

THE ROLE OF FOREST FARMERS GROUP THROUGH PAYMENT FOR ENVIRONMENTAL SERVICES SCHEME IN PRESERVING WATER RESOURCES IN CIDANAU WATERSHEDS AT BANTEN, INDONESIA

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Abstract—In an effort to preserve the environment, a lot has been done, both by the government and the community, one of which is through the payment for environmental services scheme. Payments for environmental services (PES) are a relatively new program in efforts to preserve natural resources that have been applied in several countries, including in Indonesia. One of the PES Program in Indonesia is in Cidanau watershed of Banten Province which emphasizes more on the preservation of the water resources services of the Cidanau River which is a source of raw water for the people in Cilegon. This program involves several stakeholders, including users of environmental services, farming communities, NGOs, and local governments. The success of this program is determined by the synergy of all these stakeholders. Farmer communities in the upstream watershed are land owners and have a role as environmental preserver. This research was conducted in 2017 by taking the case of the Forest Farmers Group in Tamanjaya Village, Ciomas sub-district, Serang Regency, Banten Province. The research method was a qualitative method with the informant as the head of the Forest Farmers Group Karyamuda 2. The data were analyzed descriptively. The results showed that forest farmer groups played an important role in the success of the PES program in the Cidanau watershed. Positive things found include (1) the Cidanau river flow is relatively constant, (2) land cover with higher crops is increasing, and (3) the farmers welfare are increasing.

Keywords— *forest farmer groups, PES, water resources, Cidanau watershed, Banten, Indonesia*

I. INTRODUCTION

Environmental management changes over time in line with human awareness of the importance of the environment as a resource that must be sustained sustainably. Management theory has shifted from an anthropocentric approach or known as traditional management towards environment-based management or eco-centric management. Why can't rainforests be saved? Rain forests are seen as natural resources that do not have the value of money in natural conditions. When the rainforest is cut down and the timber is taken and then sold, or the former forest land is

used as agricultural land or pasture, this has only an economic value. Other important forest functions are ignored, even though it will guarantee a global ecological balance that actually has an unlimited economic value if it is calculated with money. Realizing this, now more than one and a half decades, Indonesia has transformed the development paradigm from an economic growth approach to a sustainable development approach. Sustainable development, namely development that is holistic, pro-economic, pro-social, pro-environment long-term [1]. Nevertheless, in reality development in Indonesia still remains oriented towards economic interests. According to [2], at the end of the decade of the 2000s, approaches to environmental management or natural resources oriented to market demand increased as were all sectors in other economic fields. Marketing aspects or economic aspects in general always rely on the private sector to be able to play an active role. On the other hand, it is hoped that the government can prepare its management tools or mechanisms so that natural resources can be managed sustainably.

Cosgrove and Rijsberman [2] stated that the payment for environmental service (PES) mechanism, including water services, is one of the innovations that are currently well known in various worlds. This is very reasonable because 20% of the world's population lacks access to clean water facilities and half of the world's population lack health facilities. According to Landell-Mills and Porras (Wulandari, 2005), the development of marketing of water services in the world is due to market demand (52%), due to government regulations (28%), the existence of offers (8%) and other matters (12%).

Service fees or payments in the true sense of the word are transfers in the form of cash or goods in economic barter to be exchanged for goods or services, usually in market conditions. This definition is very narrow when applied to environmental services, different if applied to market conditions, there are producers and consumers. In environmental services, upstream watersheds collaborate in the implementation of forest management projects or 'paid'

watersheds or receive compensation from users of environmental services in the downstream watershed. These environmental services include continuous water availability, both quantity and quality, biodiversity services, panoramic beauty services, and so on. The definition of PES as follows: "... We define PES as (1) voluntary, (2) contingent transactions between (3) at least one seller and (4) one buyer (v) over a well-defined ES, or a land use is likely to be secured that service [3]. "Payments for environmental services is volunteerism, the occurrence of transactions between at least one buyer and one seller for a defined environmental service, or the area of land that provides such environmental services.

