



Who?

How, what?

Where, when?

So what?

Why?

Who cares?

Negotiation-support toolkit for learning landscapes

EDITORS

MEINE VAN NOORDWIJK
BETHA LUSIANA
BERIA LEIMONA
SONYA DEWI
DIAH WULANDARI

WORLD AGROFORESTRY CENTRE
Southeast Asia Regional Program

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10 | Access to trees of choice (NotJustAnyTree)

James M. Roshetko, Pratiknyo Purnomosidhi and Endri Martini

The choice of trees that are planted is unfortunately often dominated by supply (what is available) rather than by what is prioritized by planters. The NotJustAnyTree tool provides an evaluation approach of the planting material that can be obtained from existing local nurseries, and its quality. The tool also includes evaluation criteria for outcome and impact studies of efforts to support nurseries of excellence.

■ Introduction

Preceding tools help in defining which trees might be suitable where, and what level of tree diversity (between and within species) is desired or prioritized. Unfortunately, tree-planting programs are mostly evaluated by the numbers of trees planted rather than by the number of trees that actually survive and grow and even less in the quality of products and services that they provide. A major shift is needed from supplying what is easily available to what is prioritized. Past evaluations of tree-planting programs have focussed on the number of seedlings supplied and program funding rather than on the appropriateness of what was supplied and planted.

It is possible for farmers to obtain tree seed, sow it directly or use it to produce seedlings in a small-scale family nursery. Larger-scale tree nurseries, oriented towards local needs, offer economies of scale and other advantages. These can be managed by a farmers' group or as part of a broader community training and education program; they may also evolve into private enterprises focused on serving market demand. Often such enterprises grow out of external or community efforts to develop the technical skills and experience, access to tree seed and information, and awareness of market mechanisms necessary for individuals or groups to effectively operate a tree nursery.

An important step for any nursery that wants to supply the markets is the production of reliable quality seedlings through informal or formal quality control; in government-monitored markets this may include certification programs. The actual quality of a tree can only be assessed many years after it has been planted, but molecular markers that allow early identification of cultivars or strains are becoming more widely available.

■ Objectives

The aim of the NotJustAnyTree tool is to assess the supply and demand of quality tree germplasm, the capacity of local nurseries, and the effectiveness of support to local nursery development.

■ Steps

- 1 Survey of existing tree nurseries in a geographic area to assess the species and types of species produced, seedling quality (origin of seed, budwood, other material; type of seedling propagation; size and age of seedlings etc), the quantity of seedlings produced, average number of seedlings per sale, business capacity of the nursery, relation to other components of the tree seed sector (other nurseries, germplasm suppliers, government agencies, the private sector,

customers etc) (Roshetko and Purnomosidhi 2013). Gap analysis that starts with potential demand can identify opportunities for new species to enter into the nurseries (Narendra et al 2013).

- 2 Similar surveys of germplasm suppliers (government and private) that operate at local, national or international levels; and assessment of government support to facilitate local access to these suppliers (Roshetko et al 2003).
- 3 Needs assessment of nurseries' human resources and infrastructure to identify any training and equipments inputs required to enhance nursery operations¹.
- 4 Evaluation of the technical and cost effectiveness of the inputs required to enhance nursery operations.
- 5 Forecast of future seedling demand (government, project, private sector) and evaluation of local nurseries potential to meet that demand (Martini et al 2013).

■ Case study: nurseries of excellence in Indonesia

Aceh, the northern- and western-most province of Indonesia, covers an area of 57 000 km² and has a population of just over 4 million. Household economies were based on rice production for household consumption, fisheries for income generation and tree crops for both income generation and household needs. In Aceh Barat, tree crops provided 60% of household incomes. Across the province, smallholders cultivated mixed tree and crop systems under non-intensive management. Key species were rubber, cocoa, coconut, betel nut and fruits.



