

Sustainability of The Agroforestry Management System on *Perhutani* Forest Land in Malang Regency, East Java, Indonesia

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ABSTRACT

The Forest Management Program with the Community (PHBM) is a program that provides an opportunity for communities living around forests to participate in managing forests by planting seasonal crops with the concept of agroforestry. However, there are any threats to agricultural sustainability in the form of critical land, pest attacks, institutional functions that are not running well, and non-optimal usage of technology. This study aims to examine the sustainability of farming on *Perhutani* land which is assessed from the five dimensions of sustainability: ecology, economic, social, institutional, and technology. The data collected by distribute the questionnaires to respondents. Respondents in consist of 67 people in total who divided into 60 farmers, and seven stakeholders. Data analysis used the MDS (Multidimensional Scaling) method and leverage analysis to see the attributes that affect sustainability. The results of the study have a sustainability index value of 53.778%, it is categorized as Sufficiently Sustainable in terms of institutional dimensions about (67.119%), ecology dimensions (61.119%), and economic dimensions (58.332%). Meanwhile, the social dimension (44.597%) and the technology dimension (37.727%) are less sustainable. The leverage analysis shows 25 sensitive attributes that affect the sustainability of farming on *Perhutani's* land in each dimension.

Keywords: forest land; agroforestry; sustainability

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1. Introduction

Sustainable agriculture describes an alternative agricultural system to support economic, social, and environmental growth based on joint management while still paying attention to the aspects of sustainability (Shalati, 2022). Sustainable farming systems aim to reduce environmental damage, maintain agricultural productivity, enhance farmers' income, and improve life quality for people in rural areas. There are three indicators of sustainability that required a consideration such as sustainable environment, an increasing (prosperous) economy, and social acceptance by farming communities. Agricultural activities are carried out by humans use resources excessively to damage environmental and biological conditions, it is causing accelerated damage to natural resources, soil, and water in forest areas or the environment (Efendi, 2016).

According to (Alisjahbana et al., 2017) In 2020, Indonesia's forest area will be around 95.6 million hectares (ha) or 50.9% of the country's total land area. Plantation forests make up 5.4 million ha (2.9%) in total, about 43.1 million ha (23%) of secondary forest, and 46.9 million ha (25%) of primary forest, and Indonesia's non-forest land area was estimated to be approximately 92.1 million hectares (49.1%). there are over 2.4 million hectares of forest on Java Island, but according to Ferdaus et al. (2014) Perum *Perhutani* controls about 85.37% of it. Data from the Central Bureau of Statistics for 2020 forest area in East Java reaches 578,374 ha with a population of around 40.67 million in East Java, most of the forest area is



surrounded by villages. The large population increases population pressure to encroach on forest areas, specifically in villages around the forest.

Agroforestry is a land use system that contains a combination of trees and seasonal plants which at the same time must be able to provide the contribution to the farmers both direct or indirect (Rajagukguk, 2018). The agroforestry system is a form of land used to develop economic, ecological and social benefits that improve community welfare (Tamrin, 2015). Apart from having a role in improving community welfare, agroforestry also ensures the availability of sufficient food and able to act as a provider of raw materials for biofuels and ecological functions for the community (Rivaie 2015). The forest area with all the potentials contained of the natural wealth owned by a country. Apart from being used for timber and non-timber, forest products and environmental services, aside from the forestry sector, the area of forest also utilized for development purpose (Raharjo, 2023). The used of forest area is one of the public policies in the forest sector within management of forest area which develop other purpose than forestry activities. Policy on the Utilization of Forest Areas is one of the efforts to fulfill forest areas for the benefit of national development that is used outside the forestry sector (Rahmadanty et al., 2021). In (Decree of Directors of *Perhutani* No. 136/Kpts/Dir/2001) explained that PHBM activities are intended to increase the value and sustainability of the functions and benefits of forest resources. The government's efforts to create a prosperous society, sustainable forests, and food security in Indonesia is based on the Minister of Environment and Forestry Regulation Number 83 of 2016 concerning social forestry. Social forestry is a system of managing forest resources in the state and private forests by involving communities around the forest as the main actors in forest management, realizing a prosperous society, maintaining forest sustainability, and sustainability of forest ecosystems (Dewi, 2018; Syahputra, 2022). The program created by Community Forest Resource Management (PHBM) are to preserve forests and improve the welfare of communities around forest areas. The program enables the community to conserve and utilize the *Perhutani* area for agricultural and animal husbandry activities as the livelihood of the majority of the people living around the forest (Anggiani and Hikmawan, 2022).

Research on agricultural sustainability is carried out around the world and in various countries such as Europe (Mushi G.E et al., 2022) research about Digital Technology and Services for Sustainable Agriculture in Tanzania: A Literature Review, global issues. (Pretty J. et al., 2020) stated about Assessment of the growth in social groups for sustainable agriculture and land management, in Indonesia. (Rahmawaty, 2019) deeply intents explaining about Analysis of the Potential of Sustainable Food Agricultural Land in Lamongan Regency. However, research on the sustainability of farming on *Perhutani* land has rare in Indonesia. Therefore, this study was conducted to analyze the status of agricultural sustainability on *Perhutani* land as a form of novelty and differentiator from on the previous research. Referring to (Fauzi A., 2019) mentioned that there are aspects of sustainability important to meet the needs of human well-being as a whole. One of those is agricultural land in the forest owned by *Perhutani* which is currently being managed by some farmers in *Bambang Village* through the government policy. Based on the background above, this research focus on providing an overview of agricultural sustainability, mainly farming on *Perhutani* land or farmers participating in the PHBM program based on five aspects of sustainability (Hidayah et al., 2020). These aspects are: ecology aspects, economics aspects, socio-cultural aspects, technology aspects, and institutional aspects. In addition, the basis part for identifying the determining factors for the sustainability of agricultural development in agroforestry systems on forest land in Bambang Village, Wajak District, Malang Regency.