The crucial point in the definition PES is what is the main concern of these environmental services [4]. Environmental services including diversity conservation, watershed salvation, panoramic beauty, and other services.

The experience of PES programs in Costa Rica [5], there are four types PES directly influential, namely: (1) carbon sequestration and storage), for example an electric power company in the north pays farmers for the tropical plants they maintain; (2) biodiversity protection, for example conservation donor agencies pay to local communities for their efforts to restore biological corridors; (3) Watershed protection, for example downstream watershed users pay farmers for their efforts to maintain their land use and the least possible deforestation, erosion, flood risk, etc.; and (4) beauty landscape, for example tourism service providers pay local people for their efforts not to hunt wild animals and always maintain the lives of wild animals.

Based on the report of [6], the implementation of PES in Costa Rica was carried out through the state by issuing a Forestry Law in 1996. The Forestry Law identified a number of environmental services that could be produced from natural forests, plantations (tree plantation), and the agroforestry system, which acts as carbon fixation, hydrological services (such as reducing sludge in the provision of water for hydropower and groundwater), protection of biodiversity, and natural beauty. The program is managed by the National Forestry Fund (FONAFIFO) and its implementation by the Ministry of Energy and Environment (MINAE), special consultants, NGOs such as FUNDECOR (Foundation for the Development of the Central Volcanic Range), which works at the community level with land owner. As a component, local companies support this program through the signing a collaboration with FONAFIFO. Energia Global (hydropower company) pays \$ 10 / ha / year for protection of 1,818 hectares (ha) of land in the San Fernando watershed and 2,493 ha along the Volcano river. Platanar (another hydropower company) pays between \$ 15 / ha / year to \$ 30 / ha / year for land protection of 3,654 ha in the Platanar watershed. The State Electric Power Plant (CNFL) pays \$ 40 / ha / year for 10,900 ha of land on the Superior Balsa river, Aranjuez river, and Cote Lake. And finally Florida Ice and Farm Co. (Costa Rican beer company) was signed an agreement in 2000 to pay \$ 45 / ha / year for 1,000 ha of land in the Segundo watershed. The landowners receive \$ 540 / ha for new tree crops, \$ 210 / ha for existing trees, \$ 210 / ha for conservation areas, and \$ 0.8 per tree to support agroforestry systems. The payment was for five years and renewed five years later.

Payment for environmental services (PES) might reduce poverty through payments to upstream watershed communities who were unable to manage the surrounding natural resources which tended to damage [5]. How much influence PES has on poverty reduction depends on the facts of poverty, the management of funds received, and how much the PES payment is. Although this PES program is not designed for poverty alleviation programs, it can be synergized with the design of poverty alleviation programs and possible local conditions.

As a new paradigm in environmental management, PES is faced with opportunities and constraints. [7]state that the design of an environmental service scheme plays a central role that will guarantee the success of the program. Payments for environmental services will work well if they follow the following characteristics: (1) based on clear scientific evidence and conceptual linking land use for service provision; (2) there is clarity in defining the environmental services to be provided; (3) Flexible, sustainable and open contracts and payments; (4) their transaction costs do not exceed potential benefits; (5) relying on a number of sources of acceptance of adequate and sustainable cash flow in time; (6) compliance, changes in land use, and service provision are closely monitored; and (7) flexible enough to allow adjustments to improve effectiveness and efficiency and to adapt to changing conditions.

Community capacity building is a strategy that accompanies the key in supporting diversification of income and benefits for marginalized communities. However, this capacity strategy often gets less attention in the existing IJL scheme. The PES scheme has the potential to be an invaluable transfer mechanism for internalizing a positive environment, and for generating new income for sustainable development. This potential will be gradually fulfilled as a market for environmental services from time to time and make the IJL scheme have more sustainable financial value. In addition, the positive effects on sustainable development will be maximized if the distribution impact is a concrete effort made to build the capacity of the poor and indigenous peoples.

