofortunella microcarpa*	**18**	**12**	**0.8**		**3**	
Galo fruit, whole	*Anacolosa frutescens*	25	65	1.7		-	
Bignay	*Antidesma bunius*	37	22	0.7		1	
Sugar palm	*Arenga pinnata*	20	5	0.5		2	
Breadfruit	*Artocarpus altilis*	40	36	1.3		1	
Breadnut fruit	*Artocarpus camansi*	56	44	0.4		3	
Jackfruit	*Artocarpus heterophyllus*	30	18	1.1		2	
Johey oak	*Artocarpus odoratissimus*	18	32	1.8		2	
Bilimbi	*Averrhoa bilimbi*	8	11	0.4		4	
Starfruit	*Averrhoa carambola*	8	22	0.8		2	
Rattan fruit	*Calamus ornatus var. philippinensis*	19	10	1.7		-	
Pili nut	*Canarium ovatum*	135	520	2.6		3	
Kaffir lime	*Citrus hystrix*	23	8	0.6		2	

Indigenous and native fruits		Food Composition per 100g raw edible portion (Minerals)					
Food name and description	Scientific name	Calcium, Ca (mg)	Phosphorus, P (mg)	Iron, Fe (mg)	Potassium, K (mg)	Sodium, Na (mg)	Zinc, Zn (mg)
Apple, red[1/]	*Malus domestica*	**9**	**8**	**0.2**		**2**	
Banana, Lakatan[1/]	*Musa x paradisiaca*	**21**	**34**	**0.8**		**2**	
Calamansi[1/]	*X Citrofortunella microcarpa*	**18**	**12**	**0.8**		**3**	
Philippine dillenia	*Dillenia philippinensis*	28	5	0.1		-	
Velvet apple	*Diospyros blancoi*	46	18	0.6		3	
Durian	*Durio zibethinus*	18	56	1.1		28	
Madagascar plum	*Flacourtia indica*	44	22	1.2		1	
Batwan, immature fruit, raw	Garcinia binucao	36	20	0.3	42	2	0
Kandis[2/], flesh	*Garcinia lateriflora*	32	21	0.1	64	5	0.2
Kandis[2/], pulp	*Garcinia lateriflora*	18	20	0.1	79	15	0.2
Mangosteen	*Garcinia mangostana*	18	11	0.3		12	
Lanzon	*Lansium domesticum*	19	25	0.9		1	
Mango, paho, unripe	*Mangifera altissima*	95	17	1.2		7	
Rambutan	*Nephelium lappaceum*	32	16	0.4		18	
Maraitum	*Nephelium* sp.	5	17	0.3	147	24	0.3
Bush passion fruit	*Passiflora foetida*	11	48	0.5		16	
Avocado, green	*Persea americana*	16	24	0.8		1	
Avocado, red	*Persea americana*	11	27	0.8		2	
Malay gooseberry	*Phyllanthus acidus*	34	22	0.9		7	
Pomegranate	*Punica granatum*	15	43	0.9		6	
Sapinit	*Rubus moluccanus*	40	37	0.6	674	9	0.4
Cotton fruit, *santol*	*Sandoricum koetjape*	12	21	1.2		3	

Indigenous and native fruits		Food Composition per 100g raw edible portion (Minerals)					
Food name and description	Scientific name	Calcium, Ca (mg)	Phosphorus, P (mg)	Iron, Fe (mg)	Potassium, K (mg)	Sodium, Na (mg)	Zinc, Zn (mg)
Apple, red[1/]	*Malus domestica*	**9**	**8**	**0.2**		**2**	
Banana, Lakatan[1/]	*Musa x paradisiaca*	**21**	**34**	**0.8**		**2**	
Calamansi[1/]	*X Citrofortunella microcarpa*	**18**	**12**	**0.8**		**3**	
Mangrove apple, raw	*Sonneratia caseolaris*	28	27	0.4	300	156	0.4
Hog plum, ripe	*Spondias pinnata*	19	6	0.2	221	26	0.2
Hog plum, unripe	*Spondias pinnata*	25	5	0.2	63	8	0.1
Black/Java plum	*Syzygium cumini*	23	19	0.4		7	
Philippine cherry, *lubeg*	*Syzygium lineatum*	46	23	0.4		11	
Malay apple	*Syzygium malaccense*	18	20	0.4		2	
Lipote	*Syzygium polycephaloides*	93	22	0.2		4	
Java apple	*Syzygium samarangense*	17	7	0.3		2	
Tamarind, ripe	*Tamarindus indica*	94	78	0.9		4	
Kalumpit	*Terminalia microcarpa*	118	24	1.1		0	
Susong-kalabaw	*Uvaria rufa*	23	15	0.6		-	
Palau-biyok	*Willughbeia* sp.	5	37	0.2	57	11	0.2
Tabo	*Willughbeia* sp.	7	36	0.2	135	16	0.2

[1/] reference fruits, included in the commonly consumed fruits based on the 2018-2019 Expanded National Nutrition Survey (DOST-FNRI, 2022)

[2/]Here, flesh refers to the pericarp that is immediately after the fruit's skin and pulp refers to the arils which is the soft flesh around the seed.

*When available, the English common name of the indigenous and native fruits has been used in this table. Local names used have been italicized and other common local names can be found in Annex 1, 2 and 3.

Key: Highest value in category Significant value in category

3.4.3 Vitamins

The flesh and pulp of *Garcinia lateriflora* has the highest amount of beta-carotene among the assayed fruits (Table 8). At 1897 and 1657 µg respectively, they have between four to five times more beta-carotene than banana (360 µg). Philippine cherry and *Anacolosa frutescens* also have a higher beta-carotene content than banana, while the other indigenous fruit species have a lower content than banana but higher than apple (25 µg). A similar trend can be observed with the retinol activity equivalent (RAE)- *Garcinia lateriflora*'s values (158 and 138 µg) are far higher than banana and apple with 30 and 2 µg, respectively.

For B Vitamins, pili nut has the highest thiamine content (0.95 mg). This is followed by tamarind with 0.33 mg and durian with 0.32 mg. On the other hand, durian has the highest riboflavin content at 0.28 mg. The other fruits species evaluated have riboflavin contents ranging from 0.12-0.08 mg while the reference species have 0.05 and 0.01 mg for banana and apple respectively. The highest niacin content recorded is in white mango at 2.7 mg, followed by *Anacolosa frutescens* (1.8 mg) and *Willughbeia sp*. (1.6 mg). The other seven species have niacin contents of 1.5-1.1 mg, all well above the niacin content of banana (0.5 mg) and apple (0.1 mg).

Philippine cherry has a very high ascorbic acid content at 1,049 mg. This value is far higher than the rest of the fruits, including the more popular reference crop, calamansi (45mg). This is followed by unripe *paho* mango (*Mangifera altissima*) at 93 mg and rambutan with 91 mg.

Table 8: Nutritional content (vitamins) of indigenous fruits based on the Philippine Food Composition Tables Online Database (PhilFCT®) (i.fnri.dost.gov.ph).

Indigenous and native fruits		Food Composition per 100g raw edible portion (Vitamins)					
Food name and description	**Scientific name**	**Beta-carotene (µg)**	**Retinol Activity Equivalent, RAE (µg)**	**Thiamine, Vitamin B1 (mg)**	**Riboflavin, Vitamin B2 (mg)**	**Niacin (mg)**	**Ascorbic Acid, Vitamin C (mg)**
Apple, red[1/]	*Malus domestica*	**25**	**2**	**0.02**	**0.01**	**0.1**	**0**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**360**	**30**	**0.03**	**0.05**	**0.5**	**25**
Calamansi[1/]	*X Citrofortunella microcarpa*	**0**	**0**	**0.02**	**0.01**	**0.2**	**45**
Galo fruit, whole	*Anacolosa frutescens*	410	34	0.1	0.1	1.8	21
Bignay	*Antidesma bunius*	5	0	0.01	0.05	0.3	7
Sugar palm	*Arenga pinnata*	0	0	0	0.01	0.1	0
Breadfruit	*Artocarpus altilis*	65	5	0.09	0.05	1.5	34
Breadnut fruit	*Artocarpus camansi*	20	2	0.11	0.06	1.5	15
Jackfruit	*Artocarpus heterophyllus*	105	9	0.09	0.05	0.9	5

Indigenous and native fruits		Food Composition per 100g raw edible portion (Vitamins)					
Food name and description	Scientific name	Beta-carotene (µg)	Retinol Activity Equivalent, RAE (µg)	Thiamine, Vitamin B1 (mg)	Riboflavin, Vitamin B2 (mg)	Niacin (mg)	Ascorbic Acid, Vitamin C (mg)
Apple, red[1/]	*Malus domestica*	**25**	**2**	**0.02**	**0.01**	**0.1**	**0**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**360**	**30**	**0.03**	**0.05**	**0.5**	**25**
Calamansi[1/]	*X Citrofortunella microcarpa*	**0**	**0**	**0.02**	**0.01**	**0.2**	**45**
Johey oak	*Artocarpus odoratissimus*	20	2	0.07	0.11	0.9	34
Bilimbi	*Averrhoa bilimbi*	100	8	0.01	0.03	0.3	10
Starfruit	*Averrhoa carambola*	35	3	0.03	0.02	0.4	33
Rattan fruit	*Calamus ornatus var. philippinensis*	0	0	0.06	0.01	0.9	5
Pili nut	*Canarium ovatum*	0	0	0.95	0.12	0.4	29
Kaffir lime	*Citrus hystrix*	195	16	0.04	0.02	0.1	35
Philippine dillenia	*Dillenia philippinensis*	25	2	0.02	0.04	0.2	4
Velvet apple	*Diospyros blancoi*	20	2	0.02	0.03	0.3	16
Durian	*Durio zibethinus*	46	4	0.32	0.28	1.1	44
Madagascar plum	*Flacourtia indica*	60	5	0.01	0.02	0.3	7
Batwan, immature fruit, raw	*Garcinia binucao*	25	2	0.05	0.04	0.9	3
Kandis[2/], flesh	*Garcinia lateriflora*	1897	158	0.04	0.02	0.9	0
Kandis[2/], pulp	*Garcinia lateriflora*	1657	138	0.04	0.02	0.8	0
Mangosteen	*Garcinia mangostana*	0	0	0.06	0.01	0.4	2
Lanzon	*Lansium domesticum*	0	0	0.08	0.04	0.9	2
Mango, paho, unripe	*Mangifera altissima*	80	7	0.06	0.1	0.4	93
Mango, *bauno,* unripe	*Mangifera caesia*	5	0	0.05	0.1	2.7	13
Rambutan	*Nephelium lappaceum*	0	0	0.02	0.1	0.5	91
Maraitum	*Nephelium* sp.	0	0	0.02	0.1	0.5	0

Indigenous and native fruits		Food Composition per 100g raw edible portion (Vitamins)					
Food name and description	**Scientific name**	**Beta-carotene (µg)**	**Retinol Activity Equivalent, RAE (µg)**	**Thiamine, Vitamin B1 (mg)**	**Riboflavin, Vitamin B2 (mg)**	**Niacin (mg)**	**Ascorbic Acid, Vitamin C (mg)**
Apple, red[1/]	*Malus domestica*	**25**	**2**	**0.02**	**0.01**	**0.1**	**0**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**360**	**30**	**0.03**	**0.05**	**0.5**	**25**
Calamansi[1/]	*X Citrofortunella microcarpa*	**0**	**0**	**0.02**	**0.01**	**0.2**	**45**
Bush passion fruit	*Passiflora foetida*	5	0	0	0.07	1.1	18
Avocado, green	*Persea americana*	130	11	0.04	0.06	0.9	14
Avocado, red	*Persea americana*	45	4	0.04	0.07	1.3	13
Malay gooseberry	*Phyllanthus acidus*	35	3	0.02	0.01	0.6	4
Pomegranate	*Punica granatum*	0	0	0.09	0.01	0.4	4
Sapinit	*Rubus moluccanus*	89	7	0.04	0.05	0.8	
Cotton fruit, *santol*	*Sandoricum koetjape*	3	0	0.04	0.02	0.9	13
Mangrove apple, raw	*Sonneratia caseolaris*	168	14	0.06	0.05	1.2	1
Hog plum, ripe	*Spondias pinnata*	42	4	0.07	0.07	0.7	14
Hog plum, unripe	*Spondias pinnata*	73	6	0.02	0.02	0.2	3
Black/Java plum	*Syzygium cumini*	0	0	0.03	0.02	0.3	18
Philippine cherry, *lubeg*	*Syzygium lineatum*	500	42	0.05	0.08	0.4	1049
Malay apple	*Syzygium malaccense*	27	2	0.02	0.01	0.3	16
Lipote	*Syzygium polycephaloides*	60	5	0.01	0.02	0.3	1
Java apple	*Syzygium samarangense*	0	0	0.03	0.01	0.3	13
Tamarind, ripe	*Tamarindus indica*	0	0	0.33	0.1	1	4
Kalumpit	*Terminalia microcarpa*	20	2	0.01	0.08	1.4	16
Susong-kalabaw	*Uvaria rufa*	-	-	0.07	0.03	0.7	12
Palau-biyok	*Willughbeia* sp.	-	-	0.07	0.04	1.6	1

Indigenous and native fruits		Food Composition per 100g raw edible portion (Vitamins)					
Food name and description	Scientific name	Beta-carotene (µg)	Retinol Activity Equivalent, RAE (µg)	Thiamine, Vitamin B1 (mg)	Riboflavin, Vitamin B2 (mg)	Niacin (mg)	Ascorbic Acid, Vitamin C (mg)
Apple, red[1/]	*Malus domestica*	**25**	**2**	**0.02**	**0.01**	**0.1**	**0**
Banana, Lakatan[1/]	*Musa x paradisiaca*	**360**	**30**	**0.03**	**0.05**	**0.5**	**25**
Calamansi[1/]	*X Citrofortunella microcarpa*	**0**	**0**	**0.02**	**0.01**	**0.2**	**45**
Tabo	*Willughbeia* sp.	-	-	0.07	0.03	1.5	0

1/reference fruits, included in the commonly consumed fruits based on the 2018-2019 Expanded National Nutrition Survey (DOST-FNRI, 2022)

[2/]Here, flesh refers to the pericarp that is immediately after the fruit's skin and pulp refers to the arils which is the soft flesh around the seed.

*When available, the English common name of the indigenous and native fruits has been used in this table. Local names used have been italicized and other common local names can be found in Annex 1, 2 and 3.

