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Family Role in Sugar Palm Agroforestry Management at Community Forest Park (Tahura) Wan Abdul Rachman Lampung

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Abstract

Forest management with agroforestry is an efforts to restore forest areas by paying attention to three types of management, namely institutional management, area management and business management carried out by communities around forest areas. Agroforestry reflects a combination of high canopy, medium canopy and high canopy plants with plants that produce non-timber forest products. Wan Abdul Rachman Grand Forest Park (Tahura) which is located in Bandar Lampung City and Pesawaran Regency, apart from functioning as a nature conservation area for the purpose of collecting natural or non-natural plants and/or animals, native and/or non-native species, which are used for the public interest as research, science and education purposes, it is also a source of drinking water for the people of Bandar Lampung and Pesawaran, so its management must consider conservation aspects. This research aims to analyze the combination of plants and the rationale, as well as the results obtained by the community. Way Sabu Resort was the location for research conducted using qualitative methods. The research results show that sugar palm agroforestry provides additional income compared to managing one type of crop, apart from that it also improves the ecosystem and is able to prevent erosion and the threat of flooding. Processing sugar palm into palm sugar involves the family in the production and marketing process.

INTRODUCTION

Forests are natural resources that must be preserved because they have an important role for human life and living things. Important role for human life and living things in it. Forests are not only economically beneficial but also ecologically beneficial. Based on their main function forests are designated as protection forests, production forests and conservation forests. The Botanical Forest Park (Tahura) is one type of conservation forest that, has a function as a life support area and preservation of the diversity of flora and fauna and the uniqueness of the symptoms, and fauna and the uniqueness of natural phenomena. According to Law No.5 of 1990, Tahura is a nature conservation area that is built for the purpose of collecting plants and or animals that are natural or artificial, native and unique. natural or artificial, native and non-native species, which are utilized for the purposes of research, science, education, supporting cultivation, culture, tourism and recreation recreation.

One of the Botanical Forest Parks in Southern Sumatra is the Wan Abdul Rahman Botanical Forest Park.Raya Wan Abdul Rahman or better known as Tahura WAR which is precisely located in the Province of Lampung. Wan Abdul Rachman Lampung Grand Forest Park is a state forest which consists of several management blocks, including the utilization block. At this location, the community manages the forest using an agroforestry pattern[1]. Agroforestry is a combination and combination of forestry, hplantation and agricultural plants in a land management system.

The application of agroforestry in plant composition aims to maintain the ecological function of the forest and increase farmer income. Agroforestry has ecological functions such as providing water

[1] Tiurmasari S., Hilmanto R., dan Herwanti S. Analisis Vegetasi dan Tingkat Kesejahteraan Masyarakat Pengelola Agroforestri di Desa Sumber Agung Kecamatan Kemiling Kota Bandar Lampung. *Jurnal Sylva Lestari* 4(3) (2016): 71-82.

sources, preventing erosion and landslides of trees on managed land[2], while economic functions result from short and long term crops. Multi-purpose plants known as Multi-Purpose Trees Species (MPTS) can be a source of long-term income, because the products are harvested once a year[3]. Multi strata canopy of high, medium and low canopy also makes a difference in harvest time. Short term income can be obtained from low yielding crops such as banana (Musa sp), cocoa (Theobroma kakao), coffee (Coffea arabica), lemongrass (Cymbopogon nardus), turmeric (Curcuma longa) and ginger (Jingiberis rhizoma)[4,5,6].

Agroforestry cropping systems have two benefits: ecological benefits and economic benefits. Ecological benefits and economic benefits. The ecological benefits obtained are that this system can create environmental sustainability and ecosystems in it, while the economic benefit of agroforestry systems is the creation of diversified sources of income from the same land management. Aren-based agroforestry systems in the People's Forest Park (Tahura) are expected to improve increase the income of farmer households which has implications for improving their welfare, especially the role of farmer families in Aren Agroforestry Management.

The ultimate goal of the agroforestry program is to improve the welfare of the people, sespecially farmers who live around the forest by prioritizing active participation of the community in repairing the damaged environment damaged environment and continue to maintain it. These agroforestry programs These agroforestry programs are directed at increasing and preserving the productivity of resources that will ultimately improve the standard of living of the community, will ultimately improve the standard of living of the community

Several studies related to the contribution of agroforestry explain that the income of farmers who implement agroforestry provides greater results than non-agroforestry[7,8,9]. This research aims to analyze the combination of plants and the rationale, as well as the results obtained by the community.

