



Development of timber and non-timber forest products' production and market strategies for improvement of smallholders' livelihoods in Indonesia

2013 – 2016



Kanoppi Project

Development of timber and non-timber forest products' production and market strategies for improvement of smallholders' livelihoods in Indonesia

Contents

- 1 [Project profile: Kanoppi in Indonesia](#)
- 3 [Highlights from Sumbawa and Lombok](#)
- 6 [Highlights from Gunungkidul](#)
- 10 [Highlights from Timor Tengah Selatan](#)
- 15 [Grand strategy for integrated timber and non-timber forest product at the landscape level](#)

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Project profile: Kanoppi in Indonesia

Background



Combining tree planting with NTFP management has been an important part of local farmers' livelihoods' strategies for a long time, with each element playing a different role. Integration of improved production and marketing of smallholders' timber and NTFPs is likely to improve livelihoods, particularly in the provinces of Nusa Tenggara Timur (NTT/ East Nusa Tenggara) and Nusa Tenggara Barat (NTB/West Nusa Tenggara). Such integration, however, faces significant impediments: 1) insufficient understanding of the trade-offs between timber and NTFPs related to the cost of allocating household labour and financial capital; 2) ineffective silvicultural practices that do not optimise the production of timber and NTFPs; 3) insufficient understanding of market characteristics for different types of products (both timber and NTFPs) to add value in value chains and what the markets require to improve the products' qualities; 4) there has been conflict with integrated uses and management of timber and NTFPs in the region; and 5) unfavourable policy frameworks governing farm and landscape management that prevent value chains from effectively providing fair profit margins for community producers. The project builds on recommendations from three ACIAR projects that addressed ACIAR priorities:

'Improving economic outcomes for smallholders growing teak in agroforestry systems in Indonesia (FST/2005/177)'; 'Community forestry partnerships in Indonesia' (FST/2003/025); 'Enterprise development, value chains and evaluation of non-timber forest products for agroforestry systems in West Timor, Flores, Sumba and Savu in NTT (SMAR/2006/011).

By locating this research in smallholders' farming areas in Indonesia's poorest provinces (NTT and NTB) and in smallholders' teak production areas on its most densely populated island (Java), this project will maximize lessons in several sectors: 1) in opportunities for poverty alleviation through integrated timber and NTFP wmanagement; 2) for successful agribusiness development at the micro- and small scale; and 3) in the links between timber and NTFP use, community-based forestry management and micro- and small-scale enterprise development. Key project sites include Sumbawa and Lombok, West Nusa Tenggara; Timor Tengah Selatan in East Nusa Tenggara; and Gunungkidul, Yogyakarta.



Major outputs and outcomes

- 1 Establishment of eleven demonstration trials (three in Gunungkidul, three in Lombok, three in Sumbawa, and two in Timor Tengah Selatan) to provide media for farmers to learn and improve silviculture management of integrated timber and NTFP.
- 2 Capacity development and strengthening through farmer training and training for the project's national staff in development skills. 2,436 men and women farmers benefited from the project.
- 3 Grand strategy for Gunungkidul, Sumbawa, and Timor Tengah Selatan were developed for provincial and district government planning for integrated timber and NTFP management.
- 4 Market access improved where linkages with private-sector actors developed and research findings from the project were disseminated.
- 5 Recommendations for extension systems where training and the use of novel extension methods to promote knowledge dissemination have been improved.

Looking ahead

Development of a full proposal for the second phase of this project is underway after approval of the preliminary proposal by ACIAR in July 2016. Building on the current research findings and advances in agroforestry research more generally, it is appropriate for the project team to aim to increase smallholder income by developing and promoting improved timber and NTFP production and marketing within the context of sustainable landscape management.

Highlights from Sumbawa and Lombok

Overview

West Nusa Tenggara has among the lowest socioeconomic levels compared to other provinces in Indonesia, where it was ranked 30 (amongst a total of 34 provinces) in the Human Development Index. Combining tree planting with management of NTFPs has been an important part of the livelihood strategies of many Indonesian farmers for a long time but generally at low levels of both timber and NTFP productivity. Better management and marketing of timber and NTFPs through developing market-led agroforestry is a feasible option for increasing income amongst poorer rural households in Indonesia.

Partners in Sumbawa and Lombok

The International Centre for Research in Agroforestry (ICRAF) (trading as The World Agroforestry Centre) convenes partnerships with 1) FOERDIA through the Forest Research and Development Centre, and the NTFP Research Centre; 2) the Center for International Forestry Research (CIFOR); 3) the World Wildlife Fund (WWF) Indonesia; and 4) Universitas Mataram.

Sites in Sumbawa and Lombok

Sites in Sumbawa are Batudulang and Pelat. Batudulang is located in Batulanteh subdistrict, Sumbawa Island in the upstream area with an elevation of about 850 metres above sea level with coffee, candlenut, and forest honey as its main commodities. Pelat is in Unter Iwes subdistrict, in the downstream area below 200 metres above sea level. The community in Pelat mostly plants rice and teak.

The site in Lombok is Mangkung, located in Lombok Tengah subdistrict, Lombok island. It was chosen due to its developments in community forestry with timber trees and bamboo as its main vegetation.



Figure 1. Project sites in Sumbawa and Lombok

Outputs and achievements

Sites and farmer circumstances

Understanding the target farmers and local stakeholders, and the barriers to—and opportunities for—adoption of good silvicultural practices in different contexts, and socio-economic characterisation across project sites are key steps towards improving sustainable productivity. These steps were important in the selection of the appropriate timber and NTFP species and the identification of their management options for the farmers' sites and circumstances.

The effects of pruning, thinning, and ginger and galangal intercropping under teak stands on teak growth and the production of ginger and galangal in Sumbawa

Trials in teak pruning, thinning and intercropping with ginger and galangal were conducted in a teak garden owned by H. Hamsil in Pelat. The area of the garden is flat with low levels of soil fertility. Teak trees are planted at a distance ranging from 2 x 2 metres and are currently 5–6 years old. Branch pruning trials were conducted at three levels, namely: (i) without pruning; (ii) branch pruning at 50% of tree height; and (iii) branch pruning at 60% of tree height. For thinning, two levels were tested, namely: (i) without thinning; and (ii) thinning 25% of the total number of trees. Six treatment combinations of branch pruning and thinning were conducted.

