FACTORS INFLUENCING FARMERS DECISION IN COMMUNITY-BASED FOREST MANAGEMENT PROGRAM, KPH CIAMIS, WEST JAVA

Ary Widiyanto

Agroforestry Technology Research Institute
Jl. Raya Ciamis - Banjar Km. 4, Ciamis 46201, West Java, Indonesia

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FACTORS INFLUENCING FARMERS DECISION IN COMMUNITY-BASED FOREST MANAGEMENT PROGRAM, KPH CIAMIS, WEST JAVA. Community Based Forest Management program through *Pengelolaan Hutan Bersama Masyarakat* (PHBM) scheme has been implemented in Perhutani forest in Java since 2001. The program has been developed to alleviate rural poverty and deforestation as well as to tackle illegal logging. However, there was very limited information and evaluation on activities of the program available especially in remote area/regencies, including Ciamis. This paper studies the socio-economic, geographical and perceptional factors influencing farmers decision to join PHBM program, farmers selection criteria for the crops used in the program, and farmer decision to allocate their time in the program. It also examines the costs and income related to the program and how the program land was allocated between different farmers groups and within the farmers groups as well as the perceptions of the state company's (Perhutani) staff members on the program. Deductive approach was used with quantitative and qualitative methods. Quantitative data were collected through questionnaires from 90 respondents at three farmer groups from 3 villages, 30 respondents of each group respectively. Cross tabulation and descriptive statistical analysis were used to analyse quantitative data. Qualitative data were collected through interviewing of 9 key informants, three informants of each farmer group respectively, and two Perhutani's staff. Results showed that PHBM program contributed to about 26.9% to community's monthly income. The program introduced benefit-sharing system and accommodated community initiatives. Perhutani's support was illustrated by freedom of choice of community in selecting the sharing area (land allocated for farmer to manage) and the planted crops. Factor influencing farmers' decision in selecting the sharing area was geographic conditions, in selecting the crops was farmer skills, and in allocating working time was farmers' priority.

Keywords: PHBM, Community based forest management, Perhutani, farmer's decision

FAKTOR-FAKTOR YANG MEMPENGARUHI KEPUTUSAN PETANI DALAM PROGRAM PENGELOLAAN HUTAN BERBASIS MASYARAKAT DI KPH CIAMIS, JAWA BARAT. Program Pengelolaan Hutan Berbasis Masyarakat melalui skema Pengelolaan Hutan Bersama Masyarakat (PHBM) telah dilaksanakan Perhutani di Jawa sejak tahun 2001. Program ini dibentuk untuk menyelesaikan permasalahan kemiskinan desa dan deforestasi, khususnya penebangan liar. Meskipun demikian, informasi dan evaluasi pelaksanaan program PHBM masih terbatas khususnya di daerah atau Kabupaten terpencil, termasuk Ciamis. Tulisan ini mempelajari faktor sosial-ekonomi, kondisi geografi dan persepsi masyarakat yang mempengaruhi keputusan petani untuk ikut dalam program, kriteria petani dalam memilih jenis tanaman, dan keputusan petani dalam alokasi waktu mereka pada program. Lebih lanjut, tulisan ini menghitung pengeluaran dan pendapatan petani dalam program, dan bagaimana alokasi lahan garapan baik antar petani dalam satu kelompok tani maupun antar kelompok tani. Tulisan ini juga melihat persepsi dari staff Perhutani tentang pelaksanaan program PHBM. Penelitian ini menggunakan pendekatan deduktif, dengan metode kuantitatif dan kualitatif yang dikumpulkan melalui kuesioner dari 90 responden pada tiga kelompok tani (LMDH). Data kualitatif dikumpulkan melalui wawancara dengan anggota LMDH dan staff Perhutani (masing-masing tiga orang). Analisis data menggunakan analisis deskriptif dan naratif. Hasil penelitian menunjukkan bahwa program PHBM dapat meningkatkan rata-rata pendapatan masyarakat sekitar 26,9%. Program ini juga memperkenalkan sistem bagi hasil dan mencoba mengakomodasi inisiatif masyarakat. Dukungan Perhutani dapat dilihat dari kebebasan yang diberikan kepada masyarakat untuk

* Corresponding author: ary_301080@yahoo.co.id

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membuat pilihan terkait dengan bagi hasil lahan dan jenis tanaman. Disamping itu, sistem bagi hasil yang diterapkan cukup menguntungkan petani. Faktor yang mempengaruhi keputusan petani dalam pemilihan bagi hasil lahan adalah kondisi geografis, dalam pemilihan jenis tanaman adalah keahlian petani, dan dalam pemilihan jenis pekerjaan adalah prioritas petani.

Kata kunci: PHBM, Pengelolaan Hutan Berbasis Masyarakat, Perhutani, pengambilan keputusan petani

I. INTRODUCTION

Limited access to forest resources by the local communities has raised pressure on forest through land encroachment and illegal timber exploitation (Subarna, 2011). These pressures contribute to deforestation in Indonesia. In order to overcome this, Perum Perhutani -a state owned forest company- has implemented Community Based Forest Management programs since 1970s. These programs are namely, prosperity approach (1971–1982), forest village community development (1982–1985), community forestry (1985–1995), and forest village community empowerment (1995–2000) (Puspitodjati, 2013). Perhutani's latest program that has been implemented since 2001 to present is called *Pengelolaan Hutan Bersama Masyarakat (PHBM)*, which means literally "managing forest with community" (Perum Perhutani, 2001).

