

Article

How Can Social Safeguards of REDD+ Function Effectively Conserve Forests and Improve Local Livelihoods? A Case from Meru Betiri National Park, East Java, Indonesia

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Abstract: The National REDD+ (Reducing Emissions from Deforestation and Forest Degradation-Plus) Strategy in Indonesia highlights the importance of local participation and the reform of land tenure in the success of forest conservation. National parks are a main target area for REDD+. National parks in Indonesia have been suffering from forest destruction and conflicts between governments and local communities. This study investigated: (1) the historical process of developing the REDD+ project in collaboration with multiple stakeholders including government authorities, local NGOs, and local people; (2) the social and economic impacts of the REDD+ project on local people; and (3) the local awareness of and motivations to participate in the REDD+ project in Meru Betiri National Park in Indonesia. Interviews of stakeholders including village leaders, NGO staff, and park staff were conducted to obtain an overview of the REDD+ project in the national park.

Interviews with a questionnaire were also conducted among randomly selected heads of households who participated or did not participate in the REDD+ project and lived adjacent to the national park. Our analysis revealed that participants in the project obtained the right to use illegally harvested bared lands for intercropping while planting trees to recover forest ecosystems inside the national park. This opportunity could have contributed to a drastic increase in income, particularly for economically disadvantaged people, and to the recovery of forest ecosystems. Although local people did not fully recognize the meaning of REDD+ or carbon credits, they were enthusiastic to join in managing and patrolling forests because of their satisfaction with the income generated by the national park. However, the challenge is how both the recovery of forests and income generation from the project can be maintained in a situation of insufficient funding from donors and unsettled arguments about the benefit of sharing carbon credits with local people.

Keywords: REDD+; climate change mitigation; social safeguard; land use right; rehabilitation; communities' participation; local awareness; national park; Indonesia

1. Introduction

Reducing Emissions from Deforestation and Forest Degradation-Plus (REDD+), which is the latest global attempt to address the conservation of forests and sustainable forest management as well as the issues of deforestation and forest degradation in developing countries, was internationally recognized in the Bali Action Plan at Thirteenth Session of the Conference of the Parties to the UNFCCC (COP13) in 2007 [1]. Because deforestation and forest degradation in tropical countries are among the major contributors to global greenhouse gas emissions, and the loss of forest area has negative impacts not only on environmental services but also on local livelihoods, this result-based REDD+ scheme is expected to promote a climate change mitigation measure that will also deliver environmental and social benefits, from protection of biodiversity and preventing deforestation and forest degradation, to improvement of local livelihoods [2]. It may provide multiple benefits and promises a win-win situation for all stakeholders involved [3]. While a comprehensive and robust framework for REDD+ is still being discussed and negotiated by the international community, REDD+ initiatives have been introduced and various projects have been implemented in many developing countries with significant roles in creating better environmental and social situations [4].

In debates on REDD+, the rights of indigenous and local people form a crucial issue [5,6]. In 2010, COP16 of the UNFCCC Conference provided seven safeguards to prevent negative impacts, especially for indigenous and local people, when REDD+ activities are implemented. The safeguards covered social instruments, such as respect for the knowledge and rights of indigenous people and members of local communities, and the full and effective participation from particular indigenous and local communities, as well as environmental instruments. These safeguards imply that REDD+ is more than just a result-based financial scheme and pays more attention to forest-dependent people's livelihoods, participation, and rights, including tenure security [7].

Land ownership in developing countries is characterized by legislation that emphasizes public or private ownership and downplays community-owned resources; generally, privately owned lands are only a small proportion of total land area in these countries [8]. Huge numbers of forest-dependent people obtain their livelihood requirements in the state-owned public forests [9]. Consequently, conflicts between local communities and governments, logging concessions, and plantation companies occur frequently [10], and problems of land tenure for local communities still cannot be solved [11,12]. Because tenure insecurity fosters forest clearance and degradation as well as land grabbing, ensuring clear and secure rights to the land, forests, and carbon through the social safeguards of REDD+ may guarantee both forest conservation and sustainable local livelihoods.

On the other hand, arguments against REDD+ highlight the risk that its implementation could produce negative outcomes for the environment and local communities. REDD+ may weaken local livelihoods and undermine their traditional practices by forcing them to follow REDD+ schemes for conserving forests [1,13]. Such forest conservation tends to encourage strict forest protection and blocks residents' access to forest resources, forcing them to resort to illegal activities that may induce social conflict and increase poverty [14]. Local people oppose REDD+ because they fear the loss of rights to forestland under the program [15]. Some cases have been reported where REDD+ initiatives stimulated an increase in national parks adopting REDD+ projects without also honoring the rights of local people. Consequently, social conflicts between governmental authorities and local people have occurred, including the exclusion of local people from national parks [16,17]. REDD+ could also become a source of moral hazard by providing the greatest rewards to countries with the worst record in protecting their forests [14] and inducing rent-seeking behavior by the exaggeration of potential negative scenarios to gain greater compensation [18]. While REDD+ has negative as well as positive impacts on the environment and social circumstances, introducing REDD+ in the field needs to be seriously considered.

Over the past few decades, community forestry programs in Southeast Asian countries have been highlighted to tackle forest degradation and poverty alleviation, mostly in state owned forests. Previous work in the field of community forestry revealed that such programs can bring economic benefits to local people, empower community organizations, contribute to biodiversity conservation, increase carbon stocks, and ensure clear land tenure [9,19]. Given the attention and respect community forestry pays to the knowledge and rights of people and the way it promotes participatory processes [20,21], the social safeguards of REDD+ have the potential to be synergized with community forestry's successful implementation.

Indonesia has been enthusiastic about the REDD+ initiative since the adoption of the 2007 Bali Action Plan and has actively participated in international REDD+ negotiations. Since Indonesia has the world's third largest tropical forest, with rich biodiversity, and holds a significant position in the global climate change negotiations, the country's participation in the agreement is crucial. Protected areas in Indonesian national parks became a target area for REDD+ [22]. In 2010, Indonesia signed a letter of intent with the government of Norway to cut emissions by reducing deforestation and forest degradation in return for \$1 billion of assistance for the development of policy and institutional framework and implementation of REDD+ in Indonesia. In September 2010, a REDD+ Task Force was created to assess and prepare implementation mechanisms for REDD+ in Indonesia (by Presidential Decree No. 19/2010 and Presidential Decree No. 25/2011). After a series of discussions, the Task Force officially recognized the National REDD+ Strategy by the Decree of the Chairman of the REDD+ Task Force. Following the

Task Force recommendation, the REDD+ Agency was established in November 2013 by Presidential Decree No. 62/2013.

