COMMUNITY-BASED FOREST REHABILITATION THROUGH INCENTIVE MECHANISM: A CASE STUDY IN SOLOK AND AGAM DISTRICT, WEST SUMATRA, INDONESIA

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ABSTRACT

The existence of forests is essential to human living on earth, but the existence of forest is threatened by deforestations and forest degradations. Forest rehabilitation programs that have been carried out by the government and other parties often fail. Different approaches are needed to improve the success of forest rehabilitation in Indonesia. This research aims to analyze the success of community-based forest rehabilitation through the forest incentive and the factors that influence it. The site is in Nagari Paninggahan Solok District and in Nagari Kamang Agam District, West Sumatra. The location is part of Voluntary Carbon Market (VCM) projects by CO2BV company from the Netherlands. The research and the data collection were conducted in April 2017. Data types that were used in this research were primary and secondary data. The data analysis techniques used were descriptive qualitative analysis. The results showed that community-based forest rehabilitation through an incentive system has been successful to improve the condition of degraded forests in the research site. The indicators of the success of this program were the increase of variety and number of trees, the level of trees density, and the increase of water supply in the surrounding areas of the rehabilitation zones. The success program was affected by several factors, those were: 1) community institutions (farmers group), 2) the clarity of contract and intensive mechanism, 3) mentoring and supervisions, 4) the clarity of benefits for the citizens, 5) community participation, and 6) the communication among stakeholders. It is expected that this research can provide an insight for the government in policy-making to rehabilitate degraded forests. This finding provides information that the government needs to consider the economic aspects of local communities in forest rehabilitation programs. The incentive is one of the important factors that support the success of forest rehabilitation programs.

Keywords: community participation; deforestation; forest; incentive; rehabilitation program

INTRODUCTION

Indonesia is one of the countries that has the largest tropical forest areas. The area of Indonesian forests reaches 99.6 million ha or approximately 52.3% of the land area which consists of protected forests, national forests, and production forests (Ministry of Environment and Forestry, 2015) Many various kinds of flora and fauna grow well in Indonesian forests. Nevertheless, the existence of Indonesian forests is now being threatened by forest degradations and deforestations. Deforestations and forest degradations in Indonesia are caused by several factors, such as illegal logging, wildfires, conversion forests, unintentional farmland expansions, and social gaps. As a result of degradation and deforestation, Indonesia loses primary forest covering 6.02 million hectares in the period 2000-2012. In 2011-2012 Indonesia lost 635,000 hectares of forest in 2011 and 840,000 ha in 2012 (Ministry of Environment and Forestry, 2015). The damages occurring in Indonesian forests are very severe and need recovering by the government to prevent more severe forest damages.

The government has already maintained several programs to rehabilitate forests and land. Since the early 1950s, the Indonesian government has been running various programs of forests and land rehabilitation. Presidential Directive/Inpres (Instruksi Presiden) on Reforestation and afforestation
started to run in 1976/1977 was forest and areas rehabilitation project. This project distributed tree-seeds to the residents to be planted; one kind of the seeds distributed was albizia (Paraserianthes falcataria) seed. In early 2002, the Forestry Department has also constituted a policy under Social Forestry to promote community-based forest rehabilitation. One of the programs issued by the government was Community Forestry (HKm) (Devkota, Maryudi, & Kroft, 2010; Damiat, Lumangkun, & Dirhamsyah, 2015). HKm is national forests which are utilized to empower the residents in the forests area and the residents surrounding the forests (http://bp2sdmk.dephut.go.id). Natural sources conservation policy has to deem the issue of community prosperity (Ministry of Environment and Forestry, 2015; Hakim et al., 2010; Pitscugin, 2015). To get the community involved in managing the forests turns out to be eminent as forests are the main source of income for 10-20 million people live in the forest whose lives rely on the forests and their lives must be affected by the degradation occurring (Purba et al., 2014; Sunderlin & Resosudarmo, 1996). It is not only the Forestry Department which is responsible to afforest the 96.3 ha damaged areas, but also the stakeholders and including community living around the forest. Therefore, an innovative approach is required to achieve the goal of forest rehabilitation, which, in turn, will provide social-economics benefits to the community. One of the forest managing mechanism that can be employed in rehabilitation the forests is community-based forest rehabilitation through the incentive mechanism (Lestari, Agussabti, & Alibasyah, 2014; Blay et al., 2008; Purnomo et al., 2017).