Under the teak stands, ginger and galangal were planted with fertilization treatment. Trials started in December 2014 and were observed for thirteen months. The girth of teak trees was monitored every six months for each treatment combination and the production of ginger and galangal was assessed during harvesting. Ginger and galangal were harvested six months after planting.

Trial results indicate that the combined pruning-thinning treatments have a superior impact on incremental diameter growth of teak than either treatment alone; and that pruning without thinning had a negative impact on incremental diameter growth. More importantly, intercropping with ginger crops had a positive impact on diameter growth of all treatments.

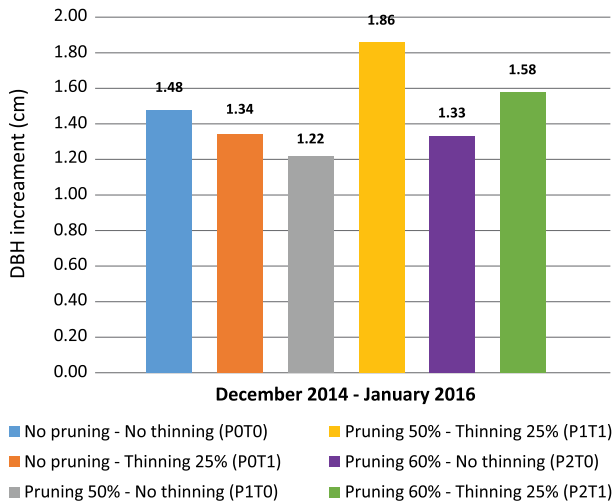


Figure 2. Effects of pruning and thinning on girth growth in 13 months in Sumbawa

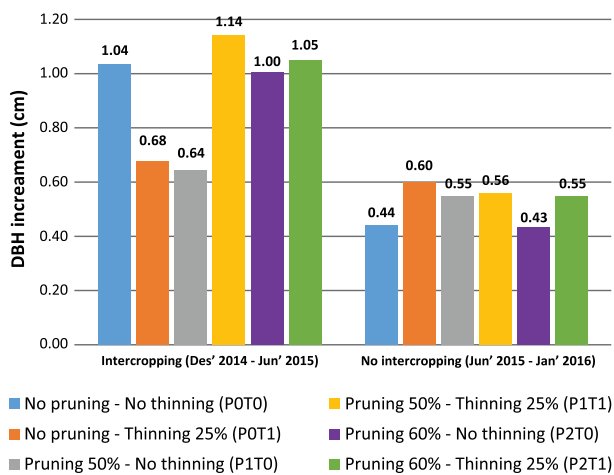


Figure 3. Effects of pruning and thinning on girth growth during intercropping and no intercropping in Sumbawa

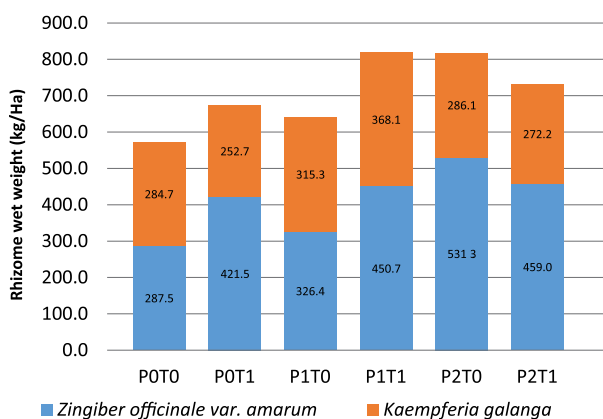


Figure 4. Rhizome wet weight for ginger and galangal

Teak value chain

Farmers in Pelat tend to sell teak in the form of stands in the garden and felled trees, due to a lack of market information. Many farmers do not know where teak wood will be sold. The farmers have no idea about the value chain between them and the end customer.

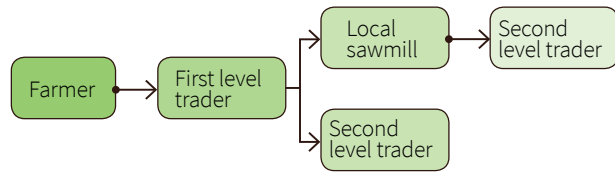


Figure 5. Teak timber flow in Sumbawa

Policy analysis Sumbawa and strategic planning for policy development of timber and NTFPs

This analysis intended to understand how policies support or hinder production and marketing of timber and NTFPs in Sumbawa, including rules and regulations supportive of the development of timber and NTFPs, and how these are implemented in the society. Due to overlapping district and national regulations, several points were made for the development of timber and NTFP policy from district to provincial level, which includes 1) facilitating villages within forests to participate in the mapping of community forests and forest area boundaries; 2) provide incentives for communities to plant trees; 3) increase farmers' capacity by requiring relevant district office to provide trainings to farmers; and 4) integrate production and marketing of priority NTFPs with the local processors by requiring traders to process products before shipping outside Sumbawa.

Trigona honey in Mangkung

Trigona sp. is a bee belonging to the *Trigona* genus and the *Meliponini* family which is identical to the stingless bees. These bees are often found in tropical areas: a) Mexico to Argentina; b) India and Sri Lanka to Thailand and the Malaysian peninsula; and c) the Solomon Islands and the Indonesia archipelago to Papua New Guinea. In some areas in Indonesia, *Trigona* has diverse names, including: Klanceng (Central and East Java), Teuwei (West Java), Galo-Galo (West Sumatra), kelulut (Banjarmasin, Kalimantan Tengah), Rentelan or Sentelan (Sumbawa), Nyanteng and Keledan (Lombok), Udep (Dayak/East Kalimantan), and Ketape or Umm (Sulawesi).

In its natural habitat, the *Trigona* bee nests on tree trunks, logs, dried bamboo, cracks in walls or stones, and under the roofs of houses. Its small wings makes the distance looking for food shorter, as far as 500 metres from the nest with a height of 3 metres, compared to other bees. The main substance produced by *Trigona* sp. is propolis. In addition, *Trigona* also produces honey and bee bread.