The PES program can be seen as a form of integrated watershed management. The environmental service return program is a market-based approach to conservation based on two mutually beneficial principles in the provision and use of environmental services (such as clean water users) who will pay for the availability of these services (clean water) to the community as compensation for the creation of conditions allowing water to be clean, through voluntary agreements.

Environmental service pay has been widely applied in several countries. Costa Rica is seen as a successful country and is a pilot project for this PES program [6]. Other countries that have conducted PES include Brazil [8], Philippines [9], Japan [10], Italy [4], and so on. In Indonesia, environmental services, one of which has been implemented in the Cidanau Watershed of Banten Province [11]. In addition to the Cidanau watershed, PES programs in Indonesia also exist in five other areas, namely (1) Bungo (Jambi province): examined the possibility of eco-certification of rubber from agroforestry systems managed by smallholders, (2) Singkarak (West Sumatra province):

Lake Singkarak's established better management and its watershed, a voluntary carbon scheme, environmental education center and revitalized the coffee 'ulu' plantation, (3) Sumberjaya (Lampung province): community forestry programs and a 'river care' program, (4) Lembang (West Java province): established payments for environmental services between farmers and the state-owned drinking water company to change their commodity for coffee as well as facilitating the establishment of a provincial environmental services 'working group for Citarum watershed, (5) Kuningan (West Java province): developed multi-stakeholders' forum for Mt Ciremai National Park as the intermediary for the water services' transaction between the drinking water company and the national park as well as the upstream cash transactions for water services and downstream parties at village level [12].

Cidanau Watershed (DAS) is one of the sources of water for industries in the Cilegon region that can supply water to more than 100 industries operating in Cilegon. The holder of the water withdrawal permit from the Cidanau Watershed is PT Krakatau Tirta Industri (KTI) issued by the Serang District Government of Banten Province. According to [11], the model of payment for environmental services has been implemented in the Cidanau watershed. In its implementation a Cidanau Watershed Communication Forum (FKDC) was formed, based on the Decree of the Governor of Banten, consisting of elements from the community, government, NGOs and the private sector.

II. METHOD

The method used in this study is a qualitative method. In qualitative research, the main characteristics come from natural background or reality in the community, using qualitative methods with steps of observation, interviews, and document review. Theory is built on data. Data presentation and analysis in qualitative research is carried out in a narrative manner.

Qualitative methods with descriptive analytic study approaches are used in this study, as revealed by [13] is a qualitative method for obtaining in-depth data, a data contains meaning. Qualitative methods can significantly affect the substance of research. This means that the qualitative method presents directly the nature of the relationship between researchers and informants, objects and research subjects.

In this study, subjects as data sources were selected purposively and were snowball sampling. The subject of this study was the role of the forest farmers group in the PES program, with the resource person of the group leader and several members of the Karya Muda 2 forest farmers group in the Tamanjaya village, Ciomas sub-district, Serang district. In addition, the researchers interviewed the Secretary General of the Cidanau Watershed Communication Forum (FKDC) as an effort to cross-check and complete the research data.

III. FINDING AND DISCUSSION

The formation of environmental services in the research area has been initiated since the Banten region is still part of the West Java Province. Based on the results of the search of

documents and interviews with resource persons Mr. N.P. Rahadian, who served as Secretary of the Cidanau Watershed Communication Forum (FKDC) and Environmental Activist from the NGO's Rekonvasi Bhumi was obtained data that initially there were concerns about the ego-sectoral environmental management of Cidanau watershed. Many institutions, agencies, community groups (NGOs), and individuals are very concerned with the management of the Cidanau watershed, given its position and function that are very important for the economy of the Banten region.