Even though the program has been introduced in 2001, the implementation of the CBFM program is different within Perhutani's area. In the case of Ciamis, one of the factors that encourage the implementation of CBFM in Forest Management Unit (KPH), Forest District Ciamis was teak forest encroachment in April 2008 by the community around the forest. At least, 15.2 ha of forest land in Sub-Forest Management Unit (BKPH), Sub Forest District Cijulang was illegally taken over by the community (KPH Ciamis, 2008). To overcome this situation, government through Perhutani offered community to manage forest together. Since then, PHBM program begin in Ciamis Forest District.

PHBM is a program that aims for sustainable forest management through collaboration between Perum Perhutani and forest communities (or alternatively other parties, i.e. local government actors, social groups or NGOs) to achieve forest resources sustainability. The program has multiple objectives, including social, economic and environmental goals (Perum Perhutani, 2007). The social and economic objectives are addressed through improved access to land and forest resources. The ecological aspects are accommodated through improved management and utilization of forest resources and land zonation.

Previous studies show some positive impacts of the program, such as contribution to the income of the household. The implementation of agroforestry in production forests was proved to be successful in minimizing forest disturbance, particularly illegal logging, and increasing job opportunities to rural people (Budiarti, 2011; Ediningtyas, 2007; Rachmawati, 2008). On the other hand, some studies also criticized this program. Rosyadi and Sobandi (2014) said that the community through LMDHs in fact are never closely engaged in PHBM planning activities. Perhutani still become the dominant actor. Moreover, LMDH feels that Perhutani is neglected their roles of LMDH in other PHBM activities. Perhutani, likely, is only pursuing their target in getting benefits merely for their own benefits.

Based on their researches, ARUPA (2012) said that PHBM program as an unfair program. They argued that there is an unbalance system in reward and punishment. Community obligated to protect the forest but only get few advantages from timber production sharing. They also said that there was less community involvement and contribution in the program planning and development.

Moreover, Affianto, Djatmiko, Riyanto, and Hermawan (2005) stated that CBFM can be categorized as an economic business. Besides producing wood and non-wood forest products (Perhutani's interests), CBFM also produces short-term agricultural products (rice, corn and others) and long-term products (fruits and other plants generally), which is in the interests of forest farmers. CBFM land could also produces environmental services, such as eco-tourism and management of drinking water sources.

The main goals of PHBM program are to provide benefits to the community. In this program, community is allowed to plant their own crops in Perhutani's land. However, there was very limited evaluation of activities under this program, especially at remote areas/ regencies included Ciamis. Moreover, it is unknown whether the program complies with the expectations of communities and provides actual benefit to them. How the relationship between Perhutani and community continues and the extent of the community's involvement in the program are important to sustain the success of the program. This paper observes farmer characteristics (geographical and socio-economic) and activities in PHBM program, and to examine factors influencing farmer's decision in implementing program. These decision are particularly related to sharing area (amount of Perhutanis's land that can be managed by farmer), crops that can be planted in Perhutani's land and time allocation or jobs selection (job opportunity inside and outside PHBM).

II. MATERIAL AND METHOD

A. Study Location

The research was conducted in 2015 and 2016 in Ciamis Regency and Banjar Municipality, two regencies in West Java Province, located at the east end of the province, about 121 km from the provincial capital Bandung. They are located at coordinates 108020' to 108040' (east longitude) and 7040'20" up to 7041'20" (south latitude). Ciamis Regency covers 26 sub-districts and 265 villages and Banjar Municipality has 4 sub-districts and 23 villages (Badan Pusat Statistik Kabupaten Ciamis, 2013).

Research cases were three farmer groups located at three different villages, three different altitudes and represented three different cultivation patterns in the Sub Forest Management Unit (BKPH) Ciamis, BKPH Banjar Selatan, and BKPH Banjar Utara; all are included in KPH Ciamis. Pine-coffee (Kertamandala Village), teak-papaya (Purwaharja Village) and teak-cardamom (Sukasari Village) were the most common cultivation patterns in the KPH Ciamis. Map of research location is presented in Figure 1.

B. Methods

Primary data were collected through farmer and key informant interviews, including data on (i) household income, (ii) costs related to the implementation of the PHBM program, (iii) household's perceptions related to economic aspects of the program (costs and income received). Factors influencing farmer's decision in implementing the program were classified into three factors: 1) related to sharing area decision, 2) related to crops selections, and 3) jobs selection. These three factors are the main activity of the community in this program and collected through in depth-interview. Perhutani's officials and farmer group members were purposively selected on the survey. Perhutani official is persons who are in charge in the PHBM section. The key question for Perhutani staff included: 1) who and how to decide the sharing area per farmer, 2) who and how decided the crops, 4) why farmers choose the crops, and 4) some details of sharing agreement between Perhutani and farmers.

