Economic Analysis of Local People's Involvement in Community-based Forest Management (CBFM) in Desa Ciomas, Indonesia

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ABSTRACT
Local people's involvement in forest management in Indonesia was studied in a context of a community-based forest management program named Pengelolaan Hutan Bersama Masyarakat (PHBM), which emerged from the state-owned forest company, Perhutani. On Java Island, this program has been spreading since 2003 and it was hoped that it would help to increase local people's income by giving them access to the forest, to assist in the thinning process and to cultivate intercropping. This study aimed to observe the impacts of people's involvement in the PHBM program on their economic wellbeing. The study was conducted over three research phases, in 2005/2006, 2006/2007, and 2008/2009, in Desa Ciomas village, Bogor District, West Java Province and through follow-up research performed in 2016 to observe more recent conditions and establish the continuity of the previous research. The results showed that local people in Desa Ciomas were highly interested in PHBM and the benefits that it offered, with an expectation of additional income. The optimal income was not realized in some cases, including when large-scale farming necessitated farming system that relied on hired labor which is known to be less productive than family labor. PHBM should be able to contribute to local people's income by empowering them with respect to both on- and off-farm activities.

Keywords: B/C ratio, community-based forest management, poverty alleviation, rural development

INTRODUCTION
Local community involvement in forest management in Indonesia has been largely based on changes in forest laws and regulations. In the past, there were customary laws that regulated forest ownership and management by local people, called Hukum Adat. Hukum Adat is usually derived from indigenous knowledge about forests and natural resources passed down through generations (Subarudi, 2014). The involvement of communities in forest management in Indonesia, especially in Java, occurred during the Dutch colonial period. From 1873 to 1950, an intercropping system involving local farmers named tumpang sari was in use (Ansori et al., 2011); then, in 1967, the Indonesia Basic Forestry Law stated that all forests inside of Indonesian territory, including natural resources, were controlled by the state. Under this law, individual/personal or communal rights to forests that could not be registered and this law effectively prevented local people from accessing forest resources under customary law (Maryudi and Krott, 2012). Forest areas were brought under the jurisdiction of the Ministry of Forestry and managed by a governmental forest company, named Perum Perhutani (hereafter, Perhutani) (Sukendro et al., 2002).

The issue of customary law and local rights to forest resources was resurrected by the Forest Law of 1999, after the fall of the New Order Government, in a period known as the Reform Era. During this area, the Indonesian government created a decentralized government structure, known as Otonomi Daerah, or regional autonomy (Sukendro et al., 2002). The decentralized government granted authority to local governments to manage their own natural resources, including forest resources (Siregar et al., 2007). Under Forest Law, existing traditional communities were empowered to utilize their own forests resources based on customary laws, and whether a traditional community still existed or not was determined by local government.

Land ownership and border disputes between local government and local people have been reported (Kusumanto and Sirait, 2002). Local communities had cause to claim forest resources, and even whole areas of forest, which belonged to the state; however, even though Forest Law 1999 granted au-
thority over community forests to local people, regulations on the management of state-owned forests were not significantly different from the government-based forest management in the New Order Era. Thus, oppression has been observed, as well as rejection of rights, expulsion, and even elimination of the access and rights of local communities with regard to forest resources. From a governmental perspective, local people were squabbling over land rights, and illegal logging and pilferage of forest resources occurred in state-owned forest areas. A number of protected areas in Indonesia suffered illegal logging in the government decentralization period during the transition of power from central to the local government occurred (Colfer et al., 2005). Based on forest community problems in South and Southeast Asia, the most serious issue that forest peoples face is the lack of recognition of their customary rights to their land (Colchester, 1994), resulting from changes in forest policies. In Nepal, prior to 1950, under the feudal system government forests were controlled largely by the government. From the 1950s, a partyless system of panchayat politics replaced the feudal system and the forests were nationalized and placed under the control of the Forest Department (Malla, 2001). In 1970, community forestry was introduced in Nepal, since the Forest department did not have the capacity to manage forests effectively and illegal forest use was increasing (Fisher, 1995).

