

COMMUNITY WELFARE AND FOREST SUSTAINABILITY IN SOCIAL FORESTRY PROGRAMS: A CASE STUDY OF KTH BHAKTI ALAM LESTARI IN MALANG, EAST JAVA

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COMMUNITY WELFARE AND FOREST SUSTAINABILITY IN SOCIAL FORESTRY PROGRAMS: A CASE STUDY OF KTH BHAKTI ALAM LESTARI IN MALANG, EAST JAVA. The implementation of the Social Forestry (SF) program in Indonesia has an important role in improving community welfare and promoting the sustainability of forest resources. The alignment of environmental conservation goals with initiatives aimed at improving community welfare can be achieved through the implementation of social forestry. Forest sustainability is considered to be in good condition when both ecological and economic objectives can be maintained. This study examined the level of welfare in Forest Farmers Group (KTH) Bhakti Alam Lestari through income contribution and forest sustainability. The results showed that the SF program provided an average contribution of 28.5% of total income. The welfare status of the KTH Bhakti Alam Lestari members was assessed based on the poverty line set by the Central Agency on Statistics Indonesia (BPS)2022. Based on this data, 54% of members of KTH Bhakti Alam Lestari are classified as underprivileged. SF management generates a monthly per capita income of 9,8 USD (IDR. 161,478). This has reduced the poverty rate to 20% of KTH members categorized as poor, and 80% classified as non-poor. Several efforts have been made to increase land cover, resulting in a decrease in open land classification from 19% to 15%, and an increase in low land cover classification from 25% to 32%, which was characterized by a greater diversity of plant species, especially from the recently planted MPTS plants on the farmers' land.

Keywords: Social forestry, welfare, sustainability, income, poverty line

KESEJAHTERAAN MASYARAKAT DAN KELESTARIAN HUTAN DALAM PROGRAM PERHUTANAN SOSIAL STUDI KASUS KTH BHAKTI ALAM LESTARI DI MALANG, JAWA TIMUR. Program Perhutanan Sosial (SF) yang sedang diterapkan di Indonesia mempunyai peran yang sangat penting dalam meningkatkan kesejahteraan masyarakat dan meningkatkan kelestarian sumber daya hutan. Melalui Perhutanan Sosial, tujuan konservasi lingkungan dapat sejalan dengan upaya peningkatan kesejahteraan masyarakat. Kelestarian hutan dianggap dalam kondisi yang baik bila ada keberlanjutan fungsi ekologi dan fungsi ekonomi. Penelitian ini menginvestigasi tingkat kesejahteraan melalui kontribusi pendapatan dan kelestarian hutan di Kelompok Tani Hutan (KTH) Bhakti Alam Lestari. Hasil yang diperoleh yaitu (1) program PS memberikan kontribusi rata-rata pendapatan sebesar 28.5 % dari total pendapatan. Tingkat kesejahteraan anggota KTH Bhakti Alam Lestari diukur dengan garis kemiskinan menurut BPS 2022; 54% anggota KTH Bhakti Alam Lestari masuk kategori miskin dan 46% tidak miskin. Potensi pendapatan dari mengelola lahan IPHPS memberikan kontribusi pendapatan per kapita per bulan sebesar sekitar 9,7 USD (Rp. 161.478), sehingga terjadi penurunan angka kemiskinan menjadi 20% anggota KTH Bhakti Alam Lestari yang dikategorikan miskin dan 80% tidak miskin. Dampak terhadap kelestarian hutan juga terdapat upaya dalam perbaikan tutupan lahan dengan klasifikasi terbuka menjadi 15% dari 19% dan klasifikasi rendah dari 25% menjadi 32%, yang ditandai dengan semakin beragamnya jenis tanaman terutama dari jenis Multi Purpose Tree Species (MPTS) di lahan petani yang prospektif dalam pengelolaan hutan lestari untuk mendukung program perhutanan sosial dan multi usaha kebutuhan.