This research was carried out from July to August 2023 at the Way Sabu Resort, Wan Abdul Rachman Forest Park, Lampung. The research location is located in a utilization block which, in accordance with the provisions, can be cultivated by people who are members of the Forest Farmer Group. The agroforestry system is used by the community to cultivate plants with high, medium and low canopy strata.

The results of Asysyifa's research (2011) on the Contribution of Traditional Agroforestry Systems in Supporting the Socio-Economic Existence of Households. Concluded that the agroforestry system found in Sungai Langsat village is an agrisilviculture system. With two sub-systems, namely the rubber

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[2] Rahman SA., Healey JR., Sunderland T., Jacobsen JB., dan Roshetko JM. 2017. Finding Alternatives to Swidden Agriculture: Does Agroforestry Improve Livelihood Options and Reduce Pressure on Existing Forest? *Agroforest Syst* 91: (2017) 185-199.

[3] Qurniati R., Febryano IG., dan Zulfiani D. How Trust Influence Social Capital to Support Collective Action in Agroforestry Development? *Jurnal Biodiversitas* 18(3) (2017): 1201-1206

[4] Kaskoyo H., Mohammed AJ., and Inoue M. Present State of Community Forestry (*Hutan Kemasyarakatan*/Hkm) Program in a Protection Forest and its Challenges: Case Study in Lampung Province, Indonesia. *Jurnal Forest Science* 30(1) (2014): 15-29.

[5] Nadeak N., Qurniati R., dan Hidayat W. Analisis Finansial Pola Tanam Agroforestri di Desa Pesawaran Indah Kecamatan Padang Cermin Kabupaten Pesawaran Provinsi Lampung. *Jurnal Sylva Lestari* 1(1) (2013): 65-74.

[6] Qurniati R., Febryano IG., dan Zulfiani D. How Trust Influence Social Capital to Support Collective Action in Agroforestry Development? *Jurnal Biodiversitas* 18(3) (2017): 1201-1206.

[7] Olivi R., Qurniati R., dan Firdasari. Kontribusi Agroforestri Terhadap Pendapatan Petani di Desa Sukoharjo 1 Kecamatan Sukoharjo Kabupaten Pringsewu. *Jurnal Sylva Lestari* 3(2) (2015): 1-12.

[8] Asmi MT., Qurniati R., dan Haryono D. Komposisi Tanaman Agroforestri dan Kontribusinya terhadap Pendapatan Rumah Tangga di Desa Pesawaran Indah Kabupaten Pesawaran Lampung. *Jurnal Sylva Lestari* 1(1) (2013): 55-64.

[9] Kholifah UN., Wulandari C., Santoso T., dan Kaskoyo H., Kontribusi Agroforestri terhadap Pendapatan Petani di Kelurahan Sumber Agung Kecamatan Kemiling Kota Bandar Lampung. *Jurnal Sylva Lestari* 5(3) (2017): 39-47.

garden agroforestry sub-system and the mixed fruit garden sub-system. From the economic aspect, the contribution given by agroforestry gardens to community income is quite large, which is an average of 53.31 percent with an average income of Rp5,159,105, - per person per year. The results of research by Sultika (2010) on Income Analysis and Community Perceptions of Community Forests concluded that the total income of farmers from community forest management activities was Rp475,687,000/year with an average of Rp7,928,117/year/farmer and the contribution was 33.02 percent. Total income from outside community forest management activities was Rp964,953,000/year and the average and contribution were Rp16,082,550/year/farmer and 66.98 percent. Based on the 2009 Ciamis minimum wage, 21.67 percent of community forest farmers were below the minimum wage. The results of research by Putri (2015) on the Analysis of Income and Welfare Level of Coffee Farmer Households in West Lampung Regency concluded that the income of coffee farmers in West Lampung Regency based on the World Bank was classified as very low. The welfare level of coffee farmers in West Lampung Regency based on Sayogjo's criteria is included in the decent living category, and based on BPS indicators it is included in the prosperous category.

The research used in-depth interviews, focus group discussions, observation and literature study. Qualitative analysis is carried out by identifying all plant compositions, as well as the reasons for carrying out plant combinations. Agroforestry results are income that comes from various crops that produce in a certain period.

