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Growth and Regional Development
PAR C5: Growth and Regional Development

The Development of Ecotourism to increase tourists visit in Geopark Ciletuh, Sukabumi, West Java

Ade Kadarisman[1], Agus Rahmat[2]
[1]Faculty of Communication, Universitas Padjadjaran; [2]Faculty of Communication, Universitas Padjadjaran

In supporting the vision and mission of the West Java in the tourism sector, the local government of municipality of Sukabumi develops ecotourism in increasing local and international tourists visit Geopark Ciletuh region as a UNESCO Geopark Heritage. Unlike the conventional tourism, ecotourism is tourism activities which paid great attention to the sustainability of tourism resources. With the potential tourist destinations owned by Sukabumi government, the development of eco-tourism is the best option to increase tourists visit while maintaining the sustainability of natural resources.

This study uses qualitative research methods with data collection technique using literature, observation, interviews, and documentation and descriptive data analysis techniques. This study examines the development of ecotourism to increasing tourists visit in Geopark Ciletuh, Sukabumi

This study used 20 informants consisting of local and international tourists, travel agents, travel guide, government officers and tourism communications expert.

The results conclude local governments have crucial roles to succeeding ecotourism program in increasing local and international tourists visit Geopark Ciletuh, Sukabumi.

Community Forestry Program and Rural Economic Development: A Case Study of Sesaot Community Forest in Lombok Indonesia

Diswandi Diswandi
University of Mataram, Indonesia

Forests cover about 124 million hectares in Indonesia and deliver a significant contribution to the global environment and climate change mitigation. However, as a result of forest concessions that were granted by the government to private companies, deforestation is a serious problem in this country. The forest destruction was also caused by the encroachment by villagers during the political chaos and lack of law enforcement following the collapse of the New Order regime in 1998. In Lombok, villagers entered forests around their village, logged the trees and occupied the forests to plant fruit trees and other crops. As a response to this encroachment, the Indonesian government started to encourage local participation by involving communities in forest management which eventually

Community Forestry Program and Rural Economic Development: a case study of Sesaot Community Forest in Lombok Indonesia

Diswandi Diswandi*

Abstract

Forests cover about 124 million hectares in Indonesia and deliver a significant contribution to the global environment and climate change mitigation. However, as a result of forest concessions that were granted by the government to private companies, deforestation is a serious problem in this country. The forest destruction was also caused by the encroachment by villagers during the political chaos and lack of law enforcement following the collapse of the New Order regime in 1998. In Lombok, villagers entered forests around their village, logged the trees and occupied the forests to plant fruit trees and other crops. As a response to this encroachment, the Indonesian government started to encourage local participation by involving communities in forest management which eventually developed into a community forestry management schemes. In addition to its goal to address deforestation, rural economic development thus poverty alleviation is also the focus of the Community Forestry program.

This study investigates the impact of community forestry programs on socio-economic improvement. A mixed quantitative and qualitative research method was used in this study called "participatory econometrics". The research included in-depth interviews, field visits, surveys and focus group discussion. Both qualitative and statistical analysis was employed to assess the impact of community forestry on socio-economic improvement.

This study found that community forestry had a positive impact on the economy and welfare of the villages around the community forest site. It had provided a new source of income, job opportunities, and leads to improvement of socio-economic conditions. The most significant economic benefit from this program is the opening of access to land for poor people who do not have private farming land. The community forestry program has also provided indirect economic benefits to people who are not forest farmers.

Key words: Community forestry, Forest conservation, Poverty alleviation, Rural development.

*Corresponding author: Diswandi, Faculty of Economics and Business, University of Mataram, Lombok, Indonesia. Email: diswandi@unram.ac.id; diswandi01@gmail.com.