Kata kunci: Perhutanan sosial, kesejahteraan, kelestarian, pendapatan, garis kemiskinan

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I. INTRODUCTION

Social Forestry (SF) policy in Indonesia has been around since the 1980s and has become a priority program under President Joko Widodo. The Social Forestry (SF) Policy has been trying to do at least two major things: increase the economy based on land use and improve critical forest conditions (Agrawal et al., 2008; Gilmour, 2012; RECOFTC, 2013; Wiersum, 1999). The implementation of the SF Program in Indonesia can be evaluated in terms of policy, social, economic, and environmental improvement. From a policy point of view, for instance, the goal of having 12.7 million ha of forest in the SF area by 2023 has not been met. Several studies (Maryudi et al., 2022; Resosudarmo et al., 2019; Sahide et al., 2020) have stated that this figure is too ambitious. Community groups encounter social difficulties as a result of limited resources and rigid regulations resulting from bureaucratic designs (Galudra, 2019; Larson et al., 2021; Moeliono et al., 2017; Ramadhan et al., 2022).

In comparison to other aspects that present obstacles, the economic aspect represents a promising opportunity (Rakatama & Pandit, 2020). Since the introduction of the SF program in 2016, research on economic contributions published in international journals has yielded a number of findings. Several case studies were conducted outside of Java; for instance, Resosudarmo et al. (2019) who conducted research in Central Kalimantan, determined that land-based economic development activities would not be observed in the near future. Separate obstacles include capital funding and expenditures beyond activities such as forest protection (Ragandhi et al., 2021). In the village forests of West Kalimantan indicates that non-timber forest products (NTFPs) provide excellent prospects for food, medicine, and craft materials, although extracting timber forest products is prohibited because they can harm the ecosystem (Hutauruk et al., 2018). Another study in Lampung Province's Community Forestry or *Hutan Kemasyarakatan* (HKm)

demonstrated economic and conservation contributions (Kaskoyo et al., 2017). The same research conducted by Kuncoro and Cahyani (2018) reported that HKm scheme in Yogyakarta Province demonstrated the influence of number of workers and partnerships on the income of farmers.

The research on the implementation of SF in Java was conducted by (Irawanti et al. 2017) examined the value chain involved in sengon wood trade, tracing it from farmers to the wood industry. Desmiwati et al. (2021) conducted other research on the contribution of agroforestry to farmers' income under the Forestry Partnership Recognition and Protection or *Pengakuan dan Perlindungan Kemitraan Kebutuhan* (Kulin-KK) scheme in Parungpanjang, Bogor Regency, West Java. The study provided basic socioeconomic data using the Kulin-KK model. Regarding the economic aspects of SF implementation in the Java region, few studies have been comparatively conducted. The existence of Perhutani, a State Forest Company (SFC), distinguishes Java's SF policy from those of others. The implemented schemes pertain to Minister of Environment and Forestry Regulation No. 39 of 2017, which are the Social Forestry Forest Utilization Permit or *Ijin Pemanfaatan Hutan Perbutanan Sosial* (IPHPS) and Forestry Partnership Recognition and Protection (Kulin-KK). The implication is that the two plans mentioned above have replaced the long-running Community Forest Management program, also known as *Pengelolaan Hutan Bersama Masyarakat* (PHBM). The PHBM scheme encountered exceptional social, economic, and environmental challenges on its journey (Djamhuri, 2012; Ota, 2019; Rosyadi & Sobandi, 2014; Sahide et al., 2020; Setiahadi et al., 2017; Supriyanto et al., 2021). The government issued the Forest Areas with Special Management (KHDPK) program in 2022 to supersede the previous program.

This recent study focused on the examination of the impact of SF on community welfare and forest sustainability within the Bhakti Alam Lestari Forest Farmers Group (KTH), located in

Malang Regency, East Java Province. The KTH holds an IPHPS management permit as of 2018. KTH Bhakti Alam Lestari was established due to the historical conflict between the inhabitants of the area and Perhutani. KTH Bhakti Alam Lestari is located in the South Malang Regency, in close proximity to a coastal stretch along the southern shoreline. The nature tourism sector serves as a means to enhance the economic contributions provided by the local community. Starting in 2014, numerous communities autonomously undertook the voluntary task of engaging in conservation efforts. An environment-centric initiative was established with the aim of generating revenue through various means, such as collecting donations in exchange for the sale of seeds. Subsequently, this movement experienced significant growth and evolved into the organization known as Clungup Mangrove Conservation Tiga Warna (CMC).

