Application of Indigenous Community-based Environmental Service Fees in the Availability of Clean Water in Jayapura City, Papua Province

Anwar Saragih
Universitas Cenderawasih, Indonesia

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Abstract: The availability of clean water is an absolute, non-negotiable element in the life of households or individual communities. There are fundamental problems related to water resources that have been used by the Regional Drinking Water Company (PDAM) of Jayapura City which has been damaged by illegal logging, forest encroachment, land conversion, and illegal mining. So that there was forest destruction in the Cyclops Mountain area of Papua which resulted in the destruction of the watersheds (DAS) that flowed 11 points of water sources in Jayapura City. This study aims to solve the problem of the difficulty of clean water in Jayapura City due to environmental damage. The research method is qualitative with a critical paradigm. The results of the analysis of this scientific article are to find the concept that you want to offer related to the implementation of Payment for Environmental Services (PES) based on indigenous communities in Jayapura. In simple terms, Payment for Environmental Services is a concept of payment for environmental services or services in the form of incentives offered to the community for their commitment and services in protecting the environment. Where the stakeholder sector provides compensation to indigenous communities through customary leaders (Ondoafi) in each customary area in Jayapura to protect the forest and not to change land functions in the upstream area of clean water resources that affect the availability and quality of clean water managed downstream Regional Drinking Water Company of Jayapura City.

1 BACKGROUND

The availability of clean water is an absolute and non-negotiable element in the life of households or individual communities. So that the main focus of every government policy in the era of regional autonomy related to the development and utilization of water resources must emphasize the principle of sustainable management in order to meet the needs of clean water for the community (Qodriyatun, 2015). Although in its implementation related to water resource management, it often encounters complex obstacles, both in terms of accessibility, service standards, equity, supervision and support from every stakeholder (Phillips, Rhonda and Robert H. Pittman, 2008).

This problem has also been faced by the people of Jayapura City, Papua Province in the last 10 years having difficulty accessing clean water (Jubi.co.id. 25/2/2020). In addition to the reasons for development and population growth which reaches 2-3% per year which is automatically directly proportional to the increase in the need for clean water in Jayapura City. There is a fundamental problem related to water resources that have been used by the Regional Drinking Water Company (PDAM) of Jayapura City which has been damaged due to illegal logging, forest encroachment, land conversion, and illegal mining (kabarpapua.co, 13/8/2019). As a result, forest damage occurred in the Cyclops Mountain area of Papua which resulted in the destruction of the watersheds (DAS) that flowed through 11 points, namely Anafre, Bhayangkara, Ajend/Kolfkamp, Kali Kamp, Entrop, Borgonji, Kojabu, Wolker Camp, Korem, Buper and Pos 7 Sentani. Where these points are the main source of water discharge which has been channeled by Regional Drinking Water Company Jayapura to residents' homes.

This means that in an effort to maintain the availability of water in Jayapura City, protection is needed through social, cultural, political and economic approaches to the Cyclops Mountain Area

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and Watershed (DAS) as a source of clean water for Regional Drinking Water Company of Jayapura City.

Where the series of management does not stand in one direction but involves a reciprocal relationship between Natural Resources and local communities with efforts to overcome environmental damage while increasing people's welfare. One of the concepts to be offered relates to the implementation of Payment for Environmental Services (PES) based on indigenous communities in Jayapura. In simple terms, Payment for Environmental Services is a concept of payment for environmental services or services in the form of incentives offered to the community for their commitment and services in protecting the environment (Wunder, 2013).

Where the stakeholder sector provides compensation to indigenous communities through customary leaders (Ondoafi) in each customary area in Jayapura to protect the forest and not to change land functions in the upstream area of clean water resources that affect the availability and quality of clean water managed downstream by Regional Drinking Water Company, Jayapura City. Meanwhile, Ondoafi or traditional leaders in Jayapura have great authority, rights, duties and responsibilities with the consequence of power over forests, rivers, seas, lands and natural resources, socially, economically and politically. Ondoafi has the authority to resolve disputes that occur in his customary territory as well as have the responsibility to protect and protect the community from all problems. In short, in an effort to overcome forest damage and damage to watersheds through the application of Environmental Service Fees, it actually looks at Ondoafi and the indigenous people in Jayapura. Therefore, a research proposal with the title: "Implementation of Indigenous Community-Based Environmental Service Fees in the Availability of Clean Water in Jayapura City, Papua Province" becomes very important in completing a series of research related to the Politics of Water Supply in Indonesia.