The National REDD+ Strategy provides the vision, mission, purpose and scope of implementation, and general policy framework of REDD+ in Indonesia [23]. An important point to note is that the REDD+ national strategy stipulates stakeholder participation. In the implementation of REDD+ programs and projects, the principle of FPIC (Free, Prior, and Informed Consent) is applied to ensure fairness and accountability for indigenous and local people whose lives and rights will be affected by REDD+ activities. Moreover, the strategy provides a framework for safeguards, consisting of fiduciary safeguards, social safeguards, and environmental safeguard. The latter two safeguards are highly relevant to indigenous peoples and local communities.

In addition, there are several initiatives related to domestic safeguard measures for REDD+ in Indonesia. First, Principles, Criteria and Indicators (PCI) framework for a System for Providing Information on REDD+ Safeguards Implementation (SIS-REDD+) in Indonesia was completed by the Ministry of Forestry in March 2013. The PCI was developed under 7 safeguards as defined in the Decision 1/CP.16 of the Cancun Agreements. Second, the Principles, Criteria, and Indicators for REDD+ Safeguards in Indonesia (PRISAI) have been prepared and revised by the REDD+ Task Force in consultation with key stakeholders. Ten principles of PRISAI have been developed based on the Cancun Agreements. Some of the principles stipulated in SIS-REDD+ and PRISAI are greatly linked with indigenous people's rights and participation in REDD+. In September 2014, the National Program for the Recognition and Protection of Customary Communities through REDD+ was launched with support from nine ministries [24].

As with other protected areas, national parks in Indonesia experienced severe deforestation during the short period of lawlessness in 1998–1999 after the fall of the Suharto regime [25]. When political stability returned, various efforts to rehabilitate the deforested part of the parks have met with limited success. Since the Bali Action Plan was adopted in 2007, interest has been growing among donors and international organizations in the potential of REDD+. This has created an opportunity for the government to launch REDD+ pilot projects in protected areas [22]. Because of the 1998–1999 illegal logging and forest encroachment incidents, which fit the definition of unplanned deforestation and forest degradation, protected areas are eligible for REDD+ projects. The government expected the projects to provide the funding and technical expertise it needs to develop good practices for sustainable park management.

National parks in Indonesia have been suffering frequently from conflicts between government and local people [26] while the national parks are targeted areas for REDD+. Land tenure issues in Indonesia, including in national parks, are considered to be an aspect of structural injustice. While more than 90% of forests are categorized as state-owned forests, some community groups have utilized and/or managed resources for generations, many since before the republic was established and forests were occupied by the government [27]. While the forest law No. 41/1999 was the first law that recognized adat rights, there is still no clear or agreed basis for legitimizing adat claims to land ownership by current statutory law [28–30]. The policies of national parks in Indonesia have strictly prohibited human interventions, including agriculture, forest resource use, and hunting within national parks, and tried to maintain the integrity of natural resources [31,32]. However, in spite of the regulatory frameworks aimed at maintaining the integrity of ecosystems within national parks, they have, ironically, provoked

illegal destruction of natural ecosystems [24]. Given that national parks are a target area for REDD+, the REDD+ initiatives may become a benchmark to tackle social and political problems and guarantee people's right to use and manage forests. REDD+ initiatives are expected to resolve such forest tenure issues, which may become a key precondition to implementing REDD+ projects effectively [6].

This study investigates whether REDD+ projects could generate sufficient economic incentives and social motivations for local people through participating in protecting forests, and draws implications for developing a national REDD+ strategy suitable for circumstances in the field. The research objectives have been: (1) to assess how the relationships between local people and national park authorities have been established through the REDD+ project; (2) to identify the positive social and economic impacts of the REDD+ project on local people; (3) to make clear local awareness of the national park and REDD+ project; and (4) to make clear motivations for participating in the REDD+ project.

2. Study Site

Meru Betiri National Park (MBNP) in East Java, Indonesia has rich biodiversity with a variety of forest ecosystems and natural habitats [33–35]. The park is under the jurisdiction of two districts, Jember and Banyuwangi. The park comprises a combination of lowland rainforests, mangrove forests, and swamp forest ecosystems. This park has rich natural habitats, including Rafflesia flower (*Rafflesia zollengeriana*), api-api (*Avicennia* sp.), waru (*Hibiscus tiliaceus*), nyamplung (*Calophyllum inophyllum*), rengas (*Gluta reinghas*), bungur (*Lagerstroemia speciosa*), pulai (*Alstonia scholaris*), bendo (*Artocarpus elasticus*), 500 identified plant species of which 331 are medicinal plants, 29 species of protected mammals, and 180 species of birds. The beach in the east part of the park is the habitat and nesting site of sea turtles.

The region's importance for conservation has been recognized since the time of the Dutch, who declared the area a protected forest in 1931 (Besluit van den Directur van Landbouw Neverheiden Handel No. 7347/B). After Indonesian independence, the area was nominated as a nature reserve in 1967. At the time when the park was awarded wildlife sanctuary status in 1972, it spanned an area of 50,000 ha. In 1982, the area was expanded to 58,000 ha partly because the Ministry of Agriculture transferred 4000 ha of teak forests, previously cultivated by the forest enterprise PT Perhutani, to the Ministry of Forestry as a part of the park (Figure 1) [36].

Many people have lived in and around the Meru Betiri area since before it was declared a park [33–35]. There are 12 villages with more than 20,000 people in the area surrounding the park, which spans two districts and has a total population of 103,311. While 40% of the people have their own land, 40% of people do not own their land and obtain income as laborers or middlemen. The average monthly income is approximately \$150, and the people still depend on forests inside the national park for their daily lives.

