Making community forestry work for climate change mitigation: case on production forest areas in Veteran Jaya Village, South Sumatra Province, Indonesia

S Lestari¹, B T Premono¹, B Winarno¹, A Kunarso¹, and A H Lukman¹

Environment and Forestry Research Development Institute of Palembang
Ministry of Environment and Forestry, Jl. Kol. H. Burlian Km 6.5 Puntikayu
Palembang, South Sumatra, Indonesia.

email: lestari@iuj.ac.jp

Abstract. Community Forestry becomes new paradigm in the forest management system in Indonesia. Through this mechanism, it is expected that the role of the community in forest management will be stronger and the benefits of forests to improve community welfare can be realized. This study aims to determine the impacts of community forestry programs and also to observe further how the community rehabilitates marginal forest areas as an effort to reduce the effects of climate change. Surveys, FGD and interviews to stakeholders and community groups that obtain forest management rights are conducted to collect data. The research-results explain that community-forestry-permit provides a freedom for the community, hence they could manage the land optimally. The implementation of community forestry still requires assistance from local government as a facilitator so that the programs carried out are truly useful and provide optimal results. Furthermore, the establishment of institutions, program design, and planning in the management system also still needs to be strengthened. The term of climate change has not been widely known by the community in rural areas of South Sumatra. However, they have realized the impact of climate change. Rehabilitation activities and several efforts to increase the number of land cover in community forestry area will be an opportunity to improve the ecosystems condition, mitigate the climate change and diversify commodity choices of the community for better livelihoods.

1. Introduction

“Community forestry is an institutional innovation of empowering local communities in managing forest resources for their benefits in co-ordination with the government, although the community do not own the forest” [1]. Therefore, the community only has the right to manage the forest area, but does not have their ownership rights. This area may not be transferred, inherited, pledged, or sold. In addition, the status and function of this area must be maintained as a forest area, and should not be planted with oil palm. Community forestry aims to improve their welfare of the local community through optimum utilization of forest resources, in fairly and sustainable way while still maintaining the preservation of forest and environmental functions [2]. Community forestry through diversified land-use practices contributes to environmental sustainability, food security and poverty alleviation.
Moreover, tree planting in the community forestry area will function in regulating water, temperature, soil, and microclimate for more resilient production [3], storing carbon and halting land degradation [4]. Accordingly, in the management of forest areas that is burdened with community forestry rights, the community must also maintain the functions of the forest including climate change mitigation.

Community-forestry permits in Indonesia are generally given to communities for forest lands that have long been opened and managed community. The function of the area has changed because it is no longer forested and has been cultivated as agricultural land. Changes in functions that occur on this land have caused loss of tree-cover on the land, reduced ability of soil to store ground water, to absorb carbon, and contribute to the prone to the danger of erosion and flooding. This change in the function of the area from forest to agricultural land occurs because the community’s needs for land are increasing as a result of increasing population numbers [5]. Shift in the function of this area contributes to climate change which ultimately has an impact on livelihood of the community. One of community group that will be affected by climate change is the community around the forest which generally has limited access to the resources, lack of diversification options for subsistence livelihood, and lack of education [6].

The impact of climate change is often not realized by the community, even the term of climate change itself is still unknown to them. However, in reality, the impact of climate change has been felt by the community in their daily lives. The most common thing is the temperature in their neighborhood, which feels hotter, and the ambiguity between the rainy and dry seasons. While the impacts of land cover changes that are experienced by the community are the shrinkage of groundwater availability when the dry season arrives. In South Africa, smallholder farmers who are engaged in crop production have experienced stagnant in crop productivity, which in turn put pressure on already constrained disposable household income because of the increased food costs and agricultural input costs [7]. In addition, farmers in rural communities of Sri Lanka has revealed that they have observed an increase in temperature and lack of adequate rainfall over the past twenty years in their area. Therefore, they changes their cropping patterns by planting short season crops as the main agricultural practices to adapt and to minimize the potential loss of their crops [8]. Community forestry has provided benefits for most stakeholders, at the most scale, for most services and for important biodiversity at the site although not all ecosystem services can be maximized simultaneously [9]. The study in production forest areas in Veteran Jaya Village aims to determine the impact of community forestry programs in this village and also to observe further the effort of the community in rehabilitating marginal forest areas as an effort to diversify their income and reduce the impact of climate change.