1. Background

After the collapse of Suharto's New Order regime in 1998, Indonesian central government control over the Indonesian forests diminished. During the transition from a centralized to decentralized government system, between 1998–2002, forests degradation that has been take in place since the colonial era and became worse in New Order regime continued to occur. Massive encroachment, illegal logging and forests occupations reached their peak due to political instability, lack of law enforcement, unclear sanctions for offenders and an increase in the number of people dependent on forest land for agricultural expansion (Bae et al., 2014; Gultom, Lawrence, Filer, Potter, & Resosudarmo, 2013).

As a response to the forest encroachment, the government started to encourage local participation in forest management (Bae et al., 2014) which eventually developed into a Community Forestry management scheme. New policies and programs were designed to rehabilitate the forests and to achieve more sustainable outcomes. In 1999, the Indonesian government introduced Forestry Law number 41/1999 to replace the Basic Forestry Law of 1967. This law determined the new status and function of Indonesian forests, including a revised management system. The law recognizes the rights of local people to be involved in forest management.

Sesaot Forest which is located in Lombok, West Nusa Tenggara Province, is a pilot Community Forestry project in Eastern Indonesia. This forest is significant as it is the primary water catchment area for the residents of Lombok. People in Mataram, the capital city of West Nusa Tenggara and of West Lombok District, use water from this forest for their daily needs. Farmers in East and Central Lombok also use the water from Sesaot forest to irrigate their land.

Since the decentralization era that began in 1999, forest governance in Sesaot has been fully controlled by the West Nusa Tenggara provincial government. The governor introduced a regulation number 522.21/457/Prov/2000 to increase regional income from the utilization of naturally-logged[1] trees in Sesaot forest. However, this policy was abused by some local people. Standing trees were logged and sold to timber mafias and lead to massive deforestation (AM, CFFG leader, interview, 8/6/2014). Forum Kawasan (2011) reported that about 1,800 hectares of Sesaot forest was cleared at the time. After the lands were cleared, local people occupied the

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[1] Naturally-logged refers to a condition where the tree falls due to death or strong winds.

forest to plant fruit trees such as durian, mangosteen, candlenut, rambutan and banana. Currently, there are 4,331 households occupying the forest land (Forum Kawasan, 2014).

In 2003, the Government of West Lombok introduced regional regulation (Perda, *Peraturan Daerah*) number 10/2003 to regulate Community Forestry in this district. Based on this regulation, local people are allowed to manage the occupied forest through the community forestry scheme. The community forestry management rules require forest farmers to plant and maintain timber trees along with crop trees.

Literatures mention that in community forestry practice, local people are empowered to manage a given forest area for the greater economic benefit for the local community (Krogman & Beckley, 2002). The forest quality is expected to improve through strengthening forest users' rights by granting formal rights to manage the forest (Shyamsundar & Ghate, 2014). Community Forestry practice allows local people to employ their local knowledge to manage the forest as long as their practices are suitable for the sustainability of the forest resource.

Decentralization of forest resources from the central government to local community is widely regarded as a tool for achieving sustainable development goals while contributing to strengthening social capital in the communities (Shyamsundar & Ghate, 2014). Agrawal and Ostrom (2001) emphasized that successful decentralization of resources management from the state to local actors creates new commons resources at local level that allow the local actors to obtain the rights and power to make decision regarding the resource management. The creation of new commons is significant for natural resource policies worldwide (Agrawal & Ostrom, 2001).

Debates amongst scholars regarding the impact of community forestry on poverty alleviation took in place in environmental economics literature. Some studies demonstrate the potential outcomes of community forestry for deforestation mitigation and simultaneous welfare improvement for surrounding communities. Bottazzi, Cattaneo, Rocha, and Rist (2013) hold the view that sustainable forest management through a community forestry approach in the Bolivian Amazon provided better incomes while maintaining low carbon emissions. Similarly, Dhakal, Bigsby, and Cullen (2007) found that community forestry could overcome the rural unemployment problem and increase incomes while ensuring sustainable forest resources in Nepal. Their findings were supported by Dhakal, Bigsby, and Cullen (2012)

through an econometric approach to demonstrate a positive outcome of community forestry for the poorest households in Nepal.

