

27 Community forests

Utilization and informal regulation for tropical fruit tree conservation

*Adhitya Marendra Kiloes, Kuntoro Boga
Andri, Achmad Rafieq, M. Winarno, Idha Widi
Arsanti and Zahirotul Hikmah Hassan*

GPD 'passport'

<i>GPD code:</i>	Combined 31 and 32
<i>Focus area:</i>	Collective action and social networking
<i>Character:</i>	Community forestry; combination of system, method, technique and institutional arrangement
<i>Species and varieties involved:</i>	Six species of mango: <i>M. casturi</i> , <i>M. applanata</i> , <i>M. foetida</i> , <i>M. odorata</i> , <i>M. caesia</i> , <i>M. laurina</i> and 11 species/varieties with names in Bahasa – Hampalam Kalambuai, Hampalam Tapah, Hampalam Pisang, Hampalam Nagara, Asam Pauh, Tandui Masam, Mangga Hambuku, Limus, Rawa-Rawa, Rawa-Rawa Humbut and Hampalam Biasa – have been managed by the community in Telaga Langsat, South Kalimantan. About six, mostly local, varieties, especially of <i>M. indica</i> (Podang Urang, Podang Lumut, Arumanis, Gadung, Madu and Golek) have been grown in the state forest land in Kediri, East Java.
<i>Name of location(s):</i>	Telaga Langsat, South Kalimantan and Kediri, East Java
<i>GIS reference of location(s):</i>	Telaga Langsat, South Kalimantan: N 02°45'05"; E 115°22'06". Elevation: 148 masl Kediri, East Java: N 06°48'47"; E 107°36'52". Elevation: 500 masl
<i>Name of farmer (data resource):</i>	Mr Nahnuddin, Achmad Ridhani (Telaga Langsat), Mr Jemu, Mustari (Kediri)

Introduction

Indonesia is considered a megadiverse country with most biodiversity found in its low-land forests (Mittermeier *et al.*, 1999; Myers *et al.*, 2000; McCarthy, 2002; Persoon and van Weerd, 2006). The country harbours many types of native fruit species of which the majority are still found wild in the forests. Estimates for native fruit species vary greatly: Uji (2007) reported 329 indigenous species of fruit trees in Indonesia, whereas the Indonesian Ministry of Environment quoted a figure of 450 fruit species. The fruit from tropical trees is nutritionally dense, culturally important and its sale contributes to family food and nutrition of local people (Kiloes, 2014). Indonesia's forests have an important role to play in facilitating economic growth through the provision of high-quality timber and other forest products such as benzoin¹ resin and rattan (Michon, 2005; Garcia-Fernandez and Casado, 2005) and rubber (Tata *et al.*, 2008). In addition, they provide ecosystem services such as facilitating a conducive habitat for pollinators, preventing water run-off and soil erosion, and retaining moisture or shade in the local ecosystem.

The communities that live in tropical forest areas and rely on forest resources for food, fruit, medicines, housing and work are often isolated, with small populations and little formal education or social connections with political powers. Communities have little say in what happens to them and their forests. Forest-dependent communities are extremely vulnerable to changes that happen to them and their systems imposed by external agencies. If their tropical forests are threatened, communities struggle, transform or disappear completely. With them is lost their extensive ecological knowledge.

In Indonesia, human activities such as palm oil production, rubber, timber and mining have already led to large-scale deforestation, soil degradation and massive forest fires. Short-sighted economic planning and inappropriate land use have led to severe ecological degradation and acute environmental and economic problems (Supriatna, 2010). FAO (2010) estimated that forest cover in Indonesia declined by 24.1 million hectares between 1990 and 2010 due to mining and plantation crops, and estimates the remaining permanent forest cover at 114 million hectares. Even in this dreadful scenario, certain indigenous communities continue to undertake a significant number of activities that can best be described as sustainable management of natural biodiversity in communal forests.