2. Research Methodology

This research was carried out in production forest of Veteran Jaya Village, Martapura subdistrict, South Sumatra Province from November to December 2018. The people in this village who are the members of Hutan Jaya Lestari farmer group, in 2018, obtained a community forest utilization permit with an area of 252 hectares through Decree of the Minister of Environment and Forestry of Republic Indonesia Number: SK. 7231 /MENLHK-PSKL/PKPS/PSL.0/10/2018.

This research is descriptive and qualitative research to observe the role of community forestry in climate change mitigation. “Descriptive research is a study of status and its value which is based on the premise that problems can be solved and practices improve through observation, analysis, and description” [10]. Additionally, [11] explains that qualitative research collect data qualitatively and the method of analysis is also primarily qualitative. Therefore, in this research, data are collected using survey, interview and focus group discussion (FGD) to households and stakeholders in Veteran Jaya Village. Focus group discussion is a qualitative approach to gain an in-depth understanding of social issues, hence data from a purposely selected group of individuals could be obtained rather than from broader population [12], as many as 20 people were involved in the FGD in Veteran Jaya village.

The study investigates the perceptions of related institutions and key informants such as government employers, local leaders, and head of the village, about community forestry permit and
the implementation of the program. People who involve in the Hutan Jaya Lestari are interviewed regarding community forestry program in this village, the benefits of the program and their expectations for the next future of the program. In addition, various information relating to climate change mitigation efforts are also explored in the process of interviews and FGDs with all relevant stakeholders.

![Site location](image.png)

**Figure 1.** Site location

3. Results and Discussions

3.1. Community Forestry Program in Vetaran Jaya Village

The area designated as community forestry in Veteran Jaya village in Martapura Subdistrict, South Sumatra province is a production forest area that is a source of livelihood for the local community. As many as 143 of the households who are members of 'Hutan Jaya Lestari' Farmer Group get the management rights over forest land in their villages. This production forest area has been transformed into an agricultural area which has been cultivated by the community to grow cassava, corn, peanuts, and other types of agricultural crops. The community in this village recognizes that the existence of the community forestry-permit providing freedom for them in managing the land, however, though the community has managed the land, they still feel fear and anxiety if the land that they have planted is taken over by the government or by the company.

By obtaining community forestry permits, 143 people in Veteran Jaya Villages have the rights to manage the land optimally. The community can determine the types of plants that are suitable to be cultivated on the land by paying attention to the land suitability and climate aspects. There are some benefits in building community forestry: the community will obtain optimal and fair benefits from forest resources through capacity building and the rights also provide access to forests in order to improve the welfare of the local community. However, in addition to these rights, the community also has an obligation after being granted a business permit to utilize community forestry [2]:

- Maintain its area from environmental destruction and pollution
- Setting up a sign of the boundary of the working area
- Prepare business work plans, and annual work plans
- Submit the implementation report to the licensor
- Plant and maintain the forests in their working area
- Implement forest product administration
- Pay attention for forest resource provisions
- Maintain forest function
- Carry out forest protection

The above obligations must be carried out by all community members who are members of the farmer groups that obtain community forestry permits. In implementing the obligations, the community members can be assisted by appointed government agencies to provide assistance for the successful implementation of the program.

Based on the results of discussions and interviews conducted with the community, village government and related stakeholders (Figure 2 and 3), various information are obtained regarding community efforts to obtain community forestry rights. These efforts include: (1) forming a farmer group whose members consist of villagers who have managed the land for which a community forestry permit will be applied, (2) building networks with forestry authorities at the site level and other related institutions for the process of proposing community forestry licenses, (3) assigning the community together with local forestry authorities and other institutions to prepare documents about the general description of the physical conditions, socioeconomic, and potential of the area, as well as the location map to be proposed, (4) submitting community forestry licences application to Minister of Environment and Forestry.

