INDONESIA

Community Forestry Supporting Resilience in Meru Betiri Park, Indonesia

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Key Lessons

Natural resource management efforts within the core and buffer rehabilitation zones of Meru Betiri National Park ('the Park') have strengthened the adaptive capacity of surrounding local communities. Achieving community access to and involvement in rehabilitating forest plots within the Park have been important steps in enhancing livelihood assets. In the process, community forestry farmer groups have become well organized and engaged in forest management and conservation activities. This led to the signing of a Memorandum of Understanding (MoU) with Park management for community access to the buffer zones within the Park. With an increasingly robust set of livelihood assets, the community forest groups are now well positioned to take initiatives in managing the forest and surrounding areas.

The Park is also home to a REDD+ pilot site which, in conjunction with access to the rehabilitation forest plots, has supported much needed alternative livelihoods for local people as agricultural yields decline due to changing weather patterns. In addition to supporting access to forest products, the project holds potential for additional income to be generated from the sale of Verified Emission Reduction credits. This may be a critical tipping point in favor of forest conservation as livelihoods are becoming increasingly vulnerable to climate change impacts.

Some key findings from this study are:

- It is important not to view the REDD+ pilot site as a new and stand alone initiative separate from preceding conservation and sustainable forest management efforts. Instead these should provide the basis for any subsequent carbon projects, ensuring an integrated approach to mitigation squarely rooted in sustainable forest management.
- It is equally important that forestry activities are not treated in isolation from those associated with other land use, in particular, issues of food security, agriculture, and livelihoods. Efforts for the long-term success of forest management will be compromised if agricultural needs – through sustainable and complementary forms, such as agroforestry – are not addressed.

- Access rights enjoyed by communities surrounding the Park have been central to their investment in reforestation efforts. However, this remains informal and dependent on staffing changes and Park management discretion. Long-term, secure access is vital to ensuring continued buy-in and investment by the communities.

Timeline

1994	Lembaga Alam Tropika Indonesia (LATIN), the Forest Department of Bogor Agricultural University, and Curahnongko village establish a seven-hectare demonstration plot for medicinal plants and agroforestry within the Park.
1998-2001	Deforestation due to encroachment and illegal logging cause the loss of 2,500 hectares of forest within the Park.
2001	LATIN organizes local communities to implement a forest rehabilitation program in the Park, engaging 3,500 households from five adjacent villages (Curahnongko, Andongrejo, Sanenrejo, Wonoasri, and Curahtakir).
2004	Local organizations and communities begin reforestation of 2,250 hectares of land within the Park.
2003-2007	Frequent droughts induce heavy crop failures in Curahnongko.
2010	The Meru Betiri National Park Reducing Emissions for Deforestation and Degradation+ (MBNP-REDD+) project begins, covering 58,000 hectares of the Park, including 4,000 hectares of 'rehabilitation' lands established by LATIN.
2011	Seventeen community forestry farmer groups from Curahnongko under Jaringan Kerja Petani Rehabilitasi (JAKETRESI, also known as the Farmers Forest Rehabilitation Network) and the Meru Betiri National Park Board sign an MoU granting community access to buffer zones in the Park.

1. Background

Meru Betiri National Park in East Java, Indonesia, is renowned for its wealth of biodiversity. The Park is home to many protected animals, including 29 species of mammals and 180 species of birds (MoF, 2012). Meru Betiri Forest was first designated as a protected area by the Dutch Colonial Government in 1931, largely with a view to protecting the Javan Tiger (now considered extinct), and eventually graduating to national park status in 1997.

Despite Indonesia's commitment to conserving its biological resources through the establishment of national parks, during the reform period of the late 1990s to the early 2000s, rates of deforestation in the Park were unprecedented (Casson *et al*., 2007). Meru Betiri lost approximately 2,500 hectares of forest during this period as companies and small-scale farmers competed for remaining forestland. However, as the Park's forest came under threat, an interesting experiment in its buffer area provided valuable lessons.

In 1994, Curahnongko village (located in the buffer zone of the Park), LATIN, and the Forest Department of Bogor Agricultural University established a seven-hectare demonstration plot to cultivate medicinal plants and promote agroforestry practices. Despite the high rate of deforestation at the time, the demonstration plot near Curahnongko remained intact.