According to the Strategic Plan of 2007 [35], the management objective of MBNP consists of four criteria: (1) to protect and maintain the integrity of the park area, along with its biological resources and ecosystem; (2) to sustainably manage and use its biological resources and ecosystems; (3) to improve the prosperity of the surrounding community; and (4) to improve the institutional and human resource capacity to manage the park through partnerships and collaboration. The park is divided into seven zones, the core zone, jungle zone, marine protection zone, utility zone, rehabilitation zone, traditional zone, and special zone. The core zone covers 28,708 ha and consists of rainforest, bamboo, and coastal forests.

The area is strictly protected, and the only human activities allowed are for biodiversity research and inventory. The jungle zone covers 20,897 ha, with mangrove forests, rainforest and bamboo. This zone is accessible only for educational and limited recreational purposes. The marine protection zone covers 2603 ha along the coastline. The utility zone covers 273 ha. This zone is a center for the development of ecotourism infrastructure. The rehabilitation zone covers 2733 ha, where the rehabilitation program is implemented. Local people are allowed to plant indigenous trees and crops within the zone. The area is also used for research on critical or degraded land. The traditional zone covers 285 ha. Communities that have been historically and traditionally dependent on the forest within this zone are allowed to use it for their own purposes. The special zone covers 345 ha. There are communities who have been living in this area since before the park was formed and the park management has had no choice but to allow the provision of modern infrastructure, such as roads and electricity, to these communities.

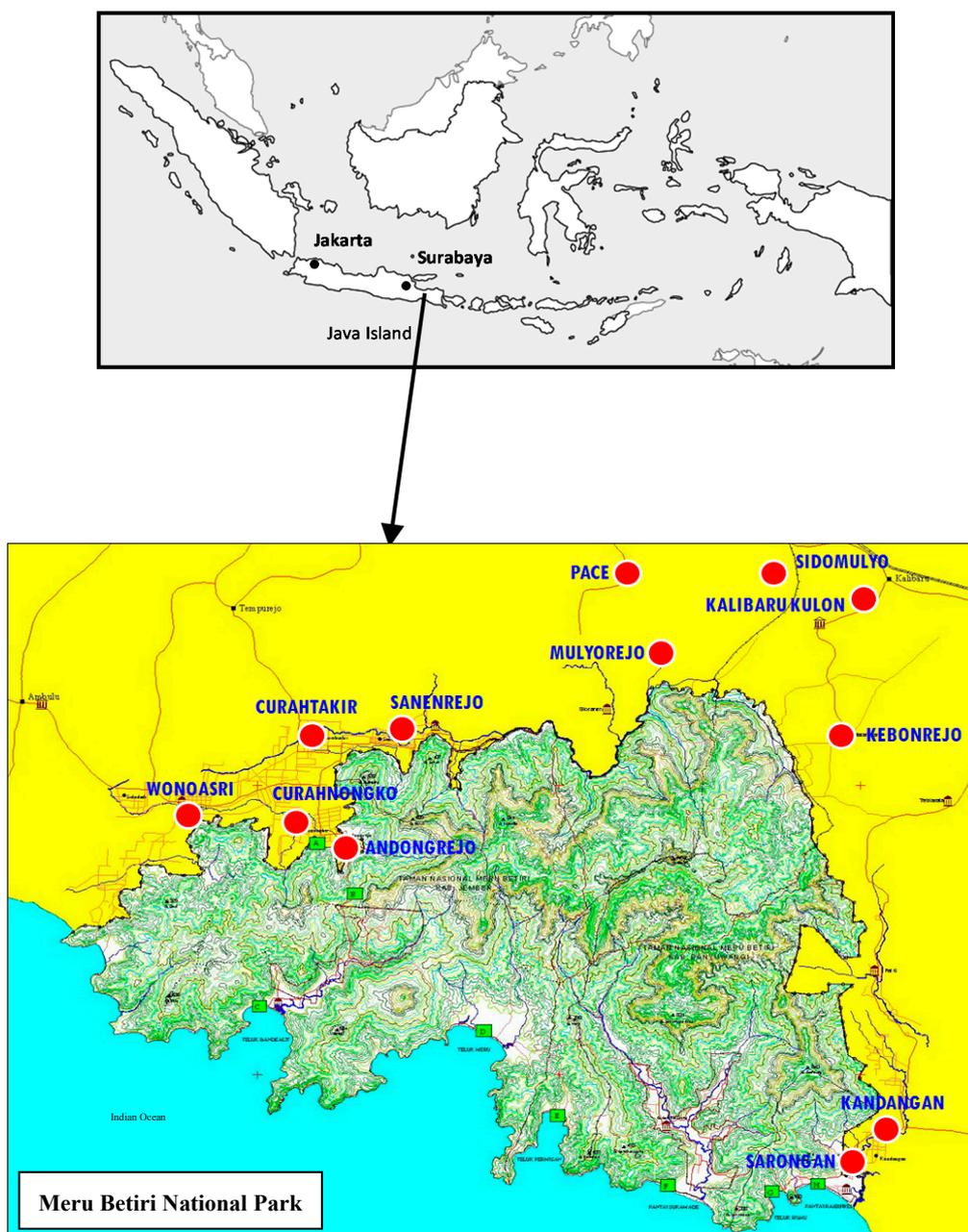


Figure 1. Study site.

The four-year REDD+ project started in January 2010 and was based on the experiences of the previous rehabilitation projects, which will be discussed in the results section. The REDD+ demonstration project in MBNP was financed by a public-private partnership between the International Tropical Timber Organization (ITTO), Seven & I Holdings, Japan, and the Forestry Research and Development Agency in Indonesia (FORDA). While the ITTO project finished at the end of 2013, some activities have been carried on with support from overseas agencies and international institutions. The REDD+ project is likely to contribute positively to the ongoing forest rehabilitation program and may improve the effectiveness of the efforts to address and eliminate the underlying causes and drivers of deforestation in the park.