Community forestry

In recent years, the inability of the state to control forest degradation has been recognized in many countries. Governments have seen the benefits of handing over forest areas to local communities under a variety of community forest management schemes in many developing countries (Murdiyarso and Skutsch, 2006). White and Martin (2002) estimate that around 14 per cent of all forest in developing countries is under this kind of management, and is most likely

to be increased up to 25 per cent (Bluffstone *et al.*, 2012). Under such schemes, villagers get the formal, legal rights to use and profit from the forest products, under jointly agreed management plans that ensure that off-take is kept at sustainable levels. Communities organize themselves by setting by-laws and by self-regulation as regards access to forest products. Their motivations to take part in such a scheme can be various: to maintain the forest to ensure future benefits is a clear often cited reason. For some, it is to ensure a continued supply of firewood and fodder; for others, to enable eco-tourism; yet others participate in the hope that the wild animals that have disappeared from the shrinking habitat will return and provide a means of sustainable subsistence in the future. In a few cases, sustainable timber off-take is the aim (Murdiyarmo and Skutsch, 2006). Such initiatives to recognize the rights of local communities are often defined as social forestry, community-based forest management or joint forest management.

In general, Indonesian forest management needs urgent improvement as many of the concessions do not have clearly demarcated boundaries, and forest fires, illegal land clearance and shifting cultivation are widespread. Forest management in Indonesia is governed by two laws, The Forestry Law – 1967 and a new Forestry Law – 1999, which empower the Indonesian Forest Corporation (Perum Perhutani) to manage all forests on public lands in Indonesia and can grant the right of exploitation or extraction to concessionaires. Concessionaires are often large-scale private sector companies, but the 1999 legislation also allows for a wider range of concessionaires including smaller ones. Neither law has specific legislation regarding community-based forest management (CBFM) or the rights of indigenous communities over forests (Blaser *et al.*, 2011), but this does not mean efforts have not been made by the Indonesian government to involve communities in forest management. CBFM emerged in Indonesia in the early 1980s. In 1985, Perum Perhutani began implementing 13 social forestry projects on public lands in Java (Perum Perhutani, 1996), the so-called PMDH programme (Forest Village Community Development Programme), which was extended in 2003.

The sustainable use of forests by communities based on informal community regulations or formal agreements with Perhutani constitutes a good practice for diversity management (GPD), as it helps the local people to use community forest for their livelihoods while also conserving genetic diversity of tropical fruits. This chapter will discuss two cases of forest management by communities, in Kediri in East Java and in Telaga Langsat in Kalimantan, which help to secure tropical fruit tree diversity.

Description of GPD

The practice of community forestry in Indonesia is considered a good practice for diversity management (GPD) as it is a combination of a system, organization or process, which over time and space maintains, enhances and creates tree genetic diversity and ensures its availability to and from farmers and other actors

for improved livelihoods on a sustainable basis (Chapter 1). Under the auspices of the UNEP-GEF project 'Conservation and Sustainable Use of Wild and Cultivated Tropical Fruit Diversity: Promoting Sustainable Livelihoods, Food Security, and Ecosystem Services', an assessment was carried out by the project teams of East Java and South Kalimantan.

Methods of identification

Preliminary participatory rural appraisal was conducted, followed by focus group discussions with key male and female farmers, local extension officials and local state forestry service staff, to better understand how local people are involved in decision making of community forestry, local rules and customary rights and benefit sharing within the communities. The team interacted with local people and government agencies to facilitate collaborative learning and constant self-reflection during field visits over two years. GPD guidelines were also used to identify good practices that manage wild and cultivated tropical fruit tree diversity through community rules and traditions.

Forest management agreement between Perhutani and community in Kediri

Tiron is one of the villages in Banyakan subdistrict in Kediri district, East Java, where the community has rich diversity of mango species in their home gardens. A baseline survey revealed that there were 26 types of mango belonging to many species in Tiron (Kiloes *et al.*, 2014). The site is a dry lowland area about 500 m above sea level, spread out on the foothills in a state forest area, in the central part of East Java province. The majority of households own 0.25–0.5 ha of farmland, with an average annual income from tropical fruits of Rp.1,500,000 (US\$150) per farmer family. The richness (i.e. the total number of different genotypes present in the area) and evenness (i.e. equity in the frequency of genotypes or alleles in the area) of the diversity are 26 and 0.74, respectively. Most of the mango trees are old, often more than 50 years, with an average yield of 150–300 kg per tree per year. Mango contributes 15–20 per cent of family income.