In an effort to stem further threats of deforestation, Park authorities approached LATIN to replicate the demonstration sites on additional plots throughout the park.

In 2001, 3,500 households from five villages (Curahnongko, Andongrejo, Sanenrejo, Wonoasri, and Curahtakir) were involved in a forest rehabilitation program. By 2004, after engaging local communities to reforest plots within the Park, some 2,250 hectares of land that had previously been encroached had undergone reforestation efforts. One hundred and four community forestry farmer groups in cooperation with a local NGO, Sustainable Nature Conservation of Indonesia (KAIL), were responsible for planting an initial 23,027 seedlings.

> "In my career, my greatest success has been my long-term involvement in the forest rehabilitation program here in Curahnongko. The land is now full of trees and medicinal plants. As a KAIL advisor, I have seen how illegal loggers can influence the community, police, and government officials, and this has been the program's biggest obstacle.
>
> *Kaswinto, LATIN Staff and KAIL Advisor*

An important component of the community's participation in forest rehabilitation was an informal 'access to land' agreement for agroforestry activities. At times, this agreement was fraught with tension but, in 2010, Park authorities reaffirmed their support for access to forest products to enhance livelihood options for the community.

While the primary aim of the rehabilitation lands was to support conservation and re-establish forestlands, the program produced a number of significant secondary benefits, especially for landless villagers. Landless villagers in Curahnongko are highly dependent on non-timber forest products (NTFPs) for their livelihoods and the rehabilitated forestlands provide substantial livelihood opportunities from the sale of NTFPs and medicinal plants.

> “In the past we were very poor, landless, without a home of our own, and without self-confidence. We worked hard in the rehabilitation lands, and I became a member of the Women’s Medical Plant Group, and later a teaching facilitator for the group in my community and other villages. [Now] I am not rich, but I am not poor either... I own land, a house, and I participate in decision-making confidently.
>
> *Siti Maemunah, Curahnongko village, Jember District*

Meru Betiri REDD+ Pilot Project

In 2010, the MBNP-REDD+ pilot project was launched across 58,000 hectares of the Park, including 4,000 hectares of ‘rehabilitation’ lands established by LATIN. The project is a public-private partnership with the Research and Development Center, Ministry of Forestry (Badan Penelitian dan Pengembangan Kementerian Kehutanan), the International Tropical Timber Organization (ITTO), the Park, and LATIN, with financial support from Japan’s 7&i Holdings Limited.

With an end-date of 2013, the REDD+ project aims to prevent deforestation and forest degradation as well as biodiversity loss; improve livelihoods by developing alternative income sources; enhance forest carbon stocks; and build stakeholder capacity.

2. Climate Change Impacts in Indonesia and Meru Betiri

Indonesia is highly vulnerable to climate change impacts. As an estimated 96% of Indonesians live within 100 kilometres of the sea, the population is expected to be heavily impacted by sea level rise (EarthTrends/WRI, 2003). In addition to temperature changes of 0.2 to 0.3°C per decade in Indonesia (Naylor *et al*., 2007), there has been a decline in annual rainfall in the southern regions, including East Java (Boer and Faqih, 2004) with anticipated delays in the rainy season and significant decreases in dry season rainfall (Naylor *et al*., 2007). Therefore there is high risk of both drought as well as increasing floods and extreme weather events nationwide (Boer and Faqih, 2004).

Indonesia’s achievement of the Millenium Development Goals is expected to be affected by climate change, namely declining agricultural productivity with associated impacts on poverty reduction and health (University of Gothenberg, 2008). As the poorest and most marginalized groups of the population tend to live in hazard-prone areas, these same groups will be most vulnerable to climate change and generally lack the resources and information needed to adapt. There is a strong need for adaptation to be mainstreamed through all development activities but especially livelihood diversification (University of Gothenberg, 2008).

Seasonal Variability and Temperature Change in Meru Betiri

From 2008 onwards, in keeping with forecasted regional climate change trends (Naylor *et al*., 2007), villagers have noted the dry season lengthening and increased storm intensity in the rainy season. They report seasonal hot spells becoming hotter and cold spells becoming colder, reducing the amount of time that farmers can spend in their fields and resulting in declining farm productivity. Short periods of atypically heavy rainfall are now regularly damaging cornfields, peanut fields, and chili and tomato farm plots. However, to date these changes do not appear to be prompting adjustments in crop species selection or other strategies.