Key: Highest value in category Significant value in category

3.4.4. Phytochemicals

The total phenolic and total flavonoid contents of 30 fruits were studied. The following indigenous and native species, *aratiles* (*Muntingia calabura*), *mabolo* (*Diospyros blancoi*), tamarind (*Tamarindus indica*) and *santol* (*Sandoricum koetjape*) had the highest phenolic contents with >350 mg gallic acid equivalents (GAE)/100 g fresh matter. Tamarind, *mabolo*, and *santol* had the highest flavonoid contents with >200 mg catechin equivalents (CE)/100g FM. A strong positive correlation was confirmed between the phenolic and flavonoid contents (Recuenco et al., 2016). In the authors' follow up study, nine Philippine indigenous fruits were screened for phytochemical constituents and assessed for total phenolics and antioxidant and antibacterial activities. Qualitative tests revealed the presence of alkaloids in *Canarium ovatum*, cardiac glycosides in *Ficus pseudopalma* and *C. ovatum*, and terpenoids in *Antidesma bunius* and *C. ovatum*. Total phenolics were highest in *Garcinia binucao* and *Mangifera altissima* with 758 and 694 mg gallic acid equivalent (GAE) / 100 g fresh matter, respectively. The DPPH radical scavenging activities ranged from 82–516 mg ascorbic acid equivalent antioxidant activity (AEAC) /100 g FM, with *M. altissima* having the highest value followed by *Rubus rosifolius* (513 mg AEAC / 100 g FM). Ferric reducing activities were highest for *M. altissima* and *G. binucao* with 111 mg and 121 mg ascorbic acid equivalents (AAE) / 100 g FM, respectively. Phenolic and flavonoid contents were strongly and positively correlated. Moreover, phenolic contents may have significant contributions to the observed radical scavenging and ferric reducing activities based on their strong positive correlations (Recuenco et al, 2020).

In a separate study with 58 accessions of indigenous and introduced fruits and nuts, *palau* (*Willughbeia angustifolia*), *tabu* (*Willughbeia coriacea*), and *baligang* (*Syzygium polyephaloides*) have the highest total antioxidant capacity at 96.38%, 93.35% and 96.06%, respectively. Also, *bignay* (*Antidesma bunius*), guava *(Psidium guajava*), *tagbak* (*Kolowratia elegans*), *mansanitas* (*Ziziphus jujuba*), araza (*Eugenia stipitata*), dulce

kumot, *namnam* (*Cynometra cauliflora*), *lipote* (*Syzygium curranii*) and *mabolo* (*Diospyrus blancoi*) have high antioxidant activity as well (Gueco et al., 2017a).

Pili (*C. ovatum*)is an endemic fruit crop in the Philippines with the center of genetic diversity in the Bicol Region. The nut is considered the priced commodity of the fruit due to its utilization in the confectionery industry, while the pulp is discarded as a waste product. However, it contains bioactive compounds such as flavonoids, tannins, anthraquinones, indoles, alkaloids, sterols, and terpenes with high antioxidant activity (Pham and Dumandan, 2019; Arenas and Trinidad, 2017a). Moreover, the results of oral toxicity tests showed no mortalities, and no significant gross and histopathological findings in liver and kidney. Thus, it can be utilized as a component for food and other pharmaceutical products. The authors also reported the potential of *pili* pomace as a functional ingredient for food. The pomace was subjected to simulated in vitro digestion to assess the stability and bioavailability of polyphenol contents. Results showed a reduction of phenolic compounds and about 90% of antioxidant activity was lost during simulated digestion (Arenas and Trinidad, 2017b).

Batuan (*Garcinia binucao*) a natural souring agent popular in the Visayas region was also assayed for physicochemical and nutritional properties by Quevedo et al. (2013, 2017). Ash, protein, sugar, starch, total carbohydrates, total soluble solids, and sodium content were low in batuan fruits. However, the vitamin C, potassium, phosphorus, calcium, magnesium, and iron were high. Trace levels of zinc, copper and manganese were also present. On the other hand, crude fat, crude protein, and tannin were high in batuan seeds. Moisture and acidity were high in pulp, while the crude fiber and vitamin A were concentrated in the peel, pulp and ripe fruit. Moreover, the results of sensory evaluation showed that the fresh and the dry, powdered form were comparable in terms of color, mouth feel, taste and general acceptability as a souring agent for fish stew. In another study, the authors reported the organic acid contents of batuan fruits. These include oxalic acid, tartaric acid, malic acid, citric acid, fumaric acid, succinic acid, acetic acid, lactic acid, and a few unidentified organic acids. The results confirmed batuan's suitability as souring agent and potential for processing as ready to use acidulant for the wider household consumption and utilization in the local food industry. The seed oil of batuan was also assayed to evaluate its quality and potential for product development. The extracted oil had high triglycerides but low diglycerides content. It also contained more saturated fatty acids than the unsaturated fatty acids with stearic, oleic, and palmitic acids as the major components while arachidic, linoleic, and linolenic acids constitute the minor components. Sterol, squalene and beta-carotene were abundant in unsaponifiable matter with a minor amount of Vit. A palmitate, - and -tocopherols Quevedo et al (2015). The hydroxycitric content which has anti-obesity properties was also evaluated by Bainto et al (2018). Results showed that the hydroxycitric content of *batuan* ranged from 2.65 to 4.81 g per 100g sample depending on the extraction method. Water was the best extraction method and it also produced pure isolate of the compound. Moreover, the study of Bagabaldo et al. (2021) revealed that among 20 local underutilized fruits evaluated for HCA content, only tamarind and batuan had significant amounts. Tamarind flesh contains 3.731±0.046 g HCA/100 g fresh weight, while batuan flesh and seeds had 3.447±0.059 g HCA/100 g fresh weight and 1.241±0.009 g HCA/100 g fresh weight, respectively.

The native fruit *bignay* (*Antidesma bunius*) is a berry that has high antioxidant activity. As reported by Aguinaldo and Villamayor (2015), *bignay* fruits and leaves contain carbohydrates, reducing sugars, phytosterols, phenolics, flavonoids and proteins. The total flavonoid content in leaves was reported at 56 QE/g, slightly higher than in fruits with 51 QE/g. These values suggest the potential of bignay as hyperuriccemic agent. The study of Grijaldo et al. (2019) revealed the phytochemical screening of male and female *A. bunius* leaf extracts. Results showed the presence of saponins, tannins, and polyphenols,

phlobatannins, steroids and terpenoids. Moreover, the study also demonstrated the potential of *bignay* leaf extracts to reduce fasting blood glucose levels. Meanwhile, Peña et al. (2022) reported that LC-MS/MS and phytochemical analyses of the plant extracts of *bignay* and *guyabano* suggest the presence of alkaloids, indoles, and phenols that may have contributed to their cytotoxic activities. The lipid-lowering properties of *bignay* were also evaluated *in vitro*. Two cultivars were assayed to determine differences in terms of maturity stage and thermal processing utilized. Results showed that 'Kalabaw' cultivar had higher in vitro lipid-lowering activities than common cultivar and that both cultivars had appreciable pancreatic lipase inhibitory activity, bile acid binding capacity, and cholesterol micellar solubility inhibition. These activities were comparable to lipid-lowering agents used as positive controls in the study. Moreover, it was found out that freshly harvested fruits had the highest bile acid binding activity, steam-blanched with the highest pancreatic lipase inhibition activity, and water-blanched fruits had the highest cholesterol micellar solubility inhibition. The results are good indication of bignay fruits' huge potential as functional food in relation to dyslipidemia (Crieta et al, 2021).

Bignay were also phytochemically analysed by Aguinaldo (2017). Carbohydrates, reducing sugars, phenolics, diterpenes, triterpenes or phytosterols, flavonoids and proteins are present. Moreover, the low toxicity and LC50 demonstrated confirms the pharmaceutical potential of this native fruit species.

Santiago et al., (2017), reported results of the antioxidant assays conducted on leaves of *Ficus nota* or 'tibig'. This species is traditionally consumed as a vegetable or used as an herbal remedy. The total phenolic and flavonoid contents were recorded to be 348.3 mg GAE/g and 2.64 mg QE/g. Moreover, the extract exhibited a concentration dependent inhibitory effect on DPPH, ABTS, and nitric oxide radicals; also, a high dose dependent reducing capacity and metal chelating potential towards iron. This antioxidant and prooxidant properties are beneficial for the treatment and prevention of certain diseases and conditions.

The bioactivities of *katmon* (*Dillenia philippinensis*) were also evaluated and reported by Ansari et al., (2021). The ethyl acetate fraction (DPEAF) had the highest scavenging activity of nitric oxide, hydrogen peroxide, and hydroxyl free radicals, with IC50 = 210.00, 70.92 and 59.88 µg/mL respectively. The xanthine oxidase inhibitory activity was highest in the DPEAF with an IC50 = 23.09 µg/mL, which has potential in the treatment of hyperuricemia.

The acute oral toxicity of the native species, *Syzygium curranii, Antedisma bunius, Syzygium cumini* were also evaluated. Different concentrations of freeze-dried powders are non-toxic, thus high potential as functional food ingredients. No clinical and behavioral signs of toxicity were also observed and there was zero morbidity and mortality. Post-mortem evaluation showed no lesions on various organs examined. Meanwhile, blood ALT, BUN and creatinine levels were within normal published values (Estacio et al., 2020). Muñoz et al. (2021) also reported that *bignay* extracts did not cause behavioral, respiratory and neurologic changes in mice. Moreover, the liver, kidney, stomach, intestines and esophagus remained intact post Bignay treatment.

3.4.5. Medicinal Properties

There are known medicinal values of indigenous and native fruits in some human diseases and conditions (Table 9). *Bignay* and *duhat* were reported to possess hypoglycemic activity. *Bignay*, *pili* and *Syzygium lineatum* exhibited cytotoxic activities. *Katmon and bignay* have potential in lowering uric acid. *Syzygium lineatum, Citrus hystrix, Rubus rosifolius,* and *Ficus pseudopalma* possess antimicrobial properties

while *S. lineatum* has analgesic/anti-inflammatory properties. Lastly, *Averrhoa bilimbi* had potential in lowering blood cholesterol.

Table 9: Medicinal value of some indigenous and native fruits against known diseases.

Pharmacognostic evaluation	Indigenous Fruit	Authors
Diabetes		
Fresh and ethanolic extracts caused a significant reduction of blood glucose levels in mice and thereby exhibited significant hypoglycemic activity.	*Antidesma bunius*	Tanquilut et al., 2019
Plant extracts significantly lowered the fasting blood glucose (FBG) levels in mice compared to the positive (glibenclamide 10 mg/kg) and negative (distilled water) controls. The blood urea nitrogen (BUN) level of all mice was within normal range. Meanwhile, the creatinine level of mice treated with *bignay* ethanolic extract was higher than the control.	*Antidesma bunius*	Grijaldo et. al., 2019
The results of the in vivo study showed that freeze-dried fruit showed significant reduction in blood total glucose by 50 and 30% with 30 and 20% supplementation (w/w), respectively.	*Syzgium cumini*	Mercado et al., 2021
The results showed that *duhat* has high total phenolic content and antihyperglycemic potential. The administration of leaf extracts improved the blood glucose levels of the diabetic mice which is almost comparable with Glibenclamide, thus can be utilized as an alternative medication for diabetes.	*Syzygium cumini*	Della et al., 2018
Cancer		
Plant extracts exhibit antioxidant and cytotoxic activities against lung cancer cells.	*Antidesma bunius*	Peña et al., 2022
The aqueous leaf extract was evaluated for possible anti-angiogenic effect and	*Canarium ovatum*	Chan & Cajuday, 2013

Pharmacognostic evaluation	Indigenous Fruit	Authors
results showed significant inhibition in blood vessel formation in duck embryos.		
Cytotoxicity screening using fractionated sub-extracts revealed a substantial improvement of antiproliferative and cytotoxic activities. Further purification yielded compounds with highly selective antiproliferative activity against human chronic myeloid leukemia cells.	*Syzygium lineatum*	Ibana et al., 2018
Hyperuricemia or high uric acid levels		
Potential source of natural antioxidants and xanthine oxidase inhibitors which can be used in hyperuricemia and presumed to be used orally.	*Dillenia philippinensis*	Ansari et al., 2021
The antihyperuricemic potential was evaluated and results showed significant inhibition on hyperuricemic activity, which were statistically comparable to colchicine in lowering the uric acid level.	*Antidesma bunius*	Aguinaldo and Villamayor, 2015
Antimicrobial property		
The leaf extracts revealed antibacterial activities, inhibiting the growth of the non-resistant and multidrug-resistant strains of the gram-negative bacteria *Escherichia coli*, *P. aeruginosa* and *A. baumanii*.	*Syzygium lineatum*	Macadato et al., 2019
For the antibacterial activities, extracts were most effective against *Escherichia coli.*	*Citrus hystrix* *Rubus rosifolius*	Recuenco et al., 2020
Extract was most effective against *Staphylococcus aureus.*	*Ficus pseudopalma*	Recuenco et al., 2020
Analgesic/Anti-inflammatory		
Leaf extracts were used for lipoxygenase (LOX) inhibitory assay and in vivo testing. The butanol sub-extract was found to be the most potent with IC50 of 4.09 µg/mL, and doses of 250 and 500 mg/kg body	*Syzygium lineatum*	Macadato et al., 2019

Pharmacognostic evaluation	Indigenous Fruit	Authors
weight (BW) were found to have the same analgesic effect as the positive control. Moreover, the dose of 250 mg/kg BW exhibited anti-inflammatory activity comparable to that of diclofenac.		
Lipidemic Activity		
The fruit extracts show significant reduction in cholesterol, low-density lipoprotein and triglycerides among rats treated with pure extracts. The results are comparable to Simvastatin, a commercially – available drug used to lower blood cholesterol.	*Averrhoa bilimbi*	Madrideo et. al., 2013

3.5 Production and processing

Indigenous fruits in the Philippines are grown mainly in home gardens, and small farms. In other communities, people gather them in the wild, in forests and other non-cultivated areas. For instance, members of the Pala'wan tribe in Rizal and Quezon usually collect fruits and vegetables in the wild while they plant cereals as their staple food (Bernadas & Peralta, 2017). The same is true with the Higaonon tribe in Bukidnon province who collect fruits from the wild and communal village areas (Buenavista et al., 2022).

Information on the volume of production and area planted to indigenous fruits is limited. Data from the Philippines Statistics Authority, show that there are only 27 indigenous and native fruits with available data in terms of volume of production, number of bearing trees/ vines, area planted/ harvested (Figure 3; Tables 10 to 12). Some of the crops are commercially grown, but the amount was insignificant compared to major fruits like banana, mango, citrus, pineapple, and papaya. Banana (*Musa* spp.) serves as a reference crop and to show the differences in production of IFs. Among the indigenous and native fruits with data, indigenous mango species (possibly including *paho*, *M. altissima* and *bayuno*, *M. caesia*, among others) had the highest volume of production during the past 5 years, followed by durian (*Durio zibethinus*), jackfruit (*Artocarpus heterophyllus*), avocado (*Persea americana*), and *santol* (*Sandoricum koetjape*). Pangasinan is the top producer for these indigenous mango species, Davao City for durian, Masbate for jackfruit, Cagayan Valley and Nueva Vizcaya for avocado, and Cavite for *santol*. The highest number of bearing trees are lanzones (*Lansium domesticum*) while area planted or harvested is highest in indigenous mango species. Area devoted to the 27 indigenous and native fruits in the list (114,488 hectares) is only a quarter of the area devoted to bananas (440,056 hectares) which are an export commodity. Lanzones (*Lansium domesticum*) and *marang* (*Artocarpus odoratissimus*) had less than 150,000 mt average production, although production went higher in 2019 but declined in 2020 and 2021. The rest of the indigenous fruits only had 1.22 mt (*Terminalia microcarpa*) to 7,500 mt (*rambutan*, *Nephelium lappaceum*) volume of production (PSA, 2022).