RESULTS AND DISCUSSION

The research was conducted in Tahura Wan Abdul Rahman, Lampung Province. Tahura WAR is one of the Tahuras located on the island of Sumatra and is considered to have succeeded in forest management with a collaborative management system with the community. in forest management with a collaborative management system with the community. Data collection was carried out in several working area units of Tahura management at the field level (Rayon). Tahura at the field level (Rayon), namely Rayon Bandar Lampung, Gedong Tataan, and Youth Camp.

Tahura WAR was established based on the Decree of the Minister of Forestry No. 403/KptsII/1993 which established the Gunung Betung Register 19 Forest Area covering an area of approximately 22,249.31 ha as a Botanical Forest Park (Tahura), ha into a Botanical Forest Park (Tahura). Geographically, Tahura WAR is located at 050 18' to to 050 29' LS and 1050 02' to 1050 14' EAST. Administratively, Tahura WAR is located in South Lampung Regency and Bandar Lampung City, Lampung Province.

Tahura WAR management consists of 6 (six) rayons, namely (1) Youth Camp with an area of 3,822.13 ha, (2) Way Sabu with an area of 3,851.32 ha, (3) Padang Cermin with an area of 4,575.01 ha, (4) Kedondong with 3,636.63 ha, (5) Gedung Tataan with 3,810.50 ha and (6) Bandar Lampung with an area of 2,553.71 ha. Division of work area unit is done in order to optimize the management of Tahura WAR area.

Agroforestry Plant Composition

There is an identified composition of agroforestry plants at the Way Sabu Resort Tman Hutan Raya Wan Abdul Rachman. Groups of main plant types and their filler plants (Table 2). The main crop is the plant that dominates the plant composition on community land with a percentage ranging between 50% - 70%. This indicator refers to research by Nadeak[10] which states that the main crops are plants which dominates in a composition, while filler plants are plants which do not dominate in a plant

[10] Nadeak N., Qurniati R., dan Hidayat W. Analisis Finansial Pola Tanam Agroforestri di Desa Pesawaran Indah Kecamatan Padang Cermin Kabupaten Pesawaran Provinsi Lampung. *Jurnal Sylva Lestari* 1(1) (2013): 65-74.

composition. The dominant crops on farmers' land (90%) are bananas and cocoa. Many people choose bananas and cocoa because these plants can be harvested in a short time; In addition, bananas and cocoa can be combined with other types of plants. This is in line with the results of Nandini's (2018) research which shows that bananas and cocoa are types of plants that are widely planted in forest areas as mixed crops in agroforestry patterns. According to Juwaningsih[11] bananas can be combined with various types of plants including coconut, mango, coffee, cloves and others.

Maintaining banana plants is relatively easy and the harvesting process is not difficult. Cocoa plants also have a fast production time, namely they can be harvested every 15 days, but cocoa requires more maintenance than banana plants[12]. Bananas reproduce in the second year, while cocoa begins production in the third year. Banana plants can grow at an optimum temperature of 270C and a maximum temperature of 380C and can grow in tropical climates[13]. Cocoa plants can grow with an average rainfall of 1,500-2,500 mm/year and the temperature suitable for cocoa plants is 30-320C[14]. These conditions are in accordance with the average rainfall in Sidodadi Village, namely 2,000-3,000 mm/year and an average temperature of 30-320C. Other types of plants included in the MPTS plant types such as cloves, coconuts, tangil, duku, candlenuts, petai and durian are developed by the community because these types of plants have economic value and can grow according to land conditions. According to the research results of Wulandari et al[15], farmers generally plant types of plants that have economic value and don't take long to harvest. The number and age of plant types used by the Sidodadi Village community can be seen in Table 3.

Based on Table 3, the amount of MPTS on land is less than cocoa and bananas. This is because people prefer plants with a short harvest time, while MPTS type plants have a long harvest time. Another cause is that people have difficulty getting the MPTS seeds they want, so the number of plant types is small and only certain types dominate. This condition causes the diversity of plant types in the Tahura WAR cultivated land by the Sidodadi Village community to be low; because according to Indriyanto[16] the dominance of few plant types causes low plant type diversity. The research results of Erwin et al[17]show that land use activities by the community by developing plants that only have economic value can cause changes in the area and function of the Community Forest Park (Tahura) WAR land.

Income from Agroforestry Products

Each plant composition provides different income which is influenced by the economic value of the type of plant (Table 4). Each plant composition consists of subsistence crops and commercial crops. Subsistence crops are crops that are not sold (do not produce monetary value and are consumed by themselves) so they are not included in the calculation, while commercial crops are crops that are sold by farmers (produce monetary value).