In Lombok Tengah and Sumbawa, the stingless bees are cultivated in houses. The product from *Trigona* sp. which can be marketed directly by farmers is honey. Honey can be packaged and sold at an average price of IDR 200.000 per 600 ml. Not all farmers in the project sites can harvest or process propolis and bee bread, but farmers can process pockets of honey into raw propolis, and bee



bread into powder. Raw propolis and bee bread powder are raw materials for the manufacturing of medicine and cosmetics. Raw propolis is priced at an average of IDR 250 000 per kg and bee bread powder is valued IDR 150 000 per kg.

Scaling up in Sumbawa and Lombok

To enhance the scaling-up of the project outcomes in Sumbawa and Lombok, ICRAF, CIFOR, FOERDIA, WWF Indonesia, and Universitas Mataram take various approaches to engage farmers, such as training and capacity development, farmer surveys, demonstration trials, and cross visits. Farmers are trained in a farmer field school environment on standing teak measurement using the Master Tree Grower method, understanding teak value chains and timber sales regulations. Skilled farmers (private extension agents) and government extension agents were also trained in the basics of extension services and adult learning practices. From Table 1, approximately 35% of the participants are women.

Table 1. Number of farmers reached

Activities	Number of farmers reached
Capacity development	88
Farmer surveys	673
Demonstration trials	50
Cross visits	12
Total	823



Looking ahead

While the project is coming to an end, the project team and partners have set up the following points to ensure sustainability of project outputs beyond the project period:

- Facilitate the strategy proposed by the project to be included in the district and provincial strategy plans for 2017, and obtain approval from the district government to raise the strategies and recommendations as district decree
- Facilitate private-sector involvement
- Disseminate research results to relevant stakeholders from the district to the national level
- Progress towards the next phase of the project to enhance and strengthen the already existing project interventions.

Contributors:

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Highlights from Gunungkidul

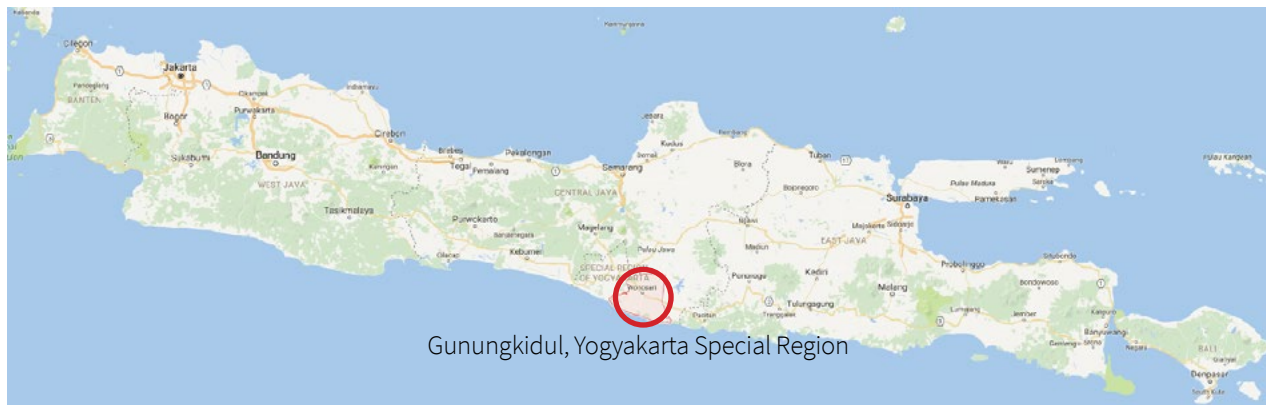


Figure 6. Project site in Gunungkidul

Overview

The project titled “Development of timber and non-timber forest products’ production and market strategies for improvement of smallholders’ livelihoods in Indonesia” (Kanoppi) is a four-year project funded by the Australian Centre for International Agricultural Research (ACIAR) aiming at identifying, enhancing and expanding smallholder involvement in the management of commercial forestry-based products at different spatial scales in Indonesia. Kanoppi’s goal underpins national and local planning in improving production and marketing of timber and NTFP through adoption of improved silviculture management, access to markets, extension systems, and policy framework.

Partners in Gunungkidul

In Gunungkidul, the International Centre for Research in Agroforestry (ICRAF) (trading as The World Agroforestry Centre) partners with 1) FOERDIA through the Agroforestry Research and Development Centre; 2) the Center for International Forestry Research (CIFOR); 3) Farm Forestry Consortium (FFC); and 4) Universitas Gadjah Mada (UGM).

Sites in Gunungkidul

Gunungkidul district is located in the southeast of Yogyakarta Special Region, and the total area of the district is 148 536 hectares. The project sites are located in Bejiharjo and Karangduwet. Bejiharjo is one of nine villages in the subdistrict of Karangmojo, bordering on a eucalyptus production forest managed by the Yogyakarta forest management unit. The village has 20 hamlets, with low-lying topography and an altitude of 150 metres above sea level. Karangduwet is one of eight villages in the subdistrict of Paliyan, and lies in the outskirts of a state forest area, a forest conservation area, and a production forest. The village counts eight hamlets and sits at 150 metres above sea level.

Outputs and achievements

Sites and farmer circumstances

Understanding the target farmers and local stakeholders, and the barriers to—and opportunities for—adoption of good silvicultural practices in different contexts, and socio-economic characterisation across project sites are key steps towards improving sustainable productivity. These steps were important in the selection of the appropriate timber and NTFP species and the identification of their management options for the farmers’ sites and circumstances.

Capacity building for private extension agents

In disseminating knowledge and information on forestry in Gunungkidul, the government extension agents are assisted by private extension agents, who are champion farmers in their villages. Trainings were held to support private extension activities. Participants were given materials to increase capacity in regulations on management of private forest products, marketing of timber and NTFP, timber silviculture management, integrated timber and



Participant measures the girth of a teak tree in a demonstration trial plot in Gunungkidul

NTFP management, and extension communications. Participants visited the demonstration trials in Karangduwet. Timber traders also participated in the training to understand the timber market chain in Gunungkidul.