Pest incidence

Communities in the Meru Betiri area also report pest and invasive species infestations which they associate with changes in climate and weather patterns, including infestations of paddy fields by earthworms. The communities point to pests as a key factor, along with seasonal variability, in diminished rice production, which is reported to have declined by as much as 80% over the past five years. Farmers also report that a new banana-wilting virus (*Fusarium oxysporum* f. sp. *cubense*) has damaged fruit and vegetable crops.

3. Assessing Adaptive Capacity and Resilience

Adaptive Capacity

Adaptive capacity in Curahnongko has been strengthened through access to the rehabilitation lands in the buffer zones of the Park and the social and livelihood benefits that this has generated.

Table 1: Assets in Curahnongko

Type	Assets	Effects on Adaptive Capacity
Natural Assets	▪ Timber and NTFPs grown on private lands ▪ NTFPs from the rehabilitation areas, including medicinal plants, fruit, rattan, bamboo, honey, and peppers ▪ Livestock fodder from rehabilitation lands ▪ Agricultural crops, including rice, corn, peanut, tobacco, and fruit	▪ Agricultural products and NTFPs support income generation and subsistence ▪ Fuelwood for household energy supply
Physical Assets	▪ Park rehabilitation lands, private agricultural and plantation lands ▪ Accessible water sources (ocean, rivers, streams, and groundwater) ▪ Road, bridge, telecommunication, and electricity infrastructure	▪ Different typologies of land offering a range of potential livelihood and subsistence sources ▪ Infrastructure supports knowledge sharing and mobility for economic development and in disaster contexts
Financial Assets	▪ Informal micro-finance institutions, credit for subsistence, wedding costs, upfront costs of labor migration ▪ Middlemen providing loans	▪ Alternatives to high interest loans as forms of credit ▪ Capital theoretically available to support adaptive strategies
Social Assets	▪ Mosque ▪ Elementary and junior high school ▪ Community forestry farmer groups ▪ Local NGOs: KAIL and LATIN ▪ Local government extension agencies ▪ Women's Medicinal Plant Group (Sumber Waras)	▪ Focal site for social capital development ▪ Capacity development ▪ Service providers deliver adaptation knowledge and technical needs ▪ Market access through market chain linkages ▪ Gender-specific groups

Type	Assets	Effects on Adaptive Capacity
Human Assets	▪ Farm labor ▪ Local forest patrols within the rehabilitation areas ▪ Local private health care providers	▪ Capable workforce to engage in agricultural labor ▪ Strengthened capacity to respond to environmental and climate change impacts (e.g., increased incidence of fire)

The Forest as a Buffer Against Climate Change Impacts

While difficult to substantiate, the communities surrounding the Park are convinced of the role the forest plays in mitigating negative ecological and climate change impacts. In the early 2000s, Curahnongko village experienced serious flooding and mudflows resulting in the loss of property and infrastructure. This was followed by prolonged droughts resulting in dried-out water sources and crop failure, all with profound impacts on local livelihoods. However, while the villagers have reported intensification of extreme weather events and natural disasters since the rehabilitation efforts started, they also consider impacts on livelihoods to have been less severe due to the perceived role of forests as buffers.

Following forest rehabilitation, the communities claim that food insecurity, loss of income, water shortages, or threats to human safety from landslides and floods have been attenuated compared to preceding years. A major flood occurred in 2010, the most significant impacts of which were losses in agricultural crops and the destruction of an important warehouse located on the edge of the Curahnongko River. This was considered to be relatively minor damage for such an extreme event. As well as appearing to contribute to disaster risk reduction, the villagers assert that the volume and retention capacity of natural water systems, particularly in streams in and around the Park, have increased.

Livelihood Alternatives from Forest Rehabilitation

Since 2001, villagers have experimented with agroforestry systems throughout the rehabilitation areas of the Park, planting native forest and fruit tree species, along with medicinal plants and crops. Through trial and error, they have learned that they can grow crops for four or five years before the forest canopy shuts out required sunlight. After five years, they transition to harvesting tree-based fruits and vegetables, such as jackfruit and *parkia* ('pete' or stinky bean). Currently, the 4,000 hectares of MBNP rehabilitation land have six different agroforestry typologies, each providing a diversified source of income for neighboring communities.

