

ON-FARM BIODIVERSITY CONSERVATION: THE RC FRUIT CONSERVATION FARM



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Bahay Kubo

Ba-hay ku-bo ka-hit mun-ti
Ma-nga pru-tas di-to ay sa-ri sa-ri
Ram-bu-tan at du-rian
Ka-la-man-si at ka-mias
A-tis, chi-co, bi-ri-ba
Big-nay, ba-lim-bing, sa-ging, a-te-mo-ya
At sa-ka may-ron pang
Man-gos-teen, ci-rue-la
Lan-zo-nes, pa-pa-ya
Du-hat at lang-ka
Sa pa-li-gid li-gid ay pu-ro pinya

Ba-hay ku-bo ka-hit mun-ti
Ma-nga pru-tas di-to ay sa-ri sa-ri
Sam-pa-lok at mang-ga
Gu-ya-ba-no at tie-sa
A-biu, pi-li, ma-ko-pa
San-tol, ba-ya-bas, u-bas, a-vo-ca-do
At sa-ka may-ron pang
Ka-soy at cai-mi-to
Sin-to-nes, ma-bo-lo,
Ri-mas at su-ha
Sa pa-li-gid li-gid ay pu-ro pin-ya

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INTRODUCTION

Scope of Biodiversity

Short for biological diversity
Shortened further to bioversity (FAO)

Ecosystem diversity

Forests	Marshlands
Deserts	Farms
Mangroves	Home Gardens

Species diversity

More than 300 edible fruit and nut species found in the Philippines. Only about 30 are economically important.

Species diversity within a genus – important in
 Varietal improvement
 Vegetative propagation

Table 1. Genera with Wide Species Diversity

Genus, Family	Number of Species	Representative Species
Mangifera, Anacardiaceae	30	<i>M. indica</i> – mango
Annona, Annonaceae	50	<i>A. squamosa</i> – sugarapple
Durio, Bombacaceae	27	<i>D. zibethinus</i> – durian
Canarium, Burseraceae	75	<i>C. ovatum</i> – pili
Carica, Caricaceae	30	<i>C. papaya</i> – papaya
Garcinia, Guttiferae	150	<i>G. mangostana</i> – mangosteen
Persea, Lauraceae	50	<i>P. americana</i> - avocado
Artocarpus, Moraceae	50	<i>A. deterophyllus</i> – jackfruit
Musa, Musaceae	50	<i>M. edible</i> – banana
Syzygium, Myrtaceae	75	<i>S. cumini</i> – jambolan
Citrus, Rutaceae	15	<i>C. sinensis</i> – sweet orange
Nephelium, Sapindaceae	25	<i>N. lappaceum</i> – rambutan
Poutela, Sapotaceae	30	<i>P. calmito</i> - abiu
Vitis, Vitaceae	50	<i>V. Vinifera</i> - grape

Genus with Wide Species Diversity: Annona (50)



A. atemoya - atemoya



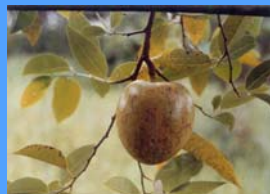
A. squamosa - sugarapple



A. muricata - soursop



A. reticulata - custardapple



A. glodra - pondapple



A. montano - maron

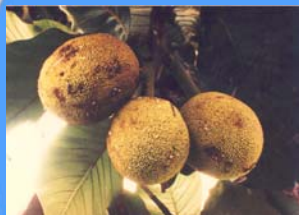
Genus with Wide Species Diversity: Artocarpus (50)



A. heterophyllus - jackfruit



A. altilis - breadfruit



A. odoratissima - marang



A. camansi - kamansi

Genus with Wide Species Diversity: Citrus (15)



C. aurantiifolia - lime



C. axima - pummelo



C. hystrix - kaffir lime



C. aurantiifolia - biasong



C. reticulata - mandarin orange

Genus with Wide Species Diversity: Garinia (150)



G. mangostana - mangosteen



G. binucao - batuan



G. lateriflora - kariis



G. xanthochymus - tinctoria

Genus with Wide Species Diversity: Mangifera (30)