Contrary to the above studies, other studies found that the impacts of community forestry on poverty alleviation were unclear. Sunderlin (2006) notes that there is no empirical evidence to support a case for successful poverty alleviation through community forestry in Cambodia, Laos and Vietnam. Similarly, Charnley and Poe (2007) reported that community forestry in America delivers more significant ecological impacts than economic benefits. Their finding was confirmed by Thoms (2008) who found that community forestry in Nepal is more beneficial for resource management and conservation than for improvement in local livelihoods. A similar result was reported by Maryudi et al. (2012). They found that community forestry in Indonesia is yet to achieve its promise to alleviate poverty.

How effective the community forestry practice in improving the community members' livelihoods, and hence poverty alleviation, in rural areas that supply environmental services is an open question that this study intends to answer through a mix quantitative and qualitative research method.

2. Research Methodology

This study uses a mixed method approach called "participatory econometrics" (Ibáñez & Rao, 2005; Rao & Woolcock, 2003). The participatory econometric approach incorporated certain steps in sequence: (1) in-depth interviews to obtain a grounded understanding of the community forestry issue; (2) survey instruments based on understandings developed from the interviews and field visits; (3) hypotheses derived from qualitative work that were then tested using survey data.

A variety of sources of data were used for this study: (1) documents; (2) maps and satellite images, (3) interviews; and (4) surveys. Semi-structured interviews were conducted with 22 relevant informants. The results from the interviews were used to develop a survey instrument (questionnaire). The surveys aimed to collect information regarding forest farmer experiences with Community Forestry practice, including the impact of these schemes on the village economy as well as the ecological impact of the programs in relation to forest management. Respondents for the surveys were 200 forest farmer households that were selected using a purposive random sampling technique (Bryman, 2015). Every survey question

in the survey related to Community Forestry practice was closed, and paired with an open-ended question in order to generate qualitative data to support the quantitative response. A focus group discussion (FGD) with community forest leaders was also performed.

3. Community Forestry Impacts on Local Socio-Economic Conditions

It will be argued that the Community Forestry program in the Sesaot forest in West Lombok has significantly improved the socio-economic conditions in the area. Community Forestry is argued to provide a wide range of social and economic benefits for villagers, including access to land, new job opportunities, new sources of income and increased income for villagers, improved education levels, improved health outcomes, better housing conditions and greater home ownership. Such benefits will be considered in two categories, direct benefits and indirect benefits.

3.1. Direct Socio-Economic Benefits of Community Forestry

Direct benefits are the immediate benefits obtained by villagers who are granted a property right to manage the community forest. These include access to land and new sources of income.

Land access for landless families

Access to land is the greatest benefit that is enjoyed by villagers who become forest farmers and obtain community forest management rights. This group of people is made up principally of the villagers who do not own private farming land, especially single parent women and the poor. As mentioned in the profile description of the first community forest farmer group in Sesaot, KMPH, participants in this program were selected on the basis of specific criteria, including: willingness to voluntarily participate, non-ownership of private farming land, and residence near Sesaot forest. Single-parent women with children were given first priority. Based on these criteria, 165 households were selected at the beginning of the Community Forestry program (Forum Kawasan, 2009).The landless family obtains access to farming land, which is beneficial for their livelihoods. Thus the Community Forestry program could be seen as a form of land distribution to the poor.

Access to community forest land is bounded by government regulation. It is clearly stated that the land remains state land. The granted right is not an ownership right, so that the

forest land cannot be sold or inherited (Menteri Kehutanan RI, 2014). The forest farmers are only allowed to manage the land and carry out farming with a composition of 70% MPTS (Multi-Purpose Tree Species) and 30% forest trees, with a minimum 265 trees on a hectare of land. Land access is granted for 35 years and can be renewed after evaluation, which is conducted every five years (Forum Kawasan, 2006). In the absence of the Community Forestry program, in 2015, based on the survey for this study, 45% of villagers did not have private land for farming. Although the size of the Community Forestry plot that has been granted to the villagers is relatively small (0.25 hectares per family[2]), it has helped the villagers obtain cash from farming forest land, which they could not have done in the past. The existence of Community Forestry has changed their lives, from being landless families to families with conditional access to land.