Figure 3: Trend in volume of production of 27 indigenous fruits for the past 5 years (2017 to 2021) (Source: Philippine Statistics Authority, PSA 2022)

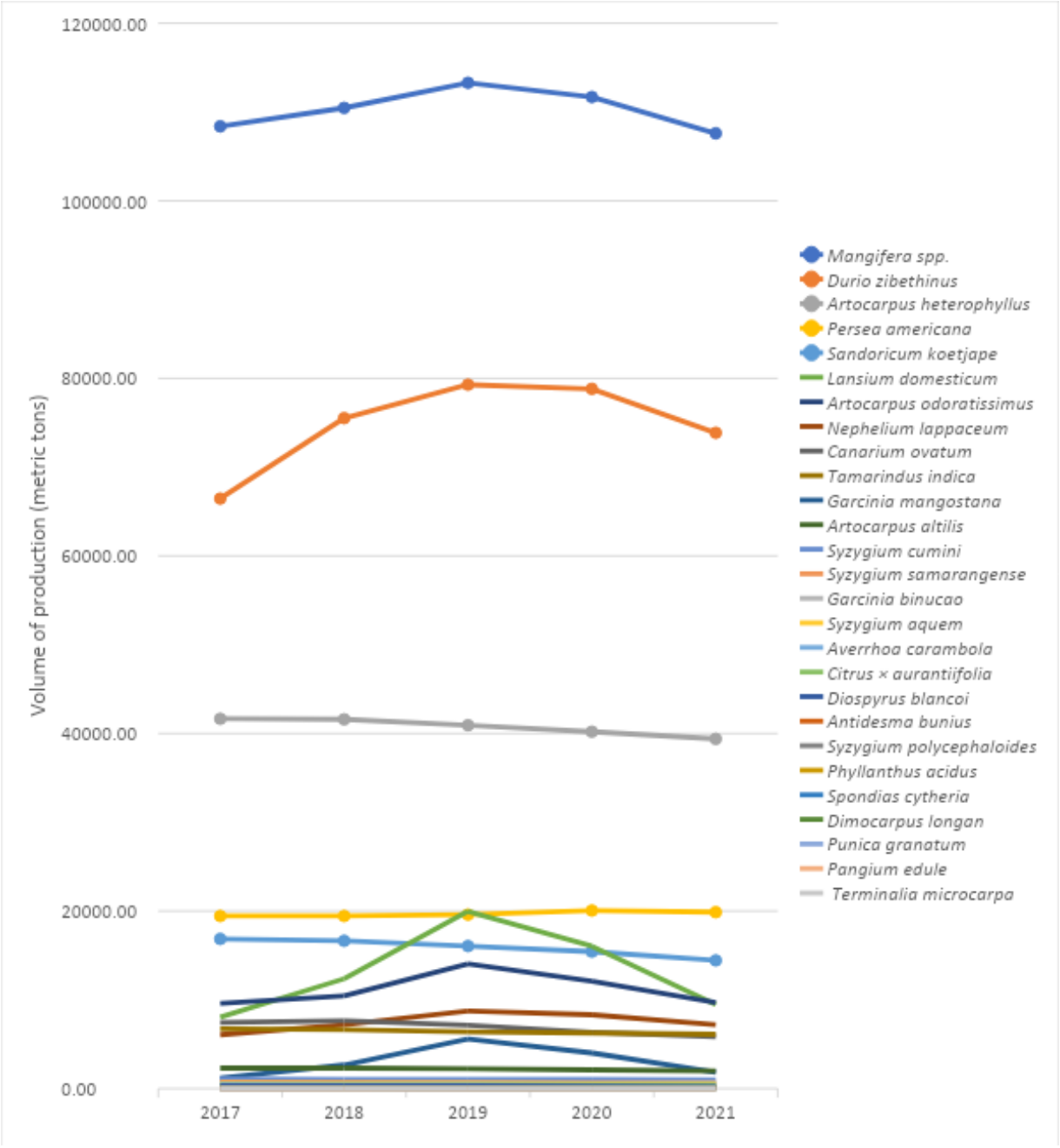


Table 10: Volume of production of some indigenous and native fruits in the Philippines from 2017-2021 compared to banana

Local name	Scientific name	Volume of production from 2017-2021 (metric tons)					
		2017	2018	2019	2020	2021	Average
Banana[1/]	*Musa* spp.	9166334.31	9358784.56	9157676.11	9056149.45	9091308.03	9166050.49
Mango Others[2/]	*Mangifera* spp.	108385.95	110458.40	113286.79	111687.69	107598.20	110283.41
Durian	*Durio zibethinus*	66457.63	75521.48	79284.05	78815.99	73867.42	74789.31
Jackfruit	*Artocarpus heterophyllus*	41656.14	41591.23	40926.69	40199.43	39388.86	40752.47
Avocado	*Persea americana*	19439.95	19442.64	19596.88	20054.72	19874.96	19681.83
Santol	*Sandoricum koetjape*	16862.46	16647.36	16056.55	15423.61	14439.07	15885.81
Lanzones	*Lansium domesticum*	8030.52	12367.94	19974.30	16037.36	9481.78	13178.38
Marang	*Artocarpus odoratissimus*	9606.26	10457.24	14056.00	12098.37	9674.62	11178.50
Rambutan	*Nephelium lappaceum*	6064.56	7207.52	8733.53	8312.52	7205.22	7504.67
Pili Nut (dried nut w/ shell)	*Canarium ovatum*	7427.41	7648.90	7158.20	6331.48	5859.46	6885.09
Tamarind Fruit	*Tamarindus indica*	6755.62	6638.31	6377.09	6259.04	6108.94	6427.80
Mangosteen	*Garcinia mangostana*	1171.25	2659.45	5600.40	4019.35	1833.29	3056.75
Breadfruit	*Artocarpus altilis*	2316.46	2311.53	2233.18	2109.54	1980.04	2190.15

Local name	Scientific name	Volume of production from 2017-2021 (metric tons)					
		2017	2018	2019	2020	2021	Average
Duhat	*Syzygium cumini*	1066.10	1052.82	1038.77	1011.72	990.82	1032.05
Makopa	*Syzygium samarangense*	706.55	672.71	671.37	644.17	607.50	660.46
Batuan	*Garcinia binucao*	529.61	546.49	571.08	599.03	605.13	570.27
Tambis	*Syzygium aqueum*	563.33	583.23	584.23	547.36	531.16	561.86
Balimbing	*Averrhoa carambola*	461.91	437.65	412.40	383.80	367.19	412.59
Lime	*Citrus × aurantiifolia*	370.95	383.07	384.71	373.48	362.96	375.03
Mabolo	*Diospyrus blancoi*	340.54	319.98	308.27	285.96	242.48	299.45
Bignay	*Antidesma bunius*	87.53	88.61	87.80	95.01	96.56	91.10
Lipote	*Syzygium polycephaloides*	71.55	71.64	66.52	65.18	60.29	67.04
Karamay	*Phyllanthus acidus*	65.02	66.10	62.32	56.15	52.78	60.47
Hibi	*Spondias cytheria*	31.39	32.25	32.85	33.27	30.98	32.15
Longans	*Dimocarpus longan*	21.70	21.86	21.85	24.49	24.30	22.84
Pomegranate, Granada	*Punica granatum*	23.69	22.26	21.80	20.51	20.48	21.75

Local name	Scientific name	Volume of production from 2017-2021 (metric tons)					
		2017	2018	2019	2020	2021	Average
Pangi	*Pangium edule*	1.85	1.20	0.98	1.00	1.06	1.22
Calumpit	*Terminalia microcarpa*	0.89	0.87	0.89	0.81	1.04	0.90

[1/] Reference crop, one of the 5 major fruit crops in the Philippines
[2/] There was separate production data on 'Carabao' and 'Piko' mango (*Mangifera indica*). Mango might include other species like *M. altissima (paho)* and *M. caesia (bayuno)*
Source: Philippine Statistics Authority, www.psa.gov.ph

Table 11: Number of Bearing Trees/Hills/Vines of some indigenous and native fruits in the Philippines from 2017-2021

Common name	Scientific name	Number of Bearing Trees/Hills/Vines from 2017 to 2021					
		2017	2018	2019	2020	2021	Average
Banana[1/]	*Musa* spp.	285918228	288639018	285335123	285381092	280913225	285237337
Lanzones	*Lansium domesticum*	1934946	1954386	1993141	2009217	2020009	1982340
Mango[2/]	*Mangifera* spp.	1699884	1709734	1705320	1708528	1700868	1704867
Durian	*Durio zibethinus*	1293038	1343438	1342881	1341526	1387628	1341702
Jackfruit	*Artocarpus heterophyllus*	1165607	1161791	1160807	1156793	1153750	1159750
Avocado	*Persea americana*	506586	506678	507944	510560	512071	508768

Common name	Scientific name	Number of Bearing Trees/Hills/Vines from 2017 to 2021					
		2017	2018	2019	2020	2021	Average
Santol	*Sandoricum koetjape*	445070	443169	437911	436885	434915	439590
Rambutan	*Nephelium lappaceum*	404967	417503	419208	420988	415395	415612
Marang	*Artocarpus odoratissimus*	336746	327989	328420	328828	328919	330180
Mangosteen	*Garcinia mangostana*	237440	243108	277533	282637	282713	264686
Pili Nut (dried nut w/ shell)	*Canarium ovatum*	164382	164810	158221	147145	146102	156132
Tamarind	*Tamarindus indica*	127211	127385	124710	124360	123850	125503
Duhat	*Syzygium cumini*	85997	84968	84366	84086	83481	84580
Breadfruit	*Artocarpus altilis*	55754	55698	55612	55526	55563	55631
Tambis	*Syzygium aqueum*	50545	50222	50288	50282	50155	50298
Makopa	*Syzygium samarangense*	46615	46536	45737	45226	44821	45787
Lime	*Citrus × aurantiifolia*	44027	44759	44588	44010	43522	44181
Balimbing	*Averrhoa carambola*	45335	44642	43744	42703	40657	43416
Batuan	*Garcinia binucao*	12825	13231	13291	13375	13453	13235

Common name	Scientific name	Number of Bearing Trees/Hills/Vines from 2017 to 2021					
		2017	2018	2019	2020	2021	Average
Bignay	*Antidesma bunius*	12644	12781	12973	13115	13158	12934
Karamay	*Phyllanthus acidus*	11687	11666	11209	11166	10929	11331
Mabolo	*Diospyrus blancoi*	11137	11130	10961	10879	10657	10953
Rattan Fruits	*Calamus ornatus* var. *philippinensis*	9483	9495	8248	8286	7532	8609
Lipote	*Syzygium polycephaloides*	3643	3573	3422	3343	3276	3451
Granada	*Punica granatum*	3381	3284	3115	3098	2942	3164
Longans	*Dimocarpus longan*	2405	2325	2299	2343	2381	2351
Hibi	*Spondias cytheria*	578	795	935	935	892	827
Pangi	*Pangium edule*	250	250	250	250	250	250
Calumpit	*Terminalia microcarpa*	146	146	128	120	120	132

[1/] Reference crop, one of the 5 major fruit crops in the Philippines
[2/] There was separate production data on 'Carabao' and 'Piko' mango (*Mangifera indica*). Mango might include other species like *M. altissima (paho)* and *M. caesia (bayuno)*
Source: Philippine Statistics Authority, www.psa.gov.ph

Table 12: Area planted/ harvested on some indigenous and native fruits in the Philippines from 2017-2021

Common name	Scientific name	Area planted/ harvested (hectares)					
		2017	2018	2019	2020	2021	Average
Banana[1/]	*Musa* spp.	446763.91	447889.39	449030.08	451177.70	450420.12	449056.24
Mango[2/]	*Mangifera* spp.	28326.00	28307.61	28273.13	28399.66	28365.97	28334.47
Lanzones	*Lansium domesticum*	20841.66	21286.90	21489.79	21548.63	21511.25	21335.65
Durian	*Durio zibethinus*	16672.09	16692.84	16677.79	16582.92	16573.74	16639.88
Jackfruit	*Artocarpus heterophyllus*	13857.06	13835.68	13862.94	13862.93	13811.24	13845.97
Santol	*Sandoricum koetjape*	7054.56	7020.83	6964.46	6946.38	6918.57	6980.96
Rambutan	*Nephelium lappaceum*	5636.98	5726.56	5691.28	5717.17	5656.26	5685.65
Avocado	*Persea americana*	5179.55	5180.24	5195.51	5241.80	5267.47	5212.91
Marang	*Artocarpus odoratissimus*	5138.74	5136.05	5143.52	5154.96	5158.68	5146.39
Mangosteen	*Garcinia mangostana*	2786.75	2926.41	2956.56	3021.35	3031.08	2944.43
Tamarind	*Tamarindus indica*	2145.97	2250.54	2212.34	2207.47	2202.44	2203.75
Pili Nut (dried nut w/ shell)	*Canarium ovatum*	2283.24	2261.96	2164.11	2006.11	1998.29	2142.74

Common name	Scientific name	Area planted/ harvested (hectares)					
		2017	2018	2019	2020	2021	Average
Duhat	*Syzygium cumini*	1126.67	1117.19	1107.59	1098.45	1093.01	1108.58
Breadfruit	*Artocarpus altilis*	903.41	900.64	898.44	897.77	905.29	901.11
Makopa	*Syzygium samarangense*	456.46	454.74	448.03	440.31	439.68	447.84
Tambis	*Syzygium aqueum*	440.69	440.47	441.89	444.94	443.69	442.34
Balimbing	*Averrhoa carambola*	329.02	320.02	311.16	301.71	295.57	311.50
Lime	*Citrus × aurantiifolia*	232.40	235.40	236.02	232.17	231.35	233.47
Mabolo	*Diospyrus blancoi*	140.67	140.69	138.24	137.12	133.30	138.00
Batuan	*Garcinia binucao*	121.16	124.96	127.18	127.49	128.57	125.87
Karamay	*Phyllanthus acidus*	84.40	85.40	84.60	83.14	83.09	84.13
Bignay	*Antidesma bunius*	71.45	71.95	73.00	74.25	76.05	73.34
Rattan Fruits	*Calamus ornatus* var. *philippinensis*	75.55	80.95	67.80	67.49	51.09	68.58
Lipote	*Syzygium polycephaloides*	37.25	36.85	35.70	34.65	34.58	35.81
Granada	*Punica granatum*	21.44	21.95	21.84	21.78	21.77	21.76

Common name	Scientific name	Area planted/ harvested (hectares)					
		2017	2018	2019	2020	2021	Average
Longans	*Dimocarpus longan*	11.90	11.90	10.90	11.78	12.00	11.70
Hibi	*Spondias cytheria*	6.69	7.49	7.99	7.74	7.09	7.40
Pangi	*Pangium edule*	2.00	2.00	2.00	2.00	2.00	2.00
Calumpit	*Terminalia microcarpa*	2.00	2.00	1.70	1.75	1.75	1.84

[1/] Banana as reference crop, one of the 5 major fruit crops in the Philippines
[2/] There was separate production data on 'Carabao' and 'Piko' mango (*Mangifera indica*). Mango might include other species like *M. altissima (paho)* and *M. caesia (bayuno)*
Source: Philippine Statistics Authority, www.psa.gov.ph

Studies were undertaken using the sexual (seeds) and asexual (stem cuttings, grafting, use of tissue culture) means of propagation. Some crops can be easily grown without the plant growth regulators and rooting hormones. The summary of the propagation studies is presented in Table 13. Other studies in production include rootstock compatibility of different *Artocarpus* species (*marang*, *A. odoratissima*; *tipolo*, *A. blancoi*; breadfruit, *A. camansi*) to jackfruit rootstock, *A. heterophyllus* in which *marang* was found to be the best rootstock for jackfruit as it performed better in terms of plant stature, yield, and resistance to *Phytophthora* disease (Loquias and Coronado, 2018). Meanwhile, the effect of fruit thinning on yield and fruit quality in 'Puyat' durian was investigated and thinning at 50% produced the highest number of harvested fruits, heavier fruit, greater pericarp weight, greater fruit circumference and longer fruit, better shelf life under ambient conditions (Nicolas et al., 2019).