Thirty respondents of each selected group were surveyed through questionnaires. From each of these groups three persons were interviewed for detail and deeper information. The key questions were about their activities in the program, benefits of the program for them, and their strategies to maximise benefits from program. Secondary data were included KPH

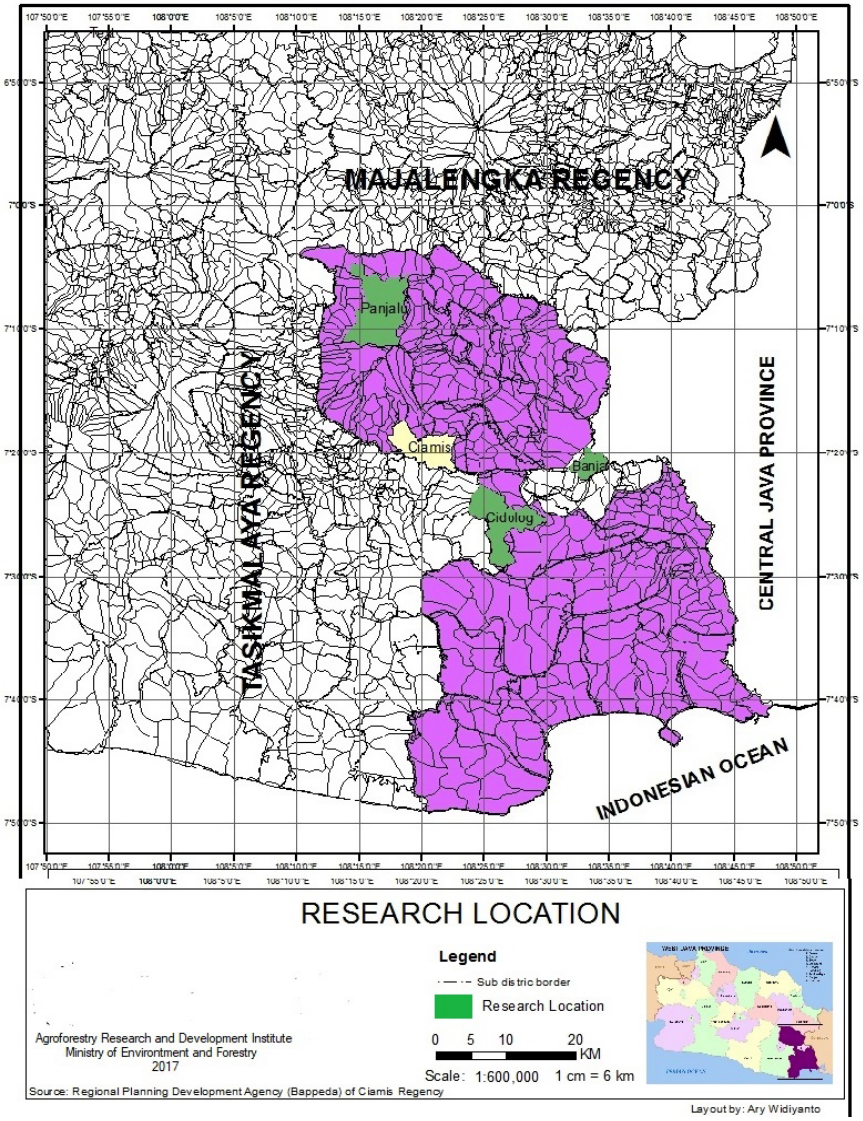

Figure 1. Research locations in green colour

reports, Perhutani reports, news and other documents. The key question for farmers are listed in Table 1.

C. Analysis

Survey questionnaires data were analyzed by using Microsoft Excel. The data consists of farmer's income during implementing the program, cultivation pattern, average sharing area, age, education, and land size owned by farmers. Cost and income of farmers were calculated to determine the economic benefits of the program. The total cost was calculated from labour time and then converted it into wage. The total income included income that derived from selling of products and wages. After harvesting, farmers sell their products. For papaya, 100% of selling income belongs to the famers. For coffee and cardamom, farmers get 80% of selling income after deducting income share for Perhutani. Farmers also get income from wages from Perhutani by planting teak and pine in the beginning of program. In addition, farmers also get wages during the the program from tree fertilizing and maintenance.

The interview data were analyzed by descriptive and narrative methods. Descriptive method was used to describe particular

Table 1. Key questions for farmer

Questions related to land sharing area	Questions related to crop selection	Questions related to jobs selection
How is the land shared for each farmer group? Who does the decision?	How is crop selected for each farmer group? Who does the decision?	What kind of jobs do the farmers have inside and outside PHBM and why they choose these jobs?
Who and how do determine sharing area for each farmer?	Who and how do determine kind of crops for each farmer?	How do farmers allocate their working time for PHBM and non-PHBM activities?
How was the land sharing methods selected and why?	How was the crop selection methods selected and why?	What is farmers' main priority in allocating their time and what is their strategy to do it?
What kind of factors are considered during the land sharing process?	What kind of factors are considered during the crop selection proocess?	What factors were need to be considered in the jobs selection?

phenomenon with sufficient details. The descriptive was interpreted as troubleshooting procedures using state of the subject/research object based on the observed facts. Nasir in Yuwono (2008) stated that the descriptive method is used for studying the problems within society, ordinances applicable within society, as well as two specific situations including relations activities, attitudes, views, as well as an ongoing process and influence of a phenomenon. Narratives (stories) in the human sciences defined as discourses with a clear sequential order that connect events in a meaningful way for a definite audience and thus offer insights about the world and/or people's experiences of it (Hinchman & Hinchman, 1997).

III. RESULT AND DISCUSSION

A. PHBM Program in Ciamis

In this program, community is permitted to utilize Perhutani's (state) land with an agreement. This research found that there were two kinds of cooperation agreements related commodities between Perhutani and communities. The first agreement is wood and annual crop agreement for instance teak-papaya pattern. The second is wood and non-timber forest product (NTFPs) agreement with two case patterns, namely teak-cardamom and pine-coffee patterns. Before the agreement, farmers were offered by Perhutani to choose the crops that would be planted under Perhutani's stand. Usually, farmers choose the crops based on economic and land suitability consideration. The difference between these agreements is profit sharing among parties. The profit sharing of timber derived from logging and thinning was 75% for Perhutani and 20% for farmers. The remaining 5% was distributed into village government, communication forum, and social activities. The profit sharing of annual crops (papaya) was 100% given to farmers. The profit sharing of non-wood forest products (coffee and cardamom) was 75% for farmers and 20% for Perhutani, and the remaining 5% was distributed into village government, communication forum and social activities (Perum Perhutani, 2001). Table 2 shows in detail of the profit sharing percentage between Perhutani and farmer.