Income generation

Another direct benefit of Community Forestry programs is cash income obtained from selling forest products, especially non-timber forest products (NTFPs) such as coffee, cocoa, banana and other fruits and vegetables. Since the Community Forestry program in Sesaot is located in a protected forest that is significant for ecological needs, timber products are prohibited from being obtained from the community forest (based on the Indonesian law on forestry, UU 41/1999). As alternative, non-timber forest products (UU 41/1999 section 26) may be collected. Based on The Indonesian Ministry of Forestry regulation number P.35/2007, Non-timber forest products refer to everything other than timber; including, for example, rattan, resin, fruits, vegetables, and honey (Menteri Kehutanan RI, 2007). The situation would be different if the status of the Sesaot forest was a production forest. Based on the Indonesian regulations on Community Forestry, timber production is allowed in a community forest that is located in a production forest.

The non-timber forest products, especially fruits, are the most significant benefits that people obtain from the Sesaot community forest. Thus, to support both economic and ecological needs, MPTS that can produce fruits are favoured for planting in the community forest. Surveys for this study indicate that, on average, 80% of the trees planted in the community forests are categorized as MPTS. The Community Forestry program in Sesaot

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[2] There is no specific range of the land size granted per household, each household obtain 0.25 hectares. In fact, some household occupy more than 0.25 hectares that have been obtained from "buying" from others.

involved conversion of degraded forest land which was replanted and developed as community forest. Almost all community forests in Sesaot are secondary forest. The community forest covers around 30% of the total size of the Sesaot forests (Forum Kawasan, 2011).

Based on surveys conducted by the author in 2015, the average community forest farmer's annual earnings per household from selling NTFPs is around Rp 15,200,000.- (US$1,150) or about Rp 1,260,000.- (US$95) per month. The highest contributions to these earnings come from cocoa and banana crops, which reach an average of Rp 5,816,100 (US$ 438) and Rp 3,466,125 (US$ 254) respectively per year. This income can be used to cover about 48% of average family expenditure, which reaches about Rp 32,150,000.- (US$2,440) a year, or about Rp 2,600,000.- (US$197) per month. To support their income from community forests, most families have additional jobs, for example as small traders, labourers, livestock farmers, *ojek* (freelance motorcycle) drivers and handymen.

For an average of four family members, the forest farmers' per capita expenditure is about Rp 650,000 (US$47) per month. Of this, the highest proportions are spent for food and education, at 54% and 13% respectively. The economic conditions of the Sesaot community forest farmers are today well above the Indonesian national poverty line, which is currently set at Rp 356,378 (US$26) expenditure per capita per month (BPS, 2016). In addition, when considering the United Nations poverty threshold, which is currently set at US$ 1.25 income per capita per day (UN, 2015), the economic conditions of forest farmers in Sesaot, at about US$1.80 per capita per day, is still above this international standard.

3.2. Indirect Socio-Economic Benefits of Community Forestry

Indirect benefits are the benefits from the existence of the Community Forestry program that are enjoyed by villagers who do not work as forest farmers. Community Forestry provides jobs for people in the villages, such as traders in forest products, truck and *ojek* drivers, food processors, and labourers for crop planting and harvesting the yields. Community forest farmers who manage a large area of community forest land often employ other villagers to help them during planting and harvesting seasons[3].