Research on community-based forest rehabilitation through incentive mechanisms has been conducted by several researchers, but it is only a small part of the research and has not yet discussed in depth how the mechanism works. This research will focus on this study. The objective of the research to determine the success of community-based forest rehabilitation through incentive mechanisms and the factors that influence the success of community-based forest rehabilitation through incentive mechanisms. The implication of this research is to identify the factors that support the success of forest rehabilitation through an incentive system so that policymakers can apply these findings on a broader scale to support forest sustainability in Indonesia.

MATERIALS AND METHODS

This research was conducted in Nagari Paninggahan Solok and Nagari Kamang Agam District, West Sumatra. These two locations were purposely selected because they included forest rehabilitation with the VCM project by CO2BV located in West Sumatra. The research and the data collection were conducted in April 2017. The research method uses a qualitative research approach. Afrizal (2015) states "Data analysis in qualitative research has been carried out starting from the formulation and identification of research problem, before plunging into the field, and lasts until the writing of the research results (Matthew B, A M, & Johnny, 2014). Data types that were used in this research were primary and secondary data. The primary data were obtained through deepened interviews to the members of the farming group, and program facilitator, as well as field observation (Dilshad & Latif, 2013; Bevan, 2014). The secondary data was obtained from readings, previous studies, and related references. The data analysis technique utilized in this research is descriptive qualitative that have data reduction stage, data display and conclusion or verification. A descriptive qualitative research technique is employed to know the success of forest rehabilitation through the incentive system.

RESULTS AND DISCUSSION

Overview of the Sites and Program

The Rehabilitation projects with an incentive system in Paninggahan and Kamang is the development of several pre-existing programs. Rehabilitation projects in Paninggahan and rehabilitation are Voluntary Carbon Market (VCM) by CO2BV company from the Netherlands. Initially, this project is only in Paninggahan (in the highlands around Singkarak Lake) and not in Kamang, after the projects running in Paninggahan and the expansion in Kamang. Before VCM project in Paninggahan, has a program called CDM (Clean Development Program) was initiated by RUPES (Rewarding Upland Poor Environmental Services) and ICRAF International Council for Research in Agroforestry that began in 2009 to 2011, but due to some constraints and problems of the program eventually stopped. After the program was initiated RUPES and ICRAF were discontinued, then CO2BV enter the Netherlands. VCM projects in Paninggahan initiated by CO2BV to implement the carbon trading program. CO2BV provides funding to communities to plant trees in farmer's fields that have been degraded, been degraded which was formerly forest area, and then the company got the benefit from
the carbon market in the Netherlands. The first contract rehabilitation program in Paninggahan between company and farmers started in 2013 to 2015 and 2015 to 2017. After the expiration of the contract, the company may extend the contract or terminate the program. If the company does not continue the contract means that farmers are allowed to use existing plants on their land.

In 2017 the number of farmers in the farmer's groups of VCM Paninggahan about 50 farmers, with a total land area of about 30.65 hectares. VCM program in Paninggahan under Bukit Panjang farmer groups, Tambang Manyiak, and Talago Datar. While in Kamang farmers who participate in the program around 20 farmers, with an area of approximately 20 hectares, and name farmers groups are Halalang Sepakat farmers groups. Farmers who want to join in the VCM must own their own land and the land is not in dispute. However, the program VCM also limited land area (limited funds and facilitator program).

Plants were grown in a VCM program determined by the company/facilitator. However, farmers are allowed to plant local plants that match the criteria of the company. Trees planted in the program include a mahogany tree, Surian, Pinang, Avocado, Cocoa, Clove and Bayur. The number of trees planted in a minimum of 700 stems per hectare. On the program are considered plants into plants that the project is actually grown from seed, meaning that the plants/trees grown previously on the farmer's land can not enter into the program.