Perhutani is managing about 1,500 ha of forest land in Tiron village, which is classified as production forest, of which 500 ha is jointly managed with the community. A management contract between Perhutani and the community was developed in 2007, and a forest village community organization, Lembaga Masyarakat Desa Hutan (LMDH) Tiron Lestari was established. The LMDH is a Forest Village Community Development Programme developed by Perhutani, and is also a cooperative between the community members to increase their social capital.

The land managed by Perhutani is mainly planted with timber trees such as teak, mahogany and sengon. The management contract stipulates that the community has the right to plant the forest land with fruit trees or timber

species with mango as the major component and agricultural crops, as long as a canopy cover of 70 per cent is maintained. At first, because the forest area is hilly, a terrace system was developed and over the last decade many mango trees have been planted. The lower terraces are planted with mango and secondary crops, the mid terraces with maize and long bean among other crops, whereas the upper terraces are planted with perennial forest crops such as teak. About six, mostly local, varieties of *M. indica* (Podang Urang, Podang Lumut, Arumanis, Gadung, Madu and Golek) have been planted by the community in the forest. Chemical fertilizers or pesticides are rarely used for the trees and crops, only manure or compost is applied. A profit share of 50:50 has been agreed by the community and Perhutani. Half of what the community earns goes to the farmer who manages the crop and the land and the other half is directed into a fund managed by the farmers' group. The fund managed by the group is used for development activities, such as saving and loans for group members, developing nurseries, developing processing methods for products and marketing the mangoes.

Since the start of the contract in 2007, an estimated 10,000 trees have been planted and canopy cover has increased. Besides the fruit trees, annual crops cultivated in the community forest have contributed substantially to the income of many households, which can be up to 30 per cent for land-poor households. The LMDH also gives importance to improving the community's capability for better livelihoods. This arrangement preserves the diversity of local mango in Tiron, as many mango seedling trees have been planted, including six varieties and 7,000 saplings, and also other noncommercial varieties that are mainly planted for a hobby and pride in their mango diversity richness.

To face any future strategic changes, this arrangement is renewed every five years by holding a formal meeting between the community and Perhutani. This meeting provides the community with an opportunity to negotiate an increase in share, voice any problems faced and tell success stories.

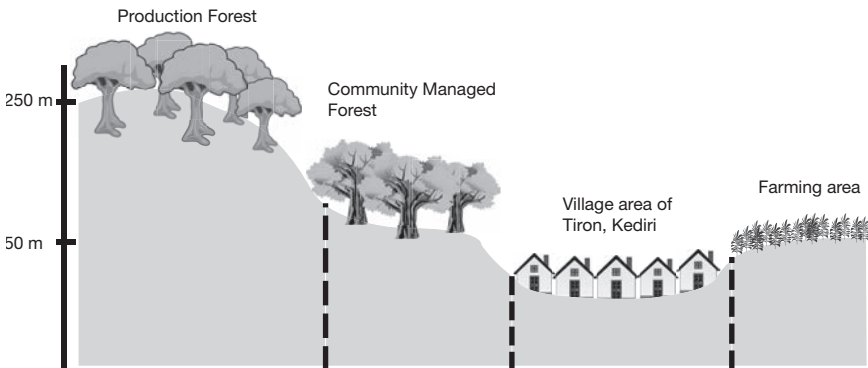


Figure 27.1 Illustration of multi-level landscape in Tiron, Kediri.

Mango diversity maintained by a forest community in Telaga Langsat

Telaga Langsat in Hulu Sungai Selatan District represents a dryland area. The site is located in the central part of South Kalimantan province, at 148 masl. The dry season is from April to September and the rainy season is October to March. It covers an area of 5,808 ha, of which 38.5 per cent is forested, while 26.1 per cent is arable and the rest is housing, village roads and other social facilities. The farming system is irrigated rice-based farming. The total number of households in Telaga Langsat is 2,084 with a total population of 8,780. The average total farm size per household is 0.62 ha with the average home garden 0.06 ha. Every household has at least one mango tree, one to two varieties per household in home gardens and one to three varieties in orchards. The richness and evenness of the mango diversity are 22 and 0.71, respectively. There are 18 types of mango belonging to different species, such as Kasturi, Palipisan, Kuini, Binjai, Hampalam, Hampalam Negara, Limus, Tandui, Rawa-Rawa, Asam Pauh, Hambawang Pulasan, Apel, Golek and Gadung (Kiloes *et al.*, 2014). The major source of income is farming, with main crops being paddy, rubber and vegetables. The average annual income per household is Rp.17,270,500 (US\$1,727), of which mango trees contribute approximately 0.6 per cent (Daroini *et al.*, 2013).

