Management of Village Treasury Land Based on Bamboo Agroforestry

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Abstract. Village land is widely used for agricultural cultivation activities. However, if it is not managed properly, it can turn into critical land that eventually needs to be rehabilitated to function optimally. The agroforestry approach to land restoration is becoming increasingly popular. This study aims to determine the management of village treasury lands and the application of bamboo agroforestry in managing village treasury lands. The research was conducted in November 2015 and February 2021. The methods used were interviews, Focus Group Discussions (FGD), observations and surveys of farmers’ land. The data obtained were processed and analyzed descriptively. The results showed that the management of the village treasury land was given to tenants with a rental system, where farmers who worked on farmers’ land were required to pay rent to the village government. The pattern of village land use is dominated by monoculture agriculture with seasonal crops such as corn, peanuts, red potatoes, and coffee. To optimize the land management of the village treasury, it also carried out activities through various programs such as reforestation, planting fruit and timber, but did not achieve success. The development of bamboo agroforestry is an alternative for managing village treasury land while still accommodating economic and ecological interests.

1. Introduction
Village treasury land is a part of village wealth. This land is controlled and owned by the village government as a source of village original income and/or for social purposes [1]. Village treasury land is a village asset that is usually an ancestral heritage that may be leased by those given the right to manage it to work on it as Village Original Income [2]. The type of village treasury land in various places has their respective terms, such as in Java it is known as titisara land, bent land, and grassland [3]. The management of village wealth lands is highly dependent on village government policies together with local community consultations.

Village land is widely used for agricultural cultivation activities. However, if it is not managed properly, it can turn into critical land that eventually needs to be rehabilitated to function optimally. Land that is open to the public and managed by the government is known as state-owned property. As a result, various governance systems determine how land is managed in order to avoid dangers like land abandonment, degradation or desertification [4]. The critical land rehabilitation model that is increasingly being used is the rehabilitation model with an agroforestry approach [5][6]. Agroforestry is a cultivation model that combines seasonal crops, plantations, and trees in one area to combine environmental and economic conservation principles to improve people’s welfare [7][8].

Many agroforestry models have been developed to optimize critical land management [6][9][10][11]. Community forests that develop in Indonesia are a picture of the success of land management using agroforestry patterns. The innovation of the combination of cultivated plants in the
agroforestry pattern continues to grow, one of which is by using bamboo as a non-timber forest product which has genuine benefits from both conservation and economic aspects. The bamboo agroforestry model was developed to support efforts to rehabilitate critical land and use village treasury land to be more productive. Therefore, this research was conducted to know the pattern of use and cultivation of village land, and the application of bamboo agroforestry in village management.

2. Method
This research was conducted in Sukaharja Village, Rajadesa District, Ciamis Regency, in November 2015 and February 2021. Primary data collection was carried out through Focus Group Discussion (FGD) and interviews with eight participants, consisting of the head of the farmer group, a sharecropper, a prominent community member, village officials, and extension workers. Observations were carried out on 6 ha of land cultivated by farmers. Secondary data as supporting data were obtained from the Sukaharja Village Office. The data obtained was processed and analyzed descriptively.

3. Results and discussion
3.1 Village land treasury management
Village treasury land was used by the community for agricultural activities long before the village expansion. The forerunner of Sukaharja Village is Karmawangsa Village, which has existed since 1912. In 1985, there was a division of Karmawangsa Village into Karmawangsa Village and Sukaharja Village with four hamlets namely, Sindang, Cihawar, and Cikawung Village. In 2007, several hamlets underwent division, namely: Cihawar became Cihawar and Cihawar Mekarsari, and Cikawung became Girimekarharja and Cikawung.

Some areas of village treasury land are erosion-prone, so the government is trying to build terraces to reduce erosion, while farmers are trying to plant bamboo on the edges of land that is prone to erosion, although the number is still limited. Making terraces, planting crops according to contours, using organic fertilizers in situ are soil protection activities to overcome land degradation [12]. Land-use change is mainly driven by local community practices and preferences, the global economy, environmental conditions, and interrelationships between various factors, including previous community activities on land [13].

Village treasury land in the form of grazing land should function as land for grazing or planting fodder plants. Still, other uses such as food crop farming are allowed at the discretion of the local government. Table 1 shows the number of treasury land sharecroppers in Sukaharja Village based on their land use pattern.

| No. | Cropping pattern | Number of farmers | Percentage |
|-----|------------------|-------------------|------------|
| 1.  | Monoculture      | 2                 | 3%         |
| 2.  | Agroforestry     | 14                | 22%        |
| 3.  | Crops            | 48                | 75%        |

Source: primary data, 2021

Table 1 shows that more farmers plant crops, because they harvest faster. There are 48 sharecroppers, 3 percent of them plant sengon and mahogany, 22% plant wood and secondary crops, and 75% plant seasonal crops such corn, peanuts, black potato, and cassava. Agrisilviculture, silvopasture, and agro silvopasture are three agroforestry systems used by the community on crucial land [14].

Farmers cultivated the village land with a rental system to the village government for IDR 50,000/brick/year (1 brick=14 m²). The village government provides opportunities for the community to cultivate village treasury land with a rental system because community land ownership is limited. This is supported by the opinion of [15], which states that some land tenure rights are permanent and some are temporary. Fertile and productive village treasury lands are usually used as crooked land for
village officials. Still the infertile village treasury lands, such as grazing land, will usually remain under the supervision of the village government.