The REDD+ demonstration project in MBNP has an objective, aims, and expected outputs as follows [35]. The stated objective is to contribute to tropical forest conservation by enhancing community participation in conservation activities and sustainable park management. The project aims to achieve the following objectives: (1) to improve the livelihoods of local communities living inside and in the area surrounding the park and (2) to develop a credible measuring, reporting, and verifying (MRV) system for monitoring the reduction of emissions caused by deforestation and forest degradation and for enhancing forest carbon stocks in MBNP. The specific outputs from activities are: (1) improved participation of the local community in forest management; (2) developing alternative sources of income to improve the livelihoods of local communities living inside and in the area surrounding MBNP; (3) reduction and reporting of illegal logging and forest encroachment; (4) improving the capacity to conduct an inventory of the resource base and carbon accounting in a measurable, reportable, and verifiable form; (5) preparing a report on comprehensive baseline data and an estimation of the emissions reduction and carbon stock enhancement of the national park; and (6) establishing and validating a system for monitoring emissions reductions and the enhancement of carbon stocks.

3. Methods

The research was targeted at those living inside or adjacent to Meru Betiri National Park, East Java, Indonesia, which became a model case of managing a national park through the national REDD+ demonstration project.

The authors (Harada, Prabowo, and Aliadi) conducted semi-structured interviews to obtain qualitative data from village leaders in the surrounding five villages participating in the REDD+ project, two local NGO staff members, a head, a staff member, and a park ranger of the national park. The contents of the interviews were as follows: historical changes in the forest ecosystems in the national park, institutional conditions for organizing the project, participation of local people in the project, agroforestry conditions, concerns about the potential impacts of REDD+ to local livelihoods, perceived benefits that local people may receive from the project, and future plans for planting trees and income generation for local people. The interviews were conducted in June and September 2010 and March 2012.

The authors (Harada and Aliadi) and the two local NGO staff members conducted formal interviews with a questionnaire written in Indonesian in the two villages selected from the five villages adjacent to the national park. Interviews of the head of each household were conducted in Indonesian from July to September 2012. The respondents interviewed were randomly selected from both participants and non-participants in the REDD+ project. In the two villages, 70 and 58 participants and

30 and 21 non-participants in the REDD+ project were selected. The ages of respondents ranged from 25 to 70 years old; further, 89% of the respondents were male, and 11% were female. The main occupation for more than 80% of respondents was agriculture. Of the respondents, 1% had lived there for less than 10 years, 19% for 10–20 years and 80% for more than 20 years. The contents of the questionnaire were as follows: land use patterns and land ownership of participants and non-participants in the REDD+ project, income of participants and non-participants in the project, awareness of local people about the rehabilitation program, local people's motivations to participate in the rehabilitation program, and local people's reasons not to participate in the rehabilitation program.

Secondary data were also gathered from the local NGO and the national park office: Memorandum of Understanding (MOU) between the national park and communities for implementing the REDD+ project, detailed contents of the programs for rehabilitation and income generation, and the national park management plan.

In addition to the interviews and gathering secondary data, participant observation was conducted. The authors observed the daily activities of local people and visited rehabilitation sites with different forest succession and vegetation stages inside the national park.

4. Results

4.1. The Changing Ecosystems and Efforts to Recover the Ecosystems through Multiple Stakeholders' Collaboration in Meru Betiri National Park

MBNP suffered from massive deforestation in 1998 followed by encroachment on the degraded forest land by local farmers. The incident was triggered by the decentralization euphoria that swept the country after the Suharto regime collapsed in 1998. Teak forests located in the rehabilitation zone in the national park, previously owned by PT. Perhutani, were totally harvested within six months by various actors, including logging companies who paid local people living inside and adjacent to the national park to occupy the land illegally and cut down the teak forests. According to local people, they watched large trucks coming and going through their villages, transporting teak logs from the forests. The park rangers and local law enforcement did not take any action to stop the illegal activities, either because they lacked the capacity to do so, or because they were being paid off. Such situations frustrated the local people who had been following the rules and caused anxiety regarding the negative environmental impacts of the logging. In fact, some villages adjacent to the national park experienced land erosion, flooding, and water shortages during the previous dry seasons. Additionally, some villages, recognizing the benefits the outsiders were reaping, decided to join the illegal harvest. However, no one has been prosecuted for the illegal activities.

The root causes of deforestation in MBNP can be identified as follows: the scarcity of agricultural land to meet the needs of an expanding farmer population and the lack of economic alternatives for the farmers, both of which result in increased pressures to encroach on forest land. The pressures were exacerbated by weak law enforcement and a lack of coordination among government institutions. In light of these pressures, park management has focused their policy measures on improving local livelihoods with the complete support of local NGOs.

The officers decided to recover the deforested rehabilitation zone with local people, including those involved in destroying the forests. Park management officers decided to replicate a reforestation model developed by the Forestry Department of Bogor Agricultural Institute and a local NGO, Lembaga Alam Tropika Indonesia (LATIN), or the Tropical Nature Agency of Indonesia. These groups had previously developed and implemented a 7 ha experimental pilot project that planted medicinal trees such as kedawung (*Parkia timoriana*), kemiri (*Aleurites molluccana*), and trembesi (*Ptecolobium saman*), and food crops such as rice, corn, peanuts, soybeans, and empon-empon (medicinal roots like ginger). LATIN aimed to develop a partnership-based collaborative forest management model involving the community in the hope that it would ease tensions between the community and park management. The project contributed to the rehabilitation of degraded lands and created better cooperation and relationships among park management officers, local government officers, and local communities.

Following the park management decision, the rehabilitation program was organized in 1999 on 4000 ha of degraded land in the rehabilitation zone of the park. Five villages adjacent to the national park participated in the program. LATIN formed a local NGO called KAIL (Sustainable Nature Conservation Indonesia), and KAIL played an important role in the rehabilitation program by organizing the farmers for forest management and patrolling, educating, and advising them, facilitating discussions between the farmers and park management, and maintaining the farmers' motivation to carry out the rehabilitation program. KAIL's involvement and the success of the 7 ha pilot project mentioned above, which provided new income sources for the farmers, were the reasons behind the high participation rate in the new land rehabilitation initiative. In some villages, community leaders took the initiative to carry out illegal "land reform," under which each farmer was allocated 0.25 ha of the deforested lands. Seeds and seedlings of medicinal plants such as kedawung, kemiri, pakem (*Pangium edule*), pete (*Parkia speciosa*) mengkudu (*Morinda citrifolia*), pinang (*Areca catechu*), melinjo (*Gnetum gnemon*), and joho (*Terminalia citrine*) were gathered by local people from inside the national park, with the permission of the national park management officials. The medicinal plants were grown in addition to annual crops such as rice, corn, peanuts, and cassava, and fruits such as banana, jackfruits, mango, durian, and avocado. However, some highly valuable commercial crops, such as tobacco, coffee, and cacao, were prohibited by the management of the national park, for fear that participants would only cultivate these crops to improve their income, without planting trees. As of 2009, 3898 farm households—nearly half of the village population—working in 127 groups, have participated. These activities implemented with collaboration among the local NGO, the national park authorities, and local people were taken over as the REDD+ project.

