Introduction

The 2\textsuperscript{nd} community nursery training funded by the ACIAR project FST/2011/057 was conducted for Bena district communities and other selected community representatives from community-based non-governmental organisations (NGO’s). The first training was conducted in 2014 for participants from Goroka and Ungai districts. The 2015 training program did not eventuate due to prolonged drought. A total of 15 participants were confirmed and 14 actually attended.

Of the 14 participants, two were females who were to some extent involved and had the desire and interest in tree-planting within their communities.

The training was a follow up action from the previous seedling distribution and qualitative surveys conducted jointly by the PNGFA (Goroka) and UPNG in which people interviewed from communities, schools and community-based NGOs predominantly suggested that a lack of skills and training in establishing nurseries for seedling production was one of the major factors that hindered individuals, communities, schools and NGOs from being engaged in active tree-planting programs. In spite of the demand and desire to meet the growing needs for wood demand for the population, the PNGFA extension program has been severely constrained by inadequate budgetary support from the government. One of the ACIAR project’s objectives is to find solutions and ways to upscale community forestry activities in PNG. One way to achieve this, as identified in this project, is through training in the establishment of community nurseries.

Two training manuals were developed and written in both English and Pidgin versions with the same contents. The training was of an educational approach with hands-on training focused on action learning in which each key biophysical principles of good nursery management were explained, demonstrated and then performed by each participant. During the training, a model nursery was built by participants for the host community to be managed by them to raise seedlings and distribute the seedlings to the local villages for their own plantings.

It was an intensive 3-day training program with half-day classroom sessions and half-day hands-on practical learning.
Objective

The nursery training had four main objectives –

1. To provide the people of Goroka and EHP, who dwell in predominantly grassland communities, with the necessary skills and knowledge to establish and manage a small-scale timber tree nursery on their own land for their own use;
2. To design, deliver and improve a nursery training course focused on target species for Goroka, EHP and the Highlands region while also providing a training manual to be adopted for the PNGFA extension program;
3. To use the nursery training as an entry point for follow-up social science research concerning the opportunities for and barriers to increased planting of timber trees; and
4. To provide justification for such training that is also acknowledged in the previous seedling and qualitative surveys and other reports delivered by previous ACIAR projects.

Training Team

The training team members were comprised of – Warea Andasua (Training Coordinator), Vincianna Andrew and John Ikiri.

Criteria for selection of participants

Participants were selected from strategic locations within the Bena district. Two other participants were selected from each of the Daulo and Goroka districts. Participants were selected on merits in a sense that they were PNGFA-registered seedling recipients or have a need for seedlings for tree plantings in their communities.

Methods

Prior to training, invitations were sent out to participants a week before the training in order to give ample time for the participants to prepare and to obtain feedback from them.

The training was delivered in two ways –

1. Practical sessions – hands-on training (see Appendix 1)
2. Classroom sessions with lectures (see Appendix 2).

Lectures and practical sessions were delivered in Pidgin. This was because Pidgin is the language of proficiency for most trainees and a language they could most easily understand and use to absorb knowledge. Seeing and doing is one of the best learning systems used in PNG culture, and trainees were exposed to practical hands-on approaches to facilitate this. The practical learning approaches were well appreciated by the trainees for the duration of the training.
Funding for Training, Accommodation, Meals & Logistics.
All training costs incurred were fully funded by the PNGFAs, Goroka budget allocation from the ACIAR project FST/2011/057.

Most of the trainees were brought in from different locations within the Bena districts with training designed to take place within three days. Hence, overnight accommodation and catering was provided by the host community at Korofeigu Community Resource Centre.

Opportunities for the participants to socialise during the evening were made available and included video shows on various climate change issues.