![Figure 2. Discussion with farmers in the field](image1)

![Figure 3. Discussion with the head of village and other stakeholders](image2)

The community hopes that by obtaining community forestry permits, the attention of the central and regional governments to rural communities will increase through various programs that can be aimed as the efforts to increase community income and welfare. Before the existence of community forestry permits, extension and assistance activities from the government to the community are very limited. Community members who have the opportunity to attend some meetings or training activities are limited to the management of farmer groups. The community do not get much information about government programs related to forestry and the management policies of the forestry area in their village. The community only has limited information that, so far, they have carried out agricultural activities in the areas that are state forest. This forest that they obtain from concessions have been granted to private companies. After obtaining a community forestry permit, the farmer group coordinates with the Forest Management Unit at the site level to draw up an area management plan. They also start to plant forestry plants in the community forestry area as an obligation after the permit is granted.

An important lesson that can be taken in the process of obtaining this community forestry permit is that collaboration and coordination among members of farmer groups are very necessary.
Furthermore, cooperation and coordination between farmer groups and local village governments are needed to support the feasibility and success of the community forestry permit application process.

3.2. Community Forestry and Climate Change Mitigation

Community forestry has an important contribution in climate change mitigation efforts, because in its management and planting systems, it still pays attention to environmental sustainability aspects. The rates of carbon sequestration on community forestry area depend on the management practices, the tree species involved and the types of agricultural crops planted [13]. Therefore, in managing the community forestry, the communities have to plant tree species in order to preserve the land forests and the environment. During interviews and discussions with community members (Figure 2), some people realize that climate change have occurred in their environment. In general, the air temperature rises and there is no clarity between the rainy and dry seasons. The same condition happens to the environment in the community of Bengkulu Tengah Regency, Bengkulu Province, Indonesia [14] and also in Kaski and Syangja District, Nepal [1] [15]. Moreover, in Congo, climate change has caused the period of rain to be shorter even the same quantity of rain is falling, the dry season is on average hotter and more severe [16]. As a result, people are difficult to determine the right time to prepare their fields and plant their crops that cause a decrease in productivity. Therefore, people should make various efforts to adapt to this climate change, including finding new crop varieties and changing planting time in order to increase production and their income [17].

Since the production forest in Veteran Jaya Village has long been converted into agricultural land, there are no more tree species in this area even though the status of this area is still production forest. Therefore, this forest becomes a stretch of agricultural land without trees as shade (Figure 4). The area which was once overgrown with large quantities of large trees has turned into an agricultural area with various types of secondary crops as a source of community livelihood. As a result, land cover in this region has also changed greatly. The microclimate around this area gets hotter especially in the dry season where the groundwater availability also decreases. Although not everyone is aware of all these transformation, one change that is very well realized by the community is the decline in soil fertility, so that if fertilization is not carried out on agricultural crops, productivity will also decrease. According to the community, the loss of land cover causes soil erosion so that the top soil is eroded and carried away by surface runoff. Therefore, various efforts are needed to prevent further damage and further decline in land quality.
Local communities could actively participate in mitigating climate change through their skill, experience, and knowledge in managing their community forest [18] [16], because community forest can contribute to increase forest carbon stocks while the community could obtain other benefits from other agricultural crops [9] [7]. Forest management by the community will have an impact on how much benefits can be obtained from community forestry programs, especially in mitigating climate change. According to [13] the role of forest management in climate change mitigation can be described below:

| Carbon sequestration                                                                 | Forest carbon stock conservation                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Through increases in forests, trees, and forest carbon stock enhancement             | Through reduction of deforestation and forest degradation              |
| - Afforestation, reforestation, and forest restoration                               | - Sustainable practices of forest management and use                    |
| - Increase of tree cover in farming systems (agroforestry), rural landscape and cities | - Integrated fire management                                           |
| - Enhancement of carbon stocks and sequestration capacity through management practices | - Management of forest health and vitality                             |
|                                                                                     | - Management of forest biodiversity                                    |
|                                                                                     | - Management of protected areas and wildlife                            |