4.2. Social and Economic Impacts of the REDD+ Project on Local People

Since the REDD+ project started in 2010, tree planting has been implemented in the rehabilitation zone. Local people could receive income by cultivating and selling crops through agroforestry. Table 1 shows the land use and ownership of local people in the two villages. While almost all non-participants only used lands owned outside the park, participants used lands inside the park as well as owned lands outside the park. Consequently, the land area used by participants is much larger than that of non-participants, while land area privately owned by non-participants is much larger than that of

participants: 0.34 ha for non-participants and 0.09 ha for participants in Curahnongko and 0.35 ha for non-participants and 0.09 ha for participants in Sanenrejo.

Table 1. Land area inside and outside Meru Betiri National Park.

Land Types	Curahnongko		Sanenrejo	
	Participants	Non-Participants	Participants	Non-Participants
privately owned land (ha/household)	0.09	0.34	0.22	0.35
state owned land (ha/household)				
national park	0.38	0	0.38	0
plantation land	0.06	0.03	0	0
Total land (ha/household)	0.53	0.37	0.60	0.35
Proportion of land in national park (%)	71	0	63	0

Table 2. Incomes of participants and non-participants in the rehabilitation program.

Type of income	Curahnongko		Sanenrejo	
	Participants	Non-Participants	Participants	Non-Participants
agricultural income from the national park (1,000 rupiahs)				
rice	1254	0	771	0
vegetables	2326	0	1957	0
fruits	720	0	1248	0
fuel woods	0	0	11	0
useful plants (cece)	363	0	3716	0
total agricultural income from the national park	4663	0	7703	0
agricultural income from outside the national park (1000 rupiahs)				
rice	1937	3903	2159	2584
vegetables	1390	2231	642	2579
fruits	143	777	208	548
fuel woods	84	1013	122	277
useful plants (cece)	71	0		0
total agricultural income from outside the national park	3625	7,924	3132	5987
non-agricultural income from outside the national park (1000 rupiahs)				
domestic animals	2517	3511	2235	4882
wage labor in agriculture	2374	2087	1395	819
wage labor as government employee	683	2740	850	6741
small business, selling cars and motor bikes	1928	6266	1034	20,610
others (sending money, endowment, etc.)	2915	4907	2832	6122
total non-agricultural income from outside the national park	10,417	19,511	8346	39,174
total income from outside the national park (1000 rupiahs)	14,042	27,435	11,477	45,161
total incomes (1000 rupiahs)	18,706	27,435	19,180	45,161
proportion of incomes from the national park (%)	25	0	40	0

Exchange rate was approximately Rp. 9500/US\$.

Table 2 shows the incomes of participants and non-participants both from inside and outside the national park. Incomes from the national park mean those related to REDD project activities. Income from rice and vegetables in the agricultural sector was fundamental for both participants and non-participants. On the other hand, significant differences in income between participants and non-participants were identified. The income of participants was much smaller than that of non-participants. The income of participants was approximately 60% that of non-participants in the two villages.

The proportion of participants' income from activities in the national park was approximately 25% and 40% in Curanongkon and Sanenrejo, respectively. The amount of money that participants could obtain from agriculture inside the national park was bigger than that from agriculture outside the national park: 4663 rupiahs in Curahnongko and 7703 rupiahs in Sanenrejo. Participants could greatly increase their incomes, in particular, by selling vegetables cultivated inside the national park. These facts imply that income from the national park is crucial for those who participated in the REDD project. On the other hand, both agricultural activities and other activities significantly contributed to continuous income opportunities for non-participants. Non-participants' income from agriculture outside the national park was almost twice that of participants: 7924 rupiahs in Curahnongko and 5987 rupiahs in Sanenrejo. Additionally, incomes from sectors outside of agriculture, especially small business, accounted for a large amount of income: 19,511 rupiahs in Curanongkon and 39,174 rupiahs in Sanenrejo.

While those who participated in the project were not wealthy people and did not have sufficient privately owned land and income from agriculture, they could successfully increase their income by using land inside the national park through the agroforestry demonstration sites of the REDD+ project. Thus, the agroforestry demonstration sites have given landless and disadvantaged people the right to access the productive lands inside the national park, which became a safety net that allowed them to raise their standard of living.

4.3. Local Awareness of and Motivations to Participate in the Rehabilitation Program in Meru Betiri National Park

Table 3 shows the results of interviews associated with the awareness of the rehabilitation program by local people in the two villages. While almost all participants and non-participants knew about the regulations in national parks, most people did not know about carbon credits.

In October 2011, the park management signed an agreement with the head of a farmers' group in Curahnongko to enhance the partnership between park management and the community around forest conservation and reducing emissions from deforestation and forest degradation. Interviews showed that most participants and non-participants in the two villages did not know about the MOU. More than 90% did not know the purpose of the rehabilitation program was reducing CO₂ emissions from deforestation and forest degradation, but most people knew about the merits of the rehabilitation program.

The results demonstrated that both participants and non-participants did not recognize the links between the regulations of national parks, the merits of the rehabilitation program, and the purpose of carbon credits, REDD+, and the rehabilitation program. The fundamental reason why local people lacked understanding of carbon credits and REDD+ is lack of opportunities to obtain information. For

instance, while the MOU mentioned above should be related to REDD+ issues, the agreement did not mention the REDD+ project, nor was the agreement followed up with any sort of explanatory meetings with village leaders and local communities. According to KAIL staff, they did not provide face-to-face meetings to explain such issues. They were not confident enough in their knowledge of the REDD+ mechanism to disseminate information to the community. Even if they had understood the scheme better, they said that they would choose to refrain from informing the people of the potential financial benefits because they feared a backlash if REDD+ failed to deliver as promised.