CMC is in charge of managing eight beaches, and Yayasan Bhakti Alam Sendang Biru works with the Sendang Biru community to oversee it. The coastal areas include Clungup Beach and Gatra Beach, which are host to designated mangrove and coral reef conservation zones. These conservation areas consist of Sapana Beach, Mini Beach, Pecah Beach, Teluk Asmara Beach, and Basong Beach. However, in 2015, Perhutani deemed the community to have engaged in multiple infractions, specifically two primary concerns that need to be addressed. Firstly, the unauthorized entry into the location, and secondly, the claims of illicit charges related to the sale of seedlings as part of donation operations. However, from a legal standpoint, the community needed to lose the initial claim because Perhutani claimed the beach the community managed as a Perhutani work area and the community did not have legal ownership at that time.

In 2015, a cooperation agreement was established between CMC and Perhutani to manage these beaches. The distribution of shares is allocated as follows: 70% for Perhutani and 30% for CMC Management.

However, it has been noticed that the complete 30% share is not consistently redistributed to the local community as intended. This made the community dependent on ticket sales and tour guides. In 2016, CMC, through the Bhakti Alam Sendang Biru Foundation, which had previously managed eight (8) beaches, was forced to relinquish Teluk Asmara Beach and Basong Beach to Perhutani. The argument is that the community entered the Perhutani area without permission and that no tourist facilities were constructed. In 2017, the Social Forestry program in the Perhutani working area allowed the community to establish KTH. The community worries that another seashore will be taken over by Perhutani because it has not adhered to the area's legal requirements. The relationship between the community and Perhutani is one of the reasons why a separate SF initiative was established in the Java region, as the community's dissatisfaction with the existing partnership (Ramadhan et al., 2023; Sahide et al., 2020). Finally, KTH Bhakti Alam Lestari was established in 2018 on 893 ha of land due to the IPHPS program. The year 2021 marked the effective conclusion of the delineation of boundaries and cultivated fields, alongside the establishment of a Social Forestry Business Group (KUPS).

The objective of this study was to fill the gap in social forestry (SF) research within the Java region. Specifically, this research aimed to investigate the impact of SF on community welfare and analyse any alterations in forest cover conditions since 2018.

II. MATERIALS AND METHODS

A. Study Area

The study was conducted at KTH Bhakti Alam Lestari, Tambakrejo Village, Sumbermanjing Wetan District, Malang Regency, which has been granted a Social Forestry permit through the Decree of Minister of Environment and Forestry number 939 of 2018. The total managed area is 893 hectares, which consists of 339 hectares of production forest and 554 hectares of protected forest.

The area is still bordered to the north and east by the Perhutani area of RPH Sumberagung, BKPH Sumbermanjing, and KPH Malang.

B. Data Collection and Analysis

The collection of data was conducted from February to April 2023 using a household survey among KTH member population of 956 people. The Slovin method with a margin of error of 10% was used to determine the number of samples (Hakim & Tania Pertiwi, 2018) which was 90 respondents out of 956 KTH member. This study employed both primary and secondary data. Observations in the field and questionnaire-based interviews with respondents provided the primary source of information (Malleison et al., 2008). Data obtained from the questionnaire was used to determine the characteristics of respondents and collect information relevant to the research objective. Secondary data was obtained through research-related literature and supporting documents.

In this study, mixed methods (quantitative and qualitative) were used to analyse the data (Bryman, 2016). Quantitative analysis was used to calculate household income from SF on-farm, SF off-farm, and non-SF, as follows:

$$\text{Total farmers income} = \text{onfarm}_{\text{IPHPS}} + \text{onfarm}_{\text{IPHPS tree stand}} + \text{off-farm} + \text{nonfarm} \dots\dots\dots(1)$$

In this study, on-farm activities included income derived from IPHPS lands, such as timber, agroforestry, and livestock production. Daily labor was a form of off-farm income. Non-farm income included that of fishermen, construction laborers, traders, tour guides, and others.

A household expense was a cost incurred over the course of a year for the basic needs of life. There are two categories of household expenses i.e. food-related and non-food-related expenses. The following formula is used to calculate total household expenses:

$$C_t = C_a + C_b \dots\dots\dots(2)$$

Notes:

C_t = Total household expenses

C_a = Expenses for food

C_b = Expenses for non-food

The Central Agency on Statistics Indonesia (BPS) 2022 poverty line was used to calculate the level of household welfare. The measurement of poverty was based on the ability to meet basic food and non-food requirements for one month. The poverty line was used to determine whether or not an individual was poor. The