Land ownership and forest access conflicts can lead to poverty. Poverty has generally been defined as insufficiency in food, income, and other resources required to maintain an adequate standard of living, usually caused by a lack of access to assets (natural, physical, financial, human, social) (Arnold, 2001). In total, 23.8% of Indonesian villages border forests (Badan Pusat Statistik, 2016), and 50% of poor people in Indonesia, i.e., about 32 million people, live in forest villages (CESS-ODI, 2005). Since poor people tend to be heavily dependent on common, pooled resources, sudden restriction or denial of access to such resources can significantly increase the vulnerability of the poor (Mahanty et al., 2006). Poverty alleviation requires local participation in forest management, even if it is legally recognized that forests are owned by the government. In Ghana, poverty reduction strategies promote customary tenurial systems as a mechanism for sustained poverty alleviation (Colfer et al., 2005). Government-based Forest Management (CBFM) has had more success in addressing poverty than either the state or the private sector (Mahanty et al., 2006). In Vietnam, community forestry was finally legally implemented in 2004, after its exceptional success in improving national wellbeing (Sunderlin, 2006) by reducing the rate of poverty from 58% to 29% of the total population between 1993 and 2002, thus representing one of the greatest success stories in economic development worldwide (World Bank, 2003). Being initiated earlier, CBFM in Nepal has enhanced the income of many poor households (Mahanty et al., 2006) who joined the Community Forest User Groups (CFUGs) or Leasehold Forest User Groups (LFUGs) and developed enterprises, with the supports from both governmental and non-governmental organizations (NGOs) (Pandit et al., 2008).

Various schemes promoting cooperation between forest companies and communities have been implemented in Indonesia, including Community Forestry (Hutan Kemasyarakatan or HKm), Village Forests (Hutan Desa or HD), and Community Forest Plantations (Hutan Tanaman Rakyat or HTR). These schemes aim to enhance local prosperity (Fujiwara et al., 2012). In 2001, Perhutani, as the state forestry company, initiated a CBFM scheme named Pengelolaan Hutan Bersama Masyarakat (PHBM) for forest villages on Java Island, which is still in operation (Nurjana, 2005). PHBM is a joint program between Perhutani and forest village communities, with principles shared between the stakeholders such that their common interest in achieving sustainability of forest resources can be optimized (Perum Perhutani, 2001). Forest villagers interested in PHBM joined the forest village community bodies Lembaga Masyarakat Desa Hutan (LMDH). PHBM adopted a benefit-sharing system wherein farmers who were members of an LMDH had the right to profit economically from harvesting timber, with the amount earned being based on negotiations between Perhutani and the LMDH. The maximum profit that can be gained by farmers is 25% of the timber price, while they obtained 100% of the benefits from intercropping plantations (Nurjana, 2005).

The effectiveness of PHBM for overcoming poverty in forest villages in Indonesia has been analyzed in several studies. A study on PHBM in Central Java Province found that benefit-sharing of timber production, which is one of the main features of PHBM, has contributed to the overall development of the village (Fujiwara et al., 2012). Another study on PHBM in West Java Province found that land and plant controls in PHBM resulted in an increase in the minimum income from agroforestry businesses for poor households in villages around the forest, both from timber and non-timber products. The increasing income raised poor households above the poverty line (Aji et al., 2013). In contrast, based on research in Jambi and East Kalimantan, Urano (2013) concluded that the CBFM poverty alleviation policies promoted by the Indonesian government have not made the expected progress, as they have not solved the problem of weak land rights of customary landowners in forest populations (Urano, 2013).

This study aimed to examine the hypothesis that CBFM contributes to reducing poverty. Although PHBM had been in operation for 10 years by 2011, not all villages around forests in Indonesia had even formed an LMDH (Fujiwara et al., 2012). To investigate the sustainability of the scheme, this study intended to identify local people’s perspectives and problems with PHBM, as well as the role of PHBM in increasing income. Therefore, this study was conducted over three research phases and one follow-up research phase. The study was conducted in Desa Cimomas, West Java, one of the villages wherein PHBM has been implemented. First, we observed the process and level of involvement of local people in PHBM in Desa Cimomas, their motivation to participate, and tree species preferences in tree plantations. Second, we identified the problems with PHBM experienced by local people in Desa Cimomas, and estimated the benefit-cost (B/C) ratio of farming on PHBM land in Desa Cimomas. Third, we observed the impact of PHBM on poverty by calculating local
people's incomes in Desa Ciomas. Finally, follow-up research was conducted 7 years later.

**DATA AND METHODS**

This study was carried out in a village in Bogor District, West Java Province, variously named Desa Ciomas or Ciomas Village. A map of Desa Ciomas is shown in Fig. 1. A PHBM program has been conducted in Bogor District, in the forest area of the Sub-District Parungpanjang, since 2003, over 931.55 ha of the whole 5,432.9 ha forest area of the Sub-District (Ansori et al., 2011). This PHBM area is called Bagian Kesatuan Pemangkuan Hutan (BKPH) Parungpanjang. Since 2000, Perhutani has planted Acacia mangium, as the main tree plantation species, in this forest area. In this PHBM model, the tree species and tree spacing were determined by Perhutani, while the annual crop species, tree maintenance, and proportion shared were open for negotiation. As logging activities, farmers were able to practice hauling logs. For timber plantation in BKPH Parungpanjang, farmers receive 100% of the benefits from the timber harvested during the first thinning, 20% from the second thinning, 20% from the third thinning, and 15% from the final cutting. For intercropping plants including fruits and other crops, farmers gain 100% of the harvesting benefits.