B. General Information of the Three Farmer Groups in PHBM Program

Currently, 106 farmer groups involve in the PHBM program in KPH Ciamis, although not all of these groups are active due several

Table 2. Profit sharing percentage between Perhutani and farmer

No	Parties	Primary plant (Pine-teak, %)	Non-wood forest product (Coffee-cardamom, %)	Annual crop (Papaya, %)
1.	First party (Perhutani)	75	20	0
2.	Second party (Farmer)	20	75	95
3.	Village government	2.5	2.5	2.5
4.	Communication forum	1.5	1.5	1.5
5.	Social activity	1	1	1

Note. Adapted from Perhutani (2012)

Table 3. Three studied farmer groups representing three cultivation patterns of PHBM program in KPH Ciamis

No.	Farmer Group	Cultivation pattern	Village	BKPH	Regency/City
1.	Sinapeul Indah	Pine-Coffee	Kertamandala	Ciamis	Ciamis
2.	Ajisaka	Teak-Papaya	Purwaharja	Banjar Utara	Banjar
3.	Pasir Mukti	Teak-Cardamom	Sukasari	Banjar Selatan	Ciamis

reasons. For instance, the teak-papaya farmer group could only participate during the first three years since the cooperation agreement was signed. When teak grows and its canopy covers the land, farmers cannot further cultivate the land due to light competition for papaya crops. Accordingly, farmers have to find other location to continue the PHBM program, if they could not wait until the teak wood is being harvested. The PHBM program involving these three farmer groups has been running for more than seven years. Table 3 shows in detail the cultivation pattern combinations within these three farmer groups.

More detail information regarding to the starting time of the program, size of sharing areas, and the number of members of each farmer group is presented in Table 4. It can be seen from the table that farmers of Sinapeul Indah group have a different residential and activity area. This means that farmers should move from their village to the targeted program location during conducting farming activities, such as land preparation (land clearing), cultivation, plant nursery and harvesting. It can also be noticed the different cultivation patterns that may relate to geographic characteristic of the areas, i.e. pine-coffee (highland area), teak-cardamom (midland area), and teak-papaya (lowland area). Figure 2 illustrates these different patterns.

The socioeconomic characteristics of respondents varied among all farmer groups. In general, farmers who were involved in the PHBM program have the following characteristics: low income, low education levels, and the main occupation is farmer. All members of the farmer groups actively participate in all stages of the activities in this program. In the first year, members planted crops and trees as part of the cooperation agreement. They were paid (wages) from planting trees (teak or pine). Teak requires about 35–40 years to be harvested, whereas pines require about 25–30 years. Cultivation activities that were conducted by members as part of the agreement include fertilizing, weeding and replanting trees.

The average income of members was Rp 1,088,330, which was lower than the regional minimum of wage (RMW) of Ciamis Regency, which was Rp 1,363,319. The average farmer's income from the PHBM program was Rp 313,837 or about 26.7% of the average members monthly income (Table 3). Without

Table 4. Description of three farmer groups

Description	Group Name		
	Sinapeul Indah	Pasir Mukti	Aji Saka
Geographic characteristic of the location	Highland area (700-800 m above sea level)	Midland area (± 400 m above sea level)	Lowland area (50-100 m above sea level)
Residential area	Rajadesa Village, Rajadesa	Sukasari Village, Cidolog	Purwaharja Village, Purwaharja
Activity Area	Kertamandala Village, Panjalu	Sukasari Village, Cidolog	Purwaharja Village, Purwaharja
Distance to Capital City of Ciamis (km)	38.9	35.6	29.4
Sub Forest Management Unit	Banjar Utara	Ciamis	Banjar Selatan
Tree-crop pattern	Pine-Coffee	Teak-Cardamom	Teak-Papaya
Startingyear of PHBM	2012	2012	2013
Group sharing area ha)	27	14	7.8
Individual sharing area (ha)	0.25-2 (a=0.9)	0.31 (a=0.31)	0.1-0.5 (a=0.21)
Number of members	34	45	40
Land ownership (ha)	0.08-3.19 (a=1)	0-2.24 (a=0.35)	0-1.4 (a=0.38)
Age of farmers (years)	25-62 (a=44)	24-70 (a=48.8)	30-75 (a=50.2)
Family members (people)	2-7 (a=3.5)	2-5 (a=3.1)	2-5 (a=3.6)
Years of education	6-12 (a=6.9)	6-9 (a=6.5)	6-12 (a=7.3)
Total Income per month (x Rp 1,000)	850-1,500 (a=1,071)	1,000-1,500 (a=1,150)	300-1,500 (a=1,043)

Remarks: a =average, Source: Widiyanto (2017)

additional income from the program, about 81% of farmers' incomes were below the RMW of Ciamis Regency. With the program, only 46% of farmers have income below the RMW of Ciamis Regency. This means that the PHBM program provided positive economic contribution to the community. However, this economic contribution could only be enjoyed by papaya farmers for relatively short period (2–3 years) as compared to cardamom farmers (up to 10 years) and coffee farmers (up to 20 years).

