A Global Strategy
for the conservation and use of Coconut Genetic Resources
2018-2028

Compiled by R. Bourdeix and A. Prades

cirad
LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

COGENT
Coconut genetic resources for enhanced livelihoods

Bioversity International

production of coconut hybrids by farmers and linked ecotourism activities must be fully developed and applied to other countries. As part of a conservation-through-use approach, an ecotourism "kit' will help stakeholders to develop new lucrative ecotourism activities. It will include downloadable documentation and video guidelines. For instance, basic ecotourism activities will consist of: creating a small nursery; recognizing Dwarf, Tall and Hybrid by using colours of the germinating sprouts; emasculating inflorescences for producing hybrids; and the floral biology of Dwarf and Tall coconut palm. Preliminary tests conducted in Amanu'a island in Samoa indicates that both American and local tourists really enjoyed to learn such details, which gives to them a completely different view of what are coconuts and their diversity[23]. From this common base, stakeholders will develop other ecotourism activities specific from their own culture and location.

Regarding on-farm conservation, farmers make the ultimate decisions about conservation and use in their community. I*t is crucial to better understand the socio-economic determinants that influence farmers' decisions* about the conservation and use of particular varieties in their community. From an ethnological perspective, as discussed in section 1.1.4, the symbolisms associated with the coconut palm strongly influence the stakeholder behaviours. *These symbolisms and their consequences should be further studied*, and particularly by integrating a gender approach. Mechanisms for identifying negative trends in crop genetic vulnerability and genetic erosion should be developed at national and international level. These "early warning systems" will draw attention to immediate threats to *in situ* conservation of traditional varieties.

3.4.2 Multifunctional landscape management

The example of Vanuatu

The case of Vanuatu illustrates how the involvement of local stakeholders could be strengthened in producing good, diverse and advanced planting material. The Vanuatu archipelago contains 80 islands, but "official" improved coconut varieties are only produced in one of those, Espiritu Santo[24]. Until recently, VARTC was mainly producing two varieties for farmers: the improved Vanuatu Tall (IVTT) and the hybrid between the Vanuatu Tall and the Rennell Island Tall (RIT).

Although this hybrid is performing well, production of hybrid seednuts was stopped in 2013: managing a seed garden of Vanuatu Tall for producing this hybrid is highly challenging since these palms grow very fast; and climbing for inflorescence emasculation is dangerous. Transportation cost also considerably limits the use of these varieties by farmers.

Instead of using a unique seed garden under the method of assisted pollination, which requires climbing the palm, isolated units could be planted in farmers fields scattered over islands. These units would consist in planting 60 Green-coloured IVTT palms and

---

[23] Valerie Saena Tuia, personal communication

[24] Only two plots of Improved Vanuatu Tall were recently planted by farmers in an other island (Pentecost) ; in the future these plots could serve for producing planting material. Tiata Sileye, personal communication.

40 Brown-coloured RIT palms[25]. These fields would need to be protected from pollen contamination by any kind of design. These units will produce, simply by open pollinated, seednuts of IVTT, RIT and their hybrid IVTTxRIT, as follows:

- Green sprouted seedlings harvested from IVTT will be IVTT.
- Brown sprouted seedlings harvested from IVTT will be natural hybrid IVTT x RIT.
- Seedlings harvest from RIT, all of brown of brown-green colour, will be either RIT or the hybrid between RIT and IVTT.

In this scenario, palm climbing is not required; production of planting material is de-centralized across many islands; planting material is made more accessible; more than only one variety is released to farmers; and responsibility of producing the planting material is shifted, at least partially, from the national institution to farmers.

The case of the University of South Pacific in Fiji

The University of South Pacific (USP) is a regional facility supported by 12 Pacific Island Countries[26]. Contact has been initiated to locate a "*Polymotu* unit" inside the Suva campus (Fiji), using the amazing red compact Dwarfs recently found in Fiji and a Tall-type sweet husk variety from Rotuma island in Fiji. The coconut palms will not be all planted in one small separate location, but scattered between all the campus buildings as in standard landscaping. This design offers an extraordinary opportunity to strengthen the commitment and interest of the thousands of students and teachers from all Pacific regions regarding more effective coconut genetic resources conservation.