2 RESEARCH METHOD

Methods This research uses descriptive analytical with a qualitative approach. The use of this method is intended, referring to Creswell who said that the phenomena that occur can be focused on the attention of researchers on problems or phenomena that are actual at the time the research is conducted, then describe the facts about the problem being investigated as it is accompanied by a rational and accurate interpretation. This method will help researchers to understand the reality that occurs in the field. The collection of research data is also carried out through a process of reviewing the results of interviews as primary data for stakeholders, especially traditional leaders or Ondoafi in Jayapura related to overcoming the problem of damage to the Cyclops Mountain area in Papua and the Alisan River area (DAS) which is the upstream source of clean water managed by Regional Drinking Water Company of Jayapura City.

Then the secondary data of this research was obtained by the author from journals, books and documents or reports related to the research focus. The author then analyzes the case phenomenon inductively related to the problem of decreasing water discharge managed by Regional Drinking Water Company of Jayapura City due to environmental damage. At the end the author recommends conceptual steps related to the formulation of compensation for the application of Environmental Service Fees and the economic benefits obtained by the Jayapura indigenous community in the application of Environmental Service Fees in the availability of clean water in Jayapura City.

3 RESULT AND DISCUSSION

3.1 Environmental Service Fee Concept

Since the 1990s, Payment for Environmental Services (PES) has become a popular policy tool for managing natural resources in more than 60 countries. In general, Payments for Environmental Services have been applied to four ecosystem services: biodiversity conservation, watershed services, carbon sequestration, and landscape beauty. Hundreds of Rewards for Environmental Services programs have been implemented around the world. Environmental Services Program) follows a similar payment approach in terms of beneficiaries, payment methods, and mechanisms.

Thus, the existing Rewards for Environmental Services program only focuses on three main ecosystem services: water, biodiversity, and carbon. There are main categories of Environmental Service Fee mechanisms including direct payments based on voluntary agreements between recipients of environmental services and suppliers of environmental services (Hieu, Thuy & Nam, 2020)

There is a growing anthropocentric understanding of natural resources providing flows of services that

provide economic value. Environmental services that benefit society include carbon sequestration, watersheds, maintenance of biodiversity, and environmental beauty. Payment for environmental services (PES) is a policy tool that is championed to provide market incentives for the maintenance of natural resources by the private sector that provides environmental services to downstream users. Payment for Environmental Services is defined as a voluntary agreement between a buyer and a seller in which payment is provided depending on the environmental services provided adequately.

Many advocate the adoption of a Pay-for-Economy scheme to develop new market-based tools to combat deforestation and promote forest conservation in developing countries rather than alternative policy tools. In the absence of this Payment for Environmental Services mechanism, land users will gravitate towards commercial land uses, often involving deforestation for agricultural purposes, resulting in the destruction of natural resources as humans have no way of realizing the benefits of providing non-marketable services. Payment for Environmental Services refers to the principle that with clear property rights and low transaction costs, bargaining can reach a socially optimal level (Lee, Andersson & Smith, 2013).

Over the years although interest in Environmental Services Fees has increased, there has been little attempt to define the term. In this section, we first define Environmental Fees and discuss their basic logic. Fundamentally, Fees for Environmental Services appear to be used as an umbrella for any type of market-based mechanism for conservation, including, for example, mechanisms such as environmental certification and charging entry fees to tourists. According to Wunder (2005) in defining Environmental Service Fees, he explains several indicators, namely

a. Voluntary transactions
b. A well-defined (or possibly used) environmental service secures that service)
c. There are service buyers
d. There is a service provider

The basic logic of the Payments for Environmental Services mechanism explains how ecosystem managers, whether they are farmers, loggers, or protected area managers, often receive little benefit from land uses such as, for example, forest conservation. These benefits are often less than the benefits they would receive from alternative land uses, such as conversion to agriculture or pasture. However, deforestation can impose costs on downstream populations, who no longer benefit from services such as water filtration, and on the global community, due to biodiversity reduction and carbon storage (actual impacts will, of course, vary from case to case).

Payments by service users can help make conservation a more attractive option for ecosystem managers, thereby encouraging them to adopt it (or, in the case of protected area managers, providing them with the resources to do so). Payment for Environmental Services thus seeks to internalize what should be an externality. Consequently, the Environmental Service Fee program seeks to put into practice the ultimate solution that the problem of external effects can, under certain conditions, be addressed through private negotiations between the affected parties (Coase, 1960).

It is very important to understand that Environmental Fees are not intended to be a solution to any environmental problem. Ecosystems may be mismanaged for various reasons, not all of which are suitable for environmental issues and are suitable for using the Environmental Service Fee as a solution. Local ecosystem managers may not have the authority to manage ecosystems, because they do not belong to anyone or belong to the state (which is the same number if the state cannot enforce management rules) and thus tend to ignore even the on-site impacts of their management decisions. The appropriate response in this case is to ensure that local ecosystem managers have appropriate tenure rights.