Even though the conditions are less fertile, the village treasury lands are still attractive to farmers who do not own or have limited land, so they rent the land. On average, village treasury land rental prices are lower than the market price [5,6]. In this scheme, both parties are expected to get benefits: the village gets income to develop the village, and the farmer can rent land cheaper than renting it from another farmer. However, this scheme was not very successful in improving the living conditions of the sharecroppers. Even though the rent price is relatively low, the land area is limited and less fertile, so the sharecroppers can only produce enough to fulfill their daily needs [5,7].

The use of grazing land by sharecroppers has been carried out for a long time, and some farmers are second or third-generation farmers who get rights/to manage in managing arable land. Transferring land lease/cultivated rights is carried out through several processes, namely through 1) inheritance to family, children/brothers/sisters, or neighbors, 2) transfer of ownership rights on orders from the village government. Farmers can access land resources but can not fully control land resources. Sharecroppers realize that the land belongs to the village, so they must be willing to let it go if one day the village needs and withdraws the right to cultivate the land. This also causes the village government to launch various programs to optimize the use of village treasury land or carry out activities aimed at rehabilitating land that is considered critical even though farmers cultivated land.

Since 1984 until 2014, there were several programs for the conservation of Sukaharja village treasury land, including a reforestation program through the provision of wood plant seeds and terracing construction, then assistance for land use under forest stands (PLBTH) with durian and rambutan, assistance in the form of mangosteen, durian, and rambutan seeds, as well as planting sugar palm, picung, kepel, and matoa which is a government program to springs protecting in the village. In addition to planting fruit and wood, since 1990 the sharecroppers planted the village treasury land with food crops such as corn, upland rice, peanuts, and cassava, but only corn and cassava were successfully harvested.

![Figure 1. The history of Sukaharja village treasury land management](image)

In 2015-2021, the Agroforestry Technology Research and Development Institute (BP2TA), one of the technical implementing units (UPT) of the Ministry of Environment and Forestry, carried out the
development of an agroforestry demonstration plot using bamboo as the main plant on the village treasury land of Sukaharja. The initial demonstration plot was built in August 2015, covering 6 (three) ha, by involving local farmers [19]. Figure 1. Illustrates the various programs carried out on the village treasury land of Sukaharja.

3.2. Bamboo agroforestry as an effort to optimize village treasury land management
Various village land-use programs were unsuccessful until the end of 2015. One of the causes of this failure is a top-down program so that the sense of belonging to farmers is low. There is even a tendency for farmers not to be actively involved in government programs towards conservation.

Programs for managing village treasury land aim to improve critical land and support business activities carried out by farmers. This means that it can balance economic and ecological interests. Land management with agroforestry systems, especially bamboo agroforestry, can be an alternative land management model. If an area has the potential of land resources to be developed, regional planning for the use of the land becomes a crucial thing to do [20].

Agroforestry has a dual function, both productive and protective (maintaining biodiversity, healthy ecosystems, water and soil conservation, and carbon sequestration). It is often used as an example of a sustainable agricultural system [21]. Agroforestry is designed to obtain maximum growth and yields by regulating crop density, crop pattern, planting time, crop rotation, and fertilization [22]. The application of agroforestry can solve land-use problems and produce food crops, animal feed, firewood, and building wood [23].

Bamboo agroforestry is developed on village treasury lands with the consideration that, apart from the limited land ownership of farmers, the biophysical suitability of bamboo, and various types of plants, farmers can earn a continuous income from their harvest arrangements (short, medium, and long term), and most importantly, farmers are interested in planting and maintaining bamboo [19]. Bamboo plants are also fast-growing, so they can improve soil conditions more quickly.

Development of bamboo agroforestry is inseparable from the process carried out in development research activities that have involved farmers and village governments from the beginning. [19] mention the stages of developing bamboo agroforestry demonstration plots in Sukaharja Village, namely: 1. planning with coordination and location determination; 2. collecting information through interviews about community perceptions of the demonstration plot development plan, FGDs on plant preferences, garden potential surveys, and land mapping; 3. Socialization and counseling; 4. Procurement of bamboo plant seeds and multipurpose plants, 5. Land clearing and planting. Bamboo agroforestry can provide economic benefits because of the variety of results obtained, namely wood and non-timber, including bamboo [24]. However, bamboo agroforestry also has drawbacks because without spacing and intensive maintenance, farmers will not be able to plant seasonal crops. After all bamboo will grow lush. Socialization, counseling, and assistance are needed in the bamboo agroforestry development program, especially bamboo stand management.

4. Conclusion
Farmers use the village treasury land in Sukaharja Village as agricultural land for food crops. Bamboo agroforestry is applied to optimize land use while still paying attention to the economic and ecological functions of the village treasury land. The development of bamboo agroforestry in village treasury lands is considered to be able to improve the condition of village land in a relatively fast time and still allow farmers to grow food crops. This study has not further analyzed the impact of developing bamboo agroforestry comprehensively in terms of social, economic, and environmental aspects, so further research is necessary.
Acknowledgments

We thank the Head of Agroforestry Technology Research and Development Institute Ciamis, the Head of Sukaharja Village, and Mr. R. Supriatna as Sukaharja’s Village Officials. They helped carry out research in the field.

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