Capacity building on bamboo

Bamboo is one of the priority commodities in Gunungkidul district. The project established a bamboo demonstration plot for research on bamboo cultivation and initiated a bamboo association. Trainings for members of the association were held in collaboration with a local NGO specialised in bamboo farming. Bamboo farmers and crafters participated the training and learnt how to propagate (stem cutting), manage bamboo groves, and preserve bamboo after harvest.



Bamboo training participants practicing the vertical soak diffusion technique to preserve bamboo

Effects of teak pruning, singling, and ginger intercropping on teak growth and ginger production in Gunungkidul

Trials on teak pruning, singling, and intercropping with ginger were conducted at a teak garden owned by Mr Bakat in Karangduwet. His rock-strewn land slopes about 8%, and fertility is rather low. Teak in Mr Bakat's garden resulted from the resprouting from the stumps of harvested trees at mixed spacing. Treatments were pruning, singling, and fertilization. Altogether, eight treatment combinations were observed.

Trial results indicate that pruning, singling, and use of organic and chemical fertilizers all have a positive impact of the incremental diameter growth of teak (Figure 8). The individual and combined impacts of the

treatments on teak diameter growth (Figure 7) and ginger production (Figure 9) were inconsistent - likely due to the heterogeneous conditions of Mr Bakat's garden. The second year data is currently being analyzed.

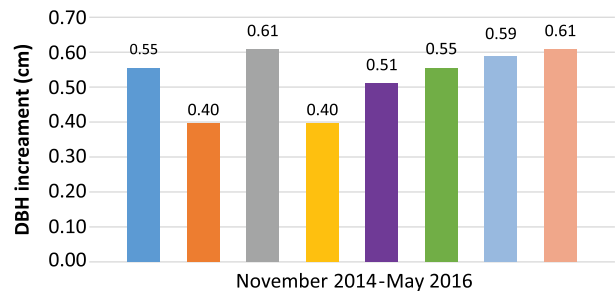


Figure 7. Effects of teak pruning, singling, and ginger intercropping on teak growth and ginger production in Gunungkidul. For the legend, please see figure 8

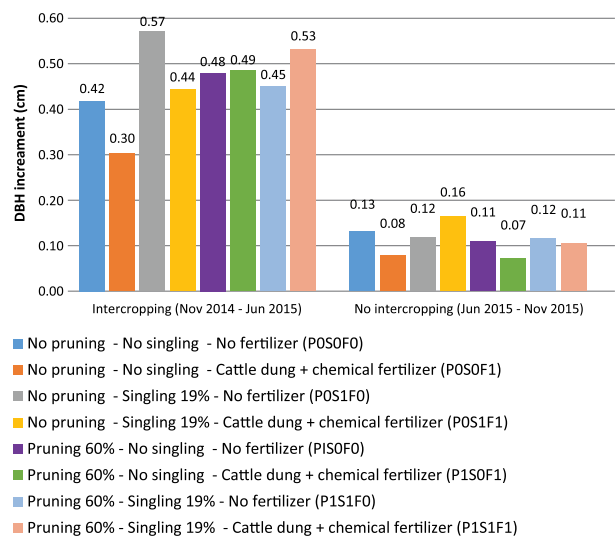


Figure 8. Effects of pruning, singling, and ginger fertilizing on teak girth growth during intercropping and no intercropping in Gunungkidul

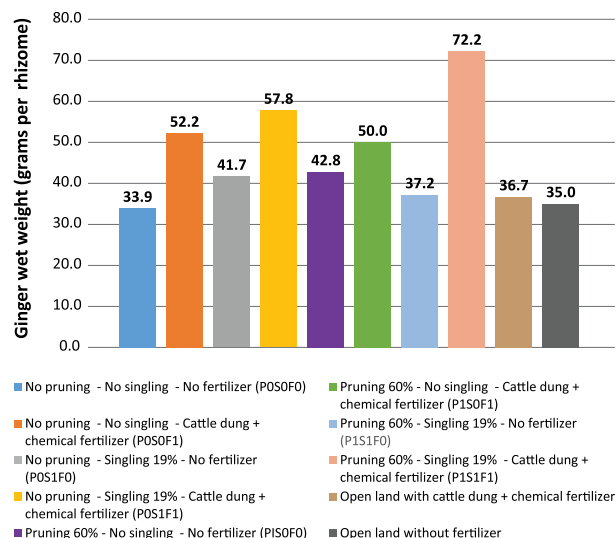


Figure 9. Effects of pruning, singling, and ginger fertilizing on the average production of ginger in Gunungkidul



Training participants practicing preservation techniques on bamboo

Policy analysis in Gunungkidul

Smallholding forestry in Gunungkidul is renowned as one of the success stories of good forestry practices in Indonesia. It is practiced by the rural people of Gunungkidul as a strategy to respond to both ecological and socio-economic challenges. There is a large variety of farming systems as a result of differences in bio-physical conditions and socio-economic situations. Those factors eventually determine the productivity, input levels and tree densities of the farming systems.

The degree to which the tree farmers obtain benefits from the practices is internally constrained by the lack of capital and knowledge as well as influence in decision-making procedures, making them vulnerable to the external influences. Tree growers in Gunungkidul rarely fully devote their time to tree farming activities; instead, the practices are usually treated as a sideline of agricultural cropping. Tree planting is made a second priority conducted during lulls in agricultural activity. Proper silvicultural practices (singling, pruning, thinning, and fertilizing) and post-harvest management are rarely applied.

The poor silvicultural practices explain the low quality of the timber that in turn results in the low timber prices. Marketing of timber from smallholder forestry in Gunungkidul is also characterized by the dependence of tree growers on intermediate traders. In the transactions of trees/timber, the farmers remain the price takers, accepting the price set by the traders. In most cases, the people receive the lowest market shares, which are instead mostly enjoyed by the traders. This practice is

encouraged and influenced by unfavourable regulatory barriers, principally relating to the cumbersome and costly processes of timber transport and obtaining harvest permits.