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[3] The community forest land size officially granted by government is 0.25 hectares per household. However, some households manage up to 4.5 hectares – due to their capability to "take-over" the land management rights of other households if the other needs cash and is willing to "hand over" his rights to get cash, although it is illegal

Before Community Forestry was established, many people sought work overseas, such as in Malaysia, since there was a lack of job opportunities in the villages. As mentioned by one Sesaot villager, "Since Community Forestry has been established, people have tended to stay in their village, and to work in the forest either as a forest farmer, a labourer for planting and harvesting, or a middleman trader…" (AN, villager, interview, 21/3/2016). The higher proportion of people staying in the villages increases family connections, and may have long term benefits in terms of social capital generation in the area, but on the other hand the greater the population may put pressure on scarce forestland resources.

Women also gain benefits from Community Forestry. Previously in Sesaot, women in the villages usually stayed in the home undertaking domestic jobs. Since Community Forestry has been established, women now go to the forest to help their husbands in managing the Community Forestry land, or to work as farm labourers. Some women also work as small traders for forest products. They buy forest products directly from the farmer in the forest, to be sold in markets in the city. Women's groups have also been created in the villages to manage food processing businesses. The raw materials for food production, such as banana, jackfruit and durian, are bought from community forest farmers, and their products are sold to supply the tourism industry.

The indirect benefits of Community Forestry also flow to those who work in related forest product businesses, such as transportation and small trading. Some villagers have opened transportation businesses to assist farmers and small traders to access the forest, and to transport their forest products to market using trucks. Many young people work as *ojek* (motorcycle) drivers, to transport non-timber forest products from forest areas that are difficult to access by truck. Other villagers have opened small *warung* (coffee shops) near the forest, to accommodate the needs of forest farmers, drivers and middleman traders for lunch or coffee breaks. Significant change is also evident with respect to the lower numbers of people whose livelihoods rely primarily on timber products. Since the Community Forestry program has been established, people in the villages are no longer so directly dependent on timber forest products for their livelihoods; which is beneficial for the ecology of the area.

The survey data indicates 37% households manage 0.25 hectares, while 63% manage more than 0.25 hectares. This is a big issue for the sustainability of Community Forestry and PES. Ultimately, there will be more landless seeking to gain land or income through illegal use of the forest as a result of these illegal transfers.

Community Forestry is also able to provide revenue for the local government, due to taxes and fees collected from the community forest farmers. The forest farmers are mandated to pay a monthly fee, which is assessed based on the area of community forest that they occupy. This fee costs the farmers Rp 10,000 (US$0.76) per month per hectare (AM, CFUG leader, interview, 8/6/2014). From the total official Community Forestry area (2,668 hectares) in West Lombok district, the local government can obtain Rp 320,160,000 (US$24,300) per annum.

4. Villagers' Views on the Effect of Community Forestry on Their Livelihoods and on Poverty Reduction

This study involved surveys of 200 forest farmers in five villages bordering the Sesaot community forest location. The primary focus of the survey was to evaluate the impact of Community Forestry and PES programs on people's livelihoods and on poverty in the villages. The survey results indicate that 95.5% of respondents agree that Community Forestry has increased the forest farmer family's quality of life. Respondents explained that after they obtained land through the Community Forestry program, they were able to take up farming to increase their income, so that they could fulfil their family's economic needs.

A small minority of forest farmers reported holding a different view on the impact of Community Forestry on the quality of their lives. From the survey, 4.5% of respondents stated that they did not think that Community Forestry had increased their family's quality of life. The main reason provided was that they had only started working as forest farmers a few years previously. In these cases, there had not yet been significant income generated from the land, because the tree crops had not yet produced yields. This situation most commonly affects new families who have recently married and obtained the land through informally "buying" it from another farmer, or "inheriting" it from their parents[4]. Another reason for lack of reported life quality improvement from Community Forestry was because the respondents were busy doing other jobs, so the income from the Community Forestry land was not the respondent's primary income source and was not considered to be significant in meeting their family's needs.

These farmers often "bought' the Community Forestry land management right from those who needed cash. Although selling and buying a Community Forestry land management right is illegal, the practice exists because some people need cash, and the only option is to

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[4] The right held by villagers upon forest land is not an ownership right. Instead, it is only an access and management right.