More examples from Indonesia, Fiji again, Côte d'Ivoire and Thailand

In Indonesia creating many "Kopyor" islands is envisioned, similar to the "Makapuno Island" existing in Thailand but with a different design[27].

Fiji plans to create a "sweet husk" island such as the traditional conservatoire already existing in Tonga but with a different design[28].

Côte d'Ivoire plans to create artificial "coconut islands" designed for conservation purposes and seednut production and planted in the middle of plantations of other tree crops (as described in section 2.2.3). Another project has been designed in

---

[25] These palms will have to be carefully selected using information on their progenies because they need to be genetically homogeneous for colour.

[26] Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. This public research university is a regional centre for teaching and research on Pacific culture and environment. USP's academic programmes are recognised worldwide, attracting students and staff from throughout the Pacific Region as well as from other regions and beyond.

[27] The "Makapuno Island" in Thailand is planted with a mix of Tall-types and Green Dwarf types of Makapuno varieties. In Indonesia, it is envisioned to plant in each island with a different set of varieties including both Tall-type and Dwarf types (preferably red or yellow) Kopyor varieties, obtained or not from vitroculture.

[28] The traditional conservatoire in Onoiki islet, Tonga; has been planted with only one Tall-type sweet husk variety; in Fiji, an island will be planted with a Tall-type sweet husk variety and two red Dwarf compact varieties. This will allow conservation of these three varieties, production of hybrid seednuts by farmers and linked ecotourism activities.

collaboration with the NGO "Ivoire Développement Durable". It plans to landscape a new large customs-free area located near the city of Grand Bassam with 20,000 fruit trees belonging to 200 varieties of 40 species, including 15 coconut varieties.

Thailand is also proactive in developing this multifunctional landscape approach. Coconut varieties have been collected and planted at King Rama IX Botanical Park in Bangkok (50 varieties) and King Rama II Memorial Park in Samut Sakhon (85 varieties). In 2014, 115 varieties (now already in the nursery) will be grown in a privately-owned area in Samut Songkham but where the public can visit freely. French Polynesia plans to build a new museum close to the CRIOBE research centre in Moorea Island; landscaping the gardens of this new museum will integrate a conservation of the local compact Dwarf coconut varieties.

Whether inland or on islands, it is expected that many COGENT countries will be interested in testing and scientifically evaluating these designs to allow conserving traditional varieties, producing advanced planting material and developing ecotourism activities, often with strong involvement of local stakeholders and beyond *ex situ* genebanks.

3.4.3 Botanists, ecologists and the coconut palm

Botanists' and ecologists' approaches towards the coconut palm, in terms of biological diversity, are sometimes problematic. Both observe a great variation within coconut populations but this variation may seem inconsistent. Botanists sometimes do not understand the dynamics of the species in its historical context. In many locations and especially in the Pacific islands, landraces are mixed. Within the same small field or large plantation, one may observe big and small fruits; large roundish coconut with flat bottom used in the past as container; long thick-husked fruit used to make rope; palms selected specifically for copra, with medium fruits and thick kernel; fruit with very thin kernel very probably selected as tender nut to drink; and all intermediate between these forms, including some depressed consanguineous progenies resulting from occasional natural self pollination. Therefore it is difficult to distinguish between these mixed landraces, especially when the palms are old and tall. When focusing their interest on other species, botanists and ecologists often seem to perceive the coconut as industrial, invasive and harmful. When renowned scientists write that the coconut palm is environmentally damaging (Young et al. 2010a, 2010b), this may negatively impact conservation and use of coconut genetic resources.

Indeed, as described in section 1.1.1, excessive and reckless coconut planting on atolls has damaged and could still threaten local biodiversity. In any event, there are solutions to manage conservation of both endemic species and coconut palms, for which genetic diversity is also strongly threatened. Experiences in implementing the *Polymotu* concept in Samoa islands shows that organizing coconut conservation in Nuusafee Island has led to removing around 12,000 seedlings (done), felling about 200 senile palms (not finished), and replanting only 150 coconut palms from 3 varieties. As described in section 2.5.9, the design planned for Tetiaroa Atoll consists of removing between 1500 and 2000 coconut palms in favour of endemic vegetation and bird nesting, and then replanting only 500 coconut palms from 5 traditional varieties.