The traditional system consists of mainly two elements. This first one is intensive management of tree stands in the buffer zones by allowing preferred trees to prosper in the forest and occasionally cutting or removing undesired trees. The second element is the recognition of 'sacred trees' in the village and surrounding forests that should not be harvested, disturbed or felled.

Managed wild populations

For generations farmers have been planting preferred species or allowing their seeds to grow in the forest buffer zones or community forest surrounding the village, creating a high density of fruit trees, which are harvested based on traditional harvesting rights. Due to this practice in the forest fringes and buffer zones, one will mostly find a higher density of Kuini, Hampalam, Binjai, Asam Pauh and Kasturi compared with the natural forest further away. Harvesting rights are organized as follows. The communities have organized cooperatives to sell the fruit during the fruiting season. The proceeds of the sale are divided among the community members. Any community member passing under a tree can take the fruit and sell it, but they cannot bring a pickup truck or any other form of transportation to carry the harvested fruit to sell it themselves. This practice avoids overharvesting and promotes equality among members of the community.

Sacred trees

The people in Telaga Langsat, South Kalimantan believe that old and large trees are sacred and should not be felled. This belief system has existed in the community for a long time and has been passed down through generations. Mostly this applies to the very large, old trees that play an important role in the forest ecosystem. This study identified at least 20 such trees. Large, old trees of Kasturi, Kuini, Rawa-Rawa, Tandui and some others are some of the sacred trees maintained by the community.

These two elements have been practised for generations and obeyed by the community members. These practices and belief systems help maintain the local ecosystem including the mango tree diversity and have been reinforced by specific informal regulations developed about a decade ago by the elders of the community. The implementation of this informal regulation is controlled by the village security group that was established when the informal regulation was implemented. The fine for breaking these rules is Rp.1,000,000 per tree (about US\$100). This fine was agreed by the community members and the money accumulated is used for community nursery development to replant the felled tree. Although the price of felled trees is higher than the fine amount, this practice helps in reforestation through the distribution of new saplings. The regulation is valid both for the mango trees in the village and those in forest buffer zones.

The ownership of the mango trees in the forest buffer zones is determined through an informal agreement between the community leaders and the forest services. Community members have to take care of the mango trees based on the guidance provided by the local agricultural and forestry staff. During the harvest season, they may harvest and sell mango fruits to the local market or to other markets with the assistance of extension staff. As per the informal agreement with the forestry services, the community can have the entire production of the trees, as most of them currently have low commercial value.

The implementation of informal regulations in the community has several positive impacts such as: increased income for low-income community, increased physical security, better food security and health, sustainable natural resource management and participation in the cultural heritage (Kaimowitz, 2003). The practices and benefits derived by the communities in Telaga Langsat attest to this. In fact, in practice this is a traditional spiritual belief (especially regarding the sanctity of trees) that has been converted into a community agreement or informal regulation by the local people.

Driving forces for the success of the GPD

The need to ensure a better life for community members with the available resources, the fear of damage to their environment and livelihood by cutting down trees, profits obtained from using the forest buffer area and additional income and support from the local institutions are the major driving forces

for the success of the GPD. A current national programme to grow one billion trees and a local government programme to develop rural small–medium processing units for agricultural crops can support the better future community management of the state buffer forest towards sustainable *in situ* and on-farm conservation of TFT genetic resources.

On the other hand, factors hindering success are the demand for land for rubber and oil palm plantings, an increase in the price of mango main-stem wood for construction and a decrease in spiritual beliefs of younger generations.

Impact on diversity

The practice in Tiron, Kediri, helps considerably to maintain intraspecific diversity of *M. indica*. The six commercial and other non-commercial varieties grown on the lower terraces currently have moderate commercial value both for fresh and processed products in the local market. Increasing demand for fresh and processed products of different varieties in the regional market motivates the community to grow more varieties and trees that in turn can help maintain some of the diversity that may otherwise be lost.