Cidanau watershed management has been handled by many sectors, from the government (central, provincial and district governments), the private sector to the general public. The implementation of the watershed management program is still disaggregated and has not been well coordinated. Each program is planned, implemented, and evaluated individually with a success rate in accordance with their respective criteria. Even people who live and live in the watershed itself are not fully involved both from planning, implementation, and evaluation of these activities. Even if their roles are involved, they are limited to assisting in tree planting or other activities that have fewer roles. In other words, the community as the subject and object of watershed management is less attention to the desires and needs of their lives so that management activities are less successful. PES in the Cidanau watershed as an integrated environmental conservation program that involves many part, is expected to involve the local farming community more openly. Thus the active involvement of farmers who live in upstream watersheds as the subject of activities is that it will be able to improve the success of environmental conservation programs.

A. Geographical Setting

The Cidanau River Basin is one of the important watersheds in Banten Province, especially for Cilegon City. In Cidanau watershed that flow the Cidanau river which become a source of raw water to be processed into clean water for the meet of water needs in the city of Cilegon (Figure 1). The Cidanau river basin is located at S: 06o07'18"- 06o18'00" and E: 105o40'00" - 106o04'00", encompassing two districts of Serang and Pandeglang districts in six sub-districts and 60 villages (Sunaedi, et al, 2018). The Cidanau watershed area is 22,620 hectares or 2.57% of the total area of Banten Province which is 880,063.35 hectares, which covers Serang Regency with an area of 21,620.71 hectares and Pandeglang Regency with an area of 999.29 hectares.

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Landforms in the study area include several units, which consist of hills, undulating, and plain. Landform units with moderate to high relief hills located in the North, East, and South form a horseshoe-like formation with a slope of slope

between ramps to steep. This hilly unit is directly adjacent to the landform unit in the form of intermittent depression formation with a gentle slope to flat. It is in this form that Rawa Danau is located which flows the Cidanau river as its main river. This Cidanau river flows water from Rawa Danau to the West and empties into the Sunda strait. Next to it are undulating landforms with altitudes between 100-500 meters above sea level. Land use in the Cidanau watershed is varied and is dominated by mixed plantations, paddy fields and forests, and partly for settlements and public facilities.



Fig. 1. Map of Banten Province and General Information of Cidanau Watershed (FKDC Secretariat Office, Serang Banten, 2017)

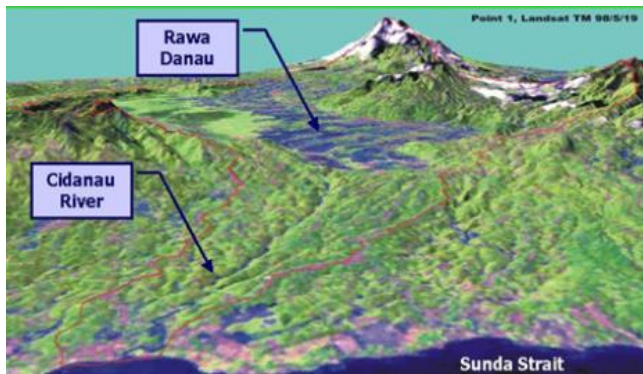


Fig. 2. Landsat Image of Cidanau Watershed (FKDC Secretariat Office, Serang Banten, 2017)

The topographic conditions of the study area are reflected in the properties of slope, namely the degree of slope, the length of the slope, and the shape of the slope. The properties of this slope are one of the factors that influence runoff and soil erosion, especially the slope and slope length. The steeper the slope and the longer the slope has the higher the velocity of the surface flow and the higher the level of soil erosion.

Surface water conditions in the study area are characterized by the presence of rivers, swamps and lakes. In the Cidanau watershed there is the Cidanau river as the main river with thirteen tributaries (sub-watersheds). All these tributaries boil down to Rawa Danau which is then flowed through the Cidanau river and empties into the Sunda Strait. Rawa Danau is a surface waters dominated by swamps with typical swamps vegetation. The lake's swamp area is around 2,500 ha. The Cidanau River is the main river in the Cidanau watershed which holds 18 watershed sub-basins in an area of