Figure 10.1. Participants in a NOEL nursery establishment and management training course

The tsunami of 2004 had catastrophic effects in Aceh. Approximately 200 000 people were killed and 500 000 displaced. Local economies were devastated and many Acehnese communities lost vital capacity and experience in tree-garden management. A generation of young farmers was not mentored by skilled elders. As a result, tree management practices were non-intensive and farmers'

¹ An appropriate assessment could be testing various types of nursery containers. A comparison of seedlings grown in biodegradable containers with those grown in normal polythene bags showed that although physical appearance was less appealing, seedling success after planting on farm was higher (Muriuki et al 2013).

access to quality tree germplasm, professional technical assistance and market links was limited. Efforts towards livelihoods' enhancement and land rehabilitation began in 2007 but many of the aid agencies in Aceh lacked staff, experience and information related to tree-garden management. Most nurseries in Aceh did not produce seedlings. They purchased them from outside the province for resale in Aceh, which meant resources used to buy and transport seedlings were not available for local investment. The quality of the purchased seedlings was often poor and damage occurred during transportation. Poor seedling quality lead to poor post-planting survival and performance.

It was important to help farmers produce high-quality germplasm, improve tree-garden management skills and enhance their market awareness. The Rehabilitation of Agricultural Systems in Aceh: Developing Nurseries of Excellence (NOEL) project, implemented by the World Agroforestry Centre and Winrock International aspired to do exactly that. The program aimed to improve agroforestry-based livelihoods and tree gardens through the use of productive tree crops produced in community-based 'nurseries of excellence'.

Implemented in Aceh Barat, Aceh Jaya and Pidie districts, NOEL facilitated the access of smallholders—both men and women—to high-quality planting materials and trained them to establish and operate tree nurseries and tree gardens. Initiated in April 2007, NOEL operated until March 2009. Program activities included introductory nursery training, bi-weekly follow-ups, intensive vegetative propagation training, technical consultations, cross-visits, market studies, nursery development and demonstration plot establishment.

NOEL partners included farmer groups, 'dayah' (community Islamic organizations), NGOs, international development organizations, universities and local technical agencies.

What did the NOEL program achieve? In just 18 months, 178 capacity-building events were conducted, training 3582 people. Across all NOEL activities, the involvement of women exceeded 30%. Fifty 'nurseries of excellence' were established, 32 by program partners and 18 'susulan' (spontaneous) nurseries by neighbouring farmers who were inspired by the success of NOEL. Over 400 000 seedlings were produced. There was a 92% success rate in nursery establishment, which is in huge contrast to many post-tsunami, pre-NOEL community nurseries where farmers were provided with only a small amount of nursery training and no follow-up technical support, as a result of which the nurseries ceased to function or operated at very low levels.

The NOEL farmers' extension approach demonstrated that a program of training, intensive follow-up and material support could facilitate the successful development of farmers' technical capacity, community tree nurseries and related infrastructure, even with partners previously unfamiliar with tree nursery operations. Supporting susulan further expanded the program's impact. The NOEL approach can effectively be replicated in other sites in Indonesia and Southeast Asia, where land rehabilitation and community livelihoods' enhancement are key objectives. (Roshetko et al 2013, Selvarajah 2013.)

■ Key references

Del Castillo R, Roshetko JM. 1998. *Agroforestry seed technology and nursery management: a training manual*. Bogor, Indonesia: Institute of Agroforestry; International Centre for Research in Agroforestry Southeast Asia Regional Program; Winrock International; Rockefeller Brothers Fund.

Roshetko JM, Purnomosidhi P. 2013. Smallholder agroforestry fruit production in Lampung, Indonesia: horticultural strategies for smallholder livelihood enhancement. *Acta Horticulturae* (ISHS) 975:671–679.

Roshetko JM, Idris N, Purnomosidhi P, Zulfadhli T, Tarigan J. 2013. Farmer extension approach to rehabilitate smallholder fruit agroforestry systems: the Nurseries of Excellence (NOEL) program in Aceh, Indonesia. *Acta Horticulturae* (ISHS) 975:649–656.