M. alifissima - paho



M. indica - mango



M. odorata - huani

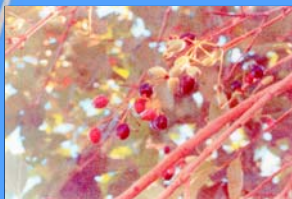


M. caesia - baluno



M. monandra - pangi

Genus with Wide Species Diversity: Syzygium (75)



S. cumuni - jambolan



S. curranii - lipote



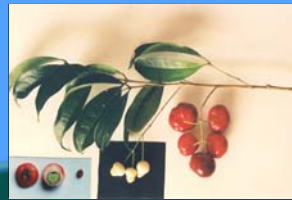
S. jambos - roseapple



S. malaccense - malay apple



S. samarangense - Java apple



S. tripinnatum - hagis

Table 2. Genera with Narrow Species Diversity

Genus, Family	Number of Species	Representative Species
Ananas, Bromeliceae	3	<i>A. comosus</i> – pineapple
Lansium, Meliaceae	6	<i>L. domesticum</i> – langsat
Sandoricum, Meliaceae	7	<i>S. koetjape</i> – santol
Averrhoa, Oxalidaceae	4	<i>A. carambola</i> – starfruit
Cocos, Palmae	1 (monotypic)	<i>C. nucifera</i> - coconut
Punica, Punicaceae	2	<i>P. granatum</i> – pomegranate
Dimocarpus, Sapindaceae	3	<i>D. longan</i> – longan
Litchi, Sapindaceae	2	<i>L. chinensis</i> - lychee
Tamarindus, Leguminosae	1 (monotypic)	<i>T. indica</i> - tamarind

Genetic diversity

Germplasm or genetic resources
 Some species like pili and cashew have wide genetic diversity
 Others, like lanzones and mangosteen have narrow genetic diversity
 Important in varietal improvement and asexual propagation

Table 3. Fruit and Nut Species with Wide Genetic Diversity

Cashew, *Anacardium occidentale*, Anacardiaceae
Mango (monoembryonic), *Mangifera indica*, Anacardiaceae
Durian, *Durio zibethinus*, Bombacaceae
Pili, *Canarium ovatum*, Burceraceae
Avocado, *Persea americana*, Lauraceae
Tamarind, *Tamarindus indica*, Leguminosae
Jackfruit, *Artocarpus heterophyllus*, Moraceae
Banana, *Musa (edible)*, Musaceae
Guava, *Psidium guajava*, Myrtaceae
Coconut, *Cocos nucifera*, Palmae
Pummelo, *Citrus maxima*, Rutaceae
Rambutan, *Nephelium lappaceum*, Sapindaceae
Grape, *Vitis vinifera*, Vitaceae

Table 4. Fruit Species with Narrow Genetic Diversity

Mango (polyembryonic), *Mangifera indica*, Anacardiaceae
Pineapple, *Ananas comosus*, Bromeliaceae
Langsat, *Lansium domesticum*, Melaceae
Breadfruit, *Artocarpus altilis*, Moraceae
Mangosteen, *Garinia mangostana*, Gutiferae

The RC Fruit Conservation Farm (RCFC Farm)

Acquired in 1986

**Located in Brgy. Mabacan, Calauan, Laguna
Area – About 4 ha**

**Started as a coconut plantation with a gently
rolling terrain at the foot of San Mateo
Mountain**

**Main fruits grown are rambutan, lanzones
and abiu**

**At present there are about 210 edible fruits
and nuts distributed in 117 genera
and 48 families**

BIODIVERSITY CONSERVATION SYSTEMS

❖ In Situ Conservation

- All fruits and nuts have evolved as plant species in the forests.
- If forests were not disturbed, this would have been the safest place to permanently keep these valuable plant resources

- ❖ **Reality is that forests all over the tropical world are being lost at an alarming rate**
- ❖ **Loss due to**
 - Illegal logging – Philippines
 - Agricultural development
 - Oil palm plantation in Southeast Asia
 - Rubber in Brazil
 - Urban development
- ❖ **Fortunately, man has learned to domesticate useful plant species, select the best fruits, propagate them by means of their seeds or other non-seed propagation methods, and improve their eating quality by breeding.**
- ❖ **Thus superior fruit varieties with high productivity and superior eating qualities are not available for cultivation.**