20,120 hectares (catchment area). Cidanau river empties into the Sunda Strait

All of these sub-watersheds are catchment areas located in the upstream area. The condition of the upstream watershed plays an important role in the hydrological cycle of this area. Based on recorded data shows that the average discharge of Cidanau river water per month was 11.29 m³ / second with a maximum discharge of 44 m³ / second and a minimum discharge of 1.48 m³ / sec. From 1980 to 1992 the average debit per month decreased to 7.36 m³ / second with a maximum discharge of 38.12 m³ / second and a minimum debit of 1.20 m³ / second. In 1995 to 1997 the average discharge of Cidanau water was 9.97 m³ / second with a maximum discharge of 26.44 m³ / second and a minimum discharge of 1.76 m³ / second.

Based on Banten Province Statistics and equipped with statistics from Serang and Pandeglang Regencies, in 2017 the population in the Cidanau watershed (research area) was 156,188 people spread in two districts (Serang and Pandeglang District), six sub-districts, and 38 villages. The total area is 187.54 km² with an average density of 832.82 people / km².

B. Establishment of Forest Farmer Groups

When FKDC to introduce the concept of environmental services introduced to the farming was not necessarily welcomed by the community. A community leader, Mr. A. Bachrani, is concerned with the hope that this program can change the condition of environmental conditions and also for a better life. The first step to join the PES program is to form a group of forest farmers with a land area of 25 hectares. To gather group members to get an area of 25 hectares to be used as land plots for environmental service payments is not easy, many people are not reluctant and opposed. Even when measuring the land for the benefit of the IJL program many signboards and other markers were damaged by irresponsible people. This is also realized by Mr. A. Bachrani, that this is evidence of past traumas when the era of the "Orde Baru", if there is a land measurement activity at that time, it means that the land will be used for "state interests" without equal substitution. He also believes that destructive people do not mean evil, but because of ignorance or lack of understanding about the PES program.

Patiently and unyieldingly, Mr. A. Bachrani with the help of environmental activists from NGOs and FKDC continued to disseminate the PES program through formal and informal activities, there were 43 people who were bound in the form of the Forest Farmers Group (Kelompok Tani Hutan; KTH) Karya Muda 2 with A. Bachrani as its chairman. In 2005 this group signed a payment contract for environmental services with FKDC for the next five years. He provides understanding and awareness of the importance of environmental conservation through this program to the community, especially the members carried out in routine activities carried out through recitation every Friday night at his home. This routine activity has been carried out until now, because it is used as a routine meeting agenda which is a requirement of FKDC.

In 2008 FKDC signed a contract with two new forest farmer groups, namely KTH Alam Lestari from Cikumbueun Village, Mandalawangi District, Pandeglang District and

KTH Agung Lestari in Gunungsari District, Serang Regency for 5 years, until 2013. Only one year, at 2009 KTH Agung Lestari breaks contracts for various reasons. In 2010 FKDC signed 2 contracts, namely (1) KTH Karya Muda 2 for the second 5-year contract as a result of renegotiation of the success of this farmer group to maintain the achievement as a participant in the environmental service program and the contract value was increased from Rp 1,200,000 per hectare to Rp. 1,750,000 per hectare, and (2) KTH Karya Muda 3 in Citaman Village, Ciomas District, Serang District, as a new participant in the environmental services program. In 2011, FKDC signed a contract with three new forest farmer groups for the five-year contract until 2016, namely with KTH Harapan Maju (Mandalawangi), KTH Karya Bakti (Ciomas), and KTH Alam Sejahtera (Mandalawangi). Since the environmental services program was officially implemented in 2005 to 2012, there were 6 forest farmer groups as active participants after 2 contracted forest farmer groups, namely: (1) KTH Karya Muda 2 Citaman Village, (2) KTH Karyamuda 3 Citaman Village, (3) KTH Karya Bakti Ujungtebu Village, (4) KTH Harapan jaya Panjangjaya Village, (5) KTH Alam Lestari Cikumbueun Village, and (6) KTH Alam Sejahtera Ramea Village.