Table 4 shows that the agroforestry crop composition that is widely used by farmers and gets the highest income is in composition II with an average income of IDR. 21,640,777/KK (a Family)/year. In

[11] Juwaningsih EH. Kajian pertumbuhan tanaman pisang beranga kelimutu. *Jurnal Partner* 15(2) (2008): 111-120.

[12] Rubyo dan Siswanto. Peningkatan Produksi dan Pengembangan Kakao (*Theobroma cacao L.*) di Indonesia. *Buletin RISTI* 3(1)(2012): 33-48.

[13] Yuniwati M., Ismiyati D., dan Kurniasih R. Kinetika Reaksi Hidrolisis Pati Pisang Tanduk dengan Katalisator Asam Chlorida. *Jurnal Teknologi* 4(2) (2011): 106-112.

[14] Safuan LO., Kandari AM., dan Natsir M. Evaluasi Kesesuaian Lahan Tanaman Kakao (*Theobroma cacao L.*) berdasarkan Analisis Data Iklim Menggunakan Aplikasi Sistem Informasi Geografi. *Jurnal Agroteknos* 3(2) (2013): 80-85.

[15] Wulandari C., Budiono P., Yuwono SB., and Herwanti S.. Adoption of Agro-Forestry Patterns and Crop Systems Around Register 19 Forest Park, Lampung Province, Indonesia *Jurnal MHT* 20(2)(2014): 86-93.

[16] Indriyanto. *Ekologi Hutan.* Penerbit Bumi Aksara, Jakarta. (2014)210 hlm.

[17] Erwin., Bintoro A., dan Rusita. Keragaman Vegetasi di Blok Pemanfaatan Hutan Pendidikan Konservasi Terpadu (HPKT) Tahura Wan Abdul Rachman, Provinsi Lampung. *Jurnal Sylva Lestari* 5(3)(2017): 1-11.

this composition, agroforestry plants are dominated by banana and cocoa plants combined with chili plants, durian, areca nut, soursop, rambutan, coconut, candlenut, clove, duku, bayur, jengkol, mango, petai, avocado, nutmeg, breadfruit, sugar palm, and cempaka. Banana, cocoa, clove and chili plants are planted in the middle of the land. MPTS plants consisting of mango, soursop, rambutan, durian, duku, jengkol, petai and avocado are among the banana, cocoa, clove and chili plants that serves as a protector for other plants. Then the areca, coconut, candlenut, nutmeg, breadfruit, sugar palm, bayur and cempaka plants function as hedge plants and prevent landslides because they are generally planted on land with a high slope.

In composition II, there are more types of filler plants compared to other plant compositions. The subsistence crops in this composition are bayur and cempaka which are woody plants planted in the Tahura area so they cannot be consumed/used, while the others are commercial crops so they can generate high income. In line with the research results of Ayu et al[18], the number of plant types that are high and produce quickly will provide higher income.

In composition II, 72% of farmers chose bananas and cocoa as the main crops because they produce quickly and have commercial value. The results of agroforestry management are the main source of income for farmers to meet their daily needs. Plant composition II incurs costs for purchasing clove seeds, while for other types of plants farmers sow their own seeds. Farmers also incur costs for fertilizers and pesticides such as urea, KCL, TSP, roundup and paste. Apart from artificial fertilizer, farmers also use manure in implementing agroforestry planting patterns. Farmers do not spend money on manure because farmers raise livestock so the manure can be used as manure. Land area and level of education greatly influence farmer income (Table 5). This is in line with the research results of Karto[19] and Mamuko et al[20] which state that land area is the most important production factor in the agricultural system. The more trees that produce and the wider the land ownership will have a big influence on increasing farming productivity. The low level of community education causes the level of community welfare to be low because the level of education is related to the level of community income. The low level of public education is due to limited funds[21].

The composition of agroforestry crops with the lowest income is in composition IV which provides an average income of IDR 12,120,000/KK (a Family)/year. In this composition, agroforestry plants are dominated by banana and sengon plants combined with chili, durian, jengkol, candlenut, duku, petai, jackfruit and bayur plants. Banana and chili plants are planted in the land. MPTS plants consisting of durian, jengkol, duku, petai and jackfruit are planted between banana and chili plants. Bayur and candlenut plants function as hedge plants. Meanwhile, sengon plants, which are the dominant plants in this composition, are scattered on the fence and between the banana and MPTS plants. Sengon plants and other forestry plants are used as protectors for other plants and function as prevention of erosion because they are on a fairly gentle slope so they have no economic value.