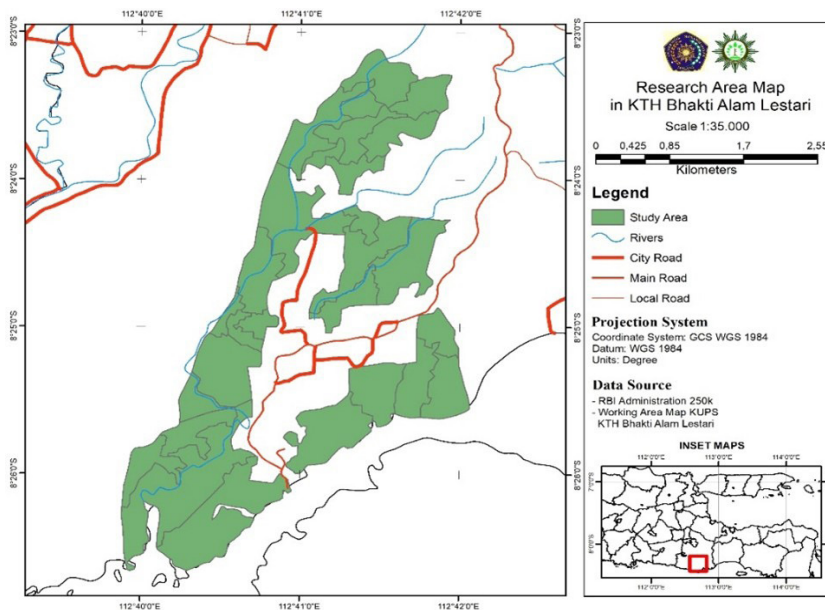


Figure 1. Map of Study site in KTH Bhakti Alam Lestari, Malang, East Java

poverty line indicated the minimum number of rupiah required per month to satisfy a person's basic needs. The urban poverty threshold was higher than the rural poverty threshold. The urban poverty line in 2022 was 31,64 USD (IDR. 521,494) per capita per month, whereas the rural poverty line was 29,37 USD (IDR. 484,209) per capita per month (BPS, 2022).

The analysis of forest sustainability in this study used several indicators, namely (a). land cover change; (b) soil quality improvement; (c) water condition; (d) presence of wildlife; (e) addition of plant species (Amri & Susanto, 2020). The assessment of each indicator was carried out through interviews using questionnaires with respondents to find out the community's perception of the condition of forest sustainability. The state of land cover change was carried out through Sentinel-2A satellite image data processing using Normalized Difference Vegetation Index (NDVI) analysis and land cover maps at the PS location from 2018 to 2023 to view land cover changes. NDVI values have a range from -1 (minus) to 1 (positive); positive values indicate a good level of vegetation cover (Marlina, 2022).

III. RESULTS AND DISCUSSION

A. Characteristics of respondents

The characteristics of the respondents in this study included age, gender, education level, number of family dependents, land area, and main occupation (Table 1). The age of KTH Bhakti Alam Lestari members ranges from 35 to 74 years of which 83 people were categorized as

productive, and 17 people were categorized as non-productive. According to BPS (2022), the productive work age ranges from 15 years to 64 years. According to (Herawati & Sasana, 2013), the age factor and knowledge factor will affect a person's work productivity; with increasing age and length of work, work productivity will increase.

Male sex predominated among respondents, making up as much as 92% (83 people), compared to female sex, which made up only 8% (7 people). On average, the female respondents continued to work on the land their husband had left because he had died. According to Dewi et al. (2020), in general, the productivity level of male workers tends to be higher than that of female workers. This is because men have greater physical strength than women, and the workforce relies more on physical strength. In addition, women who are married tend to find it more difficult to share their time with work because most of their time is spent taking care of the household.

The level of education of the respondents can be said to be low because most of the respondents were dominated by elementary school (89%), junior high school (9%), and senior high school (2%). This was due to limited funds to continue their education to a higher level. Some residents thought that school was a form of need that was expensive and not affordable for them. There was still a paradigm of thinking within the village community that work was more important than studying at school.