Disease management for jackfruit was studied to understand the etiology of the pathogen causing jackfruit bronzing. Polymerase chain reaction (PCR) analysis confirmed the causal organism as *Pantoea stewartii* subsp. *stewartii* (Smith), the same bacterium that causes bacterial wilt or Stewart's disease of corn (Gapasin et al., 2013). In a separate study, monthly stem injection of chitosan (from shrimp and crab exoskeletons) at 1 ml of 300 ppm solution to jackfruit seedlings proved to be effective in controlling seedling dieback caused by *Phytophtora palmivora* (Lesaca, 2018).

On the role of indigenous fruit as a biopesticide, *bignay* (*Antidesma bunius*) fruit extract has proven effective in controlling beetles (*Epilachna* spp., family Coccinellidae) (Belmi et al., 2014).

Table 13: Propagation method of some variety/species of indigenous fruits in the Philippines.

Species/ Variety	Propagation method	Reference
'EVIARC' jackfruit	Grafting survival using ordinary garden soil	Luna and Garrigues, 2019
Katmon, *Dillenia philippinensis*	Using mature stem cuttings at 2-feet long with 0.75-1.0 inch diameter; using a combination of MycoVAM and vermicompost as soil ameliorants	Wagan et al., 2017
'FB Cachola' breadfruit (*Artocarpus altilis*)	*In vitro* propagation using 5ppm BAP (benzylaminopurine) to produce multiple shoots; cutting scion grafted to one-year-old breadfruit seedlings and individually wrapping with a polyethylene bag	Atis et al., 2014

Species/ Variety	Propagation method	Reference
'MMSU SRO Sweet' jackfruit (*A. heterophyllus*)	Scion should be 5-15 cm long to obtain higher survival	Atis et al., 2014
Bignay, *Antidesma bunius*	Cuttings from the main stem regardless of cutting origins (bottom to top) can be used even without the application of growth regulators	Benabise et al., 2021
Bignay, *Antidesma bunius*	Taproot pruning of 1-2 cm promotes further root growth development for better seedling quality and survival during transplanting	Burcer et al., 2021
Deguai, *Saurauia bontocensis*	Seeds germinate in heat-sterilized loam soil without pre-germination treatments; stem cuttings from the base grow best untreated rather than applying rooting hormones	Tacloy et al., 2022

3.6 Post-harvest and processing

Processing and value adding is a good way of storing and extending the shelf-life of fruits while providing income to communities. The development of unique products can lead to business development and the creation of demands for specific products. For indigenous fruits, a range of products were developed – chips, candies, juices and concentrates, jam, jelly, wine, vinegar, cookies and other flour-based products, powdered products for souring agents, natural food preservatives, and many others.

Wine was developed in many fruits such as *seriales* (*Flacourtia jangomas), lubeg* (*Syzygium lineatum)*, *sapinit* (*Rubus rosifolius), makopa* (*S. samarangense*), star fruit (*Averrhoa carambola*), arius (*Podocarpus costalis*), *katmon* (*Dillenia philippinensis*), guava (*Psidium guajava*), *lipote* (*S. curranii*), *rambutan* (*Nephelium lappaceum*), passion fruit *(Passiflora* sp.), *marang* (*Artocarpus odoratissimus*), jackfruit (*A. heterophyllus*), and *bignay* (*Antidesma bunius*).

There were also efforts to produce powdered products out of *bilimbi* (*Averrhoa bilimbi*) (Limbaga et al, 2014); *katmon* (*Dillenia philippinensis*) (Dellosa et al, 2019), and *batuan (Garcinia binucao*) (Quevedo et al, 2013; Ancheta & Dizon, 2018). Powdered products from these fruits serve as an alternative to tamarind, which is the most popular souring agent that is commercially available. *Batuan* fruits, either ripe or green, can be used in making powdered products, although higher acceptability was observed in the green or unripe *batuan* powder

when tested on pork and fish sinigang (Dormido et al, 2019). The shelf life of *batuan* in powder form was evaluated using the Accelerated Shelf-Life Test wherein the product was stored in different temperature treatments. Researchers found that the shelf life of the product at room temperature can reach 202 days or 6.7 months (Ancheta et al, 2020).

Application of indigenous fruits in the food industry was also explored. For example, jackfruit was tested for its potential as an extender in canned tuna flakes in oil with optimum formulation of 15% jackfruit rags for every 155 g of canned tuna (Galvez et al., 2017). Using biodegradable films as a primary package or in combination with other packaging materials can also be explored in the future. One of the active edible films can be based on gelatin and carboxymethylcellulose with phenolic extracts from *bignay* (Belan et al, 2019).

There were also initiatives to transfer the developed technology in processing and value adding. Technical support to rural women's groups in Quezon Province was provided for the processing and product development of *katmon* (JN Paller of DA-BAR, personal communication).

There are limited initiatives in the postharvest of indigenous fruits. For *katmon*, initial studies were done to evaluate the physico-chemical properties of the fruits after harvest to extend its shelf life. As expected, fruits immediately turned brown and softened but the use of Modified Atmosphere Packaging (MAP) using polyethylene bags stored under ambient or low temperatures (13-14 °C) took one week when packed as peeled fruits and by two weeks if packed intact (Artes et al, 2018). To reduce browning of dehydrated jackfruit pulp, the use of 0.1 or 0.2% w/w sulfite in jackfruit variety 'AES Jak 1' was recommended (Galvez et al, 2013).

3.7 Marketing

Marketing should not be treated as the end of the production phase of operations, but it should be the driving force of production as dictated, by market and consumer needs (Crawford, 1997). The rapid market appraisal studies of indigenous tamarind (and some other underutilized fruits) showed that there is a strong domestic and international market potential. However, there was a significant reduction in yield and production areas over time where most producers are small-scale farmers. It was found that there is a lack of market linkages connecting the farmers, traders, and processors, resulting in loss of profit and food waste (Policy Action Group, DOST-PCAARRD, 2022).

3.8 Policy and Institutional Frameworks

The Bureau of Plant Industry through the Department Circular No 17 Series of 2020 released the "Guidelines on the Listing of Traditional Crop Varieties for Conservation and Sustainable Use" to support wider utilization and commercialization not only of the more popular varieties but also of traditional crops being cultivated by farmers over generations (www.bpi.da.gov.ph). In support of the *pili* industry, House Bill/Resolution No. HB00391 was filed as "An Act Promoting the Cultivation, Production, Processing, Marketing and Distribution of Pili Nut and

for other Purposes". *Pili* is relatively more commercialized than the rest of the indigenous fruits that are still largely underutilized. These resolutions to be passed into law would be a breakthrough for further promotion of these crops.

3.9 Research and Promotion Initiatives

3.9.1 Agencies involved in research and promotion of indigenous fruits

Agencies with initiatives on indigenous fruits are found in 35 provinces throughout the country with Laguna (30%), NCR (22%), Leyte (13%) and Camarines Sur (5%) having the greatest number of studies (Figure 4). Most of the studies in Laguna are implemented by the University of the Philippines Los Baños (UPLB), Department of Science and Technology - Philippine Council for Agriculture, Fisheries, and Aquatic Resource (DOST-PCAARRD) while implementing agencies involved in the NCR are from various universities and the attached agencies of the Department of Agriculture (DA) and Department of Science and Technology (DOST). Visayas State University (VSU) has initiatives in Leyte while the Department of Agriculture - Regional Field Office 5 (DA-RFO 5) and its research arm DA-BIARC (The Bicol Integrated Agricultural Research Center), and Central Bicol State University of Agriculture have initiatives in the Bicol Region.

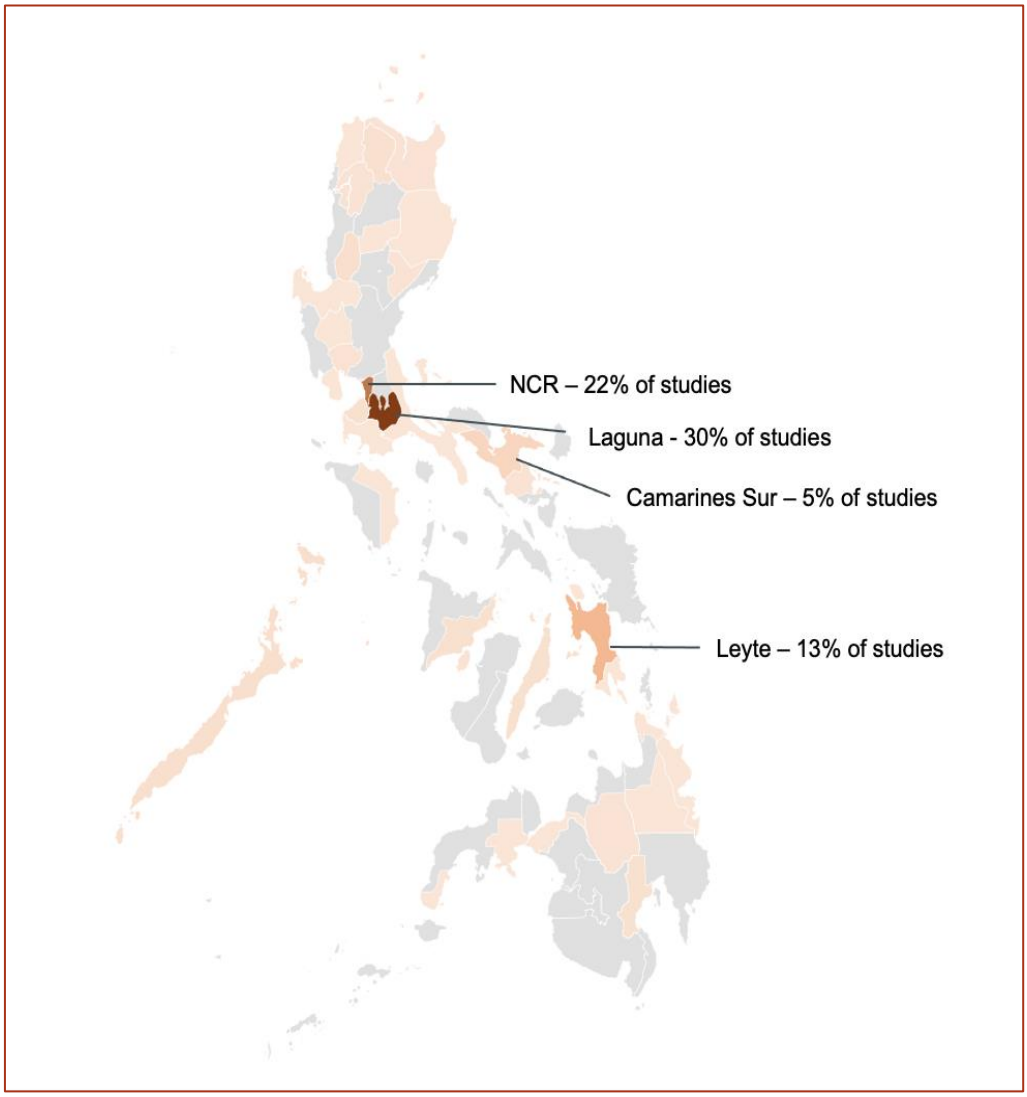
Only 64 (37%) of the literature reviewed mentioned the source of funding for initiatives on indigenous fruits. The majority of these are funded by the government sector such as the DA – Bureau of Agricultural Research (DA-BAR) and the research arms of the Department of Science and Technology (DOST) like the Philippine Council for Agriculture, Aquatic and Natural Resources (PCAARRD) and Philippine Council for Health Research and Development (PCHRD). The DA-BAR has supported 24 studies on indigenous fruits and vegetables (JN Paller of DA-BAR, Personal Communication) spending a total amount of Php 80 M (USD 1.4M). The agency supported 13 projects on genetic conservation, characterization, propagation, product development and commercialization of indigenous fruits. Product development and commercialization include *kalumpit* (*Terminalia microcarpa*), arius (*Podocarpus costalis*), bilimbi (*Averrhoa bilimbi*), the star-fruit (*Averrhoa carambola*), *batuan* (*Garcinia binucao*), and *katmon* (*Dillenia philippinensis*).

3.9.2 Agencies involved in research and promotion of indigenous fruits

Promotion of indigenous and native fruits is necessary for people to appreciate the value of these crops. By promoting the cultivation and use of these fruits and showing that they are good sources of nutrients and a potential source of income, will lead to the conservation and preservation of these crops for future generations.

Activities to promote indigenous and native fruits include exhibits, capacity building, distribution of planting materials, IEC materials on production and utilization. DA offices and BPI distribute planting materials to beneficiaries and conduct capacity building in terms of production, processing, and commercialization throughout the country.

Figure 4: Distribution map showing percent initiatives per province based on the total available literature of indigenous fruits in the Philippines from 2012-2022.