Numerous regulatory barriers also exist on state-sanctioned smallholder forestry. That the existing community forestry programmes in Gunungkidul fall short of the initial targets to a large extent is explained by the regulatory barriers of tenurial uncertainties and the complex licencing procedures. Those coupled with the limited capacity (as government institutions rarely provide technical or financial assistance) appear to impede local people in securing community forestry licences. More importantly, those who did secure a community forestry licence are yet to obtain meaningful benefit from the forests, particularly in the case of timber.

The government should make concrete efforts to remove both regulatory and technical barriers which prevent smallholding tree growers to benefit from the forests. This may include the removal of unfavourable policies, and providing technical facilitation and financial support to encourage the competitiveness of community forestry businesses. For community forestry schemes in state forests, simplifying licencing procedures (for both management and harvest rights) is one of the key strategies. Ideally, both licences can be secured with one single application, reducing paperwork and preparation costs. Instead of having numerous institutions involved in the process, establishing a single and integrated task force closer to the people will also reduce time, and will minimize 'informal payments'.

Scaling up in Gunungkidul

To enhance the scaling up of project outcomes in Gunungkidul, ICRAF, CIFOR, FOERDIA, FFC, and UGM take various approaches to engage farmers, such as training and capacity development, farmer surveys, demonstration trials, and cross visits. Table 2 provides information on the number of farmers reached.

Table 2. Number of farmers reached

Activities	Number of farmers reached
Capacity development	61
Farmer surveys	780
Demonstration trials	40
Cross visits	12
Total	893

Gunungkidul produces commercial non-timber products, such as bamboo, which was abundant between the 1970s and 1980s. During the project, there emerged a signal for the commercialization of bamboo, manifested in the increasing number of processing industries. This is due to the demands, from both local and national, even international markets. Bamboo is increasingly valued on the market and is seen as an alternative or substitute for timber. It has competitive advantages due its unique, timber-like features. Nonetheless, the raw material (bamboo) for the processing industries in Gunungkidul is unfortunately supplied by other districts, such as Wonogiri, Pacitan, Magelang, Purworejo, Boyolali and Sleman. This is due to the limited domestic supply. Only 30% of the supply is sourced locally.

The DFS has started to encourage farmers in potential bamboo-planting regions to create associations as a platform for innovation and knowledge transfers. It also provides technical assistance to farmers' associations. The district government also plans to create a Bamboo Forum, a consultative and knowledge transfer body at the district level. For a swift implementation of the policy, the district government has explored collaborating with a number of institutions, such as the National and Provincial Bamboo Chambers (Dewan Bambu) to facilitate local processing industries. For research and development on the selection of species, the bamboo-culture, and processing, the district government also invited universities, CIFOR and ICRAF.

Looking ahead

The project team and partners have set up the following points to ensure sustainability of the project outputs beyond its running period:



Training participants practicing preservation techniques on bamboo

- Facilitate private-sector involvement, in particular for teak and bamboo, including emphasizing strategies proposed by the project to promote economic benefits of smallholder teak and bamboo products
- Disseminate research results to relevant stakeholders from the district to the national level
- Progress towards the next phase of the project to enhance and strengthen the already-existing project interventions.

Contributors:

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Highlights from Timor Tengah Selatan



Figure 10. Project site in Timor Tengah Selatan

Overview

There is a huge potential to tackle rural poverty in much of Indonesia through developing more productive and profitable smallholder timber and non-timber forest product (NTFP) production systems and through associated market development. East Nusa Tenggara has among the lowest socioeconomic levels compared to other provinces in Indonesia. In 2015, the province ranked 32 (amongst a total of 34 provinces) in the Human Development Index. There is a large trade in NTFPs in eastern Indonesia, creating an opportunity for farmers to benefit from integration of better-fit production and marketing of NTFPs that will improve their livelihoods.

Partners in Timor Tengah Selatan

The International Centre for Research in Agroforestry (ICRAF) (trading as The World Agroforestry Centre) partners with 1) FOERDIA through the Forest Research and Development Centre, Kupang; 2) the Center for International Forestry Research (CIFOR); 3) University of Western Australia (UWA); 4) Threads of Life (ToL); and 5) Universitas Nusa Cendana (Undana).

Sites in Timor Tengah Selatan

The project sites are located in Bosen, Molo Utara subdistrict and Fatumnasi, Fatumnasi subdistrict. Bosen covers an area of approximately 15 km² with 90% of its population working as farmers. Vegetables and candlenut are the main commodities in the area. Fatumnasi covers an area of approximately 35 km² with most of the population working as farmers and dependent for their livelihoods on cattle and gathering NTFPs in the Mutis conservation area, such as honey, tubers, and bamboo. Both locations are mountainous with Fatumnasi at an altitude of 1 500 metres above sea level and Bosen at 1 200 metres above sea level.

Outputs and achievements

Sites and farmer circumstances

Understanding the target farmers and local stakeholders, and the barriers to—and opportunities for—adoption of good silvicultural practices in different contexts, and socio-economic characterisation across project sites are key steps towards improving sustainable productivity. These steps were important in the selection of the appropriate timber and NTFP species and the identification of their management options for the farmers' sites and circumstances.

In both Bosen and Fatumnasi, the topography is dominated by hills and mountains. To get from one village to another, people would have to cross several rivers and hills. Timber trees commonly found are mahogany, gmelina, teak, pine, and kabesak, which is indigenous to the area. Non-timber producing trees are candlenut, tamarind, coconut, and betelnut. The project's baseline study showed that communities did not engage in activities related to



Participants mapped and discussed timber and NTFPs in their respective villages, and presented the results.

timber or NTFP processing. Most farmers relied on local collectors who frequently visit door-to-door, or sell directly to the local market.

Training on timber and NTFPs for farmers and private extension agents

The training for private extension agents and farmer champions was held for three days involving 17 men and 7 women from the Bosen, Netpala, and Ajaobaki areas. Training materials included an introduction on timber and NTFPs in the region, regulations on forest management, integrated timber and NTFP farming, marketing of timber and NTFPs, and communicating and disseminating knowledge and information through extension practices.

Participants provided positive responses and developed action plans to increase facilitation in practicing pruning and thinning of timber trees, facilitation in indigo cultivation and natural dye production, and disseminating information on rules and procedures of timber felling in private land.