"sell" their management right upon the Community Forestry land. This study's survey results showed that 29% of respondents obtained rights to Community Forestry land through buying the right from other farmers. To avoid contravening the regulations, the term the respondents used was "*ganti rugi*" (compensate for loss). The forest agency and the forest farmer community groups face difficulties in controlling these transactions. It seems that transfer of the forest management right is not regarded as a problem as long as the land is not "sold" to people who come from outside of the villages. Thus, the property rights upon the community forest are circulated only among the targeted households in the villages. As mentioned by one forest agency officer, "the forest management rights should be distributed among people who live in the surrounding villages where the Community Forestry is located' (MM, forest agency officer, interview, 6/6/2015). Nonetheless, the problem of the re-emergence of landless households from among the recipients and of inequalities among landholders over time is a potentially serious issue. There is no written contract for the transactions, which are based only on oral agreements among the relevant parties; although these transactions need to be approved by the CFFG leader to be locally accepted.

In general, the Community Forestry program has had a positive impact on socio-economic conditions in the villages. The survey results indicate that 82% of respondents agree and 13.5% strongly agree that Community Forestry helps to reduce poverty in the villages. They argue that it is easier to make a living because Community Forestry programs have established job opportunities in the villages. The general economic conditions and welfare in the village have increased significantly even though some people have not become community forest farmers. Only 0.5% of respondents disagreed with the statement that Community Forestry reduced poverty in the villages (and 4% of respondents were neutral). Those who disagreed argued that the answer depends on the size of the community forest plots awarded. The Community Forestry plot size is relatively small, and is arguably not adequate for those who have large families. Thus, the benefit of Community Forestry on socio-economic conditions is smaller for this group of families.

5. **Welfare Index to Measure the Socio-Economic Impact of Community Forestry Program**

To measure the impact of Community Forestry program on farmer households' socio-economic condition, a welfare index was designed. Eight basic indicators of welfare were surveyed to generate the welfare index. These indicators of welfare were chosen based on the

social economic survey standards used by the Indonesian statistics agency. These indicators include: house ownership, house wall material, house floor material, electricity, water supply, energy for cooking, transportation and communication (Riyadi et al., 2015). A summary of the welfare index is presented in table 1.

Table 1 Summary of Welfare Indicators Before and After Community Forestry Program Established

Indicators	Criteria	1998 (%)	2015 (%)	Change (%)
House Ownership	Own house	40	97	+57
	Live with family	60.	3	-57
House wall material	Bamboo	45	3	-42
	Wood	34	9	-25
	Brick	20	88	+68
House floor Material	Soil	56	1	-55
	Cement	43	61	+18
	Tile	1	38	+37
Access to Electricity	No Electricity	70	0	-70
	Shared from neighbour	20	20	0
	PLN grid	10	74	+64
	Own generator	0	6	+6
Water Supply	River/spring	77	1	-76
	Private well	1	1	0
	Public pipe	21	8	-13
	Private pipe	1	91	+90
Energy for Cooking	Wood/timber	100	34	-66
	oil	0	1	+1
	gas	0	65	+65
Transportation Facilities	No transportation	88	14	-74
	Bicycle	10	14	+4
	Motor bike	2	69	+67
	Car	0	3	+3
Communication Facilities	Do not have a mobile phone	100	9	-91
	Have one mobile phone	0	47	+47
	Hove more than one mobile phone	0	44	+44
Education Level	Primary School	67	35	-32

Indicators	Criteria	1998 (%)	2015 (%)	Change (%)
	Junior High School	20	27	+7
	Senior High School	12	26	+14
	Undergraduate	1	12	+11
	Postgraduate	0	0.00	0

Source: Author's survey; 2015; n = 200

Table 1 suggests that significant changes in household wellbeing occurred after the Community Forestry program was established. However, of course, correlation does not necessarily prove causation, and many factors can impact on these observed changes. In particular, it must be noted that the 1998 baseline comparator is at the point of the greatest impact of the Asian Economic Crisis[5]. Other contributing factors could be government investment in infrastructure such as roads and health services; social safety net (cash transfer and 'rice for the poor' programs); subsidy on fuel; and remittance from migrant workers. At the least, data from this survey suggest there may be a positive relationship between Community Forestry program and forest farmer families' welfare, despite the difficulty disentangling the impact of these policies from other broader changes in the economy.