The agroforestry demonstration sites have provided landless villagers access to productive land as well as opportunities for capacity and skill development. Income from agroforestry has minimized forest exploitation and has become a source of community pride. However, the various benefits offered by the rehabilitation plots continue to be vulnerable until the community gains official legal rights to access, manage, and benefit from them.

Community Efforts Support Access Rights

While access to forest areas remains informal, so far there have been no attempts by authorities to block community access to buffer zones in the Park. This may be mainly due to recognition of the valuable contributions made by local communities to the sustainable management of the Park. Since 2001, approximately 3,000 farmers, working in 104 community forestry farmer

groups, have planted 186,666 trees of more than 30 species within and around the Park. These measurable contributions to the Park's ecology are an important negotiating tool for the villagers when addressing access rights with new Park directors.

4. Vulnerabilities

Despite the various assets that contribute to adaptive capacity, challenges remain for the communities in responding to natural events and environmental changes, including climate change.

Of Curahnongko's 6,168 inhabitants, only 1,677 are landowning farmers due to limited available land. More than 1,000 landless community members are employed on these smallholdings.

Of the large landless population, most are classified as poor and resort to wage labor to meet basic needs. This landless segment of the local population relies heavily on Park rehabilitation land for crop production via agroforestry, cultivation of medicinal plants, and fodder for livestock. The rehabilitation lands provide poor families with up to 90% of their household cash income. However, the limited land-use options associated with the classification of Park land constrain uses that might otherwise help to reduce poverty.

The Director of Meru Betiri National Park informally grants access to the forest areas through personal discretion; consequently villagers and community forestry farmer groups participate in the forest rehabilitation program without a written legal basis. The Ministry of Forestry is obliged to uphold the director's agreements but, without formal access rights, the communities remain vulnerable to losing forest access should political or structural changes take place. This is a real possibility and over the duration of the rehabilitation activities, the Park's director has changed four times, creating a sense of insecurity among the local communities.

> "I have observed the relationship between the Meru Betiri director, the local community and KAIL. Every time there is a new Park head, KAIL presents the forest rehabilitation and agroforestry program. If the head likes the program, we continue to discuss collaboration opportunities. If not, the discussion usually stops.
>
> *Kaswinto, LATIN Staff and KAIL Advisor*

Vulnerability is also associated with governance issues. The central source of seedlings for rehabilitation plots is the Indonesian community forestry nursery program, administered through a district-level forestry agency. At times, the program has been influenced by political parties' interests to garner votes and, on the basis of political affiliation, some villagers have found it difficult to source the needed seedlings.

Due to limited understanding of climate change dynamics, villagers struggle to independently incorporate climate change adaptation strategies within forest rehabilitation strategies. Currently, Park representatives and LATIN do not have sufficient capacity to facilitate this. Rural development organizations and micro-finance institutions in the area have yet to include climate change risk or adaptation profiles within their development service programs, projects, or support activities.

Work by LATIN and KAIL has created important opportunities for diversifying and strengthening villagers' livelihoods, but there is no guarantee of continued NGO support. LATIN and KAIL have continued to struggle to secure funds to carry out activities around Meru Betiri. Sensitive to issues of sustainability, LATIN and KAIL staff are strategically seeking to build local leadership, as well as overall social and human capital, for the continued resilience of the community.

> "My concern is about developing new KAIL facilitators without the means to pay them. This is why local recruitment is so important. They can be motivated through religious beliefs and in return gain community respect.
>
> *Kaswinto, LATIN Staff and KAIL Advisor*

5. Responses to Environmental Changes and Development Needs

The Curahnongko community uses forest-based livelihood assets to respond to environmental impacts and changes. From 2003 to 2007 periods of insufficient rainfall induced heavy crop losses so many villagers sought wage labor or relied on revenue from rehabilitation lands to compensate for shortfalls in income. As agroforestry production grew, fewer people outsourced work as income derived from the rehabilitation lands gradually increased. The integrated agroforestry system progressed beyond an emergency safety net to providing more secure and reliable livelihoods and subsistence for the community.