Oil extraction workshop

The workshop participants, 10 men and 6 women, were from Bosen and Oel Ekam and were divided into two activities. The 'factory' activities of learning how to prepare the raw materials and make the oils took the majority of the time, but the 'office' sessions were also important for establishing a context for the work and a foundation for the community businesses.

Water sources and oil seed resources

As a first step it was important to get some understanding of the village landscape. This was achieved by listing the village's water and oil seed resources. The seasonality of water sources and access to water across the village are a proxy for the level of community development: nowhere in the village is there running water. To examine oil seed resources, participants were split into two groups and asked each to map the coconut, candlenut and avocado trees across the village. One group drew a topographic map and indicated estimated numbers

of trees in locations across the map. The second group developed a schema listing both the hamlets (dusun) and neighbourhoods (RT) and ranking the populations of the three species in each RT from 'few', to 'some', 'many' and 'very many'. Though utilizing very different methods, both groups ranked the relative sizes of the populations in the same order.

Table 3. Group results on tree sources

Tree Species	Group 1		Group 2		Group 1 & 2 Average Ratio
	Population Estimate	Ratio	Population Ranking*	Ratio	
Coconut	1550	2.54	36	1.33	1.94
Candlenut	1140	1.87	30	1.11	1.49
Avocado	610	1.00	27	1.00	1.00

* Few=1, Some=2, Many=3, Very Many=4

Candlenut

Participants next looked at each of these species in more detail. For candlenut, the harvest season is between December and March, with the price during the 2014–2015 season starting at IDR 25 000 per kg for shelled nuts and declining to IDR 10 000 perkg, and starting at IDR 5 000 per kg for whole nuts and declining to IDR 3 000 per kg. These pricings are interesting in terms of the wage the market pays for the shelling work. During the workshop, participants timed the shelling process and weighed the whole and shelled nuts. The ratio of shelled to whole was 1:3.48 and it took an average of 53.4 person minutes to shell a kilogramme of nuts.

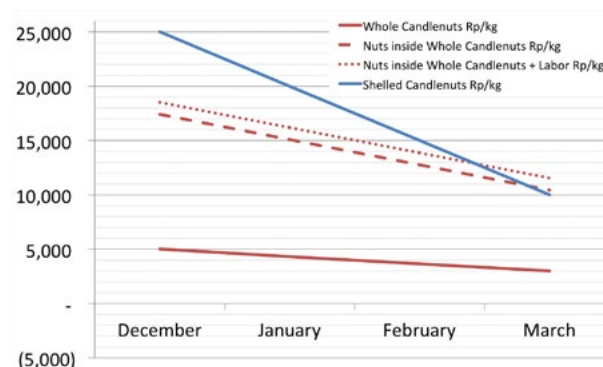


Figure 11. Price of candlenuts by harvest season



A farmer marks a bottle of candlenut oil, pressed at a cold-press oil production workshop in Oel'ekam village, Timor Tengah Selatan, East Nusa Tenggara, Indonesia.

Since the ratio between the prices for shelled and whole candlenuts becomes less than 1:3.48 by the end of the season in March, there is a time when the farmers are actually paying to shell their candlenuts.

Later in the workshop, during the business planning sessions, it was established that people were willing to work for IDR 10 000 per day, which equals IDR 1 113 per kilo for shelling candlenut. With this in mind, income from selling shelled candlenut falls below this threshold by the end of February. This data suggests that farmers would increase their income with a strategy that sells shelled candlenuts only when the price is high at the beginning of the season, makes cold-pressed oil from mid-season onwards as the market value of the nuts decreases, and sells any remaining stock as whole nuts at the end of the season.

Table 4. Stages to expand marketing of oils

Stage	Local	Bali	Australia
Stage 1 Small scale	<ul style="list-style-type: none"> Bottle and sell VCO in Soe 	<ul style="list-style-type: none"> Find customers for VCO, candlenut oil and later avocado and Callophylum oils in Bali's massage, surf and restaurant sectors 	
Stage 2 Medium scale	<ul style="list-style-type: none"> Bottle and sell VCO in Soe Produce VCO, candlenut, Callophylum, and avocado oil for Bali markets 	<ul style="list-style-type: none"> Supply customers with VCO, candlenut, Callophylum, and avocado oil in Bali's massage and restaurant sectors 	<ul style="list-style-type: none"> Find customers for VCO, candlenut, Callophylum, and avocado oil in Australian markets
Stage 3 Large scale	<ul style="list-style-type: none"> Bottle and sell VCO in Soe Produce VCO, candlenut, Callophylum, and avocado oil for Bali markets Produce VCO, candlenut, Callophylum, and avocado oil for Australia markets 	<ul style="list-style-type: none"> Supply customers with VCO, candlenut, Callophylum, and avocado oil in Bali's massage and restaurant sectors Trans-ship VCO, candlenut, Callophylum, and avocado oil for Australia markets 	<ul style="list-style-type: none"> Supply customers with VCO, candlenut, Callophylum, and avocado oil in Australian markets

Coconut

Within the village, an estimated 70% of coconuts are used as food or for making oil and coconut milk. The remainder is sold if income is needed, with small coconuts being sold for IDR 1 000 and large coconuts for IDR 2 000. For calculations made during the workshop, an average price of IDR 1 500 was used.

Avocado

Although avocado oil was not made during this workshop, it will be at a follow-up event during the January to March season. Most villagers have a few trees. Fruit is either consumed or fed to pigs. None are sold and many are left to rot in the field.

Marketing

A threefold strategy was proposed to participants for the development of their business. Stage 1 was to sell virgin coconut oil (VCO) to the local market in the town of Soe. There had been community-based VCO production in the region, which had found a market in the town, but it had collapsed due to internal conflict. There is demand for VCO in Soe that is currently unserved, so this should be the initial focus of the group's production. Stage 2 will be to find markets for VCO, candlenut oil and later avocado oil in Bali's massage and restaurant sectors once production volumes and hygiene standards meet Bali market demands. Stage 3 plans to expand further into Australian markets.

Price setting

After a week during which all participants had worked very hard from 0800 to 1700 each day, showing a lot of enthusiasm for the oil press and its potential, there were many expectations for the price-setting discussion. A lot of time had been spent during the week quantifying the inputs and yields from each step in the processes, with a particular focus on labour inputs and working out ways to streamline the production process to reduce these costs.