Based on this diagram, the role of community forestry in carbon sequestration is through increasing tree cover in farming system (agroforestry) and rural landscape because most of the area of community forestry that is located in production forest has changed its function from forest area to agricultural land. Therefore, there are only a few trees in this area or even none at all because the trees have turned into an agricultural plant. Forest management in production forest areas in Veteran Jaya village after the status of the area designated as a community forestry area will determine whether this region will be able to play a role in mitigating climate change efforts or not. In the near future, forest management planned by members of farmer groups will be very decisive. Guidance from local government and Forest Management Unit are needed so that the management of this area can be planned and implemented properly.

3.3. Implementation Strategy in Mitigating Climate Change after a Community Forestry Permit is Granted

Awareness of the status of the area which is currently managed by villagers in Veteran Jaya makes the community care about their obligations to preserve the function and the sustainability of environment in this area. Moreover, the awareness of members of the farmer groups raises; their awareness that the loss of tree cover in their area has caused some impacts from climate change. The community believes that planting trees in the community forestry and surrounding areas are important. If tree planting activities are not carried out as soon as possible, the environmental conditions will get worse. The weather will get hotter, the availability of ground water will decrease, and surface soil erosion that can cause decrease in soil fertility will continue to occur. As a result, environmental damage will threaten the environment around their homes.
To prevent the impact of environmental damage, the community has made several efforts including planting bambang lanang trees in the area of community forestry. The members of the farmer groups plant bambang lanang trees around their cultivated land (Figure 5), so that these plants can also function as land boundaries. In addition as one of the efforts to prevent climate change, bambang trees can also be used as savings or as future investments because of their economic value.

The management of the farmer group “Harapan Jaya Lestari” also instruct the members of the farmer group to plant *Michelia champaca* (bambang lanang wood) in the area around the community forestry in addition to planting in the area of community forestry (Figure 6). Especially at the locations along the road from the settlement of veteran villagers to the area of community forestry. By doing this, environmental sustainability is expected to be realized. In addition, the community can also get various benefits from the successful development of bambang lanang trees around the area of Veteran Jaya Village. According to [19], community forestry can also have a role in climate change adaptation, including biophysical roles, socio-economic roles and institutional roles.
4. Conclusion
Climate change will have several impacts to the environment which in turn will result in many challenges and opportunities that will be faced by communities, especially for forest-dependent people. Tree cover provides important services that play a role in mitigating climate change and can help people adapt to climate variability and changes. Therefore, it is important to have a better understanding of the institutional capacity of the system to adapt.

After obtaining a community forestry permit, people in Veteran Jaya Village have the rights to manage the land optimally. Moreover, the community will obtain optimal and fair benefits from forest resources through their capacity as well as collaboration and coordination with Forest Management Unit and other organizations in the site level. Community forestry permit provides access for the villagers to utilize forests in order to improve the welfare of the local community.

Land management by taking into account the sustainability aspects of yields and environment is one way to minimize the impact of climate change. The term of climate change has not been widely known by the community in rural areas of South Sumatra. However, they have realized the impact of climate change. Rehabilitation activities and several efforts to increase the number of land cover will be an opportunity to improve the ecosystems condition, mitigate climate change and diversify commodity choices of the community for better livelihoods. The member of farmer groups in Veteran Jaya Village has planted bambang lanang trees around their cultivated land and around the community forestry area as one of efforts to prevent climate change. These bambang trees can also be used as savings or future investments because of their economic value. The implementation of community forestry still requires assistance from the local government as a facilitator so that the programs carried out are truly useful and provide optimal results. Furthermore, the establishment of institutions, program designs, and planning in the management system also still needs to be strengthened.

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