The expenditure summary for the Training is outlined in tabulated format below –

<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Unit Cost</th>
<th>Quantity</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hire of Training venue, meals &amp; accommodation</td>
<td>Quotation from supplier</td>
<td>3 days/3nights</td>
<td>K5,450.00</td>
</tr>
<tr>
<td>2</td>
<td>Nursery Materials (Hardware) Mini Genset</td>
<td>Quotation from supplier</td>
<td>Assorted 1</td>
<td>K5,490.00</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>K2,990.00</td>
</tr>
<tr>
<td>3</td>
<td>Cash Advance Deposit</td>
<td>Purchase of Goods &amp; Services</td>
<td>Various</td>
<td>K4,380.00</td>
</tr>
<tr>
<td></td>
<td>Total cost for Nursery Training</td>
<td></td>
<td></td>
<td>K18,310.00</td>
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</tbody>
</table>

Discussion

The training used an educational approach, a formal technical training - i.e. imparting of technology and skills. A total of 14 participants attended the 3-day intensive training entitled “Community Forestry Nursery Training” and graduated with certificates of attendance. Amongst the participants were 2 women to maintain gender balance, and both of these women are also active tree-farmers. The training sessions were delivered in two modes. From morning – lunch was a classroom session with lectures and the afternoons were hands-on practical sessions.

Day 1. Morning session covered topics including: Introduction to forestry; Silviculture systems; Forest nurseries – objectives and types of forest nurseries, choice of nursery site, nursery design and layout including size and shape, nursery management plan, buildings, seed beds and seed sowing, standout beds, nursery equipment/tools, water supply and irrigation, soil management including plant requirements and soil properties, physical properties, soil fertility, pH, pathogens, preparation of soil mixture, soil fertility, compound fertilizers and soil sterilisation.
Afternoon practical session covered topics including: Discussion on the model nursery site; construction of germination shed; construction of standout and seed beds; soil sterilization; and preparation of seed trays.

Day 2. Morning session covered topics including: Seed collection and seed collection criteria; tree climbing and seed picking; seed drying and extraction; seed storage; methods of plant production including bare-root seedlings, stump plants and container-grown plants; pre-germination techniques; sowing of seeds including time of sowing, methods of sowing, density of sowing, depth of sowing; transplanting techniques; nursery techniques for 3 target species - Casuarina, Eucalyptus and Pinus; care and protection of seedlings including watering, shading, root pruning and hardening; quality control of seedlings including ways of assessing seedling quality, grading and culling; and choice of species and their field establishment.

Afternoon session: Practical demonstration of seed collection, seed drying & extraction, Pre-germination technique for seed with hard seed coats, sowing techniques for 3 x target species- Casuarina, Eucalyptus & Pinus spp.


Afternoon practical session covered topics including: Demonstration of tree planting, fertilizer application, seed-bed preparation, seed sowing and shading; open-forum / discussions including a wrap-up and closing with presentation of certificates.

The training was delivered in a nursery operational sequence following the above-noted schedule (copy attached) with both classroom lectures and hands-on practical sessions. All trainees were mature adults and the training method was focused on action learning whereby each key biophysical principle of nursery establishment and management to produce high-quality healthy planting material was explained, demonstrated and actually performed by participants.

During the graduation and presentation of certificates, all participants were presented with some basic nursery material support. For each participant, this included 2 seed trays, 1000 polybags, a 15m length of shade cloth, and seeds of the 3 main target species (i.e. Casuarina, Eucalyptus and Pinus). These materials were intended to help the participants to immediately establish their own nurseries.

The nursery training was also limited to forest trees only and did not include information about fruit trees, coffee and other agricultural crops in which most rural household systems in Goroka and the Eastern Highlands are actively involved in.