A price was only established for VCO to the local market. Participants originally wanted to calculate the labour costs at IDR 25 000 per day and coconut costs at an average of IDR 1 500 per nut. This resulted in a cost of goods of IDR 43 618 per bottle where market research in Soe had established that a bottle could be retailed for Rp 35,000. Facilitators pointed out that, as is the case with a savings and credit association, profit is taken at the end of a business period, not at the time of sale, and asked what the minimum was they were willing to work for, knowing that they could get profit later. They said IDR 10 000 per day. Participants were then asked whether they could get coconuts any cheaper than IDR 1 500 per piece, they established that there was a surplus of coconuts and that many were just left below the trees, and that given this they felt they could get coconuts for IDR 1 000 each. With these new parameters, participants recalculated the cost of goods at IDR 30 000 per bottle, which is below the retail price and leaves room to offer retailers sales commission.

Table 5. VCO costing

VCO Costing – 1 st Draft	Unit Cost	Total Cost
Buy 347 coconuts	IDR 1 500	IDR 520 500
Buy 17 bottles of 600 ml	IDR 350	IDR 6 000
Labour 4 person days	IDR 25 000	IDR 100 000
Electricity for grinder and blender	IDR 75 000	IDR 75 000
Delivery to Soe, 1 motorcycle ride with 20 bottles	IDR 2 000	IDR 40 000
Total Cost of Goods for 10 litres		
Cost of Goods per bottle for 17 bottles of 600 ml	IDR 43 618	IDR 741 500
VCO Costing – 2 nd Draft	Unit Cost	Total Cost
Buy 347 coconuts	IDR 1 000	IDR 347 000
Buy 17 bottles 600 ml	IDR 350	IDR 6 000
Labour 4 person days	IDR 10 000	IDR 40 000
Electricity for grinder and blender	IDR 75 000	IDR 75 000
Delivery to Soe, 1 motorcycle ride with 20 bottles	IDR 2 000	IDR 40 000
Total Cost of Goods for 10 litres		
Cost of Goods per bottle for 17 bottles of 600 ml	IDR 29 882	IDR 508 000

Trading to Bluestone Botanicals, Ubud, Bali

Bluestone Botanicals is a business in Ubud, Bali, with two retail stores that sells high-quality essential oils and cosmetic products. ToL and UWA approached the owner, Bradley Parrish, to show him the VCO and candlenut oils from the Oel Ekam workshop and he was impressed by the quality of the product.

They buy 50 litres of VCO and 10 litres of candlenut oil per month. They pay IDR 120 00–130 000 per litre for VCO with no more than 2% water content, and IDR 120 000–

160 000 per litre for candlenut oil. For some suppliers they also pay a delivery fee of IDR 10 000–25 000 per litre. They immediately bought the stock of 3.6 litres the participants had from the workshop at IDR 140 000 per litre, and said they could buy as much as 50 litres of VCO and 10 litres of candlenut oil per month.

A way to test for the water content of the oils will help with the marketing and quality control of the product. Using a centrifuge may prove a suitable method.

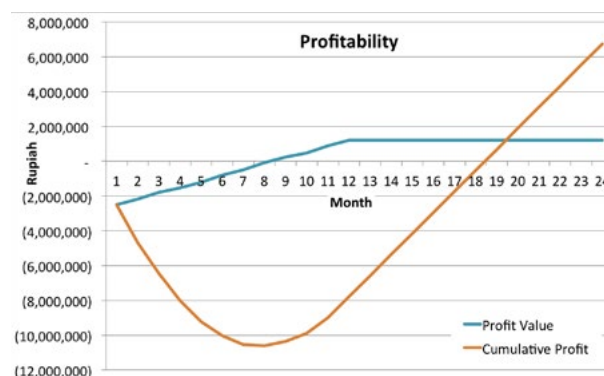


Figure 12. Profit value against cumulative profit of VCO

For the following calculations the trading activity of buying from the producers and selling to Bluestone Botanicals will be regarded as a separate business activity. Starting at the October 2015 workshop with production of 8 litres of VCO and 6 litres of candlenut oil, and increasing over the course of a year to meet Bluestone Botanicals' monthly demand of 50 litres of VCO and 10 litres of candlenut oil per month, this trading would produce a monthly profit after 9 months.

If anything over a net profit of 15% was spent on increasing the producers' income, the trader will break even after 20 months, and the producers' daily income will have increased from the initial IDR 10 000 per day to almost IDR 20 000. This daily income can be further increased by improved efficiency, and therefore reduced labour time, as producers become more skilled at the production process.

Table 6. Total labour per day in Indonesian Rupiah (IDR)

VCO Costing	Quantity	Unit	Unit Cost	Total Cost
Trader profit sharing per litre (when profit ≥15%)	60	litres	-	IDR 232 563
Profit sharing equivalent per 600 ml bottle	100	bottles	IDR 2 326	-
Labor Costing			Per Day	Per Bottle
Basic labor			IDR 10 000	-
Producer profit (0.24 person days labor per 600 ml bottle)			IDR 9 884	IDR 2 326
Total labor per day			IDR 19 884	-



A farmer drying halved coconuts under the hut taken during a cold-press oil production workshop in Oel'ekam village, Timor Tengah Selatan, East Nusa Tenggara.



A farmer practicing putting grated coconuts into the oil extraction machine during a cold-press oil production workshop in Oel'ekam village, Timor Tengah Selatan, East Nusa Tenggara.

While this business plan outlines a feasible path to profitability that is based on developing a single retailer relationship, for both the producer and the trader, it also underlines the need for the kind of partnership that this ACIAR project is offering. The risks for the trader in investing in a 20-month breakeven period for a community-based product such as this are considerable and provide a disincentive for participation. With the project's backing, this timeline is shortened and the risks—particularly the community social risks—are significantly reduced.

Scaling up in Timor Tengah Selatan

To enhance the scaling up of project outcomes in Timor Tengah Selatan, ICRAF, CIFOR, FOERDIA, and WWF Indonesia takes various approaches to engage farmers, such as training and capacity development, farmer surveys, and demonstration trials. Table 7 provides information on the number of farmers reached.