Table 3. Local awareness of the rehabilitation program.

Statements	Curahnongko				Sanenrejo			
	Participants		Non-participants		Participants		Non-participants	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Do you know about MOU between the national park and the village?	9	91	0	100	24	76	5	95
Do you know about regulations in the national park?	100	0	93	7	91	9	71	29
Do you know the purposes of carbon credits?	6	94	3	97	21	79	5	95
Do you know the purposes of the rehabilitation program?	94	6	77	23	93	7	86	14
Do you know the merits of the rehabilitation program?	90	10	93	7	100	0	95	5

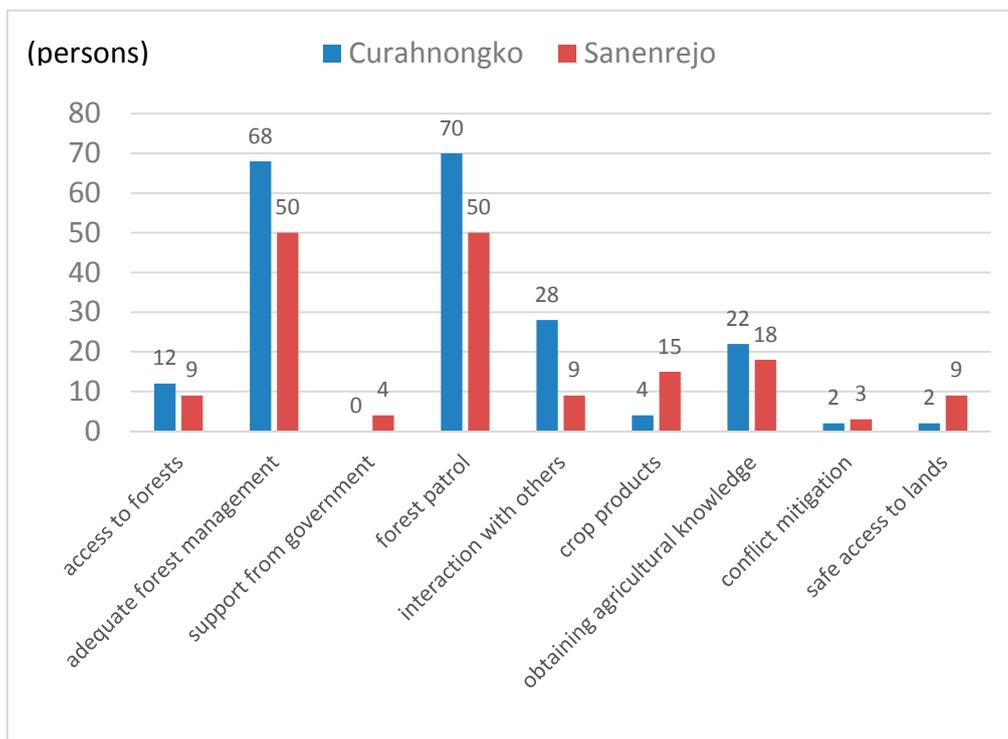


Figure 2. Local people’s motivations for participating in the rehabilitation program. Note: Respondents chose three statements.

Figure 2 shows the motivations of local people who joined the rehabilitation program. Many people in the two villages insisted that they could do adequate forest management and that forest patrolling was their motivation to join the program. Local people had the positive impression that the agroforestry of the rehabilitation program could provide opportunities for them to cultivate crops inside the national park, where they were not allowed to use forest resources under the current regulations of national parks in Indonesia. As for the patrol, local people started the patrol in the core zone to tackle illegal logging in 2010. Most people did not have any expectations of government.

On the other hand, the main reasons the non-participants did not join the rehabilitation program were that they were afraid of violating the regulations of national parks, had enough private land, and were not capable of expanding their activities by joining the program (Figure 3). As shown in Table 3, given that non-participants are wealthier than participants and are also engaged mainly in non-agricultural sectors, non-participants did not necessarily need to join the program and obtain access to additional lands.

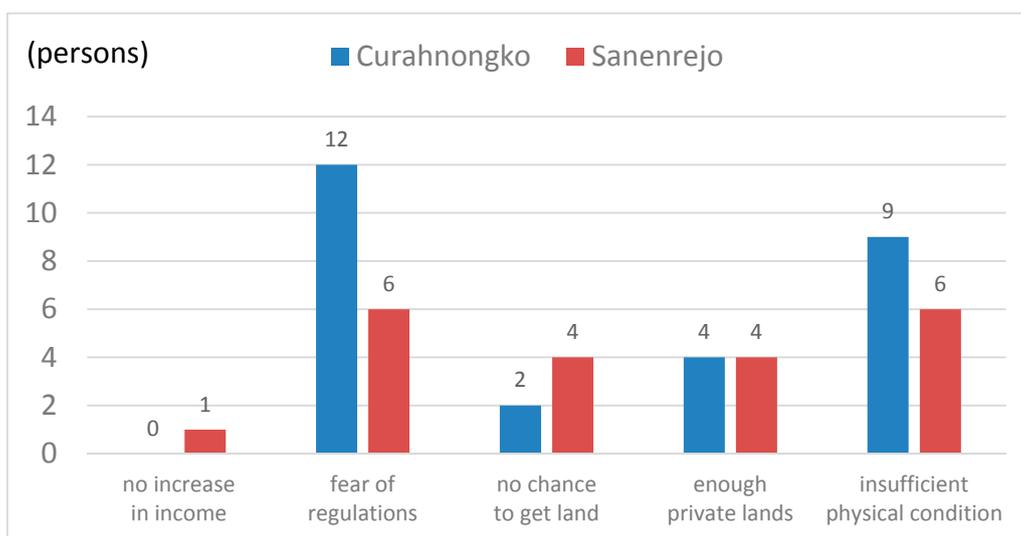


Figure 3. Local people’s reasons for not participating in the rehabilitation program. Note: Respondents chose one statement.