If ecosystem mismanagement is linked to a lack of awareness or information about land use practices that are in the financial interest of private landowners to adopt, then education and awareness building are appropriate responses. Similarly, if capital market imperfections prevent landowners from adapting personally beneficial technologies or practices that improve the provision of environmental services, then providing access to economic benefits is the most promising approach. The scope of application of Rewards for Environmental Services is in a series of problems where ecosystems are mismanaged because many of the benefits are externalities from the perspective of ecosystem managers.

If most ecosystem benefits are externalities, other voluntary approaches are unlikely to yield results. Giving local managers ownership rights over the ecosystem may not be enough, as they will only experience a fraction of the total benefits, and this may be less than the benefits of alternative land uses. Likewise, training or awareness-building will not suffice, for awareness of the benefits to others are unlikely to outweigh the definite benefits to oneself for all but the most altruistic actors.

In the case where applicable, an important distinction can be made on the basis of whether the environmental services provided are public goods and not. It is often assumed that all environmental services are purely public goods, i.e. that users cannot be prevented from benefiting from the environmental services provided (non-excludability), and that consumption by one user does not affect consumption by other users. This certainly applies to some environmental services carbon sequestration, for example, is perhaps the clearest example of a public good (Engel, Pagiola & Wunder, 2008).

3.2 Clean Water Problems in Jayapura

The issue of clean water in Jayapura City, Papua Province is an important issue that has received more attention in the last decade. The reason is that the people of Jayapura City often have difficulty getting clean water due to the decrease in water debit managed by the Regional Drinking Water Company of Jayapura City is a Regional Owned Enterprise that carries out the administration of Regional Government affairs and is obliged to provide basic services in the field of clean water to the community.

That's why Regional Drinking Water Company of Jayapura City in carrying out its service duties should actually be oriented towards meeting the needs of the community by providing the best service to the customer community in the form of providing adequate clean water in terms of quality, quantity and continuity. Regional Drinking Water Company of Jayapura City is currently experiencing many problems, namely the small amount of water in managed sources due to the damage the high rate of water leakage reaching 54% and environmental damage that has an impact on drought.

Jayapura City is one of the regions which is the capital city of Papua Province with an area of 940 km2 or 0.30% of the total area of the province. Jayapura City consists of 5 districts, namely Muara Tami District, Abepura District, Heram District, South Jayapura District, and North Jayapura District. Furthermore, there are 25 sub-districts and 14 villages in the Jayapura City area with a total population according to the Jayapura City Central Statistics Agency (BPS) reaching 362,998 people (Jayapura City BPS, 2021).

As the sole manager of clean water, PDAM Jayapura Regional Owned Enterprises (BUMD) in 2021 will at least serve 35,700 clean water customers. A total of 31,700 customers are located in the territory of Jayapura City and 4,000 customers are in Jayapura Regency. According to data from PDAM Jayapura City, in order to meet the needs of the community, at least 895 liters of water per second are needed. Currently, the water supplied by PDAM Jayapura is only 778 liters per second from the original capacity of 1075 liters per second. This means that there is a significant decrease in water, which is 297 liters per second due to damage to water resources in forest areas (PDAM Jayapura, 2021). Seeing the significant decrease in the water debit of Regional Drinking Water Company of Jayapura City, if it is not anticipated, this will certainly endanger the community with the threat of drought and a prolonged water crisis in Jayapura City.

Moreover, the need for clean water is increasing every time. This is because the population growth rate in Jayapura City, which was recorded in the last 5 years from 2017-2022, has experienced a rapid increase which linearly will automatically have an impact on increasing the need for clean water for every community who lives and settles in Jayapura City. That does not include people who stop by and live temporarily in Jayapura City who also need clean water.

There are at least eleven sources of clean surface water scattered in Jayapura City and Jayapura Regency. The coverage of the reservoir service area varies based on the water source. These water sources have water catchment areas in the Cycloop mountains, so their sustainability automatically needs to be maintained properly so that the water flow produced remains maximal.

However, the obstacle faced in maintaining the sustainability of water sources managed by the Regional Drinking Water Company of Jayapura City is the problem of deforestation, namely the felling of forest trees by both indigenous/local communities and by entrepreneurs who collaborate with indigenous peoples or who obtain government permits, lack of understanding of the importance of maintaining forest sustainability and the lack of supervision and socialization from the Jayapura City government to maintain and preserve forests.

In addition, the problem of massive environmental damage in the upstream area of clean water sources is caused by the increasing number of settlements in the buffer area irregularly at the expense of trees. This also causes the condition of the Cycloop Forest to be increasingly worrying with many spots where there are almost no trees for circulation and empowerment of clean water. Even though the availability of water in the Cycloop is getting thinner and the discharge is decreasing, especially during the dry season (Musfira, 2018).