The amount of income received from program by each farmer is different within and between farmer groups. Result of statistical analysis shows that there are no significant correlation between incomes from PHBM program with age, land ownership, education and cultivation pattern. Nevertheless, incomes from PHBM were significantly related to sharing area with pearson correlation of 0.964 at 99% of significant level. Likewise, the income received in the first year was different from the second, third, and fourth years. In total, in the first four years, the amount of additional income from PHBM program received by cardamom farmers was higher than income of papaya and coffee farmers. It was caused by several factors: 1) Coffee farmers require substantial capital investment in the first 3 years, higher than cardamom and papaya farmers; 2) coffee harvest began in the third year, whereas

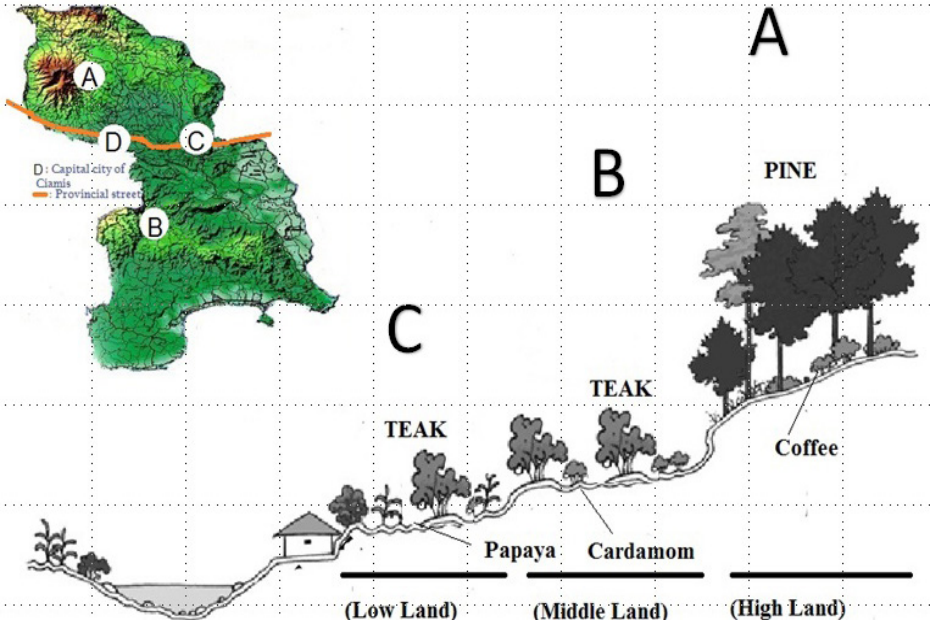

Figure 2. Different cultivation patterns among the three farmer groups of PHBM program

cardamom and papaya were started from the first year; and 3) papaya harvesting was only lasted for two years, whereas cardamom can be harvested until ten years. It seems that coffee farmers received the least income during the first three years. However, the fact that coffee farmers could earn income until 20th year was thought to be the main motivation for farmers to continue growing coffee despite having to spend a lot of capital in the first three years.

The income from timber can be divided into three types. The first is income from firewood at the fifth year of the plantation. All of this income belongs to the community. The second income is derived from thinning. Pine will be thinned two times at the 10th and 15th year of plantation. Teak will be thinned six times at the10th, 15th, 20th, 25th, 30th and 35th year of plantation. The third income was derived from timber harvesting. The harvesting time for pine is at the 30th year and for teak is at the 40th year. Farmers will get 25% of income from harvested timber from both thinning and final harvest. The expected money is big and significantly will contribute to farmers' income although farmers should wait for a long time to get the income from timber.

C. Farmer Groups Activities in PHBM Program

1. Sinapeul Indah: Mountainous Area, Pine-Coffee

Farmers in Sinapeul Indah group have greater land ownership (1.01 ha on average) and larger sharing area (0.9 ha in average) than the other two groups. Compared to the two other groups; the farmers in this group engage the longest time in the PHBM program. In average, they need to spend 227 days for farming activities in the first four years of the program. Coffee harvesting occurs three times a year beginning in the 30th month. The average harvested coffee is 1,067 kg in the third year and about 1,170 kg in the fourth year. They will get the highest coffee production in the fifth until 10th year. The price unit is Rp 3,000/kg in raw and Rp 16,000/kg in coffee powder.

Compare to other cultivation patterns, coffee farmer needs higher capital in the beginning of the program. From the first until the third year, their average net income is Rp 6,563,000, Rp 2,639,000 and Rp 219,000, respectively. Eventually, in the fourth year they get positive income for the first time. After deducting 20%

of their income through sharing with Perhutani, on average they will get Rp 12,014,400 net income.

Farmers chose independently Panjalu Sub-District as the program location for several reasons; 1) the high altitude is suitable for coffee cultivation; 2) coffee requires a special cultivation technique, which is not known by local people (Panjalu Sub-District); and most importantly, 3) coffee cultivation can give them long-term economic benefit. With good plant treatment, coffee could be produced within 20 years, or at least 15 years.

2. Pasir Mukti; Midland, Teak-Cardamom

Compare to other farmer groups, farmers in Pasir Mukti have a higher average monthly income. The income was possibly come from other jobs in addition to the income from their own land. Cardamom harvesting occurred three times a year beginning in the 8th month with an average harvest per farmer of 178 kg in the first year, 953 kg in second year, and 1,943 kg in the third year. In the fourth year, the production decreased to 1,325 kg. Usually the third and fourth years are the peak of cardamom production. The price per unit is Rp 8,000/kg in raw or fresh condition and Rp 16,000/kg in dry condition. In the first year, some farmers tend to sell in fresh condition, because they need cash money to cover their expenses in the beginning of the program.