3.10 Challenges and Opportunities

The challenges and opportunities mentioned below are only limited to the available literature gathered at the time of this study. The book by Coronel (2011) provides ample information on endemic and introduced species in the country. Some of the fruits described were mentioned in several ethnobotanical studies and surveys. However, the existence of the mentioned species was unknown at the time of this review. Production data from the Philippine Statistics Authority should include scientific names to be able to provide more accurate and comprehensive data.

Conservation

Most of the diversity studies focused on more popular commercial crops like the *Artocarpus* species and *pili* (*C. ovatum*) and less on other indigenous species. Given a great number of indigenous species, there is still the need to conduct diversity studies using both morphological and molecular techniques. Also, existing collections need better representation in the genebanks to strengthen genetic diversity. Additional sampling from conservation sites is needed. The evaluation of existing germplasm can be exploited to be able to fully devise better conservation strategy. Several indigenous fruit species must be prioritized to start. However, the maintenance of existing and future collections is expensive and most of the support comes from external funding. Therefore, sufficient internal funding must be provided to increase genebank capacity.

In-situ and *ex-situ* conservation have their own pros and cons. It is therefore suggested to complement *in-situ* with *ex-situ* conservation and v*ice versa* to ensure that the maximum genetic diversity of the priority species is maintained (Heywood and Dulloo,2005). Most of the identified *ex-situ* conservation sites are individual or private group initiatives. There was no identified community field genebank in this study.

Production and varietal improvement

Indigenous fruits are commonly grown from seeds with limited understanding of their proper care and management. Most fruits are grown organically, with no fertilizers and chemical pesticides. Studies on the propagation and production of indigenous fruit species directly contributes to the diversification of the cropping system and can provide a more substantive base for the fruits' direct utilization or the processing industry.

In the past 10 years, there has been limited varietal release of indigenous fruits primarily because of their perennial nature. The selection should include field performance like yield, resistance to biotic and abiotic stresses, and their nutritional and functional properties for direct utilization.

Nutritional evaluation

A range of functional property studies were available to provide in-depth nutritional information of indigenous fruits. Several species were proven to contain higher nutritional value than some of the popular fruits available in the market. However, it is important to take note that the data does not reflect the nutrient variability due to the differences in environment and varieties or sub-species.

Marketing

Despite the potential for commercialization, there was insufficient literature of the economics of indigenous fruits. In some instances, though, indigenous fruits, despite having a strong economic potential, lack the linkages between the farmers, traders, and processors. Hence,

the strengthening of the linkages between these stakeholders are recommended. Support from the DA-BAR and other agencies is needed to make production and commercialization of indigenous fruits sustainable. Profitability and cost and return analysis of indigenous fruit products are usually not available in the literature.

Indigenous fruit species for promotion

Promotional activities exist but the priority crops need to be reevaluated. Below is the list of fruit species identified for promotion based on the DOST-FNRI nutritional data (Table 14). The uses, wide adaptability, and economic potential of the fruits were also considered in this list.

Table 14: Indigenous fruits for promotion based on nutritional quality, functional properties, multiple uses, wide adaptation, climate resilience, and economic potential.

Fruit	Reasons for promotion
Pili *Canarium ovatum*	Endemic variety with utilization in the confectionery industry; the nut has very good proximate composition in terms of protein, fats and ash content; rich in minerals and vitamins like calcium, phosphorus, iron, thiamine, riboflavin and Vitamin C; has anti-angiogenic property which has potential for cancer treatment; the pulp, which is considered a waste product, can also be promoted for use since it is rich in bioactive compounds and safe for consumption, thus can be utilized in the food and pharmaceutical industries.
Tamarind *Tamarindus indica*	Fruits are high in carbohydrates, sugar, and ash content; excellent source of calcium, potassium and thiamine and fair amount of riboflavin; it has high hydroxycitric acid which has anti-obesity property; has multiple use (vegetables, fresh fruits eaten raw, and for processing)
Bignay, *Antidesma bunius*	It has anti-cancer, anti-hyperuricemic, and glucose lowering properties; high phenolics and flavonoids content and antioxidant activity.
Artocarpus spp. (includes marang, jackfruit, breadnut, breadfruit)	Good source of vitamin C, iron, calcium (www.ifnri.dost.gov.ph); package of technologies for production and processing are in place; has multiple use as vegetable, fresh fruit, and for processing.
Katmon, *Dillenia philippinensis*	Has potential for processing; technologies for production and processing are in place; high nutritional quality and functional property; can also serve as an ornamental plant
Lubeg, *Syzygium lineatum*	Fruits have extremely high vitamin C content and also high in calcium; has potential for processing.

4. Conclusion

This desk review demonstrated that indigenous fruits can be a good source of vitamins, minerals, and phytochemicals for health and wellness. The results revealed that initiatives exist for genetic conservation, seed system and varietal development, nutritional promotion, production, post-harvest processing, and policies. The genetic representation of existing germplasm can be improved. There are no existing community field genebanks in the country. Existing conservation initiatives are mostly driven by public repositories and a few public individuals or groups. Varietal development, production and processing technologies can be strengthened to make conservation sustainable. There is only limited research on marketing and economic development of indigenous fruits in the country.

This study recommends seven priority species for collection and characterization, regeneration, evaluation, seed distribution and exchange including *katmon* (*Dillenia philippinensis*), *Syzygium* spp., *alupag* (*Litchi chinensis* subsp. *philippinensis*), *kubili* (*Cubilia cubili*), galo fruit (*Anacolosa frutescens*), *mabolo* (*Diospyrus blancoi),* and *Mangifera* spp. They are recommended based on their conservation status, nutritional quality, functional properties, and economic potential. Meanwhile, six indigenous fruits are recommended for promotion and direct utilization based on nutritional quality, functional properties, multiple uses, wide adaptation, climate resilience, and economic potential. This includes *pili* (*Canarium ovatum*), tamarind (*Tamarindus indica*), *bignay* (*Antidesma bunius*), *Artocarpus* spp., *katmon* (*Dillenia philippinensis*), and *lubeg* (*Syzygium lineatum*).

5. Recommendations for collection, conservation and seed system

This desk review presented the research and development initiatives on indigenous fruits across the value chain – from drivers to inputs, production, postharvest/ processing to market and consumer. Looking closely at the genetic resources that play a key role in diet diversity and adapting to adverse climatic conditions, the following are recommended to support the collection, conservation and evaluation and establishment to an improved seed system on indigenous fruits:

1. Scientists and government agencies must be linked to increase awareness for genetic conservation to improve or create policies. An increased institutional support like funding is recommended to increase the capacity of genebanks. An enhanced international cooperation for research and development through government support can help in the understanding in genetic diversity assessment and implementation of conservation.

2. Community field genebanks must be established through the collaboration of the Local Government Units and experts from State Colleges and Universities, Department of Agriculture- Regional Field Offices, and Bureau of Plant Industry Research Centers.

3. Provide technical assistance such as training on production, processing, and conservation strategies and provisions on facilities and equipment to existing private individuals or groups to increase their capacity.

4. Establish a network and strengthen linkage between private groups/ organized growers, community field genebanks, institutional genebanks, and public breeding institutions to increase access and exchange of genetic resources. The availability of planting materials and improved varieties will encourage the production of indigenous fruits in the local communities and farmer fields.

5. Seven (7) priority species are recommended in this review paper for long-term funding availability. This is based on the degree of vulnerability and the potential for production, marketing, and commercialization. In-depth nutritional analysis can be exploited to better understand their nature and serve as a basis for national promotions.

6. Integrate indigenous fruits in production systems such as multi-story cropping, lowland farming, and agro-ecotourism to encourage conservation while providing business opportunities.

7. Profitability and cost and return analysis of the promoted indigenous crops must be studied to maximize business opportunities and attract private investors.

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Annexes

Annex 1: Endemic/indigenous fruits in the Philippines as described in Coronel, 2011.

No.	Scientific name	Common/Local Names*
1	*Acmena acuminatissima*	Bic: bohokan; Ib: lubeg; Ilc: malabayon; Iln: tagilumboy; Kal: tulan; Neg: ngaret; Sam: malaruhat-sapa; Tag: husu-husu; kahoybod; malaruhat, malaruhat-parang, salasak, talamitan; War: bagotambis-nga-bugnoran, binloan; biniloan,bohokan.
2	*Aglaia clarkii*	Bic: alamag, kansuyud, tukang-kalaw; Ceb: saldana; Ilc: batukanog; Iln: kansulod, tukang-kalaw; Pan: baluy; Sam: tikbal; Tag: tukang-kalaw; Tagb: barongisan.
3	*Aglaia diffusa*	Lb: alugasin; Ilc: arangin, balamban-nga-puraw, daweng,salugen, saralo; Iln: mata-mata; Kal: ugis; Mag: kamata-mata; Neg: oksa, parusapil, tibungaw; Sub: mamata; Sul: batilan, kaniwi, lungan, maligang, saplungan; Tag: bugalbal, kuping, malasaging, salaking-pula.
4	*Aglaia elliptica*	Bic: mata-mata; Ilc: batukanag, palatangan, salapugud; Iln: odling; Kuy: lumbunaw; Lan: kamata-mata; Neg: tibungaw; Pan: balinsiagaw; Sub: bubuyakit; Sul: mamonak, mamonaw, saplungan; Tag: dalamiras, kagatongan, kaniwi,malasaging, maltumbaga, matang-ulang, salamungay, sulmin, tadyang-kalabaw; War: hagasan.
5	*Aglaia everetti*	Bag: kunaw; Ceb: bunguas, lumbunaw, malasantol; Iln:bulua, bulog: Man: bubunaw; War: bagasantol
6	*Aglaia llanosiana*	Bic: mata-mata, taba-taba; Ib: mata-utta; Ilc: adi-oas, arangen,tagasleng; Iln: bulog, magitlumboy, mata-mata, tapuyi; Sul: libunaw; Tag: bayanti, kanini, malatumbaga, salamungay
7	*Aglaia oligophylla*	Pan: ansa; Tag: manalaw, putian.
8	*Aglaia tomentosa*	Buk: karayap; Iln: bulog; Kal: tibungaw; Sul: mata-mata,saplungan; Tag: bayanti, kanining-puti, karamiras, kuling-manok.
9	*Allophylus macrostachys*	Ilc: bignay-baker; Neg:barotangol; Pan: lingo-lingo; Tag: bignay-gubat.

No.	Scientific name	Common/Local Names*
10	*Alphonsea arborea*	Bic: bolon, lanutan, malatamban; Ceb: sapiro; Tag: kalay, lanutan, palo-kalay; War: lanutan.
11	*Ampelocissus martini*	Iln: bika.
12	*Anacolosa frutescens*	Gad: yupa: Tag: malabignay, aluloy, galo; War: mataboto.
13	*Antidesma ghaesembilla*	Bag: dangul; Bik: tubo-tubo; Bon: ayusit; Ib: arusi; Ig: arusit; Ilc: arosep; Iln: inyam, kiuyan; kuy: dampol; Mag: ningnul, ninol; Mang: barungasi; Sam: binayuyo, banumayo; Sul:minul; Tag:binayuyo, bignayoko, binayuyo, kabogbog, kiuyan, limyang, pinang, tinuyong.
14	*Antidesma pentandrum*	Bik: alangnon; Ib: bugnay, talan; Ig: salagna; Ilc: bugnay, unat: Neg: bunay: Pam: malabinayuyo; Pan: balanei-na-manok; Sam: balinog; Tag: bignay-pugo, binayuyo-matsing, malabignay, pakagli.
15	*Ardisia crenata*	
16	*Artocarpus blancoi*	Bic: tipolo; Ceb: kalo, kolo; Ilc: pakak; Iln: tipolo; Iv: chipuho; Pam: tipolo; Tag: antipolo.
17	*Artocarpus camansi*	Bic: ugod; Ceb: dulugiyan, kalo; Ilc: pakaw; Tag: dulugiyan, kamansi, kamongsi.
18	*Artocarpus elasticus*	Bic: gumihan; Bag: tugup; Ceb: antipolo; Man: tugup; Tag: antipolo.
19	*Artocarpus nitidus* subsp. *nitidus*	Tag: Kubi.
20	*Artocarpus ovatus*	Tag: Anubing.
21	*Artocarpus sericicarpus*	Tag: Gumihan;
22	*Artocarpus vrieseanus* var. *refractus*	
23	*Baccaurea lanceolata*	

No.	Scientific name	Common/Local Names*
24	*Bridelia glabrifolia*	Lg: mata, tongal; Ilc: baransiagaw, lusuban, panayumen; Iln: managasa; Pan: malapilin; Tag: agay, lamuti, Ting: lusuban.
25	*Calamus maximus*	
26	*Calamus mitis*	
27	*Calamus mollis usitatus*	
28	*Calamus ornatus* var. *philippinensis*	Bag: tubo; Bic: kalapi; Ceb: kayapi, mayangyang; Ib: alimuran; Iln: kalapi; Pam: limuran; Sam: limuran; Tag: gupak, likuto, limuran, lukuan, palaklakanin, uway; War: kalapi.
29	*Canarium luzonicum*	Bic: malapili, pili; Ib: antang, pili; Ilc: alangi, alangki, bakoog: Iln:pili; Pan: bulaw; Tag: basiad, belis; pilawi, pili, pisa, sahing, tugtugin; Ting: bakan; War: pili.
30	*Canarium ovatum*	Bic, Ceb, Tag, War: pili; Tag: basyad, liputi, pilawi, pili-pilawi.
31	*C. vrieseanum* f. *williamsii*	
32	*C. vrieseanum* f. *stenophyllum*	
33	*Capparis micracantha*	Buk: balituk; Ceb: salimomo; salua-sua; Ilc: tarabtab, tarabtab-uwak, taraptap; Iln: alungung; Pam: kasuit; Tag: bayabas-uwak, dawag, halubagat-kahoy, malarayat-kahoy, salambagat, tinikan.
34	*Castanopsis philippinensis*	Tag: bating, bayoktoan, lobian, paungayan, takatak, talakalak, talakatak; War: ulayan.
35	*Celtis luzonica*	Bag: dalu; Bic: malaigmo, olarag; Ceb: kayonkong, oau; Ilc: maraguid; Iln: magabuyo, manikbubuyu, tabaw, ulalo; Man: udayu; Tag: malaikmo.
36	*Celtis philippinensis*	