Table 7. Number of farmers reached

Activities	Number of farmers reached
Capacity development	135
Farmer surveys	555
Demonstration trials	30
Total	720

Looking ahead

While the project is coming to an end, the project team and partners have set up the following points to ensure sustainability of project outputs beyond the project period:

- Facilitate the strategy proposed by the project to be included in the district and provincial strategy plans for 2017, and obtain approval from the district government to raise the strategies and recommendations as district decree
- Facilitate private-sector involvement and more women empowerment through indigo paste production and naturally-dyed woven fabric
- Disseminate research results to relevant stakeholders at district to national level
- Progress towards the next phase of the project to enhance and strengthen the already existing project interventions.

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Grand strategy for integrated timber and non-timber forest product at the landscape level

Promoting synergy between social forestry programme and natural resources management priorities in the region: lessons learnt from Sumbawa, Timor Tengah Selatan and Gunungkidul

Combining tree planting with NTFP (Non-Timber Forest Products) management has been an important part of local farmers' livelihoods' strategies for a long time, with each element playing a different role. Integration of improved production and marketing of smallholders' timber and NTFP is likely to improve livelihoods and with better management, at the landscape level.

In implementing Participatory Action Research (PAR) approach, CIFOR and project collaborators have been facilitating the formulation and elaboration of policy and regulation framework that support integrated timber and non-timber forest products' production and market strategies. Project collaborators include: WWF Indonesia, Farm Forestry Consortium in Gunungkidul, Mataram, Gadjah Mada University, and provincial and district level government in three project sites. Since 2013, the policy research team has been participatively facilitating the processes in each site through the initiated Policy Working Group. Priority program included conducting training sessions aimed at improving the knowledge and capacity of the local communities with regards to policy and regulations applied on their management practices.





Strategic policy direction: grand strategy document in Sumbawa and Timor Tengah Selatan

Background:

- There have been a lack of coordination and inter-connectivity between local government institution, business sector, and community groups in developing timber and NTFP.
- Identified local government' needs for having a referral document in providing strategic direction for developing the integrated timber and NTFP management scenarios involving multiple stakeholders, and the supporting policy and regulatory framework.

Objective:

The grand strategy document aims as the reference for strategic direction in improving the coordination, synergy and inter-connectivity among multi-stakeholders along the supply and value chains, primarily among relevant government agencies. The grand strategy

was developed by referring to government strategic documents produced by national, provincial and district government, including the regional spatial planning document of RTRW (*Rencana Tata Ruang Wilayah*).

Approaches:

Strategic direction was formulated based on spatial data analysis to decide the prioritised strategic development area. The landscape approach is based on watershed-based ecosystem and its zonation (i.e. upstream, midstream and downstream).

In Sumbawa, strategic document produced is '**Grand strategy for integrated management of timber and NTFP at the landscape level**' focused on five main watersheds, including Sumbawa Watershed. This is part of the state forest area managed by Production Forest Management Unit (KPHP-Kesatuan Pengelolaan Hutan Produksi) Batulanteh. The KPHP has adopted the grand strategy as part of its long-term and short term management plans.

In Timor Tengah Selatan, the entry point for management strategies is the forest classification category and the three zones in the watersheds.

The document produced is the '**Grand strategy for integrated management of NTFP at the landscape level**'. The approach and the lessons learnt in developing the grand strategy document have been adopted by the provincial government in developing the regulation for NTFP management for the whole province. The strategy has also been adopted at the village level with allocated budget.

In the grand strategy document, management directions are specified based on the three components:

1. Area management (kelola wilayah): Enforce the conservation function of the area as a buffer zone and/or rehabilitate degraded areas, while enhancing local livelihoods.
2. Business management (kelola usaha): Promote the establishment of small-medium scale enterprises (UMKM-USaha Mikro Kecil dan Menengah) for value added processing activities both for timber and NTFP.
3. Institutional arrangements and management (kelola kelembagaan): Improve the coordination, synergy and interconnectivity of various government agencies at the district level, as well as between these agencies and private market industries.

Legal status:

Head of District Decree legitimised the grand strategy document both in Sumbawa and Timor Tengah Selatan, as well as decree on the primary timber and NTFP species. In operationalising the grand strategy, Kanoppi Policy Research Team is now facilitating the advocacy to internalise the grand strategy into local government medium-term development planning. The implementation of Law No. 23/2014 has affected the direction of policy advocacy strategy. There have been a range of uncertainties during the transition period when the authority for natural resources management was moved from the district to the provincial government.

At the crossroads: *Hutan rakyat* in Gunungkidul after Law No. 23/2014

Hutan rakyat (farm forestry management) is not part of the national social forestry programme, because of its development is located outside the state forest, particularly in other land-use category (*APL-Areal Penggunaan Lain*), and/or on privately-owned lands. However, its role in meeting the demand from the

national wood market has been proven. Estimated timber production from *hutan rakyat* in Java and Madura in 2009, reached up to 74 million m³ and managed by smallholders on 2.7 million hectares of plantation (ARuPA 2010). Today, the future sustainability of *hutan rakyat* management in Gunungkidul is at the crossroads. With the proposed district level document on '**Grand strategy for timber and NTFP management at the district level**', it is expected to be used as the basis for receiving the continuing support from district government, particularly after the Law No. 23/2014 is implemented.

Grand strategy promotes the synergy between the social forestry programme and the natural resources management priorities in the region

Grand strategy provides a strategic alternative approach, in facilitating the social forestry programme to be part of natural resources management plan based on landscape approach at the district level. Particularly in





ensuring access granted to the community groups will be in line with the regional development priorities, and so to receive supports from, and funded by, the local government. Strategic approaches, in which grand strategy can facilitate:

- Grand strategy guides the implementation of the social forestry programme after the management rights have been granted to the community groups.
- Grand strategy assist the management unit on the ground to be resilient in facing the dynamic national policy and regulatory changes, particularly in adapting to these changes by retaining its identity, status, and function.
- The development of Village Forest (Hutan Desa-HD) in APL can receive supports from district and provincial governments as part of the landscape-based forest management.

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