In the first year, on average, the loss is about Rp 800,000 per farmer, because the total income still could not cover the total expenses. In the beginning of second year they got positive income of Rp 5,540,800; Rp 11,875,200 and Rp 7,920,000 for the second, third, and fourth year, respectively.

Farmers in the Pasir Mukti group depend on their own land as their main income source. Their main jobs are farmers and labor of landlords. However, with only about 0.4 ha of average land ownership, the income was not enough. Therefore, most of them have other job as labor in general. About 77% of them received about Rp 50,000/day as a labor in agricultural sector.

Farmers choose cardamom as the plant does not need a special treatment. The plant is high tolerance to low light intensity, which is important when the teak grows taller. They considered the PHBM program as an additional job.

3. Aji Saka; Lowland, Teak-Papaya

Farmers of Aji Saka group plant papayas as their crops. Farmers got income in the beginning of the 7th month. Afterwards, they harvested and sold papaya every week. The average harvest was 6,205 kg in the first year and 11,983 kg in the second year, with a price per unit of Rp 1,700 to Rp 2,000 per kg.

In the first year, on average, papaya farmers got Rp 1,503,500 net income, and in the second year, they earn Rp 3,890,000. Afterwards, they should wait for three years, when Perhutani conducted the first tree thinning. During the waiting period, some farmers used the land by cultivating some annual crops, such as peanuts and cassava, while some others just left the land.

In the beginning of the program, Perhutani allowed farmers to decide their sharing area and the crop that would be planted. Farmers planted papaya from California variety, which had a higher price (Rp 2,000/kg) as compared to local variety (Rp 1,000/kg). The selling price was the main reason of farmers in selecting California varieties.

In average, their monthly income was smaller as compared to cardamom and coffee farmers. With a total sharing area of 7.8 ha and 40 total members, in average, each member only manages about 0.21 ha. To get additional income, they should look for additional job. The additional jobs were very important, because papayas only produced for two years. The third year's production was very small, and could not cover the operational costs; therefore, they changed papayas to other plants such as peanuts and cassava.

D. Factor Influencing Farmer's Decision in PHBM Program Activity

In this program, farmers were given the authority to determine the amount of sharing area received by each member as well as the types of crops that they will plant. Farmers in each group had different strategy in making their choices. Most studies that have modelled farmer decision-making have assumed a single objective of profit maximization as the motivation for decision-making behaviour (Wallace & Moss, 2002). In such situation, the decision-maker is usually seeking an optimal compromise among several objectives or trying to achieve satisfying levels of his goals (Wallace & Moss, 2002). In PHBM case, farmer decision is also influenced by non-economic motivation. Some activities were also conducted voluntary, motivated by farmers willing to protect their environment (Rakhmadi, 2014; Sukhmawati, 2012).

Based on the interview, farmer decided to join the new program to improve their livelihoods, and strategically chose the sharing area and crop combination based on the following:

1. Geographical conditions (altitude, distance from capital city), which influence farmer's strategy in dividing shared area for each farmer.
2. Skills, which influence people's strategy in crops selection. Beside land suitability, economic feasibility, and microclimate, skill is also one factor considered in the crop selection, and
3. Their priority in allocating time to work, which influence people's strategy in their livelihood strategy. In this research can be found in midland and lowland. Farmer see this program as a secondary job. They have another job either in on-farm or off-farm job.

1. Geographical Conditions

The first decision to make was the location of the PHBM land. Their decision was highly influenced by geographical condition, such as whether their locations were scattered or clustered, and close or far from the main road. These three farmer groups were located at three different locations and altitudes. The pine-coffee pattern was in highlands (mountainous area), the teak-cardamom pattern in midlands, and teak-papaya in lowlands and close to the town and main road. Located in highlands, with the program's areas scattered and spread, the coffee farmers divided their land based on member condition. Members who had more experience got a larger sharing area. They assumed that experienced member could work faster than new member. The larger land the longer the time needed to maintain the crop Topographical conditions, besides socio-economic conditions, were closely related with crops management such as crops combination as stated by Fujiwara et al. (2018).

The cardamom farmers agreed to share the community land equally. This decision was taken by considering that the program's location lies in one overlay. Therefore, it was easy to divide the sharing area equally. The decision influenced their income. Compared to the other cultivation patterns, this pattern has the most equal income distribution. Meanwhile, the papaya farmers have sharing areas that are located in several places (scattered) and bordered by other land use and the road. The papaya farmers agreed to divide the land based on the distance from their homes. The closer to home, the larger the sharing area because they assumed a broader area would require more maintenance and time.

These choices affected the income of each farmer. Larger sharing areas tend to give greater income. Some exceptions were exist due to crops' harvest productivity, which is closely related to plant treatments and fertilizers.

2. Skills

The second decision to make was related to crop selection. Every crop has its own characteristic and special requirement of skill. Hence, farmer choose the crop by considering their skill and experience in agriculture. Consequently, their choices were highly

determined by skill and technique in specific crop. In brief, coffee growers chose coffee based on their experiences. Some farmers chose cardamom because it was less necessary treatment of plant. Some farmers chose papaya because they have experience in planting other varieties of papaya. This new variety is not so different in the maintenance but has better prices.