6. Quantitative Analysis

Quantitative analysis has also been considered in this study to generate support for or against the qualitative finding. The influence of community forestry program on socio-economic improvement is quantitatively measured using an econometric analysis.

A welfare index is used as proxy for socio-economic conditions. The welfare of community forest farmers was hypothesized to be influenced by the Community Forestry index, the property rights of the forest farmer over the community forest, farmer involvement in a PES (Payment for Environmental Services) program (Diswandi, 2017), farmer compliance with *adat* rules, and community forest land size. Thus the regression model for this situation is as follows:

$$welfare = \beta_0 + \beta_1 cfind + \beta_2 pr + \beta_3 pes + \beta_4 adat + \beta_5 lgcfland + \varepsilon \qquad (1)$$

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[5] The Asian economic crisis in 1998 led to a decrease in household wellbeing, due to hyper-inflation increasing the cost of basic need items including food and fuel (Johnson, 1998)

where *welfare* refers to welfare growth as proxy for socio-economic conditions, *cfind* refers to Community Forestry index, *pr* refers to property rights, refers to PES program, *adat* refers to adat rules, *lgcfland* refers to community forest land size, ε refers to error term representing other factors that influence the dependent variable that are not included in this model, and β_0, β_1, β_2, β_3, β_4 and β_5 refer to regression coefficient or the parameters of the econometric model.

The dependent variable in this model is welfare growth. This variable measures the growth of the forest farmer's welfare during two periods of time: before the Community Forestry program was introduced in 1998; and after the program had been well established in 2015. The expected influence of each independent variable on the dependent variable in this model is as follows:

1. *Influence of community forest index on welfare*

The Community Forestry index refers to an index of Community Forestry management practices that are applied by the forest farmers. This index is constructed from nine factors that form three groups of governance indicators of Community Forestry. The factors include land governance, institutional governance and business governance. A high index indicates a better Community Forestry practice, which will potentially lead to better socio-economic outcomes, and thus higher welfare growth.

2. *Influence of property rights on welfare*

Farmers' property rights, which are indicated by the legal status of the Community Forestry land, will assure their security of land access. The survey conducted for this study indicates that the more secure the access, the better the outcome for farmers' incomes and economic livelihood. More secure property rights could impact positively on welfare growth.

3. *Influence of PES on welfare*

Farmer involvement in a PES program will generate economic benefits (Diswandi, 2017), since the PES program provides cash that is used by the farmers' group to buy multi-purpose tree species (MPTS) seeds to be planted in the community forest land . The value of the seeds could be an immediate economic benefit of the PES program. Further, the yield produced by the MPTS will be the primary economic benefit for the farmer in the future. Thus, involvement in a PES program is estimated to increase welfare.

4. *Influence of adat on welfare*

Failure to follow *adat* rules may cause the forest farmers to lose their rights to manage the community forest. They would then suffer economic disadvantage, since income from the community forest would be decreased as well. Surveys for this project indicate that farmers

who follow *adat* rules believe they will be granted secure rights to manage the community forest, thus ensuring their economic benefit from the community forest. It is therefore hypothesized that if the farmers comply with *adat*, welfare will improve.

5. *Influence of Community Forestry land size on welfare*

Community Forestry land size was estimated to influence welfare growth in regard to the ability of the households to obtain money by farming on the community forest land. It was assumed that the larger the land size per household, the more money the household can obtain, thus the greater the improvement in welfare.