This study used both primary and secondary data. Primary data were collected by interviewing LMDH members, informal leaders in the community, local officers of Perhutani, village officers and local researchers from the Forest and Nature Conservation Research and Development Centre (FNCRD), and by visiting tree plantations directly. Secondary data were acquired by collecting documents from relevant institutions, such as the Bogor Statistics Institution, the Bogor District Planning and Development Office, Perhutani, and the Desa Ciomas village office. We also interviewed local farmers who were familiar with PHBM. The interviews of farmers' group members were conducted in Cinyurup and Banar Hamlet. In Desa Ciomas, three farmer groups were involved in the Perhutani tree plantation: 1) the Mitra Wana Saluyu (MWS) group (172 members living in Cinyurup, Lebakpicung, and Bojongsengkol hamlets), 2) the Gua Saung (GS) group (30 members living in Kompa and Rewod hamlets), and 3) the Wana Jaya (WJ) group (105 members living in Banar hamlet (Fig. 2).

Cinyurup and Banar hamlets were chosen as sub-site locations because PHBM was originally introduced in those two hamlets. There were 279 farmer household in Cinyurup hamlet and 272 in Banar hamlet. For PHBM implementation, Perhutani generally enacted six steps: dissemination, dialog, organization building, negotiation, agreement signing, and implementation (Ansori et al., 2011). In Desa Ciomas, local people from farmer groups were involved in PHBM implementation from the outset. Figure 3 shows the PHBM implementation process in Desa Ciomas. Informal dissemination of PHMB program information was completed by hamlet activists working door to door, to determine people's interest in participating in the program. The hamlet activists then engaged in preliminary negotiations with Perhutani officers based on people's interest, to establish program details and the area that PHBM will be implemented in. Then, the first informal meeting between hamlet activists and local people was held to disseminate the negotiation result and plan the next steps of the agenda. The second meeting was a formal meeting between Perhutani officers, NGOs, village officers, hamlet activists, and local people, involving explanation, dialog and negotiation pertaining to the PHBM program and area. The next step was registration of farmer group members by local farmers, followed by land allocation of PHBM areas by Perhutani. The third formal meeting was held between Perhutani, NGOs, village officers, and farmer group candidate members, to discuss the group name, group board election, and initial thinning plan. The PHBM agreement was signed during the fourth meeting, which was followed by subsequent meetings to further discuss the initial thinning plan. Hamlet activists play a significant role in PHBM initiatives.

In the first three phases of this study, our focus with respect to the interviewees was based on the objectives of each phase of research. Some respondents were involved in the first, second, and third phases, while the other interviewees differed among phases. The interviewee composition depended on local FNCRD researchers' recommendations and the accessibility of local people during the research phase. The objectives of the first phase (2005/2006) were to identify 1) the level of people's involvement in PHBM in Desa Ciomas, 2) the motivation of local people to participate in PHBM in Desa Ciomas, and 3) existing and preferred tree species in the tree plantation. This research mainly focused on the initiation of PHBM, so the interviewees were mainly farmer groups' members in Desa Ciomas; their membership of PHBM was not a consideration at that time. For this research, we interviewed 30 farmers; 17 farmers from the MWS group and 13 farmers from the WJ group.

The objectives of the second phase (2006/2007) were 1) to identify the problems faced by local people with respect to PHBM and 2) to estimate the B/C ratio of farming systems implemented in the tree plantation and managed via the PHBM system in Desa Ciomas. The second research phase focused on problems associated with implementation of PHBM in Desa Ciomas, so the interviews were mainly with farmers who participated in PHBM. There were 50 respondents in this study: 25 people from Cinyurup hamlet and 25 from Banar Hamlet. Based on interviews with local government staff, we listed the problems faced by local people with respect to PHBM implementation and then distributed the questionnaire to respondents to obtain their opinions regarding the problems associated with PHBM implementation.