In Ciamis Regency, the Rajadesa Sub-District was known as the biggest coffee producer in West Java Province, apart from Bandung. Coffee plantations require special skills. Coffee farmers from this area got their skill and knowledge from their experiences in joining transmigration program in Lampung and Aceh, which were the centre of coffee production in Indonesia, in the 1970s and 1980s. After the PHBM program began in 2001 and implemented in 2008 in Ciamis Regency, some of the transmigrant came back to Ciamis and developed coffee plantations.

Coffee plantation needs special skills and techniques. Meanwhile, cardamom and papaya plantation did not need such special skills. These factors influenced farmer decision in crop selection. Farmer with particular skill tend to choose their crops based on their skill, otherwise they choose plants with no special treatment requirement.

3. Time Allocation Priority

Cardamom farmers considered the PHBM program as an additional job. Their main jobs are farmer and labour in farming sector. This was the main reason why farmer in this farmer group choose cardamom as their crops. Cardamom cultivation did not need special treatment, which means farmers can spend fewer times in the program.

Additional jobs were available to farmer depend on their location. Cities provide more various jobs compared to rural areas, on both formal and informal sectors as well as on off-farm sector. Aji Saka farmers benefited from this aspect. They got more opportunities of additional jobs, mostly as labour in off-farm industries. As a result, as comparison to coffee farmers, papaya and cardamom farmers spent lesser time in this program activity (Figure 3).

Related to this priority aspect, Wallace and Moss (2002) stated that such behaviour was motivated by the desire to maximize levels of satisfaction or utility. It can thus be argued that it was important to understand the manner in which farmers allocate their resources and their likely responses to changes in agricultural policy. Knowledge is required to know farmers motivational factors goals, objectives and values, which are the focal points of their decisions. Program location distance from their house was influencing farmers' spent time in the program. The further the distance means the lesser their activity in the program (Yudilastiantoro, 2011).

Similarly, Azmi (2008) stated that bigger farmers land ownership and their job in non-farming sectors decreasing their willingness to join CBFM Program in Bogor, West Java. Although joining the program, this will not be their first priority and they won't spend much

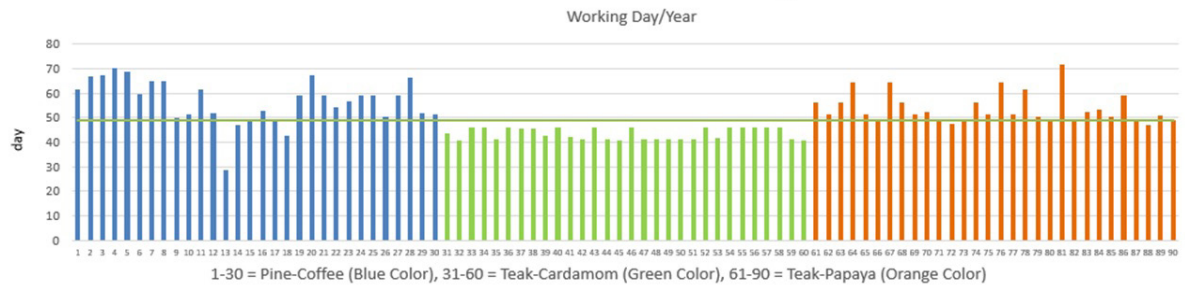

Figure 3. Working days per year by each farmer group

time for implementing the program activities. Similarly with Sabastian et al. (2014) and Fujiwara et al. (2018), the household characteristic and job opportunities both on-farm and off-farm in Gunung Kidul is significant factors affecting farmers' decisions to manage timber trees.

Winberg (2010) reported some factors that attract people to participate in Participatory Forest Management in Ethiopia, which were clear benefits and incentives that outweigh their investments in managing the forests. On the other hand, government commitment also needs to be stable without contradictory actions to ensure trust and dedication to the agreement from the community side.

Farmers should consider some factors before they make some decisions. Some of them are current and future prices, costs, yields and weather. A farmer must decide the best combination of crops and best management practices (BMPs) for a given year (Ng, Eheart, & Cai, 2011). Willock et al. (1999) said that a model of farmers' decision making would include a large range of valid variables and should take into account prior psychological theory. Moreover, this model will assemble individual differences, rural resource management, business management, and mathematical/statistical modelling. An outline model of farmers' behaviour and decision making was constructed as modified from Willock et al. (1999) (Figure 4).

In this research, geographical conditions (i.e. altitude, distance from city, microclimate), skills (technique in particular crop cultivation), and priority (time allocation in the program) can be classified as antecedent variables. Moreover, these variables when combined with their objectives in farming (such as economic and daily needs) influencing their decisions in the context of sharing area, crops selection, and jobs selection. In the remote site with high altitude, farmers chose to plan pine and coffee, because (a) pine is a tree species suitable to be grown in higher altitudes; (b) in the most remote village there were less off-farm labour opportunities, so the farmers could choose labour intensive crop such coffee. Coffee also requires high initial investments, but provides income for longer period of time (20 years).