4.4. Further Program to Achieve “Complete” Reforestation and Continuous Income Generation

In 2011 and 2012, LATIN and KAIL implemented a new program for enhancing and accelerating rehabilitation. They began participatory mapping and conducted an inventory of lands used and planted by the REDD+ project participants in the national park [37]. Table 4 shows the land classification for categorizing participants’ lands inside the national park. The purpose of land classification is to promote further intensive tree planting by identifying those who managed each plot of land and the number and species of trees planted. The target of the plan was for all lands to be type 6, dense forests with no crops (more than 150 trees planted/ha), at the end of the project. In the categorization of lands in Curanongkon, LATIN and KAIL classified 750 participants into 6 types: 120 participants in type 1, 75 participants in type 2, 148 participants in type 3, 170 participants in type 4, 188 participants in type 5, and 49 participants in type 6. The total number of planted trees in Curanongkon was 18,136 of 54 different

species. While the project is still in the trial process, it will try to cover the rehabilitation zone with dense forests.

LATIN and KAIL also started the new program PINTAR (Program Insentif untuk Petani Rehabilitasi), which gives economic incentives to participants for rehabilitating lands through tree-planting started in June 2012 (Table 5). Participants could obtain discounts for purchases of daily necessities (economy), funding support for educational expenses (education), and funding support for purchases of medicines in care insurance facilities (health). As participants moved their land closer to type 6, they could receive more economic support through this program. The program was started in December 2013 by the local NGO and is still in the demonstration process, where only 50 participants who have lands of type 6 were targeted. The local NGO is planning to expand the target areas if they can obtain funds from donors.

Table 4. Land classification based on tree density and number of species. Source: LATIN (2011) [37].

Types	Vegetation Conditions	Density (trees/ha)	Number of Species
1	No trees, only crops	0	0
2	A few trees + crops	less than 50	less than 5
3	Rather dense + crops	51–100	6–10
4	Dense + crops	101–150	11–15
5	Dense	151–200	16–20
6	Dense no crops	more than 151	more than 11

Table 5. Total amount of money participants can get annually. Source: LATIN (2011) [37].

Types	Economy (rupiahs)	Education Health (rupiahs)	Total
1	60,000	0	60,000
2	120,000	0	120,000
3	180,000	180,000	360,000
4	240,000	240,000	480,000
5	300,000	600,000	900,000
6	360,000	720,000	1,080,000

5. Discussion

Chhatre *et al.* [7] demonstrated that tenure security and local participation in forest management will not only enhance social outcomes but also improve outcomes for forest management and improve forest governance. This study also revealed that securing land use inside the national park and the participation of local people, with the close collaboration with local NGOs and the national park, could lead to the achievement of both the recovery of forests and the improvement of local income.

Here, successful achievements and challenges of the REDD+ project are identified based on the research results: how the project could both conserve forest ecosystems through rehabilitation and improve local livelihoods through agroforestry, how carbon credits may function in the market, and how the benefits of carbon credits may be equally distributed. Finally, the policy implications of REDD+ are discussed.

5.1. How Could the REDD+ Initiatives Enable Local People to Obtain the Rights to Use Lands inside Meru Betiri National Park?

The most valuable achievement of the REDD+ project was the revelation that local people could use lands for agriculture in MBNP, though the Indonesian government strictly prohibited any human activities under the regulations of national parks.

It is widely recognized that tenure reform, including property rights, should be prioritized for effective REDD+ implementation because conflicts are often provoked by ambiguous and unfair land ownership or use [38–40]. Whereas UNFCCC's social safeguards and the Indonesian REDD+ National Strategy highlighted local people's rights as social safeguards [23,41], the Indonesian National REDD+ Strategy stressed that land tenure reform, including a constitutional right of boundaries and management rights for natural resources, is a prerequisite for successful implementation of REDD+ [23]. Sunderlin noted that REDD+ has given visibility to forest tenure issues on the international stage [38]. The Indonesian National REDD+ Strategy also shows that land reform has become the central argument for resolving land tenure issues towards successful REDD+.

Whereas this case study of MBNP exceptionally allowed local people to use forest resources and lands inside the national park, this is a rare case that cannot necessarily be adopted in other national parks. The REDD+ project in this national park was recognized to be valuable and was able to be successfully implemented because the national park had some experience with local people who had been supported by a local NGO (LATIN) before the REDD+ project started. The four-year ITTO REDD+ project was successfully implemented because the local NGO built confident relationships with the national park authorities. The local NGO played a significant role as a third party in the development of a partnership between local people and the national park authorities through a pilot project to rehabilitate bare lands inside the national park. Although the economic impacts for local people were limited, trust among the two parties was built through the activities, and such a relationship pushed the park authorities to implement rehabilitation in the bare lands after illegal logging inside the national park, which was the basis of the subsequent REDD+ project.

Additionally, local communities were strongly supported by local NGOs. During the activities mentioned above, one staff member of LATIN established an independent local NGO with local staff (KAIL), which had a basecamp in the city close to the communities. KAIL devotedly supported local people by exploring projects to improve economic conditions, organizing local institutions for forest management, patrolling of the national park, and establishing MOU between the local community and the national park. These relationships among the national park, local NGOs, and local people could achieve the rehabilitation of bare lands and fulfill local people's demands to use land inside the national park. Such experiences were smoothly transitioned into the REDD+ project.

In cases in which the national government owns national parks in Indonesia and strictly prohibits access of local people to the parks to ensure the integrity of forest ecosystems, local people have no incentives to participate in conservation efforts [42]. Larson and Petkova noted that REDD+ can improve governance if national REDD+ strategies, programs, or reforms and the donors supporting local communities integrate efforts to build government capacity and strengthen the role of communities to promote good governance and contribute to REDD+ implementation [40]. The case from MBNP could demonstrate the necessity of land reform and multiple stakeholders' collaboration beneficial for local

people for the successful REDD+ implementation against the “adverse legacy” of strict forest protection of national parks in Indonesia.

5.2. Rehabilitation of Forest Ecosystems or Improvement of Local Livelihoods through Agroforestry?

Whereas the national park authorities decided to give permission to use lands to local people who were highly involved in the illegal activities in the Suharto era, they persuaded local people to join the REDD+ project to manage the trees obligatorily planted under the intercropping system of annual crops. While revenues from the REDD+ project should be comparable to those of other land use alternatives, the national park authorities hesitated before planting some highly valuable commercial crops. These authorities were afraid that people would focus on income generation from cash crops rather than managing the forest.