❖ **Ex Situ Conservation**

- In research institutions
- Plant species and their germplasm are collected from various sources (including forests)
- They are propagated and planted in field genebanks and later characterized
- Ideally, the germplasm collections are duplicated in other research institutions
- Requires a large growing area.
- Vulnerable to typhoons and destructive pests.
- Long-term life depends on long-term funding

❖ On-farm/Home Garden Conservation

- Serves as duplicate repository of fruit germplasm collections maintained in research institutions
- Only elite collections (e.g. cultivars) are usually maintained.
- However, rare fruit collectors also maintain species that don't have economic value.
- Heirloom fruit species (e.g. boy/girlhood fruits, parents favorites) are usually priority collections.

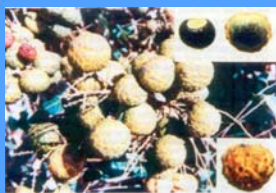
❖ RC FRUIT CONSERVATION FARM AND FRUIT BIODIVERSITY CONSERVATION

- ❖ The Farm, after its acquisition in 1986, was known simply as RC Farm. It was a neglected coconut plantation.
- ❖ While the coconut palms were being rehabilitated, different varieties of rambutan and lanzones were intercropped with coconut and the Farm was renamed the RC Fruit Farm.
- ❖ Over the years, different fruit and nut species and varieties were acquired from local sources and from different tropical countries and planted in the farm.
- ❖ The Farm was renamed RC Fruit Conservation Farm and since then, the focus was shifted to biodiversity conservation, promotion and dissemination.

❖ Diversity of fruit collection at the RCFC FARM

- The Farm is now in existence for almost 25 years.
- At present, the Farm has collected and established 210 fruit and nut species, representing 117 genera and 48 families.
- The Farm also has a collection of 120 outstanding fruit varieties, most are officially registered with the Department of Agriculture.
- Of the 210 species, 44 are indigenous to the Philippines. Seventy-three (73) are from Tropical Asia, Pacific and Oceania, 80 are from tropical America and 8 are from Tropical Africa.

SOME INDIGENOUS FRUITS AT RCFC FARM : 44/210



Alupag, *Litchi chinensis*
ssp. *philippinensis*



Biasong, *Citrus micrantha*



Lipote,
Syzygium curranii



Batuan, *Garcinia binucao*



Pili, *Canarium ovatum*



Galo, *Anacolosia frutescens*

SOME TROPICAL ASIAN AT RCFC FARM : 77/210



Banana, *Musa* (edible)



Breadfruit, *Artocarpus altilis*



Mango, *Mangifera indica*



Mangosteen, *Garcinia mangostana*



Durian, *Durio zibethinus*



Langsat, *Lansium domesticum*

SOME TROPICAL AFRICAN FRUITS AT RCFC FARM : 8/210



Akee, *Blighia sapida*



Miracle Fruit, *Synsepalum dulcificum*



Tamarind, *Tamarindus indica*



Voavanga, *Vangueria madagascariensis*

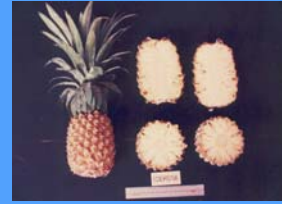
SOME TROPICAL AMERICAN FRUITS AT RCFC FARM : 81/210