The small number of commercially valuable plant species causes low income in composition IV. Commercial crops in this composition only consist of banana, jengkol, durian and petai, while the others are subsistence crops. Chilies are only consumed to meet daily living needs. Rambutan, mango and

[18] Ayu HY., Qurniati R., dan Hilmanto R. Analisis Finansial dan Komposisi Tanaman dalam Rangka Persiapan Pengajuan Izin HKM (Studi Kasus Desa Margosari Kecamatan Pagelaran Utara Kabupaten Pringsewu). *Jurnal Sylva Lestari* 3(1) (2015): 31-40.

[19] Karto. Analisis Perbedaan Luas Lahan dan Produktivitas Padi Sawah (Studi Kasus pada Petani Padi Sawah di Desa Ujungaris Kecamatan Widasari Kabupaten Indramayu Musim Tanam 2013). *Jurnal Agri Wiralodra* 6(2)(2014): 36-44.

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[21] Adalina Y. Kondisi Sosial Ekonomi Masyarakat di Sekitar Taman Nasional Gunung Halimun Salak. *Jurnal Penelitian Hutan dan Konservasi Alam* 12(2)(2015): 105-118.

soursop are seasonal subsistence crops; only for consumption with nothing to sell. Like sengon, candlenut and bayur are also woody plants that are only used as protection for other plants. The reason people continue to maintain these plants is because they have other jobs so they do not have enough time to replace the existing plants on the land.

To meet their living needs, in composition IV farmers have other jobs as a side job for additional income, namely as construction workers. The reason people have side jobs is because land products are considered insufficient for household needs. People plant types of plants that require minimal maintenance so it doesn't take up much work time. According to Syofiandi et al[22], side jobs cause activities on the land to decrease and result in less than optimal land use.

The management of agroforestry plants in composition IV does not use many quality seeds, because farmers sow their own seeds. Farmers also do not incur costs for fertilizers or pesticides such as urea, KCL, TSP, roundup and paste. Farmers only use manure in implementing agroforestry planting patterns. However, farmers do not spend money on manure because farmers raise livestock so the manure can be used as manure. The small number of types of plants that have economic value and the management carried out simply means that the income in this pattern provides the lowest income compared to other plant compositions.

The number of farmers whose welfare is classified as sufficient is 88 people (96%) and is found in compositions II, III, V and VI (Table 6). Tiurmasari et al[23] explained that the moderate and decent living categories can be assumed to be prosperous, while the poor and near poor categories are assumed to be farmers who are not yet prosperous. So the most prosperous crop composition is in crop composition II with an average rice equivalent consumption of 691 kg/person/year. Then for the people who are said to be the least prosperous (poor) are in composition IV with an average consumption of rice equivalent of 276 per person (1%).

Households that are not yet prosperous are caused by low income and uncertain numbers, which results in difficulty in accessing adequate education and health, resulting in weak competitiveness of poor households in competing for more economically viable job opportunities. The quality of human capital is still low, the level of education is still limited and the lack of adequate work skills means that workers cannot access better job opportunities.

Composition II shows that the highest average consumption of rice equivalent (kg/person/year) is found in households with the highest income so that they are able to meet the basic needs of society better and this, based on Sajogyo's[24] welfare indicators, can be categorized as prosperous. Even though the measure of welfare is only at the limit of fulfilling basic (primary) needs and has not met all of society's needs, especially secondary needs (television, refrigerator and motorbike) and tertiary (jewellery, houses and luxury cars).

CONCLUSION

Sugar palm agroforestry at the Way Sabu Resort Community Forest Park (*Taman Hutan Raya*) Wan Abndul Rahman is a combination of sugar palm plants with coffee, cocoa, candlenut and nutmeg plants. Crop combination provides additional income for farmers on the one hand, and also contributes to improving ecological disaster. Moreover, the research results show that sugar palm agroforestry provides additional income compared to managing one type of crop, apart from that it also improves

[22] Syofiandi RR., Hilmanto R., dan Herwanti S. Analisis Pendapatan dan Kesejahteraan Petani Agroforestri di Kelurahan Sumber Agung Kecamatan Kemiling Kota Bandar Lampung. *Jurnal Sylva Lestari* 4(2)(2016): 7-26.

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[24] Sajogyo T. *Garis Kemiskinan dan Kebutuhan Minimum Pangan*. LPSB-IPB, Bogor (1997).

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