Table 1. Characteristics of respondents

No.	Characteristics of respondents	Number of respondents	Percentage
1	Age (Year)		
	35–44	22	24%
	45–54	26	29%
	55–64	25	28%
	65–74	17	19%

Table 1. Continued

No.	Characteristics of respondents	Number of respondents	Percentage
2	Gender		
	Man	83	92%
	Women	7	8%
3	Level of education		
	Elementary School	80	89%
	Junior High School	8	9%
	Senior High School	2	2%
4	Number of Family Dependents		
	1 person	3	3%
	2 person	9	10%
	3 person	25	28%
	4 person	34	38%
	5 person	12	13%
	6 person	5	6%
	7 person	2	2%
5	Land area (ha)		
	0-0,7	30	33%
	0,8-1,4	33	37%
	1,5-2	27	30%
6	The main occupation		
	farmer	67	56%
	fisherman	13	24%
	construction workers	4	9%
	trader	2	4%
	tour guide	4	7%

The number of dependents in the respondent's family ranged from 1–7 people, which was dominated by 4 people in each family. The number of family dependents can be one of the causes of a household becoming poor if there are many non-productive ages in the family, and vice versa if many are already productive. According to Achamd et al. (2015), the greater the number of family members, the easier it will be to deal with problems related to community forest management, and the more labour involved, especially from family members, or what is called family management.

Respondents who had an area of 0.8 to 1.4 ha owned the majority of the respondents' land, which was no larger than 2 ha. The respondent's land area would have an impact on how much money they would make; if the land area was

large, then the potential income they could make was also large. According to Anatika et al. (2019), if a farmer has a large area of land, the income earned will also be greater, thus it can be used to meet the needs of the family.

The main occupation of most of the respondents was a farmer (50%) and, on average, they also had livestock, in their free time while on the farm they would look for animal feed. The KTH Bhakti Alam Lestari area, which was close to the south coast area, made some people also work as fishermen (24%). Rural people commonly work as farmers, some work as landowners or as farm laborers. Farming is often viewed as a job that does not require special skills or a certain education (Achamd et al., 2015).

B. Analysis of household income levels of KTH Bhakti Alam Lestari members

The level of household income affects the level of household welfare. If household income increases, household expenditure will also increase, and vice versa, so that households with higher incomes tend to be more prosperous than households with lower incomes (Bakkegaard et al. 2017). The source of household income for KTH Bhakti Alam Lestari members was income from SF on-farm, SF off-farm and SF non-farm .

Table 2 shows the average annual household income of KTH Bhakti Alam Lestari members, which was 1,543 USD (IDR. 25,444,500). The largest contribution to the household income of KTH Bhakti Alam Lestari members was from SF non-farm (60%), followed by on-SF on-farm (28.5%), and SF off-farm (11.5%0. The contribution of income from on-farm SF was still not adequate because some of the land had just begun to be planted with fruit-

bearing trees and sengon wood was harvested every 5–6 years. Income from livestock was greater, with an average income of 222,35 USD (IDR 3,666,667) from the sale of goats or pigs. Most of the respondents keep livestock for unexpected emergencies, usually they search for animal feed while working on their farmland. Agroforestry is an alternative livelihood option where the main income of farmers comes from off-farm and non-farm activities (Desmiwati et al., 2021). The amount of income varies depending on the size of the land, the condition of the land, and the number or types of plants that are ready for production.

Figure 2 shows the productivity of managing social forest land (on-farm); the highest occurs in KTH members aged 45–54 years with an average land area of 1.1 ha and an average income of 213 USD (IDR. 3,512,857) per year. According to Desmiwati et al. (2021), the age range between 41 and 45 is the most productive for social forestry land under agroforestry

Table 2. The average household income of KTH Bhakti Alam Lestari members is based on annual income

No	Source of income	Total income (IDR)	Total income (USD)	Mean	Income shared (%)
1	On-farm SF				
	MPTS	285,680.000	17,324	3,174.222	12.5
	Timber stand (Sengon)	35,400.000	2,146	393,333	1.5
	Livestock	330,000.000	20,012	3,666.667	14.5
2	Off-farm SF				
	Daily laborers	250,550.000	15,194	2,895.000	11.5
3	Non-farm SF				
	Construction Worker	307,800.000	18,665	3,420.000	13.5
	Fisherman	610,450.000	37,019	6,782.778	27
	Trader	124,700.000	7,562	1,385.556	5.5
	Tour guides	144,500.000	8,762	1,605.556	6
	Others	190,925.000	11,578	2,121.389	8
	Total	2,263,605.000	137,271	25,151.167	100