In 2014 the implementation of the environmental services program in the Cidanau Watershed has entered its third period. The main objective of this program, in addition to maintaining the watershed environment is also to improve the living (economic) life of the people in the upstream watershed. The expected impact with the improvement of the community's economic level is the reduced habit of people cutting trees on their land or in forest areas when they need cash. Cutting down trees is considered to reduce the environmental quality of the Cidanau watershed, especially water resources.

The social characteristics of the farming community in the countryside, they will not believe in a program without seeing the results first. The success of forest farmer groups, especially KTH Karya Muda 2, has attracted the interest of other farmers to join this PES program. On the one hand, the community's interest to become a participant in the PES program is very much; on the other hand, the limited funds available to finance this scheme have enabled not all forest farmer groups to be participants. The addition of funds from the use of Cidanau watershed environmental services in each period of value is still limited, so it is not enough to cover all forest farmer groups that are priority areas.

In the previous two periods, the environmental service contract was appointed by FKDC based on the readiness of the forest farmer group. To find a solution to this problem, FKDC took the selection process through submission of proposals. The selection model applied is the Participatory Landscape Appraisal (PaLA) method developed by the World Agroforestry Center ICRAF [14]. As many as 30 forest farmer groups in 15 villages in the upper Cidanau watershed covering Serang and Pandeglang districts with an area of 3,300 hectares are very interested in becoming PES participants. This farmer group is identified as a potential farmer group receiving environmental service contracts. Assessment in the selection of proposals prepared by farmer groups includes institutional aspects, work plans for land management and business activities, as well as plans for the use of funds (benefits sharing) as an indicator. Each indicator

has its own assessment components. Institutional Indicators have 10 assessment components, including (1) organizational structure, (2) organization legalization, (3) organizational rules, (4) member land data; area, type and number of trees, (5) plant population, (6) floor plan, (7) identification of regional potential and problems, (8) group activity plans, (9) administrative completeness, and (10) group activity documentation. The Work Plan Indicator has 9 assessment components, namely (1) land use, (2) thinning of tree stands, (3) soil and water conservation, (4) food security, (5) energy security, (6) appropriate technology, (7) parties involved, (8) women's involvement, and (9) sustainability plans. The Plan of Use of Funds (benefit sharing) has 5 assessment components, namely (1) basic living needs, (2) education, (3) health, (4) employment, (5) local wisdom.

In preparing proposals that were included in the selection of environmental service contracts, ICRAF's role was to train NGO staff in the Rekonvasi Bhumi to apply the PaLA method developed by ICRAF to identify existing environmental problems in the land or landscape in a watershed area, and map existing local wisdom for solve the problem. Preparation of proposals and selection was carried out in the workshop activities organized by FKDC. The proposal that was completed was then selected by the FKDC assessment team which was a representative of various components, including representatives of the government, NGO Rekonvasi Bhumi, and PT KTI Cilegon. In addition to being used as a selection process for environmental service contracts, this proposal preparation also aims to increase awareness of farmer group members on the importance of protecting the environment and spur awareness of the importance of planning activities that are beneficial to their environment and life. Of the 30 proposals that followed the selection process, based on the results of the assessment by the Team, there were 6 (six) forest farmer groups that passed and received environmental service contracts in 2015 for the first five years until 2020. The number of forest farmer groups in the Cidanau watershed in 2005 to 2015 is shown in Figure 3.