For the second research phase, we applied B/C ratio analysis, also known as the profitability index, to determine the profitability of different farming systems. The B/C ratio is commonly used in investment proposals in the context of forest management, and can be obtained by dividing the total benefits by the costs. In this study, BCR was used to calculate the profitability of three farming system conducted by the farmer families. Three farming
Fig. 1 Map of Kecamatan Tenjo in West Java (Jawa Barat) Province (upper) and Desa Ciomas in Kecamatan Tenjo (lower) (Badan Koordinasi Survei dan Pemetaan Nasional, 2003).
systems were considered: 1) 50% of framing is undertaken by farmers and their family members, and 50% by paid farmers. 2) Farmers hire paid farmers for all land preparation and harvesting activities, and 3) Farmers hire paid farmers for all activities. The value yielded was adjusted according to a prespecified discount rate, as given by Armitage (1998):

$$ B/C \text{ Ratio} = \frac{\sum B_t}{\sum (1+r)^t} $$

(1)

where

- $B_t$ = the benefits for a period of a year $t$
- $C_t$ = the cost for a period of a year $t$
- $r$ = the discount rate.

Data on the benefits and costs for local people were gathered by interviewing the farmers. The discount rates used were 15%, representing the typical rate, and 18%, representing the extreme interest rate scenario for Indonesia. These interest rates were determined based on the discount rate in Indonesia in 2009, of 14.5%. Only nine farmers in this research were involved in BCR analysis, as they had applied the farming systems before and thus the possessed cost and benefit data; the farmers were asked about these data as they applied the first, second, and third-wave farming systems. In the BCR analysis, if the ratio is greater than 1, then the farming system is considered to be economically worthwhile; however, if it is less than 1, the farming system should be redesigned or abandoned (Armitage, 1998).

The objective of the third research phase (2008/2009) was to establish the impact of PHBM on poverty by calculating local people's income in Desa Ciomas. For this research, we interviewed and distributed questionnaires to 33 farmers: 17 from in Cinyurup hamlet and 16 from Banar hamlet. Data on local people's incomes and expenditures in Desa Ciomas was obtained by questionnaires distributed to 30 of the 33 farmer respondents: one respondent had an extremely high income and two others did not complete the questionnaire. Local people's level of poverty was assessed in the context of the poverty line and the average minimum wage (AMW). This study used two references to determine the poverty line. The Indonesian Statistics Agency (BPS) stated that the poverty line in Indonesia in 2009 was Rp. 200,269.00/capita/month (Purwanto, 2007) while the World Bank (WB) stated that the poverty line was US$ 1.9/capita/day, i.e., Rp. 514,026.00/capita/month where 1US$= Rp. 9,018.00. The AMW in Bogor District in 2009 was Rp. 893,412.00 per month i.e., Rp. 10,720,944.00 per year.

The objective of the follow-up research conducted in 2016 was to observe the persistence of the effects of the previous research phases. For this study, we interviewed researchers and local people who contributed to research activities related to PHBM in Desa Ciomas, BKPH Parungpanjang.

For data analysis, this study used mixed qualitative and quantitative methods, presented as narrative descriptions. This study combined the dominant-less-dominant method, where the study's methods and results are based mainly on the dominant paradigm, but with small proportions being based on a non-dominant paradigm to support the dominant paradigm (Creswell, 1994). The dominant paradigm herein is the qualitative method, and the non-dominant paradigm is the quantitative method. During the first research phase, we interviewed farmers about local people's degree of involvement in PHBM implementation,
and supported the analysis by questionnaire data with statistical calculations. During the second research phase, we interviewed farmers regarding problems with PHBM implementation and supported the analysis by calculating the B/C ratio for farming systems in PHBM. During the third research phase, in-depth interviews were conducted using a structured questionnaire asking farmers about their income after participation in PHBM; this analysis was supported by statistical data on local income and expenditure in Desa Ciomas.

**RESULTS AND DISCUSSION**

Local People's Perspectives and Preferences in PHBM

Understanding local people's participation in PHBM can be achieved by probing their motivation, to do so, as well as being surveying their perceptions and preferences with regard to tree species in PHBM. Even though decision-making in PHBM was dominated by Perhutani originally, the PHBM was designed to involve local leaders and activists. Strong and legitimate traditional leadership promotes priority-setting among local people (Shackleton et al., 2002). In Desa Ciomas, as mentioned before, the implementation of PHBM involved local people drawn from farmer's groups, and the role of local leaders and activists in Desa Ciomas remained significant even after PHBM had been in place for number of years.