To compensate for crop yield declines generated by temperature and rainfall fluctuations, farmers began to plant crops in the rehabilitation lands, such as corn, peanut, chili, and tomato where they are protected by the forest canopy.

With the assistance of the MBNP-REDD+ project facilitators, LATIN, and KAIL, villagers are engaged in action research that will define effective forest management strategies in the rehabilitation lands, particularly with regard to forest enrichment and agroforestry. The villagers recognize that this will eventually enhance the forest's capacity as both a natural asset in countering climate change as well as a carbon sink.

6. Adaptation, Mitigation, and Community Forestry Linkages

Climate change mitigation and adaptation are strongly linked in Indonesia. High rates of deforestation exacerbate climate change impacts and constrain available adaptation options (University of Gothenberg, 2008). The MBNP-REDD+ pilot project, while still in its early stages, has various activities underway on the ground with lessons already emerging.

Discussions on REDD+ benefits are focusing increasingly on the indirect benefits to local communities rather than raising expectations of direct financial payments. This has led to an interest in non-financial benefits, such as increased tenure security and access rights that may accrue as a result of REDD+ projects and become a key negotiating point for the communities living around the Park. Even without full tenure and virtually no discussion of financial payments, the promise of informally-recognized forest access has been a powerful incentive in generating strong levels of support within the community.

Largely missing from REDD+ discussions until recently, agriculture and food security are unavoidable components of forest conservation in the region. The high levels of poverty and

food insecurity cause agriculture to be a powerful driver of deforestation. In order for REDD+ to be viable in contexts such as Meru Betiri, efforts are needed to incorporate and validate food production in a forestry context. Agroforestry needs to be recognized as an important component of sustainable forest management in the region. The pressures communities are facing to shift from subsistence food production to cash crops will lead to increased vulnerability; however the integration of sustainable food systems, such as agroforestry within REDD+, will provide an alternative to reliance on cash crops.

Effects of the REDD+ Project on Community Resilience

In its early stages, the REDD+ project made important contributions to building resilience in Curahnongko and the Park. Community engagement in forest rehabilitation has fostered social capital and improved relationships with Park authorities. The project has also provided technical information and contributed to skills development for surrounding communities and other stakeholders, including Park officials, local authorities, and NGOs.

The 2011 MOU granted to community forestry farmer groups has strengthened access to Park rehabilitation land. The agreement, while informal, provides improved security of access for the villagers. The signing process was an important symbolic step forward for the relatively new local JAKETRESI network. The negotiations gave members confidence and experience in articulating their needs; now members consider themselves to be in a better position to advocate for their rights.

> “ It is not a large park that can withstand disruptions and we have more to manage than just carbon.
>
> *Mrs. Khairun Nisa, Head of Meru Betiri National Park, Section Area II*

The MBNP-REDD+ project has focused on local communities since its inception. Livelihood development is an important component of the project and Meru Betiri has provided technical and financial support for a range of small-scale activities, including aquaculture and marketing support for dried jackfruit production.

> “ For the MBNP-REDD+ project, community engagement is very important. Without community involvement, Meru Betiri National Park just does not have adequate resources to protect the trees and biodiversity. And without the community as a partner, it is likely illegal logging will increase. My hope is that at some point in time, REDD+ revenues can benefit both the Park and the villagers equally.
>
> *Kaswinto, LATIN Staff and KAIL Advisor*

JAKETRESI community forestry farmer groups have developed rules and regulations to avoid further forest encroachment and prevent illegal logging and wildlife hunting in Meru Betiri, all supporting ecological services and biodiversity protection. Over the past year, JAKETRESI members have conducted detailed forest and plant inventories, mapping, and resource-use research within the rehabilitation lands. They hope to use this information to better understand community assets and thereby strengthen their role as a strategic partner in the MBNP-REDD+ project. Project partners, the Park, LATIN, KAIL, and JAKETRESI, will initiate a large-scale rehabilitation effort in mid-2012. Overall, the aim is to employ assisted natural regeneration, in addition to agroforestry approaches, to enhance carbon stocks and strengthen adaptive capacities through access to a range of forest products.