Conclusion
The 2\textsuperscript{nd} Community Forestry Nursery Training for communities in Goroka and EHP was successfully completed. Many trainees acknowledged, commended positively and appreciated the importance of the training program. The technology and skills imparted to them, together with the material support provided will empower the participants to do things to help sustain their livelihood in their communities. This is particularly important in these changing times when we are faced with the dilemma and challenges of climate change, and deforestation coupled with increasing population pressure. Some participants vowed to go back to their own communities and immediately train others specifically in the area of nursery techniques for propagating the three target species. The most important expected outcome achieved in this training is the imparting of key forest nursery operational and management skills so that at the conclusion of the training the participants are able to then do it for themselves. Many others from the public who have heard of the training wanted to attend but could not due to limitations of space, logistics and funding.

**Recommendation**

- Further Nursery Training programs should be conducted within each district to cover the entire Province.
- Follow-up visits to each participant will continue to provide mentoring and moral support.
Appendix 1: Photographs of training activities

Constructing nursery stand-out and germination beds

Soil sterilisation and soil-sieving for tubing
Seed bed & seed tray preparations and sowing of seeds.

Seed collection and drying/extraction methods
Broadcast sowing Eucalyptus seeds in prepared trays

Shade cloth, seed trays and seeds of the 3 target species (Casuarina, Eucalyptus and Pinus) were distributed to each participant at the end of training
# Appendix 2: Training Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Activity</th>
<th>Proponent</th>
</tr>
</thead>
</table>
| **Day 1**<br> Tuesday<br> 11/11/14 | 09:00  | **Introduction** - Opening Remarks  
- Trainer & Participants | - Area Manager – Highlands |
|      | 10:00 – 12:00 | **Classroom Session**  
- Introduction to Forestry  
- The importance of planting trees, economic, social & environment perspectives  
- Forest Silviculture, Forest nurseries objectives & types of nurseries, Choice of nursery site, Nursery design & layout, Water supply & irrigation, Soil Management |  - Trainer |
|      | 12:00 – 1:00 | Lunch |  |
|      | 1:00 – 4:00pm | **Practical Session,**  
- Discussion on sallyns site,  
- construction of standout beds, seed beds, germination shed, shading, soil sieving & tubing, soil sterilization, preparation of seed trays & seed beds |  - Trainer  
- Demonstrations & explanation by nursery leading hand |
| **Day 2**<br> Wednesday<br> 12/11/14 | 08:30 – 12:00 | **Classroom session**  
- Seed collection, Methods of plant production, pre-germination techniques, Sowing of seeds, Transplanting, Nursery techniques for Eucalyptus, Casuarina and Pinus spp., Choice of species, Field establishment, Fire Protection |  - Trainer  
- Demonstrations by nursery leading hand |
|      | 12:00 – 1:00 | Lunch |  |
|      | 1:00 – 4:00pm | **Practical Session**  
- Seed collection, seed drying & extraction,  
Pre-germination techniques (seeds with hard seed coat) Sowing techniques for different species, Casuarina, Eucalyptus & Pinus spp., Transplanting, watering & shade requirements, culling & grading, root pruning, fertiliser applications |  - Trainer  
- Demonstrations by nursery leading hand |
### Day 3

**Thursday 13/11/14**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 12:00</td>
<td><strong>Classroom session</strong>&lt;br&gt;- Field establishments/plantings&lt;br&gt;- Fire protection&lt;br&gt;- Log volume calculations/Climate Change (Supplementary)&lt;br&gt;- Recapping of 2 days classroom/practical sessions &amp; practicals on: Fertiliser applications, root coiling</td>
</tr>
<tr>
<td>12:00 – 1:00</td>
<td>LUNCH</td>
</tr>
<tr>
<td>1:00 – 3:00</td>
<td>- Discussion &amp; wrap up training session&lt;br&gt;- Presentation of certificates to participants</td>
</tr>
<tr>
<td></td>
<td><strong>End of training – Participants depart to their home districts/villages</strong></td>
</tr>
</tbody>
</table>

- **Trainer**
- Closing remarks by Area Manager – Highlands
- Closing remarks with Presentation of certificates by Deputy Provincial Administrator & Advisor Natural Resource, EHPG.