By interview and distributing questionnaires to 30 farmers in Desa Ciomas, who were members of the MWS and WJ farmer groups, we gathered information on local people's motivations for participating in, and perception of, PHBM, and their preferences with regard to tree species for PHBM. Local people's motivation for participating in PHBM was strong, as shown in Fig. 4. The main factor influencing local people's participation in PHBM was their own desire (87%). They were also motivated strongly by their understanding of the PHBM program (77%), and of their rights and obligations within the framework of the program (87%), as well as by their attendance of meetings (73%), and active discussion during the meetings (70%). The role of the hamlet activists can also be seen by the reference to the responses of the farmers; they stated that they received information about PHBM mostly from their neighbors and friends (80%). Other motivations were associated with the farmers' relationship to the forest. Local farmers were motivated by the additional income gained by participating in PHBM (80%) and some of them had been involved in previous tree plantations in the area (63%).

Although they were highly motivated to participate in PHBM, the perception and understanding of local people of PHBM was surprisingly varied, as illustrated in Fig. 5. Only 40% of respondents said that the PHBM program had been progressing well, while 43% said progress was fair; the remainder said progress was poor or absent. Local people's opinions of PHBM were low based on the benefits they had gained thus far. Only 30% of the respondents perceived that they had gained income, 6.7% said they had gained employment, and 26.7% said they had gained both; 36.7% offered no opinion. The respondents admitted that they were motivated by profit-sharing from the PHBM program, though they were actually not sure about the sustainability of the benefits they could receive. Most of the respondents exhibited no detailed understanding of the profit-sharing percentages.

The respondents also stated that they needed capacity building or empowerment programs, such as training and education about PHBM. In total, 33% of the respondents suggested training and education to improve PHBM. Another 43% of the respondents suggested technical improvements, such as more tree species or enhanced tree spacing, to enable planting of intercropping plants.
The participation of local people requires that they understand the tree species planted in the PHBM area. The tree species planted in the PHBM area were decided in consultation between Perhutani and local people. Timber-producing tree species were nominated by Perhutani, while other multi-purpose tree species, such as fruit and food producing-trees, were preferred by the local community. Through observation and interviews, we gathered data about existing tree species and tree species preferred by locals in Desa Ciomas (Fig. 6).

As a timber-producing tree, Acacia mangium has been widely planted on local people’s land. The next most popular tree species were other fast-growing species, such as Sengon (Paraserianthes falcatoria) and Kecapi (Sandoricum koetjape).

Before Acacia mangium was planted extensively, Puspa (Schima noronhiae) trees were widely grown in this area. Puspa, Mahogany, and teak are classified as slow-growing trees. Even though they produce high-quality wood, they are less preferred due to their long rotations. Local people nominated Acacia mangium and Sengon as their most preferred tree species. The respondents stated that it was very easy to find Acacia mangium seedlings on land that was previously planted with this species. In addition, they stated that Acacia mangium was easy to grow and maintain, and had a good market price. However, one respondent stated that marketing Acacia mangium had proven difficult because it was subject to suspicion as an illegal timber logged from the Perhutani plantation. The main species on the Perhutani planta-
tion in this area was *Acacia mangium*, which was actually the most preferred species in the area for both timber production and environmental protection purposes. Perhutani preferred to plant *Acacia mangium* in both PHBM and non-PHBM areas. *Acacia mangium* is a fast-growing tree species that also has a high survival rate in poorer soil, and is expected to prove profitable in the context of saw log and pulp markets. *Acacia* plantations are recognized as valuable assets for climate change mitigation and have been widely introduced throughout tropical regions in conjunction with CDM projects (Matsumura, 2011).

In terms of multi-purpose trees, fruit trees such as *rambutan* (*Nephelium lappaceum*), *cempedak* (*Artocarpus integer*), and *nangka/jackfruit* (*Artocarpus heterophyllus*) were the most widely planted trees. *Rambutan* and jackfruit remained the preferred tree species among farmers, because they had a good market price and are easy to grow. Jackfruit trees also produce good timber. Another fruit, *cempedak*, was less preferred because of its lower price. Local people relied on their own knowledge and understanding of plantation and market conditions when choosing tree species. Fast growing, easy-to-obtain seedlings, which were also easy to grow and maintain, and commanded a good market price, were important to respondents when selecting trees to be planted on their land.

Problems Faced by Local People During PHBM Implementation

In this study, we identified the problems faced by local people in Desa Ciomas during the 4-year PHBM implementation period. Before identifying the problems faced by local people, the survey enquired regarding the reasons for farmers' participation (or not) in the PHBM program. The farmers stated that their main reason for participating in PHBM was to receive additional income by working in the PHBM area. Other reasons were a desire for profit-sharing in the context of timber production, and a desire for more experience and knowledge. As well as receiving additional farmland, farmers who participated in PHBM also received education on farming techniques, such as establishing intercropping plantations between perennial trees and annual crops, and they were able to apply the same practices to their own land. Meanwhile, the main reason cited for not participating in the PHBM program was insufficient time, because the farmers were busy with their own land. The farmers stated that their income from their private land was higher, so they focused on that land instead of participating in the PHBM program.

