Enhancing Papua New Guinea (PNG) Smallholder Cocoa Production Through Greater Adoption of Integrated Pest and Disease Management (IPDM).

By Yak Namaliu, John Konam, Josephine Saul, Rosalie Daniel and David Guest
The Outcome Highlights of ACIAR Research Project: PHT2003-015

1. Adoption of Research Results:
   This presentation highlights the importance of packaging research results and intervention pathways to fast track technology transfer and stimulate industry growth.

2. Alleviation of rural poverty:
   There is also some indication of alleviating rural poverty and improving human resource capacity in poor disadvantage rural communities through effective technology transfer.

3. Bio-Security:
   Farmers access to technology and information tend to improve their crop protraction husbandry practices and are able to manage existing pests and are prepared for any new pest.
1st Research Hypothesis

IPDM is effective package for managing *Phytophthora* diseases and problem of most cocoa insect pests and other diseases at smallholder level

*Phytophthora* Black Pods

Nitrogen deficiency
2nd Research Hypothesis

Direct transfer of technology through community PAR empowers farmers to adopt technology
Goals

• Transform industry from 10% to 50% medium management level (i.e. Option 2 or above)

• Increase production to 100,000 tonnes by 2012
Theobromae cacao; Chocolate

Holdings..  
Plantings..  
Bearing..  
Harvesting..  
Processing..  
PNG production
Pest & Disease Complex

1\textsuperscript{st}. Phytophthora disease (s)

2\textsuperscript{nd}. Insect associated Phytophthora attack
3rd and 4th Important Pest Complex

3rd. Vsd Caused by
Oncobasidium theobromae

4th. Soil Nutrition problems
5th. A new threat

Cocoa Pod Borer (CPB) (*C. cramerella*)
These constraints are factor of high bio-security risk.

It is serious because there is low or nil adoption of Crop Health Management practices in PNG (2004).

- This has lead us to develop this Research for Development project.

- How we conducted the research?
Method: IPDM Pilot Trial Sites

1. Bougainville
2. ENB
3. Madang

Major Act.

a) 2005.
b) 2006.
c) 2007.
d) 2008.
3 Sites in Bougainville

1. Buka smallholders
2. Tinputs Smalholders
3. Arawa smallholders
3 Sites in East New Britain

1. Tavilo Smallholders, Leased Blocks
2. Keriba Smallholders, Leased Blocks
3. Tingangagalip village community
3 sites in Madang
1. Wadan Village Community
2. Kaul 2 Village Community
3. Galeg village Community
# Management options

<table>
<thead>
<tr>
<th></th>
<th>Current level of Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>(Purplish)</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>High level Sanitation</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Cultural Husbandry</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Fertilizer Weedicide</td>
</tr>
</tbody>
</table>

- **Fungicide Insecticide**
Community and Family PAR

Recording Baseline Ecological

Family Participation in Training
## Data & Results

<table>
<thead>
<tr>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baseline Survey</td>
<td>Good Data</td>
</tr>
<tr>
<td>2. Review on Baseline</td>
<td>Good Data</td>
</tr>
<tr>
<td>3. Production data</td>
<td>Very poor</td>
</tr>
<tr>
<td>4. Other input data</td>
<td>Very, very poor</td>
</tr>
<tr>
<td>5. National Production</td>
<td>Increase in production</td>
</tr>
<tr>
<td>6. Outreach</td>
<td>Farmer to farmer and new projects</td>
</tr>
</tbody>
</table>
On Station IPDM Results: 2005

Effect of IPDM inputs on Healthy Ripe pod yields and pod rot incidence

- K3900/ha +34%
- K5217/ha
- K6039/ha +55%
- K7012/ha +80%

Number of pods

Percent pod rot

IPDM Management Options

One Two Three Four
# Plant Health Care Management

<table>
<thead>
<tr>
<th>Site</th>
<th>Acc.</th>
<th>Plant health care. Before</th>
<th>Plant health Care. After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buka</td>
<td>Acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Tinputs</td>
<td>Acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Arawa</td>
<td>Very acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Tokiala</td>
<td>Very acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Kariba</td>
<td>Very acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Tingangalip</td>
<td>Acc</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Waden</td>
<td>Very acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Kaul 2</td>
<td>Acc.</td>
<td>Nil</td>
<td>Very good</td>
</tr>
<tr>
<td>Galeg</td>
<td>Very poor</td>
<td>Nil</td>
<td>Very good</td>
</tr>
</tbody>
</table>
Norman Pukur’s 2008 Production
Insecticide spray for CPB management

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of Dry Bean Bags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.-March</td>
<td>11</td>
</tr>
<tr>
<td>April-June</td>
<td>10</td>
</tr>
<tr>
<td>July-Sept.</td>
<td>15</td>
</tr>
<tr>
<td>Oct.-Dec.</td>
<td>@ Production not obtained</td>
</tr>
<tr>
<td><strong>Total Production</strong></td>
<td><strong>36 bags = 2.3 tonnes</strong></td>
</tr>
<tr>
<td></td>
<td>@ + more then 3 tonnes</td>
</tr>
</tbody>
</table>
Shift in ENB
# IPDM Outreach in PNG

**a) Province**

1. Bougainville Autonomous Region
2. ENB Province.
3. Madang Province.
4. New Ireland Province.
5. Morobe Province.

**b) Other country**

1. Solomon Island, Dr John Konam..
Extant of IPDM Outreach in PNG
Back to Basic: Managing Plant Diseases; APPS 2007 Theme

- ACIAR Project: PHT/2003/015 was an advanced Program.

- Farmers are adopting technology

- PNG Cocoa production is rising in the graph

- Adoption Crop protection; improves crop bio-security

- Community PAR is better intervention method. The question raised by Frank Jarret ‘How do farmers (in PNG) find out about innovations and just what source of information are important. This is probably is the answer.
PNG Smallholder have never changed their practice; PTH 2003-015 stimulated the shift...
Farmer is happy; Research team is also satisfied
And most important, Funding had an impact.
New research programs
- Fostering adopting and evaluating its rates
- Improving IPDM option 2, Cultural and Bio., cont.

Cocoa Pod Borer (CPB) is spreading very fast & lots of production is lost & chemicals will be used more often.
<table>
<thead>
<tr>
<th>Stages</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>Phase 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACIAR PHT2003-015</td>
<td>Completed</td>
<td>Completed</td>
<td>Completed</td>
<td>a) PNC CCIL Not yet.</td>
<td>b) New Ireland</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement of IPDM</td>
<td>Yet to secure Funding</td>
<td>Major Threats.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option 2 Cultural</td>
<td></td>
<td>1. Cocoa Pod Borer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Change in disease statue and population of Phytophthora spp in PNG</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Acknowledgement: On behalf of the project leader, Professor D. Guest, I pass on words of...

We acknowledge ACIAR for funding…Our greatest gratitude goes to Dr Grag Johnson for his part in proposal write up and approval…I thank all of you for attending this session. And thanks goes to..

We have been working as a team despite the problem of further distance apart, Normal duty work loads and farmer problems.

I take this opportunity to thank Professor Guest and his colleagues for leading us all through out.

I also extend my acknowledgement to staff of PNG CCIL in carrying out the project and attainment of some achievements.

For the good of scientific domain I thank the conference organisers to accept this document publication and presentation.

Once again for Dr Grag, this was where we started in 2004 and may not be the end..is a good research and will go on.