Source: Primary Data, 2023

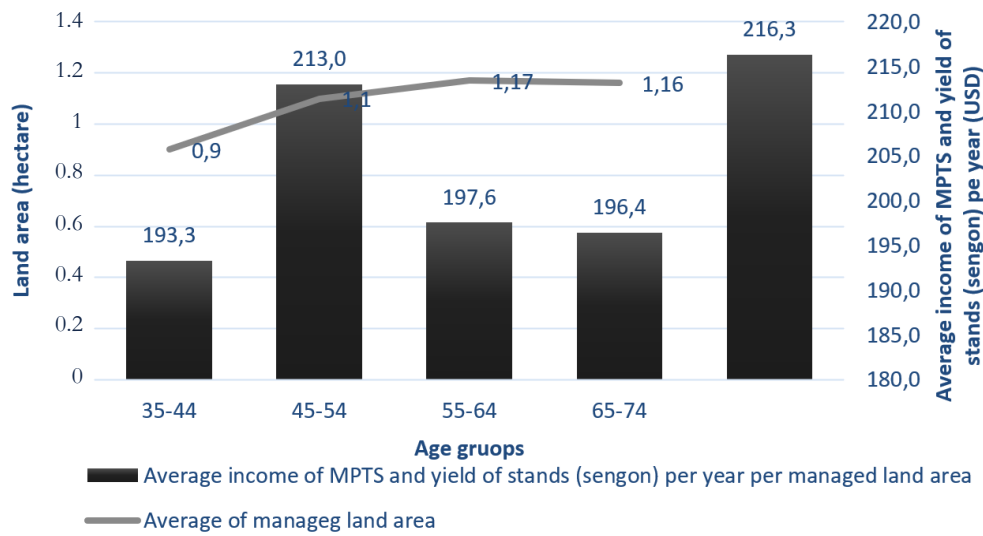


Figure 2. The income distribution of KTH Bhakti Alam Lestari members based on land area and age of the respondents

management. In the age groups 55–64 and 65–74, income from managing social forest land tended to decrease, even though their average lands were 1.17 and 1.16 ha, respectively. In addition to the age factor, this was also because there were lands that had just been planted with MPTS species, thus there was no income that could be procured yet from that area. Moreover, the income from sengon wood was still very low. Meanwhile, the 35-44 year old group managed lands with an average area of 0.9 ha, the income from managing social forest land was relatively low compared to the older age group. This was because they were more focused on earning their main income from non-SF.

Household expenses of members of KTH Bhakti Alam Lestari were divided into two parts, namely expenditures for food and expenditures for non-food (see Table 3).

Table 3. Household expenses for KTH Bhakti Alam Lestari members

Item	Annual expenses (USD)		
	Food	Non-food	Total expenses
Total	61,701	49,270	110,971
Percentage	56%	44%	100%
Average	685	547	1.233

Table 3 shows the total expenditure of KTH Bhakti Alam Lestari member households at 110.971 USD (IDR. 1,829,924,500) per year. The average total expenditure in the family each year is IDR. 20,332,494. Expenditure on food was greater than non-food at 56% to 44%, respectively, indicating a higher level of need for food than non-food. The high need for food was influenced by the size of the members in each family (Syofiandi et al., 2016).

C. Analysis of the level of the household welfare of KTH Bhakti Alam Lestari members

The welfare level of KTH Bhakti Alam Lestari members was measured based on the 2022 Central Statistics Agency (BPS) poverty line. The poverty line is based on the ability to meet basic food and non-food needs (expenses) per person in one month. According to BPS (2022), the urban poverty line was greater than the rural poverty line; the urban poverty line in 2022 was 31,62 USD (IDR. 521,494) per capita per month, while in rural areas it was 29,36 USD (IDR. 484,209) per capita per month.

Table 4 shows that 49 respondents (54%) were below the poverty line according to BPS 2022. The income contribution from managing PS land reduced the poverty rate; each family

Table 4. Distribution of respondents according to the BPS 2022's poverty line

Line of poverty	Criteria	Average income per capita (IDR)	Average income per capita (USD)	Number of respondents	Percentage (%)
< USD 29,36 (IDR 484,209)	Poor	361.438	21,91	49	54
> USD 29,36 (IDR 484,209)	Not poor	633.685	38,42	41	46
Total				90	100