Based on the questionnaire results, shown in Table 1, the biggest problem with PHBM was illegal logging. For farmers participating in PHBM, illegal logging could reduce the benefits gained from timber products. In theory, the PHBM program could contribute to decreasing illegal logging practices by increasing local awareness that illegal logging might reduce benefits associated with forest production (Fujiwara et al., 2012). According to local farmers, illegal logging still occurred in the area, albeit to less of an extent than before PHBM implementation. Another problem concerned damage to the plantation caused by the cattle owned by the farmers that roamed with insufficient supervision.

Local people also had difficulties in choosing farming systems for their land. As mentioned earlier, by joining PHBM, local people gained more land to cultivate in addition to their own land. On the land gained from PHBM, local people were allowed to farm intercropping plants. Some farmers who were not able to cultivate their land chose to pay other farmers daily to help them work on both the PHBM land and their own private land. Farmers stated that they needed additional help, either because their farmland was too large or because they were busy with other, non-farming jobs. Through hiring additional farmers, the farmers implemented three kinds of farming system: 1) 50% of the...
farming was undertaken by farmers and their family members, and another 50% by paid farmers. 2) Farmers hired paid farmers for all land preparation and harvesting activities, and 3) Farmers hired paid farmers for all activities. Local farmers received additional land from PHBM through two stages of land allocation: the first was in 2005 and the second in 2006. Table 2 shows the net benefit to respondents of implementing the three farming systems during PHBM Stages I and II. The net benefits were low for both stage I and stage II. Some farmers stated that they covered their costs using their income from their own land, rather than from PHBM land; they did this in the initial years, in the hope of receiving more income later.

The results of the BCR analysis are presented in Table 3. The analysis yielded a low BCR ratio for the third farming system in PHBM Stage I. The BCR ratios for the first and second farming system in PHBM Stage I exceeded 1, indicating that the farming systems could be profitable, with the first system being more profitable than the second. In the second system, farmers had needed to pay high cost for land preparation and harvest activities and then more cost to hire labors. Besides, according to the farmers, hiring labors for land preparation and harvest activities was not effective because hired labors were less skilled enough in those activities.

However, the ratio was lower in Stage II while the average of additional areas is Stage II was also smaller than Stage I. The possible decline in profitability associated with use of hired labor for additional land should be accounted for when additional land is located. The farmers stated that they used more paid farmers during the Stage I, which did not generate sufficient additional benefits to cover the additional cost of labor. The land allocation should thus be adjusted in line with the ability of farmers to work. For example, farmers with more family members available to work could have received more land.

Impact of PHBM on Poverty

Based on our observations, local people in Desa Ciomas have a typical subsistence lifestyle, as per other rural areas in Indonesia, and local people mostly work as farmers. There were some farmers who worked both on their own land and on forest land if they participated in PHBM, and there were others that did not have farms and worked only on other people’s land. Farming activities were varied, as shown in Table 6, including farming in home yards, rice fields, dry land cultivation, gardens, and forest areas operated under PHBM. Farmers typically used their harvest to support daily living; if they harvested in excess of that requirement, they would sell their harvested products, depending on the harvest amount and land width.

Even though PHBM in Desa Ciomas had been in place for 6 years by 2009, the local people were still considered poor based on the income from farming and their expenditures.
Based on the surveys conducted in this study, the income of respondents was often lower than their expenditure, as shown in Table 4. The income range of the 30 respondents was Rp. 3,530,000.00 – 36,634,000.00 per year, with an average income of Rp. 14,992,850.00, while their expenditure ranged from Rp. 9,001,000.00 – 47,378,000.00 per year, with an average expenditure of Rp. 17,357,408.00. The average income and expenditure in Desa Ciomas are shown in Table 5. In total, 60% of the respondents had an income below the average, and 43.3% had expenditure below the average. Local people's income from farming was lower than their expenditure, indicating that some farmers had an additional income from other jobs. There were also farmers who had no other job, and thus chose to fulfill their daily needs by borrowing money from relatives, and even from