The practice in Telaga Langsat, South Kalimantan, maintains the existing interspecific and intraspecific diversity, even though the mango types they grow currently have low commercial value. The informal village policy not to cut down large, old trees in and around the village and in the buffer zone is one manifestation of consolidating the community role in management of tropical fruit tree genetic resources.

Impact on livelihoods

Farmers with small farms can apply to the village leader to join the community group that manages the state forest in Tiron, Kediri, for growing mango. As a member of the group, farmers can increase their income through mango cultivation. Indirectly, group membership also enhances human capital in Tiron. Farmers gain capacity in managing forest land to cultivate mango for improving their livelihood. As part of the produce is used for home consumption, it can directly improve the nutrition of their household. In Telaga Langsat, the income benefits have been limited. Most of the noncommercial mangoes harvested from species and varieties in Telaga Langsat are marketed locally to obtain additional income. From the profit share the community has started to establish group marketing and processing of local mango fruits and forest produce to add value.

Both arrangements and practices build upon and strengthen the social capital of the community, through traditional beliefs as in Telaga Langsat or through profit-sharing arrangements as a group with the government in Tiron, Kediri. Social capital is a fundamental requirement when pursuing the conservation of a common or public good such as fruit tree diversity, to be able to share the costs of conservation and to avoid overharvesting or destruction by free

rider attitudes. Local or national government along with interested nongovernmental agencies can provide policy to assert community resource management.

Future prospects and sustainability of the GPD

One major achievement could be made if specific legislation regarding community-based forest management were developed, which provides forest communities with ownership and harvesting rights and strengthens and recognizes their commitment and involvement in forest management. For the time being, we should encourage the practices as described in this chapter as a practical way forward to create better representation of forest communities in forest management. Incorporating the conservation dimension and ensuring a strong focus on tropical fruit tree diversity in the Forest Village Community Development Programme would be a major incentive for local communities to safeguard their unique mango diversity.

To support the use of state forest and community forests, some technologies that have been developed by the Indonesian Agency for Agricultural Research and Development, such as propagation by grafting and marcotting, are instrumental to have a supply of saplings to be planted in the forest area. Also, development of processing technologies that add value to the mango diversity can be used to support the GPD.

Community participation in meetings of the local government and local forestry services may be promoted to discuss and develop effective ways for improved use of state forests and to further refine how to cooperatively manage forests by the community and the forestry services with an increased share of profits going to the local communities. This can have a positive impact on maintaining TFT diversity (and diversity of other species as well, depending on the context) and also improve livelihoods and environmental services in the sites. Increasing the benefits gained from local TFT resources can further empower local communities and decrease their dependence on support from public and other agencies. To support better use of available resources, conservation efforts of fruit trees can be usefully combined with training in various processing techniques describing the process step by step, including photos and details of the equipment required. Farmer-to-farmer training or Farmer Field Schools (FFS) on community forest management can also be formulated. Exchange visits among farmers in the communities to other locations where such activities have been successfully implemented is a good way to further expand the familiarization and use of this kind of GPD. They can learn about what other villages have done to improve their skills, some of which may be relevant and feasible to try out in their own community.

References

- Blaser, J., Sarre, A., Poore, D., and Johnson, S. (2011) *Status of Tropical Forest Management 2011*, ITTO Technical Series No 38, International Tropical Timber Organization, Yokohama, Japan