The amount of incentives given to farmers is 5 million rupiahs/ha contract (3 years) and payment held 3 phases, the first year 50%, the second year 30%, and 20% the third year. People consider rehabilitation programs through the forests to have economic benefits. The proceeds from the program to help farmers rehabilitate the land. In addition, in the long term, the will get the benefit from the program after the expired contract, the community will benefit from planted crops such as cloves, avocado, and others. The general overview of the project can be seen in Table 1.

Table 1. General overview rehabilitation project through incentive in West Sumatra

| Characteristics       | Explanation                                      |
|-----------------------|--------------------------------------------------|
| Owner                 | CO2BV Netherlands                                |
| Location Project      | Solok and Agam, West Sumatra                     |
| Contract duration     | 3 Years                                          |
| Types of trees        | Mahogany, Surian, Pinang, Avocado, Cocoa, Clove and Bayur |
| Incentive payments    | Through the group with three stages per year: 50%: 30%: 20% |
| The amount of incentive/year/ha | Rp. 5,000,000 ha                             |
| Number of trees       | 700 stems/hectare                                |
| The number of farmers | 70 farmers                                      |
| Project large         | 5.65 hectare                                    |

Source: Primary data

The Success of Forests Rehabilitation by Incentive Mechanism

The incentives for revitalizing the forests have succeeded to improve the condition of the forests in the research area. The result shows that the citizen-based forest rehabilitation program in Nagari Paninggahan and Kamang has succeeded to restore the condition of damaged forests. The economic incentive is very essential to the success of forest rehabilitation and to attain people's support to run this rehabilitation program (Lu et al., 2005). The incentives system in forest rehabilitation is one of the methods that can be employed to improve the condition of forests. The incentives system in forest rehabilitation is one of the approaches to conservation by reimbursing the landlord or the forest owner.

Forest improvement in both areas of rehabilitation is supported by the result of observations and interviews which are addressed with several indicators. The indicator of success in this program that can easily be noticed is the increase in plant varieties. The plant's varieties increase because the farmers are allowed to plant local plants that can provide economic benefits, like Mahogany, Surian, Avocado, Cocoa, etc. The successes of forest rehabilitation can also be examined from the numbers of trees compared to the trees grow in none rehabilitation plots. The forest rehabilitation in both locations is considered successful as it can increase water supply in the surrounding areas where the research takes place. Based on the interviews with several farmers in Kamang, the water supply was raised after the implementation of forest rehabilitation; this was indicated by the increase of water volume in rice field areas which are located nearby the rehabilitation forests.

The results showed that the community was enthusiastic about providing incentives for forest rehabilitation. Communities assess the incentive assistance provided by donors can overcome the limited costs for forest rehabilitation. local people consider this program to have a positive impact in the short and long term. in the short term, the height of the tofu tree will reduce the potential for landslides, floods, drought in the dry season, and increase the availability of groundwater. in the long
run, the community considers that this program can provide an economic improvement from fruit and wood products. People can take the fruit and sell it so that it will increase household income. Then, the community’s need for wood can be met with a selective cutting system so that the community does not encroach on the forest around the community settlement.

**Factors influencing the success of forest rehabilitation**

Factors that endorse the success of forest rehabilitation in Paninggahan and Kamang are not only influenced by granting incentives to the farmers who manage the forests, but also endorsed by several factors; community organization (institutional community), the clarity of contract and intensive mechanism mentoring and supervisions, the clarity of benefits for the citizens, citizens participation, and the communication among stakeholders.

1) Institutional Community

Institutional community plays a very important role in the success of community-based forest rehabilitation. According to Harun & Dwiprabowo (2014), one particular factor that endorses the success of managing natural resources is organizing the institutional community, furthermore, Lu and Chou (2005) stated that networking in the basic organization and nearby residents hold an important role in the success of a rehabilitation program (Mutolib et al, 2016).

The institutional organization in Nagari Paninggahan and Kamang provides a great contribution in endorsing the success of forest rehabilitation program. In those two Nagari, there is a functional farming community which can be a liaison for the residents and the financial support directions for the forest rehabilitation program. Besides, this farming community functions as a media of funding distributor, a certain station for discussions to solve problems, a media of educations and training, a means of communication among the member of a farming community, and a means of supervising the scheduled-activities of managing the forests.