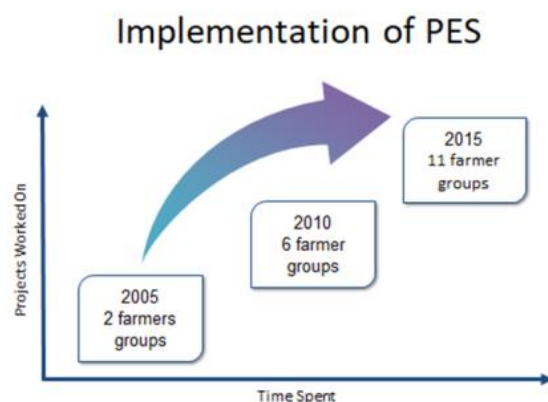


Fig. 3. Development of Forest Farmer Groups

C. Payment for Environmental Services Scheme

The Payment Mechanism for Environmental Services in the Cidanau Watershed is based on a draft Environmental

Services Payment Agreement signed by PT KTI the producer of clean water as a party that utilizes environmental services (buyer), with the Cidanau Watershed Communication Forum (FKDC) which acts as an intermediary with the upstream watershed community. Furthermore, the payment agreement between FKDC and forest farmer groups acts as sellers, provided that the payment amount is IDR 1.2 million for new participants (the first five years) and IDR 1.75 million for the old participants (the second 5 years and so on). See Figure 4.

The scope of the contract is that forest farmer groups are willing to develop, maintain and maintain forests with timber and fruit types. The types of plants that are entitled to payment for environmental services are, all types of forestry plants including multipurpose trees species (MPTS) based on the provisions of the Ministry of Forestry and Plantations of the Republic of Indonesia, not-except for the type of legumes.



Fig. 4. Mechanism of Payment for Environmental Services (FKDC Secretariat Office, Serang Banten, 2017)

Requirements for recipients of payments for environmental services (providers of environmental services), are:

1. Having the desire and willingness to carry out the upstream downstream relationship concept with the willingness to accept transaction mechanism;
2. The land projected to receive payments for environmental services must meet the following requirements:
 - a. It belongs to the community;
 - b. Located within the Cidanau watershed (DAS) area;
1. Having the types and criteria of plants, as follows: (1) Not legumes (Leguminosae) except petai plants; (2) not a type of plant that has fiber roots except bamboo which is calculated based on a clump (kitchen); (3) all types of fruit plants except coffee, oranges and guava; (4) have a minimum trunk diameter of 15 cm for existing plants and a minimum of 5 cm for new plants; (5) plants have been given notation or given tree numbers per ownership land; and (6) plant stems are healthy and well maintained.
2. Meeting conservation requirements, are: (1) planting trees considering the formation of canopy strata; (2) distribution of plant species must be evenly distributed; and (4) the type planted does not have a monoculture tendency;
3. Have sufficient understanding of the concept of upstream downstream relations with the environmental services

transaction mechanism and are willing to comply with the environmental service payment agreement;

4. Maintaining plant stands that are included in the payment scheme for environmental services, without eliminating the right of the landowner to the proceeds from the stands of plants except wood during the agreement for payment of environmental services;
5. Form of groups or other community organizations, with no less than 25 hectares of land ownership and have made direct efforts that produce and/or maintain environmental service products;
6. Having a regular schedule for group meetings and good administration;
7. Having a bank account signed by at least 2 (two) group administrators;
8. Willing to make land ownership limits by using red painted stakes and/or natural boundaries which are poured into the lay out (rincik) land ownership map along with the type and number of plants.

The method of payment for environmental services from FKDC to groups of forest farmers follows the conditions as follows:

1. For the first year, the payment is carried out in 3 times, as follows:
 - a. The first payment is 40% of the total payment that will be received by the farmer group for one year, at the time of signing this environmental service payment agreement.
 - b. The second payment is 30% of the total payment that will be received by the farmer group for one year at the end of six months after 14 days. The team appointed by FKDC completes verification and accepts the condition of the tree on the land included in the payment mechanism for environmental services based on payment bills from farmer groups.
 - c. The third payment is 30% of the total payment that will be received by the farmer group for one year, at the end of the twelfth month after 14 days The team appointed by FKDC completes verification and accepts the condition of the tree on the land included in the payment mechanism for environmental services based on payment bills from farmer groups.
2. For the second year and so on, payments will be made in 2 (two) times per year, namely:
 - a. As much as 40% of the total payment that will be received by the farmer group for one year, at the end of the fifth month or no later than 14 days after the Team appointed by FKDC finishes verification and accepts the condition of the tree on the land included in the payment mechanism for environmental services based on the payment bill from farmer groups.
 - b. As much as 60% of the total payment that will be received by the farmer group for one year, at the end of the eleventh month or no later than 14 day after the Team appointed by FKDC completes verification

and accepts the condition of the tree on the land included in the payment mechanism environment based on payment bills from farmer groups.