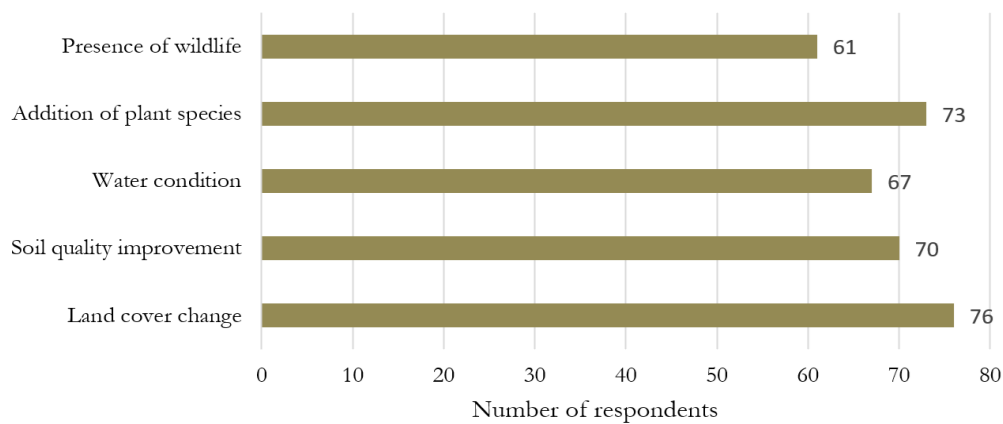


Figure 3. Perception on Forest Sustainability in KTH Bhakti Alam Lestari

member got an additional income of 9,7 USD (IDR. 161,478) per month. Therefore, with the contribution from PS on-farm income, the poverty rate decreased from 49 people (54%) who were initially included in the poor category to only 18 people (20%). And members of KTH Bhakti Alam Lestari who were above the poverty line increased from initially only 41 people (46%) to 72 people (80%).

D. Forest Sustainability Analysis

Forest sustainability can be measured by land cover changes, soil quality improvements, spring improvements, the presence of animals or wildlife, and the addition of plant species to the land (Juniyanti et al., 2020; Zhou et al., 2021). The following results are from a survey using a questionnaire about the sustainability of forests on 90 members of KTH Bhakti Alam

Lestari. The survey examined land covers, soil quality, the condition of springs, plant diversity, and the presence of animals

Changes in land cover, improved soil quality, well-preserved springs, and an increase in the presence of animals and wild animals, such as partridges, porcupines, snakes, squirrels, lizards, and monkeys were indications that the Social Forestry program had a largely positive impact after its implementation, as shown in Table 5. The survey findings on perceptions of forest sustainability showed a significant increase in all indicators, with a proportion over 50%. The land cover change had the highest percentage, with a perception value of 85%. Changes in land cover can be seen in the increasing density of tree stands and the return of dense vegetation (Figure 4). The quality of the soil was getting better because it had

Table 5. Perceptions by category on forest sustainability in KTH Bhakti Alam Lestari

Indicators	Category	Frequency	Percentage (%)
Presence of wildlife	Increase	61	68
	Do not change	27	30
	Decrease	2	2
	Total	90	100
Addition of plant species	Increase	73	81
	Do not change	17	19
	Decrease	0	0
	Total	90	100
Water condition	Increase	67	74
	Do not change	22	24
	Decrease	2	2
	Total	90	100
Soil quality improvement	Increase	70	78
	Do not change	18	20
	Decrease	2	2
	Total	90	100
Land cover change	Increase	76	85
	Do not change	12	13
	Decrease	2	2
	Total	90	100