6.1. Regression Process

Several regression models were constructed in this analysis. The first model includes all independent variables that are hypothesized to influence the dependent variable. The estimation result of the first model determines whether the model is the best model or not. To produce the best model, any insignificant variable as a result of the regression will be excluded from the model. After including only significant variables, the model will be tested again. The process is repeated until all independent variables significantly influence the dependent variable. Criteria for the best model are that all independent variables significantly influence the variation of the dependent variable; that there is a high and significant value of F-statistics; and that there is a high value of adjusted R^2. The OLS regression result is presented in Table 2.

Table 2. OLS Regression Result

Variables	Model 1	Model 2	Model 3
constant	23.516 (2.59)**	23.864 (2.63)**	33.285 (4.83)***
cfind	2.112 (1.37)	2.108 (1.37)	2.607 (1.73)*
pr	15.09 (6.22)***	15.10 (6.70)***	15.342 (6.61)***
pes	1.248 (0.59)		
adat	2.753 (1.55)	2.813 (1.59)	
lgcfland	12.618 (2.98)**	12.856 (2.63)**	14.378 (3.49)***
F statistic	12.21***	15.22***	19.30***
R^2	0.2198	0.2223	0.2162

t statistics in parentheses
** Significant at 0.1 ; *** Significant at 0.05

The OLS regression result for model 1 shows that only two independent variables –property rights and community forestland size– significantly influence welfare, with confidence intervals of 99% and 95% respectively. Meanwhile, PES and *adat* do not significantly influence welfare. This model produces an F statistic of 12.21 with 99% of confidence interval that indicates a simultaneous significant influence of all independent variables on welfare. This model produces R^2 value of 0.2198 that indicates the ability of this model to explain the variation of welfare by 21.98%.

The next regression removes the PES variable due to its smallest probability to influence the welfare, resulting Model 2. The OLS regression result for model 2 shows that Community Forestry index and *adat* were not significantly influence welfare. Property right and community forest land size significantly influence farmers' welfare with confidence intervals of 99% and 95% respectively. This model produces a higher F statistic and R^2 value than model 1.

The next model (Model 3) removes *adat* due to its smallest probability to influence welfare. After the *adat* was removed, all independent variables in Model 3 significantly influence the welfare, partially and simultaneously, although the adjusted R^2 in this model is lower than the previous one.

6.2. Quantitative Analysis Result

The Community Forestry program has a positive influence on socio-economic conditions, which is indicated by a positive relationship between both Community Forestry land size and the Community Forestry index and welfare improvement of the forest farmers. The larger the land size, the higher the farmer welfare improvement. Also, the higher the Community Forestry index, the higher the welfare improvement.

The other variable that has had a significant influence on the welfare of the forest farmers after the establishment of the Community Forestry program is the expectation of property rights granted to forest farmers upon community forest land. The forest farmers' property rights are indicated by the issuance of community forest land permits. Forest farmers who hold legal permits tend to obtain more economic benefit than those who have not obtained a legal permit. Meanwhile, involvement on PES program and *adat* rules that are employed in the practice of Community Forestry do not influence the welfare of the forest farmers.

7. Conclusion

Although many factors influence poverty reduction in Indonesia, I argue that the Community Forestry program in West Lombok has been able to help villagers escape from poverty. Data from the West Nusa Tenggara Province confirm that the poverty rate in the region decreased from 27.75% to 17.24% during and after the establishment of Community Forestry program (BPS, 2014). The main benefit of Community Forestry has been felt by people who were previously landless and mainly poor. This program provides access to land for this group of people.

The program also provides a source of income that derives largely from non-timber forest production, such as fruit and other tree crops. Socio-economic benefits have also been enjoyed indirectly by people who do not work as forest farmers, but who work in other sectors related to the Community Forestry program, including as traders, drivers, processed food producers and labourers.

Socio-economic conditions, such as housing conditions, transportation and communication facilities, and access to health services indicate that there are significant positive outcomes from the Community Forestry program in these areas. This study confirms that Community Forestry program has significantly contributes to rural economic development in villages around Sesaot Forest in Lombok, Indonesia.

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