In the low land sites, which were located closer to the larger town with more wage labour opportunities and markers for fruits, farmers chose less labour intensive crop to be planted with teak (tree species suitable for lower altitudes). These crops are included

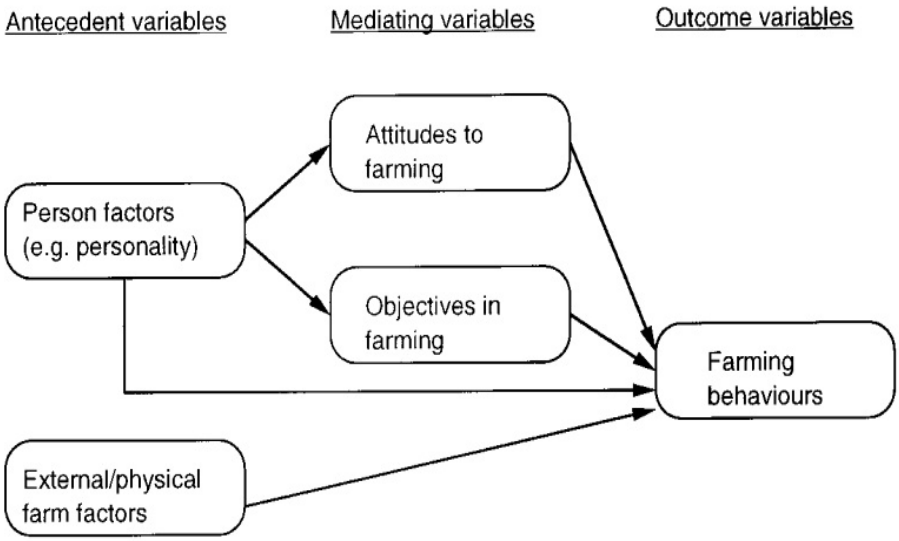

Figure 4. Schematic relationships among individual differences and behaviour (Source: Willock et al., 1999)

papaya and cardamom, since most their labour was used for wage labour, and growing papaya and cardamom under PHBM program was secondary/additional income source for them. Their main activity and priority is their own land. Papaya can only grow under teak stand for three years. Therefore, it can't be long term source of income. Cardamom can grow well under tree stand and did not need special treatment and maintenance after first and second year. Hence, farmer could allocate their time in other job or activity.

Margarian (2009) said that farmers' strategy could be divided into two types; 1) quantity-followers on the land-market, might be judged as "conservative" by observers, and 2) quantity-leaders in strategic competition, leave an entrepreneurial impression on observers. She explained that these strategies represent alternatives that evolve endogenously from strategic interaction, rather than attributed to differing exogenous conditions or cultural differences. But, beyond this classification, their decision and strategy sometimes depend on specific and idiosyncratic circumstances; countless individual strategies of adoption evolve.

According to Margarian (2009) classification, in this research case, papaya and cardamom farmers' behavior can be classified as traditional or conservative behavior, which was ascribed towards farmers whose main aim consists in stabilizing their farm. Therefore, farmers tend to avoid risk and make small steps of growth. Meanwhile, coffee farmers' behavior can be categorized as entrepreneurial attitude, which was ascribed towards farmers, who invest capital and labor where they are most profitable. However, in crop selection, one of the most considerable factor is land and climate suitability.

Moreover, these annual crops were very important for the farmers, in the tree-crops cultivation pattern. Annual crops produce commodities for both household consumption and market sale. In teak-crops pattern, besides supplying food for households, smallholder teak systems provide about 40% of household income from both agricultural and timber crops (Roshetko et al., 2013). Farmers income from PHBM program from annual crops harvesting (such as paddy and peanut) are also influencing their activeness in agricultural activity (Waluyati et al., 2017). On the other hand, some researchers said those annual crops contribution were not yet optimum, by comparing livelihood resource from teak forest and benefit obtained (Wasito et al., 2011; Wasito et al., 2011a).

Study by Budiarti (2011) found that community perception about PHBM program and community livelihood strategy are influenced by internal factor such as farming experiences, kind of jobs, and formal education and external factor such as number of land ownership. The more number of lands owned by community, the lesser number of times they spent in the program. In this research case, the external factor that influencing farmer decision in time allocation was different and did not apply for coffee farmers. Although they have larger land than cardamom and papaya farmer does, they must spent longer time in the program, because coffee needs special treatments and skills.

Different results were also found in Karanggayam Sub-District, Kebumen. In this region, communities did not have right to determine their own crops and number of sharing area in farmer groups. All activity, such as sharing area allocation, kind of crops, resin sap, harvesting, replanting, and other activities were fully determined by Perhutani. The decision did not comes from stakeholder discussion (in Communication Forum as dialog organization at sub-district level), but already determined by Perhutani, either in sub forest district or forest district level. As a result, community participation in this program was very low (Anomsari, 2015). In community forestry program in protected forest in Garut, the amount of shared area also determine by the government. Sharing area determined by

economic conditions of community around the forest and tenurial conflict (Subarna, 2011).

IV. CONCLUSION

This study showed that PHBM program could provide economic contribution to the community. Community's average incomes increased after program implementation. This program contributed about 26.9% to farmers' average monthly income. The PHBM program introduced sharing agreement and tried to develop potential of community initiatives. Perhutani's supports could be seen in farmer group freedom of choice in selecting the sharing area for each farmer and in selecting the crops. Perhutani's contribution to farmers could also be seen in the benefit sharing through sharing agreement. In the sharing agreement, Perhutani gave 20% of their wood production, 80% of coffee production, and 100% of papaya production to farmers. Factors influencing farmers' decision were related to geographical conditions on selecting the sharing area was, farmer skills on selecting crops, and farmers' priority in determining resource (labor) allocation in the program. Lessons learnt from PHBM program in Ciamis are farmers should select the most appropriate cultivation pattern to maximise the benefits and Perhutani should consider the amount of sharing area that directly correlated with farmers' income.

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