Objective 2

Develop protocols and capacity for sustainable low-impact coconut wood harvesting, plantation rehabilitation, and log grading, handling and transport.
Project objectives

1. Identify markets
2. Forestry: stem harvesting
3. Peeling in S. Pacific
4. Peeling trials
5. Assemble and test products

By-product utilisation
Objective 2 – CocoVeneer forestry practices

Identify markets → Forestry: stem harvesting → Peeling in S. Pacific → Peeling trials → Assemble and test products → By-product utilisation

Advanced veneer and other product from coconut wood
**Objective 2** - Develop protocols and capacity for sustainable low-impact coconut wood harvesting, plantation rehabilitation, and log grading, handling and transport

2.1 - Local resource assessment and harvesting
2.2 - Development and training in harvesting and handling protocols – Agroforestry operations.
2.1 Local Resource Assessment and Harvesting

• Material for Trial 1 collected from a representative Fijian site.
  – Dispatched to ENSAM, France.

• Trial 2 material sourced from an Australian site.
  – Not sufficiently dense to be representative.

• Hollow high-density Fijian stems sourced for Trial 2 through Pacific Green.
  – Needed for Australian Customs but were unsuccessful trial specimens.

• Fijian stems sourced for Trial 3.1 & 3.2 through Pacific Green.
  – Supplied to TUD Nasinu, Fiji
2.1 Local Resource Assessment and Harvesting

**Trial 4 log supply**
Harvesting and agroforestry trial near Savusavu, Fiji - June 2015

A total of 96 x 6 m peeler quality logs were felled.
2.2 Harvesting and agroforestry

Agroforestry trial near Savusavu, Fiji. June 2015

Harvest selections ➔ Felling ➔ Log handling & transportation ➔ Site rehabilitation

Advanced veneer and other product from coconut wood
2.2 Harvesting and agroforestry

Log specifications:
- Lower diameter range of 29 – 35 cm
- Log sweep less than 3 cm in any 2.5 m length.
- No presence or evidence of termites.

Agroforestry trial
Harvest selection
2.2 Harvesting and agroforestry

**Log Specifications:**
Lower diameters were measured before felling
Log sweep was estimated before felling then measured after felling
Log recovery:
- Approximately 60% of standing palms would produce a peeler log to the required specification.
- Remaining stems were too large (mainly) or had excessive sweep (only about 5%).
- Palms had to be cut at approximately 1 m above ground to avoid butt-sweep.
- Palms stems were about 35-40 m high.
Log handling:
A landing was cleared for the harvested logs at a well drained location.
A tractor front-end loader was used to forward logs to the landing and load logs on the truck.
2.2 Harvesting and agroforestry

Log supply:
Logs forwarded to the veneer peeling mill at Labasa in northern Vanua Levu and stacked on bearers.
2.2 Agroforestry protocols

Code of Practice for Harvesting Senile Coconut Palms in the South Pacific Islands Region

Sections in the draft Code of Practice includes:

- LEGAL COMPLIANCE
- PRE-HARVESTING ARRANGEMENTS
- THE HARVESTING PLAN
- HARVESTING PERSONNEL ACCREDITATION
- HARVESTING OPERATIONS
- PLANTATION HYGIENE
- WEATHER RESTRICTIONS
- RESTORATION OF HARVESTED AREA
- REHABILITATION OF THE HARVESTED AREA
2.2 Agroforestry protocols

Code of Practice for Harvesting Senile Coconut Palms – PRE-HARVESTING ARRANGEMENTS

- Log demand
- Possible selections – mapping tools
- Partial harvest?
- Clear-fell harvest?
- Stakeholder and/or community approval
- Harvesting Plan

Identified Log demand
Identify the best selection options to meet the demand
Log volume required will determine the harvesting Strategy
Interested parties will review environmental, social and commercial considerations
Harvesting Plan in accordance with a Coconut Palm Harvesting Code of Practice
2.2 Agroforestry protocols

GIS software can assist in identifying harvest selections and developing Harvesting Maps

Advanced veneer and other product from coconut wood
2.2 Agroforestry protocols

Code of practice: HARVESTING PERSONNEL

Harvesting Personnel Accreditation

Code of Practice includes certification requirements for:

- Harvest Supervisor
- Chainsaw Operators
- Harvest Machine Operators
2.2 Agroforestry protocols

Code of practice: HARVESTING OPERATIONS

Harvesting Operations

Code of Practice establishes required standards for:

- Harvesting machines
- Safety equipment
- Construction of roads, tracks and landings
- Felling
- Log handling and transportation
- Salvaging windblown palms
2.2 Agroforestry protocols

Code of practice: PLANTATION HYGIENE & SAFETY

Plantation hygiene and safety during harvesting operations

Code of Practice establishes required standards for the management of:

• Harvest site rubbish
• Fuel spillage
• Camp fires
• Fire precautions
### Code of practice: WEATHER RESTRICTIONS

<table>
<thead>
<tr>
<th>Operation</th>
<th>Stop guidelines</th>
<th>Start guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felling</td>
<td>Wind prevents accurate directional felling.</td>
<td>Wind drops and accurate directional felling is possible</td>
</tr>
<tr>
<td></td>
<td>Ground conditions are too slippery to allow the chainsaw operator to move safely</td>
<td>The ground dries to allow the operator to move without slipping.</td>
</tr>
<tr>
<td>Forwarding</td>
<td>Water flows on road or track.</td>
<td>Soil surface becomes solid enough to operate on without causing rutting deeper than 30 cm.</td>
</tr>
<tr>
<td>Landings</td>
<td>Water starts to pond on the surface of the landing</td>
<td>The soil is no longer saturated. This can be seen as the soil surface becomes solid enough to operate on without causing rutting.</td>
</tr>
<tr>
<td>Log Haulage</td>
<td>Trucks cannot move unassisted along the road because of slippery conditions, or muddy water is running in wheel ruts which are more than 10 cm below the road surface for a distance greater than 50 m.</td>
<td>The surface dries and trucks can move without assistance along the road and water is no longer running in wheel ruts.</td>
</tr>
</tbody>
</table>
Site clearance and rehabilitation options:
The Stakeholders should decide which cropping system will replace the harvested coconuts stems before harvesting. Rehabilitation cropping options include:
• Site clearance for the replanting of coconut palms
• Site clearance for a single crop or stock pasture
• Site clearance for inter-row or multi-cropping systems
2.2 Agroforestry protocols

Code of practice: – HARVESTING RESIDUES

Several options for using coconut log harvesting residues are being investigated.

- Biochar from coconut wood pyrolysis
- Wood chipping for compost production
2.2 Adoption of Agroforestry protocols

2.2 Agroforestry Operations

- 2.2.1 Harvest selections
- 2.2.2 Felling
- 2.2.3 Log handling transportation
- 2.2.4 Site rehabilitation

Forestry activity

Ag. activity

Advanced veneer and other product from coconut wood
2.2 Adoption of Agroforestry protocols

- Barriers exist to the practical acceptance of coconut harvesting codes of practice.
- Community and estate stand owners view their rights differently to forest owners or operators.
- Coconut stem owners are used to acting independently, and this is likely to carry over to coconut harvesting.
2.2 Adoption of Agroforestry protocols

• Estates or communities own most coconut stands, and will control harvesting.

• Regular log supply will likely result from:
  – Offer of logs for sale at an agreed price at a set collection point.
  – Direct negotiation with the community land-owners.
**Objective 2 – CocoVeneer forestry practices**

### Forestry: Stem harvesting

#### Key completion dates –

<table>
<thead>
<tr>
<th>Activity</th>
<th>Planned</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Local resources assessed and obtained for peeling trial 1</td>
<td>August 2012</td>
<td>March 2013</td>
</tr>
<tr>
<td>2.1 Local resources assessed and obtained for peeling trial 3</td>
<td>November 2013</td>
<td>August 2014</td>
</tr>
<tr>
<td>Draft harvesting and handling protocols developed</td>
<td>August 2014</td>
<td>August 2014</td>
</tr>
<tr>
<td>Stems for Trial 3.2</td>
<td>November 2014</td>
<td>May 2015</td>
</tr>
<tr>
<td>Obtain stems for Trial 4</td>
<td>March 2015</td>
<td>May 2015</td>
</tr>
<tr>
<td>Code of practice distributed for comment</td>
<td>May, 2015</td>
<td>August 2015</td>
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