- Bluffstone, R., Robinson, E., and Guthiga, P. (2012) 'REDD+ and community controlled forest in low income countries: Any hope for a linkage?', Environment for Development (EfD), Sweden and Resources for the Future, USA, Discussion Paper Series, October 2012, EfD DP 12-11, University of Gothenburg, Sweden
- Daroini, P.B., Dewi, H.A., Andri, K.B., Rafieq, A., Pribadi, Y., Fakhрина, Saderi, D.I., Lesmayati, S., and Lamers, H.A.H. (2013) *Baseline Report Indonesia for the UNEP-GEF Project Entitled: Conservation and Sustainable Use of Cultivated and Wild Tropical Fruit Diversity: Promoting Sustainable Livelihoods, Food Security and Ecosystem Services*, GEF, UNEP, Bioversity and ICHORD, Indonesia
- FAO (2010) *Global Forest Resources Assessment 2010 Country Report: Indonesia*, Food and Agriculture Organization of the United Nations; [http://www.fao.org/forestry/ fra/67090/en/](http://www.fao.org/forestry/fra/67090/en/)
- Garcia-Fernandez, C. and Casado, M.A. (2005) 'Forest recovery in managed agroforestry systems: The case of benzoin and rattan gardens in Indonesia', *Forest Ecology and Management*, vol 214, no 1-3, pp. 158-169
- Kaimowitz, D. (2003) 'Forest law enforcement and rural livelihood', *International Forestry Review*, vol 5, no 3, pp. 199-209
- Kiloes, A.M. (2014) 'Review about production and trading performance of some of Indonesian tropical fruits in year 2008-2012', Proceedings of a National Seminar, Faculty of Agriculture, University of Sebelas Maret, Indonesia (in Bahasa)
- Kiloes, A.M., Winarno, Kuntoro, B.A., Rafieq, A., and Arsanti, I.W. (2014) *Community Fruit Catalogue: Mango and Citrus in East Java and South Kalimantan, Indonesia*, Office of National Project Management Unit of GEF/UNEP Project 'Conservation and Sustainable Use of Wild and Cultivated Tropical Fruit Diversity: Promoting Sustainable Livelihoods, Food Security, and Ecosystem Services', Jakarta
- McCarthy, J.F. (2002) 'Turning in circles: District governance, illegal logging, and environmental decline in Sumatra, Indonesia', *Society and Natural Resources*, vol 15, pp. 867-886
- Michon, G. (2005) *Domesticating Forests: How Farmers Manage Forest Resources*, IRD, Paris, France, CIFOR, Jakarta, Indonesia and ICRAF, Bogor, Indonesia
- Mittermeier, R.A., Myers, N., Gil, P.R., and Mittermeier, C.G. (1999) *Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*, CEMEX, S.A., Mexico City, Mexico, p. 430
- Murdiyarto, D. and Skutsch, M. (2006) *Community Forest Management as a Carbon Mitigation Option*, Center for International Forestry Research, Bogor Barat, Indonesia, pp. 1-7
- Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B., and Kent, J. (2000) 'Biodiversity hotspots for conservation priorities', *Nature*, vol 403, no 6772, pp. 853-858
- Persoon, G.A. and van Weerd, M. (2006) 'Biodiversity and natural resource management in insular Southeast Asia', *Island Studies Journal*, vol 1, no 1, pp. 81-108
- Perum Perhutani (1996) 'Integration of forest management and forest village development', Perum Perhutani, Jakarta (in Bahasa)
- Supriatna, J. (2010) 'International year of biodiversity Indonesia'; [http://www.the jakartapost.com/news/2010/01/23/int039l-year-biodiversity-and-indonesia.html](http://www.thejakartapost.com/news/2010/01/23/int039l-year-biodiversity-and-indonesia.html)
- Tata, H.L., van Noordwijk, M., and Marinus, W. (2008) 'Trees and regeneration in rubber agroforests and other forest-derived vegetation in Jambi (Sumatra, Indonesia)', *Indonesian Journal of Forestry Research*, vol 5, no 1

- Uji, T. (2007) 'Review: Indonesian native fruits diversity and its potency', *Biodiversitas*, vol 8, no 2, pp. 157–167 (in Bahasa)
- White, A. and Martin, A. (2002) *Who Owns the World's Forests?*, Forest Trends and Center for International Environmental Law, Washington, DC

Notes

- 1 Benzoin was and still is highly valued as an ingredient in incense for burning in rituals and religious ceremonies, not only in all western Indonesian islands, but also in mosques and churches all over the Middle East, North Africa and Europe. The fragrant resin of benzoin has been exploited in the wild and traded from Sumatra for at least 10 centuries, first to China, then to the Middle East and finally to Europe, with an amazing historical continuity. It was and still is used for traditional and modern medicinal purposes, a component valued by the pharmaceutical industry. It was and still is used in perfumery (Michon, 2005).