Abiu, *Pouteria caimito*



Avocado, *Persea americana*



Pineapple, *Ananas comosus*



Sapodilla, *Manilkara zapota*



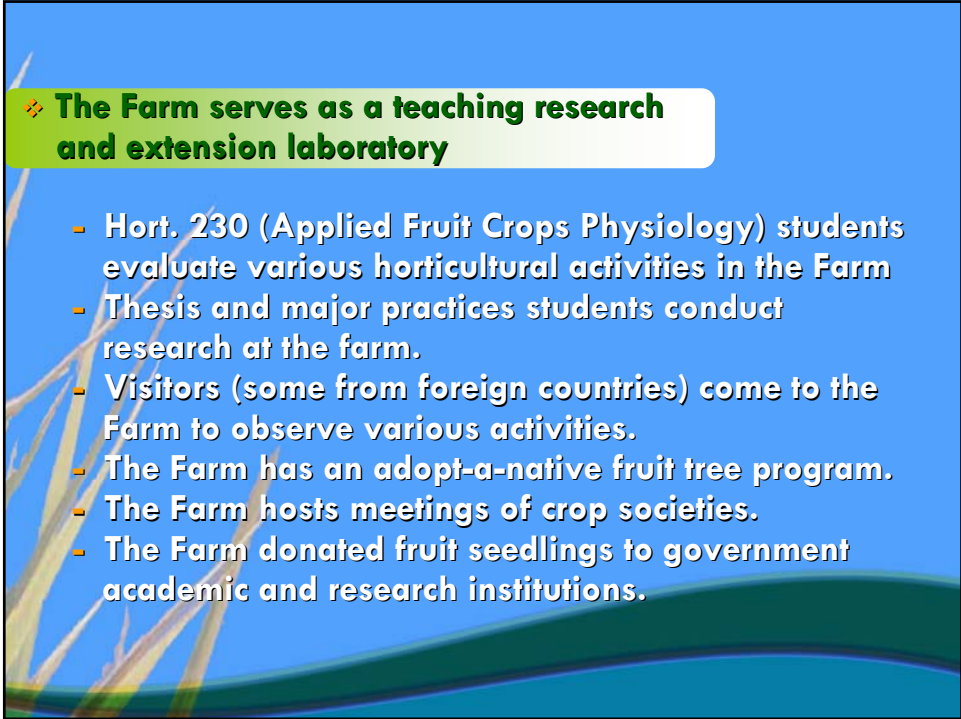
Cashew, *Anacardium occidentale*



Soursop, *Annona muricata*

❖ The Farm is a showcase of

- A unique cropping system to reduce typhoon damage
- None use of inorganic pesticides and fertilizers
- Different asexual propagation techniques.
- Use of multiple rootstock for slow-growing fruit trees like lanzones
- Grafting male scions on female trees of dicecious fruits like bago, batuan and pili to improve fruit set.
- Topworking undesirable fruit varieties.



❖ The Farm serves as a teaching research and extension laboratory

- Hort. 230 (Applied Fruit Crops Physiology) students evaluate various horticultural activities in the Farm
- Thesis and major practices students conduct research at the farm.
- Visitors (some from foreign countries) come to the Farm to observe various activities.
- The Farm has an adopt-a-native fruit tree program.
- The Farm hosts meetings of crop societies.
- The Farm donated fruit seedlings to government academic and research institutions.



The Philippine Rare Fruit Society and Fruit Conservation

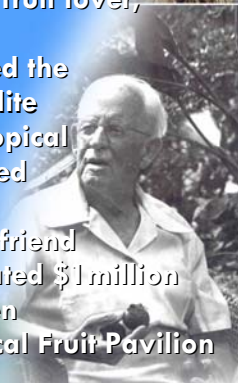
❖ **An informal society, the members communicate through the internet**

- They live in different parts of the country.
Juan Ong in Cebu
Loreto Bayna in Palawan
Onofre Grino, Jr. in Zamboanga City
Verman Reyes in Pampanga
Alexis de Manuel in Cotabato
Edmund Sana in Cagayan
Alex Belen in Isabela
- They visit the RCFC Farm to acquire fruit seedlings.
- They also visit each others farm to gather and share information.
- They play a vital role in fruit biodiversity conservation

What Now RCFC Farm?: THE FUTURE

❖ **I envision the RCFC Farm to eventually become a part of national botanic garden**

- Like the Kampong of Dr. David Fairchild in South Florida a 10 acre collection of tropical plants
- After the death of Dr. Fairchild, the Kampong was purchased by a wealthy fruit lover, Dr. Catherine H. Sweeny.
- Dr. Sweeny eventually donated the Kampong and became a satellite component of the National Tropical Botanic Garden which is located in Kawai, Hawaii.
- And get a donor, like my late friend William F. Whitman who donated \$1 million to the Fairchild Tropical Garden for the construction of a Tropical Fruit Pavilion





RC FRUIT CONSERVATION FARM
**'Our Four-Hectare Garden of Rare Tropical Fruits and Nuts
from All Over the World'**

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