Because of these efforts, the REDD+ project was able to accomplish the partial recovery of forest ecosystems in areas where timber was illegally harvested inside the national park. The park has achieved net reforestation since 2005 as the rehabilitation program has progressed: an annual forest increase rate of 0.08% during 2005–2007 and 0.03% during 2007–2010, and an annual deforestation rate of 0.30% during 1997–2001 and 0.07% during 2001–2005 [36]. It can be concluded that conversion of land to agroforestry by the REDD+ project could contribute to the recovery of forests.

The REDD+ project also contributed to an increase in income from the intercropping of rice and vegetables, as shown in Table 2. This study demonstrated that agroforestry activities in the rehabilitation program inside the national park could provide additional income for the project participants. The project also encouraged participants to use more land than they privately owned outside the national park, which contributed to an increase in total income (Table 2). It can be concluded that the project became a safety net for ensuring economically stable lives for participants, who were disadvantaged people with insufficient private land outside the park. The REDD+ project in this national park can fulfill the prerequisite conditions of participation of local people and benefit-sharing for local people.

The national park faces some challenges in balancing the recovery of the forest ecosystem and the improvement of people’s income generation in a sustainable manner. As shown in Tables 4 and 5, the local NGO has tried to develop both activities simultaneously. The final target of the local NGO is to create dense forests with no crops (types 5 or 6 in Table 4). An economic incentive program for participants has been implemented to compensate income lost, which may occur with the progress of the rehabilitation project towards denser forests (Table 5). The programs of the local NGO are paradoxical because economic improvement through agriculture and rehabilitation by covering the land with trees cannot necessarily be achieved simultaneously. The excessive pursuit of type 6 forests (Table 4) means fewer economic contributions from agriculture compared with other types of lands that have both crops and trees. An increase in land devoted to type 6 forest necessarily means that fewer people will have the ability to intercrop and will see a drop in the income they can obtain by selling agricultural products.

Whereas income generation is an incentive for local people to join the REDD+ project, the challenges are how the economic program presented in Table 5 can compensate for the shortfall in agricultural income from the national park; and how the funding offered in Table 5 can be managed. For the former, if the local people own land of types 5 or 6 inside the national park, they can receive economic support

in the amount of 900,000 or 1,080,000 rupiahs. However, Table 2 shows that participants' agricultural income from the national park exceeds the money supported (4663 rupiahs in Curahnongko and 7703 rupiahs in Sanenrejo), which implies that compensation from the economic incentive program cannot indefinitely satisfy the demands of local people. As for the latter, the economic incentive program has been completely relying on foreign donors for funding. However, there is no guarantee that the funds can be maintained continuously. Given the distribution of carbon credits from the REDD+ project, cash benefits from carbon credits may be used to provide income to local people in the program. In Indonesia, however, no clear national vision of benefit-sharing including the local community has been well discussed; the regulation of revenue-sharing for REDD+ projects among the government, local community, and project developer ranged from 20% to 70% [43].

It is also challenging to help local people understand REDD+ or carbon credits. Resosudarmo *et al.* [44] demonstrated that local knowledge about REDD+ was generally low in developing countries. Our study also revealed that knowledge about carbon credits was quite low (Table 3). The staff of the local NGOs were reluctant to give sufficient information about REDD+ because they were not confident enough to inform local people about the REDD+ arguments or carbon credits.

This study also provided promising results for the success of the REDD+ project. The REDD+ projects in several developing countries including Indonesia, Tanzania, Cameroon, and Brazil demonstrated that local hopes were especially high for forest protection and income improvement [44]. The fact that this study revealed that local people had strong motivations to join the REDD+ project, such as adequate forest management and forest patrols (Figure 2), should also be a sign of the future success of the REDD+ project.

This study only shows the findings from one of many national parks in Indonesia. The limitations of this study include a restricted amount of time for the field research and a relatively small number of respondents. However, at the least, it can be suggested that local participation, income generation with the benefit-sharing of carbon credits, and exploration of alternative livelihoods are crucial to increasing the motivations of those who are interested in conserving tropical forests. It is crucial to investigate the socioeconomic implications of REDD+ and to develop strategies for how social safeguards can be defined, implemented, and monitored [45]. Whereas the participation of local people and land reform are not straightforward [7], the lessons learned from the implementation of the REDD+ project in a national park can serve as a model that has implications for forestland in other countries that are trying to accomplish an effective and efficient balance between conserving forests and improving local income in a sustainable manner.

6. Conclusions

The study investigated (1) the historical process of developing the REDD+ project on local people; (2) the social and economic impacts of the REDD+ project on local people; and (3) the local awareness of and motivations to participate in the REDD+ project in Meru Betiri National Park in Indonesia. Interviews of related stakeholders, including a questionnaire for householders, were conducted.

The study findings confirmed that the project secured land use inside the national park and the participation of local people in the REDD+ project in the park, which had been strictly prohibited by national regulations in Indonesia. Consequently, the project in the national park could successfully

introduce alternative livelihoods to improve income, particularly for economically disadvantaged people, by implementing a rehabilitation program with agroforestry while conserving forests. Local people were enthusiastic to join in the project. The study also demonstrated the necessity of further discussion of effective benefit-sharing of carbon credits while realizing local participation in REDD+ projects and improving local livelihoods. These outputs of the project can become a model for collaborative forest management with multiple stakeholders in national parks in tropical countries that are confronting similar problems.

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Author Contributions

Kazuhiro Harada collected and analyzed all data used in the study and wrote most of the article. Dede Prabowo contributed to conceptualization of the study and to writing of Section 1. Arif Aliadi collected all data in the field in Section 4 and supervised the fieldwork. Jun Ichihara contributed to collect data of Indonesia REDD+ policy and write Section 1. Hwan-Ok Ma contributed to give comments and suggestions for the study as a manager of the ITTO REDD+ project in Meru Betiri National Park.

Conflicts of Interest

The authors declare no conflict of interest.

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