# Coconut

Coconut plays an important role in tropical economies and farming systems, primarily in Asia, the Pacific and in coastal and island areas. The crop is above all grown on smallholdings, partly as a food crop—for its water, meat and sap—whilst also providing growers with a regular income from copra production. In recent years, copra has been faced with stiff competition from other tropical and even temperate oil crops, and the sector could well die out in the least competitive areas. Against this backdrop, the Coconut Programme has chosen to focus its research on improving crop productivity and producer incomes, on integrated control of lethal decay diseases and on diversifying the outlets for coconut.

## Objectives

• To increase coconut productivity, particularly on smallholdings.

• To restore the competitiveness of copra, the main source of vegetable oil in producing countries and the principal world source of lauric oil.

• To keep coconut in the traditional growing zones, for its food, economic and cultural value, and to develop alternative outlets for smallholders.

• To prevent the risk of coconut disappearing from regions affected by lethal decay diseases.

R. Bourdeix

### The programme at a glance

A staff of 20, including 16 researchers and technicians, in Côte d'Ivoire, Vanuatu, Papua New Guinea, French Guiana and Montpellier.

An average of two doctoral and six other students hosted each year.

**Expertise**

Genetic resource evaluation and management, biotechnology, agronomy, ecophysiology, crop protection, processing technology.

Commodity channel, plantation and oil mill appraisals.

**Installations**

Joint IRD-CIRAD oil palm and coconut in vitro culture laboratory.

International coconut genetic resource database.

Various copra oil production prototypes.

## Improving crop competitiveness

In the main producing areas, the programme is attempting to increase, secure and diversify production on coconut-based farms. It proposes high-yielding planting material and crop management sequences for both monoculturing and intercropping. Based on traditional systems and optimized intercropping models, it is working to develop coconut-based farming systems.

**Some current operations**

Diagnosing the agroeconomic factors limiting production.

Modelling coconut palm architecture and functioning in Vanuatu and the Philippines.

Drawing up coconut replanting and rehabilitation schemes in Papua New Guinea.

Managing collections and creating high-yielding varieties suited to local conditions, in Côte d'Ivoire and Vanuatu.

Using pheromones to trap insect pests in Papua New Guinea, the Philippines and Ghana.

Scientific and technical support of coconut replanting and rehabilitation projects in Ghana and Mozambique.

Developing a control strategy against a coconut root pest on peat soils in Indonesia.

CIRAD

Centre de coopération internationale en recherche agronomique pour le développement

**Tree Crops Department**
**CIRAD-CP**

**Coconut Programme**

## Control of lethal decay diseases

Coconut plantations in Mexico and the Caribbean are affected by lethal decays caused by lethal yellowing and *Phytophthora* rot. The programme is developing integrated control of these types of diseases, with a view to preventing the disappearance of coconut from these production zones. CIRAD is working with Mexican specialists on this, but the work undertaken is of international importance, given that the diseases are also seen in Africa and Asia.

### Some current operations

Etiological studies of the diseases that cause decay, development of reliable nucleic probes and identification of vectors (Mexico, Ghana, Mozambique).

Creation of resistant planting material in Côte d'Ivoire and varietal tests in Ghana.

Search for genetic resistance to disease using molecular marking techniques.

Seednut production and in vitro vegetative propagation of improved material (Montpellier, Mexico, Philippines).

## Diversification of outlets

The programme is working on new large and small-scale processing technologies for coconut meat, fibre, shells and sap, with a view to making optimum use of coconut products and by-products. Any innovations undergo technical and economic appraisal. The aim is also to support the breeding of cultivars with good processing performance.

### Some current operations

Appraisal of coconut production, marketing and processing in Polynesia, Ghana, Mozambique and Saint Lucia.

Support of women running small-scale coconut oil processing units in Ghana.

Development of a method for evaluating coconut technological quality and processing performance in Côte d'Ivoire and Vanuatu.

C.H. Calvez

*Fresh coconut meat crushing in Ghana.*

Optimization and transfer of the hot oil immersion drying (HOID) technique for coconut oil extraction in Ghana and the Philippines.

R. Bourdeix

*Hybrid coconut planting in Vanuatu.*

J.L. Verdeil

*Clump of coconut somatic embryos.*

## Biotechnologies for coconut improvement

Obtaining high-yielding varieties adapted to specific conditions requires in-depth knowledge of the genetic diversity of the species. On behalf of COGENT (Coconut Genetic Resources Network), CIRAD manages a database containing information on the origin, morphology and agronomic performance of germplasm held in seventeen countries. It also carries out support and training missions in this field.

An RFLP study of some forty ecotypes representative of the main coconut growing regions revealed two main groups of Tall varieties. Autogamous Dwarf varieties apparently share a single origin: Southeast Asia.

Studies are under way to draw up a standard protocol for molecular diversity analyses, using microsatellites (in conjunction with researchers from the United Kingdom). The results will be included in the international database.

## Main partners

### In France

IRD, INRA, Universities of Montpellier and Paris, Agro-Montpellier.

### Worldwide

National research organizations (Côte d'Ivoire, Ghana, Jamaica, Mexico, Papua New Guinea, Philippines, Vanuatu).

International networks and organizations: COGENT, IPGRI, Asian and Pacific Coconut Community, BUROTROP.

Commercial plantations and processors (Brazil, Côte d'Ivoire, Dominican Republic, Indonesia, Mozambique, Philippines, Saint Lucia).

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