3.3 The Role of Indigenous Peoples

Indigenous peoples have a great influence on environmental change and have a paradigm of preserving nature. At the same time, indigenous peoples also become agents of change. Where indigenous peoples are critical to the success of policies and actions directed at climate change mitigation and adaptation, and equitable transition policies. Another consideration is of course the main dependence of indigenous peoples on natural resources and ecosystems, with which they also share complex cultural relationships. Since nature is their core productive asset, their economic activities do not allow it to harm the environment. Their livelihoods depend on the values they derive from nature, such as fish, bush meat, fruits, mushrooms, medicines, roots, and construction and other productive materials.

Jayapura City consists of several groups of indigenous people who inhabit an area. Land is an important part because it is an inseparable part of the customary system that is owned. This means that if there is environmental damage in the Jayapura City area or the Cycloop Mountains, of course the main victims will be the traditional community because of their dependence on nature conservation.

Thus, through customary law based on local wisdom, the indigenous people of Jayapura must be involved in every policy related to natural sustainability including protecting clean water sources whose upstream watersheds are in the Cycloop mountains. placing indigenous peoples only as a separate part but must be involved on an ongoing basis. Regional Drinking Water Company of Jayapura City as a water resource management company through the Environmental Service Fee policy formulates a practical policy, so that the Environmental Service Fee is also economically beneficial for indigenous peoples in Jayapura City. In simple terms, the compensation for environmental services carried out by Regional Drinking Water Company of Jayapura City together with the local government determines the value of the price, whether it is monetary compensation or other valuable values with a commitment to environmental conservation in the Cycloop mountain area. Prohibiting all illegal logging activities or forest encroachment is the task of the data community who gets supervision from the government then indigenous peoples have full rights to access natural resources in the Cycloop mountain area with a conservation note.

Of course, the effort to implement the Environmental Service Fee requires a foothold through the institutionalization of laws because with customary community-based environmental conservation there is a lot of potential that can be explored in the form of exploration, not exploitation. This potential return for environmental services, if managed properly, is certainly useful for improving the welfare of indigenous peoples to encourage their lives. Meanwhile, Regional Drinking Water Company of Jayapura City interest is of course the water debit that will be distributed to customers will increase and Jayapura City will be free from drought.

3.4 Environmental Service Fee Working Model

In the concept of Rewards for Environmental Services in water resources in Jayapura City, there are at least 4 (four) stakeholders (Tole, 2010), namely the local government (provincial government/Jayapura City government), Community Social Institutions (NGOs), the private sector and the community. custom. The damage in the Cycloop Mountains has so far occurred due to forest encroachment by businessmen (companies) to take wood and the community. This means that the responsibility of environmental destroyers is not only limited to compensation, but is also responsible for the entire process of repairing forest and watershed damage in the Cycloop Mountains.

In an effort to anticipate environmental damage, the government, Regional Drinking Water Company of Jayapura City and other parties involved must provide the cost of implementing the Environmental Service Fee above the minimum payment required to encourage the participation of landowners. This means that the Environmental Service Fee program in Jayapura City in the preservation of the Cycloop Mountains will indirectly reduce the effectiveness of the destructive environment.

In the Environmental Service Fee mechanism in Jayapura City, the funds provided by the government are given to customary communities from the budget. Indigenous peoples in Jayapura City are then responsible for managing the funds given in accordance with the purposes and objectives of the granting of funds. Activities carried out with compensation funds are in accordance with the agreement between the government and indigenous peoples to carry out forest and land conservation efforts through planting. maintenance, as well as maintaining plants and carrying out a series of other activities related to efforts to preserve the function of the Cycloop Mountains watershed. The text of the environmental service fee agreement is certainly

carried out by establishing an Upstream-Downstream Relationship Mechanism in Efforts to Preserve Water Resources in the Cycloop Mountains so that it remains sustainable.

4 CONCLUSION

The problem of the clean water crisis in Jayapura City must be resolved immediately. The root of the problem is the destruction of the watershed in the Cycloop Mountains, which is the origin of 11 springs in Jayapura City. Indigenous communities in Jayapura City have an important position in this sustainability by being involved in the Environmental Service Rewards program which is expected to be implemented in Jayapura City. In conclusion, the application of the Environmental Service Fee mechanism provides a number of benefits, such as the emergence of the role of indigenous peoples in environmental conservation whose goal is to protect forests from damage. Although there are indications of an increase in the socio-economic value of the participants of the Environmental Service Fee to indigenous peoples, although it has not been seen because this research is still only a policy recommendation. Likewise, the impact of improving ecological functions has not yet been seen clearly because the land that participates in the Environmental Service Reward mechanism has not been mapped due to the extent of the forest that must be protected. There is a need for a strategy that considers the aspect of increasing the value of compensation over time so that the benefits of the Environmental Service Fee scheme for service providers can be felt by indigenous peoples.

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