Tree seeds for farmers: a toolkit and reference source

This toolkit has been developed to provide information on sustainable production of seeds and seedlings of agroforestry species.

The prime objective of the toolkit is to provide information and examples of how the quality of seeds and seedlings can be maintained from collection to field planting for the great diversity of agroforestry species that are useful to small-scale farmers. The toolkit was developed recognizing the wide range of actors and stakeholders that are involved in expanding agroforestry systems. Its format is designed to answer the questions that various actors may have in relation to seed production. The toolkit is based on a review of existing documentation and extension materials on seed production. Useful references to augment the toolkit information are also provided.

The toolkit complements existing materials on seed production in two fundamental ways. Firstly, it provides information on how joint strategies can be made by the various actors and stakeholders in expanding tree planting in defined regions. Secondly, it explores in further detail the option of developing sustainable systems that provide quality material by involving the private sector in seed production. The final section of the toolkit primarily focuses on tree nursery management.

The toolkit contains three sections: 1) strategies for expanding seed production; 2) technical guidelines in seed production; and 3) the private sector and seed production.

Download the *Tree Seeds for Farmers* toolkit: http://worldagroforestrycentre.org/research/tree_diversity_domestication/genetic-resources-unit/articles-documents/tree-seeds-for-farmers.

Indonesian local tree nursery directories

Individuals and organizations often do not know what nursery resources are available to meet their tree seedling needs. The development and publication of local tree nurseries helps publicize the existence of nurseries and availability of seedling resources. The directories also increase business opportunities for nurseries. The publishing of a local tree nurseries directory in an inexpensive and practical output, which can expand the impact of a project or program.

Below are listed four examples of local tree nursery directories from Indonesia.

Purnomosidhi P, Roshetko JM, Prahmono A, Moestrup S. 2012. *Direktori usaha pembibitan tanaman buah, kayu dan perkebunan di Propinsi Jambi*. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program; Little Rock, AR: Winrock International; Copenhagen: Faculty of Life Science, University of Copenhagen.

Purnomosidhi P, Roshetko JM, Prahmono A, Moestrup S. 2012. *Direktori usaha pembibitan tanaman buah, kayu dan perkebunan di Propinsi Lampung (edisi II)*. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program; Little Rock, AR: Winrock International; Copenhagen: Faculty of Life Science, University of Copenhagen.

Purnomosidhi P, Roshetko JM, Prahmono A, Moestrup S. 2012. *Direktori usaha pembibitan tanaman buah dan perkebunan di Kabupaten Aceh Barat, Aceh Jaya, Pidie/Pidie Jaya dan Nagan Raya*. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program; Little Rock, AR: Winrock International; Copenhagen: Faculty of Life Science, University of Copenhagen.

Purnomosidhi P, Roshetko JM, Prastowo NH, Moestrup S. 2012. *Direktori usaha pembibitan tanaman buah, perkebunan, kayu dan hias di Kabupaten Bogor dan sekitarnya (edisi II)*. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program; Little Rock, AR: Winrock International; Copenhagen: Faculty of Life Science, University of Copenhagen.

International tree seed suppliers directory

This directory is intended to contribute to the informed use of tree germplasm, which is an essential component of sustainable forestry and agroforestry practices, and promote wider use of quality germplasm.

Quality has both a genetic and a physiological component, and both are described in the directory. Quality descriptors can be used as criteria to select suppliers, and this will ensure that both the users and the suppliers recognize seed quality requirements. The directory also highlights the importance of biosafety issues, and it presents biosafety information that suppliers have provided

Although the directory focuses on tree taxa of importance in the tropics, it lists temperate taxa as well. It does not discriminate between taxa used for agroforestry and forestry. The purpose is to ensure that the information is useful to a wide range of users.

The directory lists suppliers by country. Download from http://www.worldagroforestry.org/our_products/databases/tssd.