Table 1 Problems among farmers in PHBM

| Problem | Respondents | Number | % |
|---------|-------------|--------|---|
| A. General problem | Illegal cutting* | 8 | 40 |
| B. Specific problems | Bio-physical problem* | | |
| 1. Land / site | a. Far distance | 3 | 15 |
| | b. Less fertile | 4 | 20 |
| | c. Steep slope | 3 | 15 |
| 2. Shade tolerant sp. and spacing of A. mangium | a. Spacing in row is too short (1m) | 4 | 20 |
| | b. Spacing between rows is too short (3m) | 6 | 30 |
| | c. Limited shade tolerant crop species | 4 | 20 |
| 3. Maintenance of A. mangium | a. Weeding | 7 | 35 |
| | b. Pest and diseases control | 1 | 5 |
| Management problems* | 1. Respondent had difficulties to register themselves to PHBM | 4 | 20 |
| | 2. Manpower availability in respondent's household | | |
| | a. Not enough quantitatively | 11 | 55 |
| | b. Not enough qualitatively | 5 | 25 |
| | 3. Plantation security/ safety | 16 | 80 |

* multiple answers

Table 2 Net benefits by doing three different farming systems

| Resp. No. | Land from PHBM (m²) | Net benefit (Rupiah) |
|-----------|---------------------|---------------------|
|           | Stage I (2005) | Stage II (2006) | Stage I (2005) | Stage II (2006) | Stage I (2005) | Stage II (2006) |
| 1         | 10,000 | 1,000 | -107,000 | -165,000 | -157,000 | -214,000 | -886,000 | -534,000 |
| 2         | 3,500  | 1,000 | 258,250  | 50,000   | -4,000   | -252,000 | -637,500 | -472,000 |
| 3         | 5,000  | 1,250 | -108,500 | -100,000 | -408,000 | -103,700 | -1,075,000 | -423,700 |
| 4         | 5,000  | 200   | -132,500 | -25,000  | -385,000 | -107,000 | -1,230,000 | -247,000 |
| 5         | 10,000 | 400   | 127,500  | -20,000  | -305,000 | -72,000  | -760,000  | -212,000 |
| 6         | 6,000  | 3,000 | 217,100  | 70,000   | -182,200 | 177,000  | -1,148,000 | -423,000 |
| 7         | 10,000 | 2,000 | 120,000  | -210,000 | 156,500  | -373,000 | -943,500  | -713,000 |
| 8*        | 2,500  | 1,000 | -900,000 | -210,000 | -541,000 | -252,000 |
| 9         | 5,000  | 350   | -695,000 | -115,000 | -815,000 | -278,000 | -1,855,000 | -428,000 |
| Total     | 57,000 | 10,200 | -1,220,150 | -725,000 | -2,640,700 | -1,474,700 | -8,535,000 | -3,452,700 |

A: Existing and preference species for tree and fruit plantation
B: Preparation and harvesting activities were done by paid farmers
C: All farming activities were done by paid farmers
* Respondent No.8 did not do the third farming system.
banks. Those farmers stated that they would pay back their debts by selling their harvests, which, in the long term, would only add to their debt burden.

Local people in Desa Ciomas were still considered poor, as local people's income per capita was lower than the poverty line stated by the WB (see Table 5). Although the average income was lower than the poverty line stated by the WB, it was still higher than the poverty line stated by the BPS, and the AMW for Bogor District. Since their income was higher than the AMW in Bogor District, local people in Desa Ciomas could be considered to in fact not be poor compared to other village people in Bogor District.

One of the benefits of participating in PHBM is obtaining additional cultivated land. Based on the interviews, local people received farmland from the PHBM that accounted for about 50% of the total land they worked on. The composition of farmland is shown in Table 6. On the PHBM land, farmers were allowed to plant intercropping plants that could provide income in addition to that gained from the main timber plantation. Additional land needed more workers, and traditional farming systems were allowed on the PHBM land. Based on the observations and interviews, it was found that, on the PHBM land, some farmers worked together with their family members, and with neighbors or rural communities. The traditional farming system involving neighbors and rural communities, but without benefit-sharing, is called gotong royong. In contrast, there were also some farmers who worked individually in the same area then shared benefits after the work was completed. This system is known as nyeblok maro. Finally, some farmers hired other farmers to work on their land.

