

# Efficient coconut-based agrosystems

## An answer to farmers' expectations

**I**n large agroecological zones of mainland coastal and insular areas of the humid intertropical regions, coconut is primarily grown on smallholdings. Its uses are highly diversified. It is most often grown to produce nuts for family consumption and as a source of income from the sale of copra, eating nuts and other coconut products.

Coconut palms are often an important component of farming systems located in ecosystems that are becoming increasingly fragilized by population increases, a reduction in available arable land, erosion and a drop in fertility resulting from inappropriate management.



Intercropping of cocoa, coconut and forest species on the island of Malo, in Vanuatu. © J. Ollivier

At the same time, it assists production diversification strategies.

The creation of viable coconut-based farming systems for farmers calls for a study of their biophysical and biogeochemical components depending on cultural practices, the climate and biological constraints.

Biological diversity and spatial and structural heterogeneity are essential aspects whose role in the performance, stability and resilience of such systems needs to be assessed.

Lastly, these systems need to be adapted and incorporated into farmers' strategies, in order to meet their requirements, but also those of public or private organizations working for sustainable development.

## Promoting sustainable cropping systems

In order to ensure the sustainability of coconut crops, CIRAD offers farmers coconut based farming systems designed to:

- Make the most of available resources (land, water, solar radiation, etc.).
- Maintain soil fertility.
- Optimize labour management.
- Improve farmer incomes.



## For more information

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## Studying farming system complexity

In order to spread their income over the short and long terms, farmers in many regions intercrop coconut palms and other perennial crops or transient annual species in the same plot, over varying lengths of time. Among other things, the multiplicity of species makes it possible to earn an income in the first 4 to 8 years after coconut palms are planted, which is their unproductive period. The intercropping combination varies depending on soil and climatic conditions, and on local market conditions.

The life span of coconut palms, around 80 years, the multiplicity of possible combinations, the agronomic constraints of such systems which are often managed without inputs (competition, fertility, drought, disease and insect attacks, etc.), but also aspects linked to the economic stability and social coherence of securing land, are all components that it is important to take into account when studying such systems.



Nut storage and husking prior to processing at the MADAL estate in Mozambique.  
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## Searching for optimum plantation management

It is first of all a matter of understanding the farmer's decision-making rules, by looking at the mechanisms brought into play, and monitoring their dynamics over time, particularly during the different stages of coconut palm development. The aim is to develop assessment strategies based on relevant criteria and to develop optimum decision-support tools.

Secondly, a clearer understanding of the efficiency of such farming systems, in terms of yield, labour productivity, adaptation to degraded or marginal environments, and the agronomic functioning that governs it, would make it possible to widen the range of crop management possibilities.

## Assisting diversification strategies

In Melanesia, for example, intercropping food crops with immature coconut palms makes it possible to meet the family's nutritional requirements, optimize labour, provide extra income, and ensure good establishment of the tree crop. Agroforestry systems are developing. They can be simple, intercropping coconut palms and cocoa trees, or more complex, involving fruit trees, vanilla, banana, and food crops in several storeys.

In general, the coconut palm adapts well to a wide range of intercrops. By modelling the functioning of such intercropping combinations, CIRAD assists such production diversification strategies, which make it possible to cope with market uncertainties and minimize the risks run by farmers.



Transporting of coconut husks in Ghana to make use of fibres.  
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Melanesian garden in Papua New Guinea: a multi-species cropping system.  
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### Partners...

- CCI (Cocoa and Coconut Institute), Papua New Guinea
- OPRI (Oil Palm Research Institute), Ghana
- RSUP (Riau Sakti United Plantation), Indonesia
- VARTC (Vanuatu Agricultural Research and Training Centre), Vanuatu



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