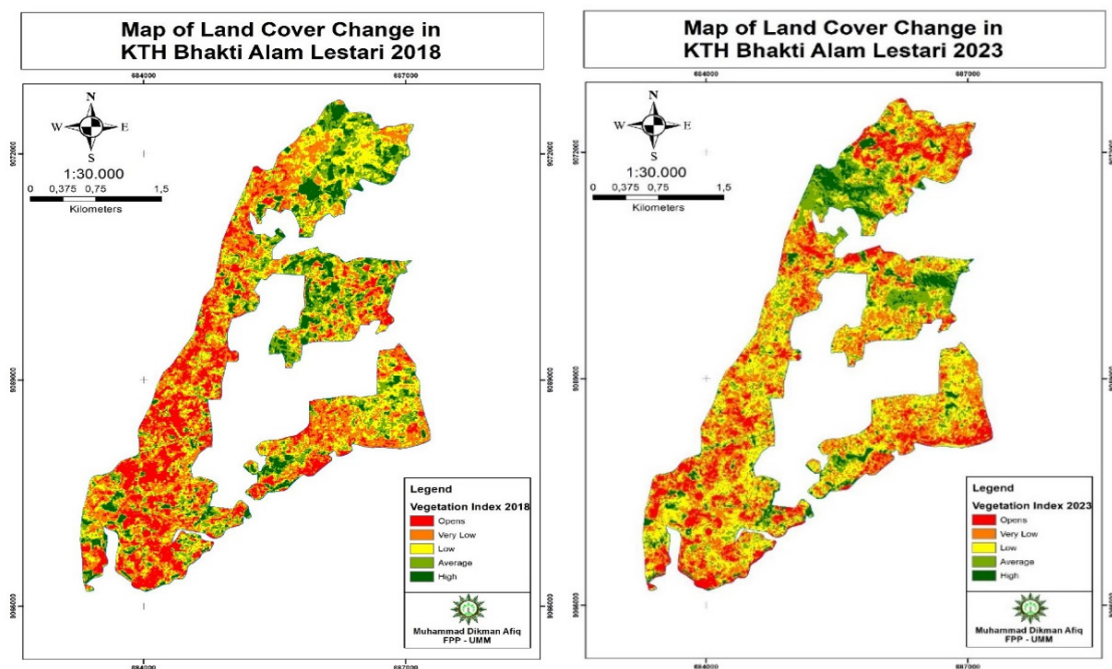


Figure 4. NDVI Classification in KTH Bhakti Alam Lestari in 2018 and 2023

started to be planted with more diverse plants. The condition of the springs was also better, because the vegetation was maintained around the springs/water catchment areas; the water discharge has improved as well. Furthermore, plant species were getting more diverse because the land was planted with various tree species that contributed to the farmers' income and would improve the stands or vegetation in the area. The presence of wild animals or other small animals has started to create a good and balanced ecosystem.

Table 6 shows that land cover had improved from 2018 to 2023. In 2018 the open area classification was 19%, and it decreased to 15% in 2023. The low land cover classification area was increased from 25% to 32%. However, the high land cover classification area, which was initially 9%, has decreased to 7% due to the harvest of sengon trees that year. Land cover change can be interpreted as either land degradation or land enhancement when assessing forest sustainability, depending on the perspectives of individuals who experience either benefits or losses from the transition process (Villamor et al., 2015). According to the perspectives of the local community and the analysis of land cover data from 2018 to 2023, the study demonstrated that social forestry management practices resulted in a noticeable improvement in forest sustainability. Community-based forestry plays a crucial role in promoting forest sustainability by enabling forest regeneration, enhancing biodiversity, increasing plant supplies, and improving

livelihoods (Cronkleton et al., 2018; Oldekop et al., 2019). The social forestry program shows the use of agroforestry patterns that effectively encourage people to restore vegetation with appropriate species for the specific location while also generating economic advantages (Kamaluddin et al., 2020; Suyadi et al., 2019). The income generated from IPHPS land in this study resulted in a 34% reduction in the poverty rate per household member, despite the existence of constraints, such as the incomplete harvest season of certain MPTS varieties and the relatively small income generated from sengon wood.

IV. CONCLUSION

Social forestry contributed an average of 28.5% to KTH Bhakti Alam Lestari members' total income. The potential income from managing SF could reduce poverty by 20% among the impoverished and increase the non-poor category to 80%. The community perceived that the SF program has a positive effect on land cover, the enhancement of soil quality, springs, and wildlife. Land cover change analysis using Sentinel-2A satellite image data with NDVI analysis from 2018 to 2023, shows that efforts are being made to improve land cover, with the classification of open area decreasing from 19% to 15% and the classification of low vegetation increasing from 25% to 32%, which is characterized by the increasing diversity of plant species being planted on farmers' land.

Table 6. Classification of land cover in 2018 and 2023

Land Cover Classification	NDVI value	The 2018		The 2023	
		Number of pixels	Percentage (%)	Number of pixels	Percentage (%)
Open	-0,197 – -0,082	16329	19%	12986	15%
Very low	-0,082 – 0,054	27046	30%	28254	31%
Low	-0,052 – -0,024	22139	25%	28376	32%
Medium	-0,024 – 0,017	15388	17%	13683	15%
High	0,017 – 0,128	8408	9%	6011	7%
Total		89310	100%	89310	100%

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