Even though the PHBM system granted more land to local farmers to cultivate, it was not able to increase local people's income significantly. Based on the interviews with respondents who participated in PHBM, it made only a small contribution to their yearly income, of about 3.1%. Some farmers stated they also needed money to help with timber plantation, and to cultivate the intercropping space. Based on interviews with local government staff, grants and loans are available to support local people, but the lending process would need to be selective and well-controlled to be successful.
Concerning local people's income and expenditure in comparison to the poverty line, and the additional income gained by participating in PHBM, farmers in Desa Ciomas were still considered poor. The farmers stated that they did not receive high income from timber products, and also that they only received Rp. 25,000–75,000 per tree from thinning activities on 4-year old trees. Some farmers stated that the PHBM land area given to each farmer was too small. The area ranged from 0.2 to 0.5 ha per farmer, and farmers could apply for more land if the PHBM area was extended. However, a larger area of farmland was not guaranteed to increase local people's income significantly. One of the results of the previous study in 2006/2007 showed that some farmers experienced a lack of manpower and thus hired other farmers; hence, land allocation in PHBM needs to consider the manpower available to farmers and their families, and also their financial capacity. Expansion of farming activities requires upfront funding, and 55% of respondents stated that farming activities in PHBM needed a lot of money, particularly in the early or land preparation stages.

Local farmers in Desa Ciomas needed to undertake alternative jobs to fulfill their needs. Additional income was earned by exploiting existing resources, such as beekeeping, one of the alternative activities introduced through PHBM. This activity was permitted in PHBM areas with Perhutani as the farmer’s partner. Three respondents had an additional job as a beekeeper; one of them was excluded from the respondents’ income analysis, as he had an extremely high income from beekeeping compared to the others. Local government has encouraged beekeeping for local people, and the Bogor District Forest Service granted 300 colonies of bees to local people; however, there were only 37 colonies left after 2 years because the local government did not provide sufficient training to the recipients. Off-farm jobs were considered to aid in poverty alleviation in Desa Ciomas and could also help local farmers to fund their plantation. Based on interviews with local government staff, local people need to be encouraged to work in professions other than farming, such as trade, employment in private companies, and office-based governmental roles. Desa Ciomas is relatively close to urban areas in Bogor, and some farmers stated that they worked in restaurants in other cities before opening small restaurants in Desa Ciomas. Beekeeping and other alternative jobs demand more skills and education, and PHBM needs to facilitate community empowerment to support local people to work in alternative jobs.

**Further Development of PHBM in Desa Ciomas**

In September 2016, we visited Desa Ciomas to observe the status of people’s involvement in the PHBM program, and to update the previous research findings. We interviewed purposely selected researchers and local people who were used to contributing to research activities. PHBM was still running in the area but with less community involvement. Willingness to join PHBM was lower, indicated by the low number of new members. Based on information gleaned from the interviews, this was due to the income gain being considered too low. Also, the older the tree plantation, the lower the benefits gained by local people, because the proportion of the benefits decreased from the first thinning to the final cut. Some farmers had even changed their job, particularly younger farmers, and had started to go to other cities to work or to be construction laborers.

It is important to foster community empowerment in PHBM areas. There have been several programs and events in Desa Ciomas, but not all farmers were willing to join programs related to community learning and empowerment. Based on the interviews, the LMDH board had insufficient organizational skills to manage the farmer group members. As a CBFM scheme, PHBM needed more active participation from local farmers in planning and managing activities; their lack of knowledge and abilities in such activities resulted in high dependency on the forest.

**CONCLUSION**

This study was conducted to examine the utility of a CBFM scheme in Indonesia, PHBM, for improving the livelihoods of local people. The study was conducted in an area known as Desa Ciomas, and encompassed three research phases and one follow-up study.
Local people initially showed eagerness to take part in the PHBM program. The initial phase of PHBM implementation in Desa Ciomas involved the local people and activists from the hamlets. Local people were motivated to participate in PHBM to acquire additional income and land granted by the program. Their interest in obtaining income from the tree plantation was also demonstrated by their preferences for tree species planted in the area. They preferred Acacia Mangium for timber plantation and rambutan for non-timber plantation, because those trees were considered more profitable.

While participating in PHBM, local people encountered problems that lowered the income that they earned from the program. The main problem was illegal logging and plantation damage caused by cattle activities. Another problem related to the manpower needed to cultivate the land: some farmers hired paid farmers to help them work with their own land and additional land from PHBM. Hiring additional farmers for larger scale farming was less profitable as additional benefits did not match the additional cost, while working in a smaller scale with family members and traditional farming system was more profitable.

The deficit between income and expenditure explained why farmers in Desa Ciomas still lived in poverty. The contribution of the PHBM program to their income was low, and poverty alleviation via PHBM needs to be supported by a program of local empowerment. Involving the community in forest management requires local knowledge and understanding about the program both for their benefits and their responsibilities. Local people's expectations of the benefits of PHBM participation were varied by their level of understanding of the program. Village community bodies under LMDH should have been more active in educating and encouraging farmers to participate in PHBM.

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