2. The Clarity of Contract and Intensive Mechanism

Community-based forest rehabilitation in Nagari Paninggahan and Kamang retains a low enforcement contract between the fundraiser and the farmers. The contract administrates incentives distribution that the farmers will get if they get involved in the rehabilitation program. The clarity of policies in the contract and incentives will affect positively the success of the forest rehabilitation program because there is certainty regarding the benefits that will be obtained by the farmers. Besides, this cleared-law-enforcement-program encourages farmers to seriously obey the well-negotiated rules. Djamhuri (2012) argues that the way how to distribute the incentives still becomes a major problem in running forest rehabilitation in Indonesia so that a clear and transparent policy will ensure the existence of the forests the residents manage.

3. Monitoring and Supervision

The success of forest rehabilitation in Nagari Paninggahan and Kamang is endorsed by monitoring and supervision run by the facilitator. Monitoring and supervising are run to ensure that the prior program functions in line with the policy and agreed-deals. Supervision and monitoring are run to resolve problems or conflicts that occurred in the field, such as the problems of distributing incentives, contracts with the farming community, selecting varieties of trees, planting trees program, conserving, and all programs that related to the rehabilitation program. According to Ostrom, one factor that affects the success of continuous revitalizing natural resources is supervision (Ostrom, 2005).

4. Clarity of benefits gained by the community

The high rate of forest deforestation and forest degradation force the government to conduct forest rehabilitation program more often. Nonetheless, a number of these programs fail because the nearby residents gain no benefits from the programs; this makes them exploit the forests to carry on living. The forest rehabilitation program has to notice the importance of fulfilling the residents’ needs as this will contribute to the accomplishment of the program. The success of forest rehabilitation in Nagari Paninggahan and Kamang is also endorsed by the clarity of benefits that the residents will gain from this forest rehabilitation program. Besides the incentives of 5 million/ha that will be gained for five years, the farmers are allowed to plant wooden trees and trees that can be fruited, so that it will help them to increase their income. As there is ownership for the plants after the contracts, it attracts people interest to get involved in this program. The community considers that forests rehabilitation program offers many economic benefits for their future.
5. Community Participation

The participation of the community plays an important role in the success of forests rehabilitation program (Zimmerman, 2011). The community of Nagari Paninggahan and Kamang participated in this program by participating in planning forest rehabilitation, participating in selecting what plants to crops, participating in cropping and preserving the plants, participating in training, and participating in evaluating the success of forest rehabilitation. Community participation will affect the success of forest rehabilitation. Community participation is the key to preserving the natural ecosystem; furthermore, Khongsak (2014) exclaimed that participation is a model that can be employed to maximize forest management by the residents.

6. Communication

The success of forest rehabilitation is also endorsed by good communication between farmers and fundraiser/company. The forms of communication are communication in selecting what plants to crops, communication in distributing incentives, and sharing the problems which the farmers coped with in preserving the plants. The affiliation of good communication and the success of forest rehabilitation is supported by the research conducted by Suwarno (2014), well, communication between the farmers and the policy initiators is essential to be maintained for the success of the environmental rehabilitation program.

CONCLUSIONS AND SUGGESTION

Conclusions of this research are community-based forest rehabilitation through an incentive system succeeds to improve the condition of degraded forests in research areas. The indicators of the success of this program were the increase of variety and number of trees, the level of trees density, and the increase of water supply in the surrounding areas of the rehabilitation zones. The success program was affected by several factors, those were: 1) community institutions (farmers group), 2) the clarity of contract and intensive mechanism, 3) mentoring and supervisions, 4) the clarity of benefits for the citizens, 5) community participation, and 6) the communication among stakeholders.

The result of this research showed that the presence of residents surrounding the forest can become a powerful factor in preserving the forests, as long as the residents can obtain significant benefits from the forest rehabilitation program. In the future, forest rehabilitation policies must pay attention to the economic well-being of local communities around the forest. Forest rehabilitation with an incentive approach is one of the efforts to encourage the success of forest rehabilitation, the government needs to collaborate with various donors from domestic and abroad to expand the scale of forest rehabilitation projects with an incentive approach.

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