No.	Scientific name	Common/Local Names*
37	*Citrus excelsa*	
38	*Citrus excels* var. *davaoensis*	
39	*Citrus hystrix*	Bic: kabog, kamuntay; Ceb: amongpong, amontaw, balo-oi, kopalian, kolobot, kolison, mayagarin; Ib: kapitan; Ilc: kamugay, kapitan, kamulaw; Kal: pinukpuk; Pan: piris; Sam: malatbas; Sub: muntal; Tag: buyak, buyog, kabugaw, kabuan, kabuyaw, kubot, kulubot, kolong-kolong.
40	*Citrus longispina*	
41	*Citrus macroptera*	
42	*Citrus miaray*	
43	*Citrus micrantha*	Biasong
44	*Citrus nobilis* var. *papillaris*	Bic: ransas; Bon: alsem; Ilc: darangita; Tag: dalanghita, sintones, tison.
45	*Citrus webberi*	
46	*Citrus webberi* var. *montana*	
47	*Clausena anisum-olens*	
48	*Cubilia cubili*	Ig: atilang; Man: baksian: Tag: ebuli, kabili, kubili, lubi-lubi, malasaging; War: tabas
49	*Cycas rumphii*	

No.	Scientific name	Common/Local Names*
50	*Dacryodes rostrata*	Lunai; Bic: palaspas; Ceb:pili-hanai; Lan: lunai
51	*Dillenia megalantha*	Bic: katmon; Tag: katmon-bayani; War: katmon.
52	*Dillenia mindanaense*	Agu: kambog.
53	*Dillenia philippinensis*	Bag: kalambok, kulambog; Bic: katmon; Ceb: katmon; Ib: balale, palali; Ig: dihis, biskan; Ilc: palali; Iln: bolobayauak; Lan: kalambugui; Mag: katmon; Man: katmon; Pam: katmon; Pan: palali, pamamalien; Sam: dingin: Sub: palali; Sul: kambog, katmon; Tag: katmon.
54	*Dillenia reifferscheidia*	Bic: balali, katmon-kadlangan, palali: Iln: katmon; Tag: katmon, katmon-kalabaw.
55	*Dimocarpus longan* subsp. *malesianus* var. *echinatus*	Chab: buli; Lan: iboli, marog, talimorok; Sul: lupak. Aluao
56	*Diospyros blancoi*	Bic: kamagong; Buk: itom-itom; Ceb: amaga, kamagong; Ib: balingagta, kamagong; Ilc: mabolo; Iln: mabolo; Iv: kamaya; Man: kamagong; Pam: kamagong, talang; Pan: kamagong; Sam: kamagong, mabolo; Tag: kamagong, mabolo, talang; War: ituman.
57	*Diospyros copelandii*	Tag: talang-gubat.
58	*Diospyros diepenhorstii*	Tag: balarowin, sapoteng-hulo, talang-gubat.
59	*Diospyros pyrrhocarpa*	Tag: Anang.
60	*Diplodiscus paniculatus*	Bag: badabo; Bic: barobo, bulolo; Ceb: malubo, manaring; Ilc: balugo, kideng, maramani; Iln: barubo, marobo, mayabo; Lan: balobo, bukad, buru; Mag: balobo, bulubu, bulugug, bulugay, tagpam; Man: balobo; Sul: dupdupan, mangabu,talu-talu; Tag: balobo, banayo, kamiling, malubo, puyus; War: balobo, barobo, marobo; Yak: balubu.
61	*Dracontomelon dao*	Bag: mamakau; Bic: dao; Ceb: batucan, habas; Iv: lupigi; Ilc: hamarak, kamarak, makadaeg; Iln: dao; Mag: makau; Man: anduong, makau, mamakau; Tag: dao, maliyaw; War: dao. kiakia.

No.	Scientific name	Common/Local Names*
62	*Dracontomelon edule*	Bic: alauihau, halauihai; Ceb: batoan; Iin: bili-bili; Kuy: ulandang; Pan: bio; Tag: aduas, anangging-puti, lamio, malaiyo; War: alauihau.
63	*Durio testudinarum*	Panugianon
64	*Ehretia acuminata* var. *polyantha*	Tanaua
65	*Elaeagnus triflora*	Bon: banaken; Ig: kapapei, padias; Iv: alunut; Sul: bankap; Tag: alingaro, lingaro.
66	*Elaeocarpus calomala*	Bic: hunggo; Ceb: kunakun; Iln: bunsilak; Tag: bongani, hunggo, kalomala, maglumboy, malaropit, unggo.
67	*Elaeocarpus cumingii*	Bag: rokambur; Bic: hunggo; Ceb: konakon, talot; Tag: hunggo; Tagb: paki; War: bago, pangutanang-bagio, saritang-bagio.
68	*Embelia philippinensis*	Bon: pongpong; Buk: dekai-dekaiang; Ig: baloko-o, bisalak, bisudak; Ilc: binurok; palongpong; Tag: dikay, lando.
69	*Excavatia littoralis*	Labusei
70	*Ficus bakeri*	Man: kataupi.
71	*Ficus lepicarpa*	Ceb: sulu-talobog. Saraca Fig
72	*Ficus nota*	Bag: basikong; Bon: labei; Gad: daoai; Ib: kiki-kik, tabug, tibug; Ig: tubug; Ilc: tebeg, tebig; Is: labai; Iv: anraranum; Lan: katinbog; Pan: tebel; Sub: bubunga; Tag: tibig; Tagb: tibei; Ting: tugbug; War: tuyokai.
73	*Ficus odorata*	Bag: paysan; Buk: malapagang; If: aplus; Iln: agasahin, agupit, isis, kapinit; Man: pili; Tag: agosos, pakiling

No.	Scientific name	Common/Local Names*
74	*Ficus pseudopalma*	Bic; lubi-lubi; Tag: niyog-niyogan.
75	*Ficus ulmifolia*	Bik: agupit, katol; Bon: apulas; Ceb: agusahis: Ib: kikig, plas; Ig: apas, kuplas, oplas; Ilc: apulas, uplas; Iln: beris; Iv: yayasi; Pam: alasas; Sam: gisgis; Tag: asis, isis, pangisis, usiu; Ting: aplas.
76	*Flacourtia euphlebia*	Bag: balaluan, nuginagin; Buk: lanagon, Ceb: banauo; Man: oropong; Sub: nanagan.
77	*Flacourtia rukam*	Ceb: agasas, salabagin; Ig: kalominga, kalunga; Ilc: obieng; Sam: kalamasati; lalamasali; Tag: amaiit, bitungol Rukam
78	*Ganua obovatifolia*	Bic: maninik; Tag: dulitan, nato.
79	*Garcinia benthami*	Kuy: bonog, bunag.
80	*Garcinia binucao*	Bag: kabala, kadis; Bic: buragris, maninila, tila; Ig: balakog, ballok, balukok; Ilc: balukok, kulilem; Iln: batuan, haras; Kuy: kandis; Sam: bangkok; Tag: bilukaw, binukau.
81	*Garcinia cumingiana*	Lb: buneg, malabunok; Ilc: gatasan, katulit.
82	*Garcinia dives*	Pam: pildis; Sam: paniginen; Tag: bilukau,kuling-manok, malabinukau, malatumbaga.
83	*Garcinia dulcis*	Bic: taklang-anak; Ib: baloko, banog; Ilc: buneg; Iln: bogalot, gatasan; Pam: taklang-anak; Pan: reneg; Baniti
84	*Garcinia lateriflora*	Bic: ugau; Buk: kariis; Ib: kariis; Ilc: katolit; Man: kandis; Neg: turobeto; Pam: taklang -anak; Tag: maladambo, taklang-anak; Tag: maladambo, taklang-anak, tatlong-anak
85	*Garcinia morella*	
86	*Garcinia luzoniensis*	Tag: Malabinukaw.

No.	Scientific name	Common/Local Names*
87	*Garcinia mindanaensis*	Bag: kabala; Buk: kabangla, kariis.
88	*Garcinia rubra*	Bic: kamantiis; Iln: kamandiis; Man: pagit; Sul; kandiis; Tag: kamandiis.
89	*Garcinia tetrandra*	Bic: buragris, lagumunan, tamil; Buk: kabangla; Dav: kadis; Ceb: mamla, butuan, pepi; Lan: bungalo; Sul: kandiis; Zam: bluas, kindis.
90	*Garcinia venulosa*	Ceb: bago-bago; Ib: bunag, katuri; If: bunog; Ig: malakod; Ilc: bilabil, buneg; Pam: pedis, taklang-anak; Sul: mangala; Tag: bilukaw, bonog, gatasan, kalogkog, peris,taklang-anak.
91	*Garcinia vidalii*	Ceb: puyangi; Ig: bilis; Iln: bagalat, bugalot; Man: katapang; Mand: kanubi; Pan: bunug; Tag: piris; War: pulangi.
92	*Glenniea philippinensis*	Malachico; Mamoko
93	*Gnetum gnemon*	Bag: bago, nabo; Ceb: bago, bago-sili, banago; Mag: magatungal; Man: bago, kugitis; Mand: kuman; Sub: babayong; Tag: bago, lamparan.
94	*Gnetum latifolium*	Bic: kuliat; Buk: bulso; Ib: kuliad; Ig: kalat, kandiat, konjat; Ilc: kalat, kaliat; lln: nonok; It: kadiat; Man: dadotum; Mang: kuliat; Pam: kuliat; Tag: bias, bias-bias, koliat, lamparahan, tubal; War: maligot.
95	*Grewia eriocarpa*	Ceb: anilau; Ib: lapi, lapni, lapnit; Ig: baruan; Ilc: balitnong, barauan, bariuan, diran, duran, keddeng, laso; Iln: balitnong, damag; Pam: masaplak; Pan: duran; Sam: baliliuan; Tag: baronhasi, danli, kanas-kanas.
96	*Grewia stylocarpa*	
97	*Ixora philippinensis*	Ilc: gintinanik, tintinani, tulang-tulang; Kuy: lumboy; Mag: talapulukit; Pan: lumoi-manok.kamingi, kayomkom, makopa-makopahan.
98	*Jossinia aherniana*	Bag: makaasim; Ceb: hangos; Ib: lankangan, rukrukso; Ilc: lakangan; Man: stangosan; Sul: lusunan; Tag: kamanla, malabayabas; War: sambonotan, tulanan.

No.	Scientific name	Common/Local Names*
99	*Jossinia tulanan*	Ceb:tulanan.
100	*Koordersiodendron pinnatum*	Bic: amugis, karogkog; Ceb: amugis, kalumanog, lako-lako, sambulauan, smbalagan,sambalabuan, sinambuaoan; Ib: urisan; Ilc: bangkasi, bangkalari, kantingen, oris, sarga, taligaan, urisan; Iln: sambulauan, sambuluan; Man: maguyabud, sambu-uauaa; Mand: maguyabud; Sul: gagil, magalibas; Tag: amugis, ambugis, dangila, mugis,; War: sambulauan.
101	*Kowloratia elegans*	Ceb: katkatan, katotang; Tag: bagombon, salbak, tagbak, tugbak.
102	*Lepisanthes alata*	
103	*Lepisanthes fruticosa*	Bag: lalingod; Bic: pipiyasuton; Ib: ara, dirig; Ilc: dirig; Iln: balinawnaw, buli-buli; Pam: balanono, balinawnaw; Tag: balanono,balinawnaw, balingnoko-noko, linawnaw, lunaw, tagalinaw.
104	*Lepisanthes rubiginosa*	Ceb: balit, buli-buli, duka, Ilc: palatangan-analabaga, Iln: aboi, balinaunau, barit, buri-buri, taguriron, togoriron, Man: magasilad, Sul: usau-usau, Tag: kalayo, kalimaui, lingarau, malasaging-puti,; Tagb: kalangkangin; Ting: lagui
105	*Litchi chinensis* subsp. *philippinensis*	Bag: rupar; Bic: boboa, halupak, kandongisol, lupak, panuto; Ceb: sambualau; Chab: bolik; Ib: apalung, dimopa; Iln: alupak, aropag, balit; Mag: lupal; Neg: apalong, marutong; Pan: aninguai, bakaliu; Sam: alupak, bakkalau, kalupai, paitan-bakir; Sub: mamata; Sul: mata-mata; Tag: alpay,alupag, bayit, gisihan, tinaingi; Tagb: kuluris; War: dagindingan, usau.
106	*Litsea garciae*	
107	*Madhuca leerii*	
108	*Mangifera altissima*	Bic: paho; Ib: appan, banitan; Ilc: pangmanggaen; Iln: malapaho; Neg: bunutan; Pam: popouan; Sam: pahutan, pao; Sub: mangapoli; Tag: malapaho, paho, pahutan, pahuhutan, pangahutan.

No.	Scientific name	Common/Local Names*
109	*Mangifera laurina*	Tag: apali.
110	*Mangifera monandra*	Bic: malapaho; Ilc: paglumbayan; Iln: pangi; Tag: kalamansanay.
111	*Microcos philippinensis*	Tag: balukok, bagiod; Pan: anakseng.
112	*Microcos stylocarpa*	Bag: mangulipit, tiua-a; Bic: aporong, apung, barobo, muling-muling; Ib: ngamo, paoli, puled pulit; Ilc: lamot, mamot, namut, pulit; Iln: balit, banalogon, poron; Kal: basilalag; Kuy: makaya; Mang: porong; Neg: peoling; Pam: susubiik; Sam: balibagum-gubat, patling; Sul: magunau; Tag: agdang , balsakan, iring, kamiring, kamuling, muling, papling, susumbiik, muling-muling; War: barbo, lapnisan.
113	*Musa balbisiana*	Ceb: lisohan; Cot: mangay; Ib: paua-ua; Lan: butuhan, mangay; Tag; butuan, saging-matsing, saging-ligaw; Sul: panyaual; Zam: butuhan.
114	*Nephelium ramboutan-ake*	Bic: bulala; Chab: litsia; Ilc: bakkalau; Kal: marangis; Sul: bali; Tag: bulala, karayo, laguan, lintias, pangyan, panongian, santias; War: potian
115	*Ochrosia akkeringae*	Mag: dins; Neg: pakoidan; Sul: labuei.
116	*Ochrosia littoralis*	Mag: dins; Neg: pakoidan; Sul: labuei.
117	*Olax imbricata*	Ilc: ubet-ubet; Iln: balagon; Tag: biton.
118	*Palaquium lanceolatum*	Bic: upong-upong; Ib: araka, mikat, miko; Tag: bagalangit, uban palak-palak.
119	*Palaquium luzoniense*	Ib: araka; Ilc: gasatan, gasatan-panalipauen, niket; Iln: nato, nato-nga-puti; Pam: dulitin; Pan: takaran; Tag: bagalangit, dulitan, nato, palak-palak, tagatoy.
120	*Palaquium philippense*	Bag: agrado; Bic: nato-pula; Ib: araka; Ilc: dalakan, darakan; Iln; manog-talisay; Neg: apakapaka, bitok; Pam: alakaak, alakau, malak-malak, malasaputi, pakankal, palak-palak; Pan: pakaran; Sam: tagogong; Tag: agas, alakaak, alakaak-na-pula, alakap, dulitan, dulitan-takloban, manimparog, palak-palak.