D. Benefits of PES Program for the Farmer Groups

Benefits gained by the community, especially forest farmer groups in the upstream watershed, both directly and indirectly. These benefits include (1) obtain cash for payment of environmental services on a plot of land he owns, (2) yields from planted fruits and vegetables on the land, (3) strengthening community capacity through the formation of forest farmer groups, (4) improve the quality of the environment to be fresher and shady, and (5) no less important is the emergence of a number of springs which were once lost due to deforestation.

In the first five years of the environmental service payment contract, each forest farmer group received IDR 30 million in cash for a forest area of 25 hectares (IDR 1.2 million per hectare). The money is used by group members to buy livestock, for business capital, to send their children to school, and for social facilities in the form of water shelters in mosques that function as public latrines. For the second, third, and fifth year contract, the payment for environmental services is increased to IDR 1.75 per hectare per year or IDR 43.75 million for 25 hectares of forest area.

At this time the income of group members is increasing because fruit and vegetable plants have begun to produce. Durian (*Durio zibethinus*) is a superior fruit with a high selling price. Besides that dry cloves become an extraordinary commodity that has advantages compared to other commodities, which can be stored relatively long and function as savings for farmers. When the price of clove is cheap, farmers save it first and when the price is expensive, they will sell it. To meet daily needs, farmers rely on the harvest of vegetable trees, such as petai (*Parkia speciosa*), jengkol (*Archidendron pauciflorum*), and melinjo (*Gnetum gnemon*). Melinjo trees can be used for fruit crackers and the leaves are processed into vegetables. The advantage of melinjo trees is that they can be harvested almost every day. Thus, the existence of the PES program has increased the income of the community in the upstream watershed. The results of this study confirm the findings made by other authors that non-economic factors, such as trust and participation in scheme design, play an important role in determining decisions by land users about whether to participate in the PES scheme on an ongoing basis [15].

IV. CONCLUSIONS

The PES program as a bridge between the interests of the downstream watershed community and the upstream watershed community is a voluntary transaction. This volunteerism can be seen from the desires of the downstream watershed communities represented by PT KTI Cilegon as buyers willing to pay for environmental services they use to upstream watershed communities represented by forest farmers as sellers who are willing to protect the forest environment so that the natural processes can continue continuously. Forest farmer groups play a very important role in supporting the success of this PES program. Those with awareness voluntarily defend the existing forest, even repairing the forest along with its damaged vegetation. They

are willing to be paid money with a value that is not much compared to the effort he made to maintain the tree stand in the community forest. The PES program in the Cidanau Watershed, which began in 2005, has now entered the third contract phase and is seen as one of the successful PES programs.

Behind all this, a surprising thing emerged from the PES program for the upstream watershed community itself. The PES program has provided tremendous benefits in the form of financial benefits and improved welfare of the farming community, as well as the recognition of the natural environment of the watershed. In addition, from the PES program upstream watershed that generally have a relatively low level of formal education, are invited to learn to increase capacity through forest farmer groups. They learn to organize properly, learn to live in democracy, and learn to solve problems by way of deliberation to reach consensus.

ACKNOWLEDGEMENT

I extend my thanks to Mr. NP Rahadian from FKDC and the Managing Director of the NGO Rebhumi Serang Banten for providing important data on PES, to Mr. A. Bachrani from the Karya Muda 2 forest farmer group as the main respondent in this study. Special thank you to Prof. Dr. Sumarmi from the State University of Malang (UM Malang) for his constant motivation.

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