Indonesian seed suppliers directory

Seed is the most important input of any tree-planting or reforestation program. Adequate quantities of seed assure planting targets can be achieved. The use of quality seed, combined with good planning and management, leads to high survival rates, fast growth and program success.

Unfortunately, the availability of tree seed is often limited. Surveys indicate that nearly all Indonesia-based NGOs and farmers' groups active in tree-planting activities lack access to tree seed of adequate quantity and quality. Many projects and government agencies face similar shortages. This problem is exasperated by a paucity of information concerning tree seed suppliers. At the national and provincial levels some lists of tree seed suppliers exist but they are not widely circulated or frequently updated. This directory supplements the international directory, above.

The majority of tree seed used in Indonesia is collected, exchanged and traded through the informal sector. The seed collectors and traders involved in this sector generally have little formal training in seed technology. They record and report little information concerning the source and quality of the seed they collect. This lack of information makes it difficult for consumers to evaluate the seed available from these suppliers. The informal seed sector operates on personal links of past contacts and word of mouth. Some suppliers are able to sell large quantities of seed because of strong customer links. Based on past experience, these suppliers collect seed to fill specific orders and meet anticipated last-minute orders. However, the potential of most suppliers is limited because they lack strong consumer links. Likewise, most consumers (seed users) have little idea where to secure seed and consistently suffer seed shortages. Projects and NGOs may contract local farmers to collect small volumes of seed but for large volumes they contact big seed suppliers in Central and East Java. Some of the seed sold by these big suppliers is collected on outer islands, shipped to Java and then re-sold to consumers on outer islands; sometimes to the same islands from which the seed was originally collected. The information and links gap between consumers and suppliers in Indonesia causes the national tree seed collection and distribution pathways to be inefficient, resulting in higher prices and seed of sub-optimal quality.

The directory was developed to address the tree seed information and links gaps prevalent in Indonesia. It provides reliable information to seed consumers—farmers, NGOs, projects, government institutions and others—and promotes the services and products of seed suppliers*. Most importantly, the directory provides a channel for consumers and suppliers to build links. The information in the directory was collected through a survey of 140 seed suppliers operating throughout Indonesia. The seed suppliers were identified by compiling the experience of five forest tree seed centres: Balai Perbenihan Tanaman Hutan in Palembang, Bandung, Denpasar, Banjar Baru, and Ujung Pandang; Directorate of Forest Tree Seeds, Ministry of Forestry; and the World Agroforestry Centre and Winrock's network of NGOs, farmers' groups and development organizations. In addition to the survey, more information was gathered through interviews with key seed suppliers in Wonogiri, Central Java, and Ponorogo, East Java, which are the primary sources of tree seeds in Indonesia (Roshetko et al 2003).

Available at http://worldagroforestry.org/regions/southeast_asia/resources/db/seedsuppliers



The landscape scale is a meeting point for bottom–up local initiatives to secure and improve livelihoods from agriculture, agroforestry and forest management, and top–down concerns and incentives related to planetary boundaries to human resource use.

Sustainable development goals require a substantial change of direction from the past when economic growth was usually accompanied by environmental degradation, with the increase of atmospheric greenhouse gasses as a symptom, but also as an issue that needs to be managed as such.

In landscapes around the world, active learning takes place with experiments that involve changes in technology, farming systems, value chains, livelihoods’ strategies and institutions. An overarching hypothesis that is being tested is:

Investment in institutionalising rewards for the environmental services that are provided by multifunctional landscapes with trees is a cost-effective and fair way to reduce vulnerability of rural livelihoods to climate change and to avoid larger costs of specific ‘adaptation’ while enhancing carbon stocks in the landscape.

Such changes can’t come overnight. A complex process of negotiations among stakeholders is usually needed. The divergence of knowledge and claims to knowledge is a major hurdle in the negotiation process.

The collection of tools—methods, approaches and computer models—presented here was shaped by over a decade of involvement in supporting such negotiations in landscapes where a lot is at stake. The tools are meant to support further learning and effectively sharing experience towards smarter landscape management.