No.	Scientific name	Common/Local Names*
121	*Pangium edule*	Bic: pangi; Iln: pangi; Mand: salingkumut; War: pangi.
122	*Phoenix hanceana*	Iv: Voyayoi.
123	*Pouteria ducitan*	
124	*Reinwardtiodendron humile*	
125	*Rhodomyrtus tomentosa*	Dayopod-mabolo.
126	*Rubus copelandii*	Bon: pinit:
127	*Rubus ellipticus*	Bon: bunut: Ig: kokobod, titau.
128	*Rubus fraxinifolius*	Buk: talagiauat, kalagiauat; Ceb: sampinit; If: bubuit, pagar; Ig: balaungan, luting, palau, pupugan; Ilc: pinit; Iln: tugas-tuga; Kal: barini; Lan: lagakunata
129	*Rubus niveus*	Tag: pilay.
130	*Rubus pectinellus*	Bag: bagalbalan; Bon: apukid; Ig: bana, kalapachap.
131	*Rubus rolfei*	Ig: dutung, subit; Bon: bunut.
132	*Rubus rosifolius*	Bic: ragini; Ilc: init; Lan: lagiauat; Tag: sapinit.
133	*Salacca clemensiana*	Cot: kauki; Bag: lakanbi; Zam: dalubi, lubo.
134	*Salacia ovalis*	
135	*Sandoricum vidalii*	Bic: malasantol; Gad: biot; Sam: magsantol; Tag: bago-santol, bangon-santol, malarambo, malasantol, Tagb: malapakhi; War: malabobonau.

No.	Scientific name	Common/Local Names*
136	*Saurauia avellana*	Buk: bolo-bolo, kalimug; Bag: baring; Lan: karimug.
137	*Sauraula bontocensis*	Bon: chuaguy, deguay, duguay, daguey.
138	*Scolopia luzonensis*	Bic: balingsua, doging-halas; Ceb: bagnayau; Ilc: palutan; Pan: amonot; Sam: aninguai; Tag: babaliwain, bitongol, malakarayom, pilapil, suliak-dagat.
139	*Semecarpus cuneiformis*	Bic: ligas; Bon: libas,pakan; Ceb: hanagas, langas, longas; Ib: kamaring; Ig: kamiding; Ilc: kamiring; Iln: agas, anugas; Pam: kaming, ligas: Sam: kamiing; Tag: kaming, ligas; Ting: kamiling.
140	*Semecarpus longifolius*	Bic: topo; Ceb: manalu; Tag: anagas,ligas,niyog-niyogan, tukud-langit.
141	*Spondias philippinensis*	
142	*Spondias pinnata*	Bic: lubas; Ceb: alambihod, alubihod; Ib: lanno, lannu; Iln: libas; Kuy: alubid; Mag: libas; Man: kalabahid; Neg: lannu; Sul: libas; Tag: aduas, alubihod, libas
143	*Sterculia foetida*	Bic: kalumpang; Ceb: kalumpang; Ib: bangad, bangog; Ilc: bangar, bobor, bubur; Iln: bobo, bobog; Mag: kurumpang; Neg: bangar; Pam: kalumpang; Sul: bubog, kumpang; Tag: kalumpang; Tagb: bubog
144	*Sterculia oblongata*	
145	*Strombosia philippinensis*	Bic: samayonan, tamahuyan,tamayuan, tamayuon; Ib: larak, sumayuan, tamayuan; Ilc: larag; Neg: tamaoyan; Tag: kamayuan, sumayuan, tamayuan;War: kamayuan, tamahuyan
146	*Swinglea glutinosa*	Ib: kalatan; Pan: tabuyok; Tag: kabuyaw-aso, tabog.
147	*Syzygium aqueum*	Bag: tabis; Buk: amogag; Ceb: malatambis, tambis; Mag: tambis; Sul: tambis; War: tambis.
148	*Syzygium bordenii*	Bic: kalolok; Chab: malatambis; Ib: amtuk; Ilc: panglumbuyan; Iln: bakilomboi, odling; Neg: maramatan; Pan: bayakbak, panglomboyen; Tag: apalang, bilolo, bislot-sapa, makaasim, malakalubkub, malaruhat, malaruhat-puti, talimomog, tayom-tayong.

No.	Scientific name	Common/Local Names*
149	*Syzygium calubcob*	Bic: karoblob, karugkog; Ib: adang, andang; Ilc: barakbak, panglongboyen, panglumbuyan; Iln: balanga, malaigang, malatupa; Man: lambug; Mang: tikoy; Neg: adang; Pan: kupkup; Tag: kalogkog, kalopkop, kalubkub, kayugkug, malaropkop, malaruhat, tampoy, tamputi.
150	*Syzygium claviflorum*	Bic: bulagsag, tinaan; Ib: kurasam, maramatan; Ilc: panglomboyen, panglumbuyen-gaugoan; neg: gamatulay; Tag: balubat, kara, kaytatanag; War: bulagsong, pacharagon.
151	*Syzygium cordatilimbum*	kara
152	*Syzygium crassipes*	Llc: barukbak; Neg: bogbog: Tag: kalubkub, makopang-gubat.
153	*Syzygium curranii*	Bic: baligang; Tag: lipote; War: igot.
154	*Syzygium garciae*	
155	*Syzygium lancilimbum*	
156	*Syzygium mananquil*	Bic: bitbid, malahagis, mobbed; Ceb: malaigang; Ib: gorongong; Ig: baba; Ilc: panglongbuyel-kopakopa; Lan: kagoko; Mag: kaguku, langisan, lugis; Man: kagagko, langauisay; Pam: bagabag; Pan: ansat; Tag: bitbit, buabua, bungkalan, dambuhala, manangkil, mangkil, midbid, mungilkil, pasoso; War: kagoko
157	*Syzygium polycephaloides*	Bic: baligang; Ib: balasugan, magtalulong; Tag: lapoti; War: igot, maigang.
158	*Syzygium simile*	Bag: magakombo; Ilc: panglongbuyen; lln: muning; Mang: arang; Neg: malaruhat; Pam: paitan; Sam: paitan, sakut-puti; Tag: makaasim, malaruhat, malaruhat-puti.
159	*Syzygium tripinnatum*	Bic; Lagis; Ib: labak, lubag, malabag: Ilc:panglongboyen; lln: malabugue; Neg: baugit; Pan: bayekyek; Tag: kaman.
160	*Syzygium xanthophyllum*	Bic: apnig, kapinig, lapinig; Ceb: malatampoy; Ilc: barakbak, panglongbuyan-daradisdisan, panglumpuyen; Sam: balabak, balokbok; Tag: bislot, bislot-sapa, kayugkug, kayokok, kayugpug, malatampoy, malayambo, tampoy-gubat.

No.	Scientific name	Common/Local Names*
161	*Terminalia calamansanai*	Bag: kabangas-bangas; Ceb: bangkalauag, lungkug, lumanog,saplid; Ig: saget; Ilc: anarap, bagabo, pangalusiten, saket; Iln: magtalisay; Lan: salisai; Man: langkop, yankug; Pam: dikang; Pan: bisal, busili; Sam: kalamansali, kalamansanay; Tag: bangkalawan, bunlos, kalamansanay, malakalumpit, sakat, subo-subo.
162	*Terminalia microcarpa*	Bic: kalomagon, kalumanog, kotmot; Ceb: buluang; Gad: bisi, disi, kalotit; Ib: alupi, kalupi, kalurig, kalusit, Ilc: anagep, kalautit, kalupit; Iln: kalomaog, lumanog, magtalisay; It: basi, gisit,; Man: bango; Neg: kalupi, kalupit; Sam: gayumayen, kalumpit; Tag: balisayan, basal, dalinson, kalamay, kalumpit; Tagb: bahe, baraus, kamaris; War: lumanog.
163	*Terminalia nitens*	Bag:samuloko; Bic: magtalisay; Ceb: magatalisay; Ib: kalaupi; Ig: kalaokit; Ilc: anagep, arinbukal, kalautit, pongud; Iln: tahungmanok; Mag: mangatalisai; Man: kananaupong; pam: sakat; Pan: bisal; Sul: mantalisi; Tag: dalinsi, daminsil, malagabi, pansaket, sakat; Tagb: samondo, tagit.
164	*Tetrastigma harmandii*	Bon: dipig; Ceb: alupidan, langnikit; Ilc: ariuat; Tag: ayo, hayok, iyo, kalit-kalit.
165	*Tetrastigma loheri*	Ilc: bariuatuat
166	*Triphasia* sp.	
167	*Uvaria grandiflora*	Bag: linas; Ceb: banawak, susung-kalabaw; Tag: banakaw, hinlalagak-saging, susung-kalabaw.
168	*Uvaria sorzogonensis*	Bic: bulagak, dalaganum, dalagau; Ceb: bagin-tulagak, butoan-pula; Ib: imunau, mamogen; Ilc: alalagat; Iln: baluganos; Tag: balonsaging, gilalagak-saging, hinlalagak-saging, susung-kalabaw, tagibalas.
169	*Vaccinium gitingense*	Ig: pagangpang.
170	*Vaccinium myrtoides*	Bag: dungal; Bon: ayumani, panlina, tenge; Ig: gatmo, gutmo; Ilc: alimani
171	*Vanoverberghia sepulchrei*	
172	*Willughbeia coriacea*	Kuy: tabu.

No.	Scientific name	Common/Local Names*
173	*Ximenia america*	

Adapted from: Coronel RE. 2011. Important and Underutilized Edible Fruits of the Philippines. UPLB Foundation, Inc. and DA-Bureau of Agricultural Research. 283p.
*Vernacular/common names from other dialects in the country = Bag (Bagobo), Bic (Bicolano), Bon (Bontoc), Buk (Bukidnon), Ceb (Cebuano), Chab (Chabacano), Gad (Gaddang), Ib (Ibanag), If (Ifugao), Ig (Igorot), Ilc (Ilocano), Iln (Ilongo), In (Isneg), Iv (Ivatan), Kal (Kalinga), Kuy (Kuyunon), Mag (Maguindanao), Man (Mandaya), Mang (Mangyan), Mar (Maranao), Neg (Negrito), Pam (Pampango), Pan (Pangasinense), Sam (Sambali), Sub (Subanon), Sul (Sulu), Tag (Tagalog), Tagb (Tagbanua), Tau (Tausug), Ting (Tinggian), War (Waray), Yak (Yakan)

Annex 2: Fruits in the Philippines that were introduced from other tropical Asian countries before the invasion of the Spanish colonizers in 1521 as described in Coronel, 2011

No.	Scientific name	Common/Local Names*
1	*Aleurites moluccana*	
2	*Antidesma bunius*	Chinese laurel, salamander tree
3	*Arenga pinnata*	
4	*Artocarpus altilis*	rimas, Bic: ugub; Ceb: dalangian; Ib: pakak; Ig: pa-a; Ilc: pakak
5	*Artocarpus heterophyllus*	langka; nangka
6	*Artocarpus odoratisimus*	Lan: madang; Mang: uboy; Sulu: marang; Tag: loloy, marang, oloy
7	*Atalantia citroides*	

No.	Scientific name	Common/Local Names*
8	*Averrhoa bilimbi*	Cucumber tree; Bic: kilingiba; Ceb: kalingiua; Ig: puis; Ilc: pias; Iln: iba; Man: ibag; Sul: iba; Tag: iba, kalamias, kalanua, kamias, kolonanas; Yak: ibe
9	*Averrhoa carambola*	Carambola, Coromandel gooseberry, five corners fruit; Bic: balimbing; Ceb: balingbing, garaha; Ib: dalihan, galuran,garula; Ilc: daligan; Iln: galangan; Sul: baimbing; Tag: balimbing; Ting: sirinato; War: malimbing.
10	*Bridelia stipularis*	Ceb: boko-boko, sangkoilang; Ig: kuriani; Ilc: annam, karaka, karabaui, karauaui; Iln: kauilan; Pam: dugaron, lubalo; Pan: kalundagi, kulandagi; Sam: alub-alub; Tag: bangkollan, hingunguto, kuto-kuto, lubalub
11	*Buchanania arborescens*	Bag: taragnisig; Bic: alitagtag, balingohot, baliohod, kalampuso, upong-upong; Ceb: anam, anugas, beobayano, butu-butu, pasig; Ib: araka, balinhasay, ganga; Ig: balinhasay,uyok; Ilc: anagas, anam,Balanga, tagantang, unkam; Mag: lagindingan; Mang: anan, balinsud; Neg: kasabang; Pan: boroan, buluan, kaming, pakaran; Sam: balinghasay, balinhay, kamiing; Sub: kaligpo; Sul: balunug, dilaan, malabaluno, manbaluno; Tag: bagilibas, bahay-uhod, balingasay, balinghasay, balitantang, balithod, hingas, kamang, maguliyok, malaybohod; Tagb: garantang; Ting: kanteng
12	*Capparis zeylanica*	Cebu: laginaw; Ib: baralawik; Ilc: talaktak, tarabtab; Tag: dawag, halubagat-baging.
13	*Castanopsis javanica*	Bag: linolimon, malabasag; Man: tayungkahon.
14	*Cayratia trifolia*	Bic: lagini, langingi, lupo, ragindi, ragining- ayam; ceb: alangingi, kagindi; lg:nalatnat; Ilc: ariwat, barinatnat; Kuy: tagini; Man: nagigni; Pam: kulutpamo; Sul: lagili; Tag: kabilan, kalit-kalit, pakopol.
15	*Cissus repens*	Bag: sogalom; Buk: ampol, kamkamot; Iln: ragini; Sub: sinampay; Tag: ayo, ayong-gala, kalit-kalit, kalit-kalit-kalabaw, kalit-kalit-na-pula, langitgit, parapet-hangin.
16	*Citrofortunella microcarpa*	Ceb: limoncito; Tag: aldonisis, kalamondin, kalamansi.

No.	Scientific name	Common/Local Names*
17	*Citrus aurantifolia*	Bic: sua; Bon: muyong; Ib: dalayap, gorong-gorong; Neg: dulugut; Tag: bilolo, dayap.
18	*Citrus aurantium*	Bic: kahel; Bon: panubang, taboyog; Ib: lubban; If: luban; Ilc: sua, kahel; Tag: kahel; Ting: gunal.
19	*Citrus limon*	Ceb: kolo-kolo, kunot, lombog.
20	*Citrus maxima*	Bic: lukban; Bon: panubang, taboyog; Ib: lubban; if: luban; Ilc: lukban, sua; Tag: lukban, suha; Ting: gunal.
21	*Citrus medica*	Bic: build, sidras; Ceb: sidras, tihi-tihi; Tag: bulid
22	*Citrus reticulata*	Bic: ransas; Bon: alsem; Ilc: daranghita; Tag: dalanghita, sintones, tison
23	*Citrus sinensis*	Fil: dalanghita
24	*Clausena lansium*	wampee; Tag: galumpi, huampit, wampi, wampit
25	*Cleistocalyx operculatus*	
26	*Corypha elata*	Bag: sirar; Bic: buri, silad; Ceb: buri; Ilc: silag; Is: bagatay, yakyak; Pam: buri, busi; Pan: piet, silag; Sub: silad; Tag: buri, ibus, piet
27	*Craetaeva religiosa*	
28	*Cynometra cauliflora*	namnam
29	*Decaspermum fruticosum*	Bag: buringaras; Ceb: alingkagai, barit, gusokan, salilihan; Ib: agem; Ig: bultia, chaching, lardu, salingsingang, tuan; Ilc: agem; Lan: kamigrin; Man: halgus; Sub: sandal; Sul: kansilai; Tag: daniri, malagiting,-giting, patalsik; War: tarongatingan
30	*Dimocarpus longan*	longan, cat's eye, dragon's eye

No.	Scientific name	Common/Local Names*
31	*Donax cannaeformis*	
32	*Durio zibethinus*	civet-cat tree. durian; Bag: dulian, durio; Lan: dulian; Mag: dulian; Sul: dulian, duyan
33	*Ficus minahassae*	Bon: sabtog; Buk: lagumit; Ceb: hagimit, hasimit, tambis-tambis; Ig: alomit; Ilc: businag; Man: malatungbog; Sub: gimit; Sul: matanug; Tag: ayimit, ayumit, hagimit, haginit, hagumit; Ting: arinit; War: tambuyogan; Yak: sangal
34	*Flacourtia indica*	batoko, Madagascar plum; Ceb: saua-saua; Ib: palutan; Mang: bolong; Sam: bitangol; Tag: bitungol, serali
35	*Flacourtia jangomas*	
36	*Garcinia mangostana*	mangosteen; Sul: manggis; Tag: manggustan
37	*Inocarpus fagiferus*	
38	*Lansium domesticum*	Fil: lanzones; Bag: tubua; Bic: lansones; Ceb: boba, bulahan, bukan; Man: buahan, buan, kalibongan; Sul: buahan; Tag: lansones
39	*Leukosyke capitellata*	Bic: amagasi, anagau, anugas, aragasi, salagiso, tinagasi; Bon: alalasi, ararasi, arasi, salasi; Buk: manombila; Ceb: alagasi, alangasi, lagasi, langasi; Ig: gugutu, lalasi, lapaik; Ilk: alalasi: Iln: bahi-bahi, damakadios, laglag, kinlagasi; Man: sagombibilan; Neg: karikasin; Sub: bilan-bilan; Sul: gasi-gasi; Tag: alagasi, amagasi, ginagasi, hanlagasi, hinagasi, isi-ngipin, kilagasi, lagasi, layasi, liaison; War: aragasi, buaua; Yak: bunkilan
40	*Mangifera caesia*	Ceb: bauno, bayuno; Man: baluno, malono, lono; Sul: bauno, balunot
41	*Mangifera indica*	Bon: pao; Ceb: paho; Chab: chupadera; Ig: manga, mangka; Ilc: manga; Man: manga; Sul: mampalam, mampalang; Tag: mangga
42	*Mangifera odorata*	Ceb: huani, uani; Sul: kandopi, uani

No.	Scientific name	Common/Local Names*
43	*Mimusops elengi*	
44	*Mimusops parvifolia*	
45	*Morus alba*	Ib: mora, moraya; Ig: amingit; Ilc: amoras; Iv: tanud, tanyud; Sp: mora, morera
46	*Musa acuminata*	
47	*Nephelium lappaceum*	rambutan; Sul: usare
48	*Ochrosia oppositifolia*	Sul: ginlin
49	*Pandanus dubius*	Bic: taboan; Iln: bakong, bauang
50	*Pandanus tectorius*	Bic: baroi; Ceb: pandan, panhakad; Ilc: pangdan, panglan; Iln: pandan; Iv: chango, pandan; Pan: pangdan; Sam: panglan; Sub: pandan; Sul: laha; Tag: pandan, pandan dagat
51	*Paratocarpus venenosus spp. papuanus*	Bic: bayuko, pangi, tambuli; Ib: buratu; Ilc: pongi; Tag: anubing-kadios, anubing-kagios, anubing-na-nangka, bituun, malanangka, sulipa; War: biga
52	*Parinarium corymbosa*	Bag: kankangan; Bic: barit, laiusin, liusin; Buk: language; Ceb: bagkangai, barit; Ilc: aningat, binggas, kagemkem, karatakot, bakokoyan, tagpas; Lan: lankangan; Mag: sigaadan; Man: bangkangai; Neg: salutui; Pam: kamulutingan; Pan: bakayau; Sul: maluktik; Tag: alamag, delebaybay, kapgangan, kulilingan, liusin, malapiga, malapuyaw, tadyang-manok, takdangan; Tagb: arangan; War: bongog, dau, laiusin, sarangan
53	*Parinarium glaberrimum*	
54	*Passiflora foetida*	
55	*Phyllantus acidus*	Ceb: bangkiling, kagindi, layoan, porous; Ilc: bagbagutut, karamay, karmay; Pam: iba; Tag: bangkiling, iba, karmay

No.	Scientific name	Common/Local Names*
56	*Pometia pinnata*	Bag: ibu, mamako; Bic: kugik, malaguas, takupan, tigaui, tugaui; Ceb: bankalan, gia-gia; Ig: kabakabot; Ilc: balambanan, sadai, sidai; Iln: alauihau, bayato, ibo, mansanab, minanukai, oyakya, takugan, tigaui; Tag: agupanga, aklam, banked, karunyan, malugay, oyakya; War: aloiho, kia-kia
57	*Punica granatum*	granada; Sul: dalima
58	*Rubus moluccanus*	Bag: sapinit; Bon: bunut, bunbunutan, pakauit; Ceb: dagamit; Ig: kinubot, konot, sapinit,; Man: siit; Sul: sampinit
59	*Salacia chinensis*	Tag: matang-ulang
60	*Salacia korthalsiana*	
61	*Sandoricum koetjape*	santol, Sam: katul
62	*Sonneratia alba*	Ib: ilukabban, lukabban; Pan: payar; Tag: hikaw-hikawan, pagatpat, palapat, palatpat
63	*Sonneratia caseolaris*	Bic: pagatpat, bungalon; Ceb: pagatpat; Ib: ilukabban, lukabban; Iln: pagatpat; Mag: pirara, palalan, Sam: pagatpat; Tag: pagatpat; War: pagatpat
64	*Syzygium cumini*	Bic: lumboy; Ceb: lumboi; Ib: lumboy; Ig: dungboi; Ilc: lumboy; Iln: duhat, lumboy; Pam: duat-nasi, lomboi; Tag: duhat, lumboy
65	*Syzygium jambos*	Bic: tampoy; Ib: tampul: Iln: bunlauan; Pam: balobar; Tag: tampoy
66	*Syzygium malaccense*	Bag: tual; Buk: gubal; Iln: mankopa; Tag: makopa, makopang-kalabaw, tamo, yambu
67	*Syzygium samarangense*	Semarang roseapple, wax jambu, java apple
68	*Tamarindus indica*	Bic: makopa, Ceb: tambis, Tag: makopa, yambu

No.	Scientific name	Common/Local Names*
69	*Terminalia catappa*	Bag: talisay; Bic: dalinsi, talisay; Ceb: talisay; Ib: dalisai; Ig: salaisai; Ilc: logo; Pam: banilak, dalasa, kalisai, hitam, talisay; Sp: almendras, almendro; Tag: balisay, talisay: Yak: talisi
70	*Toddalia asiatica*	Ig: atangen, bugkau, bukkau, subit; Tag: dawag
71	*Triphasia trifolia*	Bic: limonsitong-kasti;a, sua-sua, suang-kastila; Ib: kalamansito; Ilc: kalamansito; Neg: tagimunau; Sp: limoncito; Tag: kalamansito, kamalitos
72	*Uvaria rufa*	Bic: kurumbot; Pam: susong-damulag: Pan: al-lagat; Sam: iniu: Tag: hinlalagak, susong-kabayo, susong-kalabaw
73	*Ziziphus mauritiana*	mansanitas

Adapted from: Coronel RE. 2011. Important and Underutilized Edible Fruits of the Philippines. UPLB Foundation, Inc. and DA-Bureau of Agricultural Research. 283p.

*Vernacular/common names from other dialects in the country = Bag (Bagobo), Bic (Bicolano), Bon (Bontoc), Buk (Bukidnon), Ceb (Cebuano), Chab (Chabacano), Gad (Gaddang), Ib (Ibanag), If (Ifugao), Ig (Igorot), Ilc (Ilocano), Iln (Ilongo), In (Isneg), Iv (Ivatan), Kal (Kalinga), Kuy (Kuyunon), Mag (Maguindanao), Man (Mandaya), Mang (Mangyan), Mar (Maranao), Neg (Negrito), Pam (Pampango), Pan (Pangasinense), Sam (Sambali), Sub (Subanon), Sul (Sulu), Tag (Tagalog), Tagb (Tagbanua), Tau (Tausug), Ting (Tinggian), War (Waray), Yak (Yakan)

Annex 3: Other fruits that are native in the Philippines (not listed in Coronel, 2011).

No.	Common name	Scientific name	Reference
1	Arius	*Podocarpus costalis*	Farjon et al, 2014
2	Lubeg	*Syzygium lineatum*	Govaerts, 2003 as cited in www.powo.science.kew.org

Annex 4: List of indigenous and native fruits and nuts conserved at the National Plant Genetic Resources Laboratory (NPGRL) at the Institute of Plant Breeding, UP Los Baños.

Common name	Scientific Name	No. of Accessions
Bulog, Bobonao, Bagasanto, Bunguas	*Aglaia everetti*	1
Galo	*Anacolosa frutescens*	3
Bignay	*Antidesma bunius*	10
Inyam	*Antidesma ghaesembilla*	1
Bignay Pugo	*Antidesma pentandrum*	2
Wild Bignay	*Antidesma* sp.	2
Kaong	*Arenga pinnata*	2

Common name	Scientific Name	No. of Accessions
Breadfruit	*Artocarpus altilis*	7
Antipolo	*Artocarpus blancoi*	2
Kamansi	*Artocarpus camansi*	2
Jackfruit	*Artocarpus heterophyllus*	18
Kubi, Butong	*Artocarpus nitidus*	1
Marang	*Artocarpus odoratissimus*	8
Gumihan	*Artocarpus sericicarpus*	2
Chipoko	*Artocarpus* sp.	1
Wild Marang	*Artocarpus* sp.	1
Kamias	*Averrhoa bilimbi*	1
Star fruit, Balimbing	*Averrhoa carambola*	9
Little gooseberry tree, Sparrow's mango, Balinghay	*Buchanania arborescens*	1
Kayape, Limuran, Rimoran, Borongan	*Calamus ornatus*	5
Piling Liitan	*Canarium luzonicum*	1
Pili	*Canarium ovatum*	14
Halubagat Kahoy	*Capparis micracantha*	3

Common name	Scientific Name	No. of Accessions
Kaffir lime	*Citrus hystrix*	1
Lime, Dayap	*Citrus aurantifolia*	2
Lemon, Kolong-kolong	*Citrus limon*	1
Cabugao	*Citrus maxima*	1
Pomelo	*Citrus maxima*	3
Biasong	*Citrus micrantha*	6
Kubili	*Cubilia cubili*	3
Namnam	*Cynometra cauliflora*	2
Katmon Bayani	*Dillenia megalantha*	1
Katmon	*Dillenia philippinensis*	7
Katmon Kalabaw	*Dillenia reifferscheidia*	1
Longan	*Dimocarpus longan*	3
Mabolo	*Diospyros blancoi*	16
Anang, Kunalum	*Diospyros pyrrhocarpa*	1
Bagobo, Balobo	*Diplodiscus paniculatus*	3
Donax, Bamban	*Donax canniformis*	2

Common name	Scientific Name	No. of Accessions
Dau	*Dracontomelon dao*	1
Durian	*Durio zibethinus*	25
Alingaro	*Elaeagnus triflora*	2
Hunggo	*Elaeocarpus cumingii*	1
Agimit	*Ficus minahassae*	1
Is-is	*Ficus ulmifolia*	1
Bitungol	*Flacourtia indica*	13
Bunog	*Garcinia benthamii*	4
Batuan	*Garcinia binucao*	6
Kandis, Kariis	*Garcinia lateriflora*	3
Mangosteen	*Garcinia mangostana*	7
Bilis, Piris, Bagalat	*Garcinia vidalii*	1
Bago	*Gnetum gnemon*	1
Kayam	*Inocarpus fagiferus*	2
Tagbak	*Kolowratia elegans*	3
Amugis	*Koordersiodendron pinnatum*	2

Common name	Scientific Name	No. of Accessions
Balinawnaw, Chammaliang, Luna nut	*Lepisanthes fruticosa*	3
Kulayo	*Lepisanthes rubiginosa*	1
Wood Apple	*Limonia acidissima*	1
Alupag	*Litchi chinensis* subsp. *philippinensis*	7
Paho	*Mangifera altissima*	6
Bauno	*Mangifera caesia*	2
Apali	*Mangifera laurina*	1
Huani	*Mangifera odorata*	4
Mulberry	*Morus alba*	3
Pik-ew	*Musa balbisiana*	1
Rambutan	*Nephelium lappaceum*	5
Wild rambutan, Pulasan	*Nephelium ramboutan-ake*	3
Maraitum	*Nephelium* sp.	3
Wild Rambutan	*Nephelium* sp.	3
Pangi	*Pangium edule*	1
Avocado	*Persea americana*	9

Common name	Scientific Name	No. of Accessions
Malay gooseberry, Karmay	*Phyllanthus acidus*	2
Arius	*Podocarpus costalis*	1
Agupanga	*Pometia pinnata*	1
Granada	*Punica granatum*	2
Sapinit	*Rubus franxinfolius*	2
Santol	*Sandoricum koetjape*	3
Dagway	*Saurauia bontocensis*	1
Ligas	*Semecarpus cuneiformis*	1
Libas	*Spondias pinnata*	3
Alubihid	*Spondias pinnata*	1
Tambis	*Syzygium aqueum*	4
Duhat	*Syzygium cumini*	34
Lipote	*Syzygium curranii*	7
Tampoy, yambu	*Syzygium jambos*	2
Manangkil	*Syzygium mananquil*	1
Baligang	*Syzygium polycephaloides*	3

Common name	Scientific Name	No. of Accessions
Macopa	*Syzygium samarangense*	8
Hagis	*Syzygium tripinnatum*	9
Tamarind	*Tamarindus indica*	9
Talisay	*Terminalia catappa*	5
Kalumpit	*Terminalia microcarpa*	4
Lime berry, Limoncito	*Triphasia trifolia*	7
Susung Kalabaw	*Uvaria rufa*	3
Palau	*Willughbeia angustifolia*	3
Tabu	*Willughbeia coriacea*	1
	Total	**393**

Photo by: Susan Del Rio/IIRR

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