2. Theoretical Underpinning

(Setianingtias et al., 2019) stated the sustainable development is an effort to synchronize, integrate, and give equal weight based on the three aspects: economic, sociocultural, and environmental. The factors that affect the sustainability of a business are not only seen from three dimensions (economic, ecology, and social). Business sustainability seen in technology, institutional structure, and politics aspects (Howes et al., 2017).

According to *Perhutani*, Agroforestry is a combination of forestry and agricultural activities on the same land management that still paying attention to physical, social, economic and cultural conditions. Sustainable agriculture is implementing sustainable development in agriculture or part of the 17 Sustainable Development Goals (SDGs). SDGs is a long-term global program to optimize all potential and resources owned by each country, Indonesia among them. The 17 goals or targets that must be achieved are

eliminating hunger, achieving food security and good nutrition, and promoting sustainable agriculture (Irhamisyah, 2019). (Suhartini, 2017) argued about the application of sustainable agriculture is healthy agriculture that fosters public knowledge and awareness. Maintaining environmental sustainability could increase the productivity of agricultural land to create a proper and correct land management.

The usage of forests for agricultural activities is known as the agroforestry concept. According to (Perhutani, 2007), agroforestry is an optimal and sustainable land combining forestry and agriculture activities in the same land management unit by taking into account the physical, social, economic, and cultural conditions of those who act out their roles. The aim of agroforestry and intercropping system is are to improve the welfare of village communities around the forest by providing opportunities for village communities or farmers to grow food crops to boost people's income. The village community living around the forest plays an active role in efforts to save and prevent damage to forest land (Adhy et al., 2022; Waskitho, 2022; Hidayat, 2023).

The forest management program along with the community activities carried out with land use and utilize of the results, so that it is profitable for the parties involved. The benefits are felt to all of the parties involved. The forest management program with the community activities will be able to successfully achieve their goals, namely forest sustainability and community welfare. The success of the forest management program with the community is very determined by several factors, specifically the existence of government support at both the regional and central levels and certainly support for each element within the community (Perhutani, 2007; Septiana, 2020; Ikramatoun, S. et al., 2020).

3. Research Methods

3.1. Data Analysis

In This study, survey method using the questionnaire form as the research instrument is utilized to collect quantitative data in the shape of numerical value. This research used quantitative to analyze measurable and objective sustainability status. This research was conducted in Pandanrejo Hamlet, Bambang Village, Wajak District, Malang Regency was determined deliberately with the consideration that the location contained of community agricultural land within the forest of Perum Perhutani and farmers are participating in the community forest resource management program.

Sustainability analysis in this study was carried out on five dimensions, each containing five attributes, and analyzed it using the *Multidimensional Scaling* (MDS) method with *RapFarm* (Rapid Appraisal for Farming) software which is modified into *RapFish* (Rapid Appraisal for Fisheries) program which is developed by Fisheries Center, University of British Columbia (Fauzi A. 2019). Multidimensional Scaling is a statistical method used to analyze the influence of several indicators/variables on the other indicators at the same time. The objects in Multidimensional Scaling are represented as points between the closer distance and the points, the greater the similarity. MDS is useful for grouping things visually based on their similarities and displaying objects graphically based on these groups (Groenen and Velden, 2004)

The determination of the farming sustainability index on *Perhutani* land using the *RapFarm* technique is carried out based on a predetermined systematic. (Nababan et al., 2008) determined the index and status of sustainability based on the following stages, they are: 1) Reviewing the attributes for each dimension of sustainability and defining these attributes through field observations and literature review. 2) Scoring is based on the results of field observations and joint discussions. The range of scores are started from 1- 5 point depends on bad to good condition of each attribute. 3) The results of the scores were analyzed using the MDS program in the R application to determine the position of sustainable agricultural status on *Perhutani* land for each dimension are expressed in the sustainability index scale. The following are index values and categories of sustainability status seen in the following table 1:

Table 1. Sustainability Status Index Value.

Index Value	Category
0,00 – 25,00	Not sustainable
25,01 – 50,0	Less sustainable
50,01 – 75,00	Sufficiently sustainable
75,01 – 100,00	Very sustainable

Source: (Fauzi A., 2019)

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3.2. Data Collecting

The collected data of attributes related to the five dimensions of sustainability which are accumulated through field surveys and direct interviews with selected respondents. There are 67 people in total that consists of 60 farmers, and seven stakeholders namely Perhutani and agricultural extension workers, the village head **also** the head of the farmer group.

4. Result and Discussion

4.1. Sustainability Analysis

The results of the analysis using *Rapfarm* (MDS) shows that the sustainability index of the five dimensions with the highest score begin with institutional (67.119%), ecology (61.119%), economics (58.332%), social (44.597%), and the technology (37.727%). Multidimensional sustainability is illustrated through a kite diagram as shown in Figure 1.

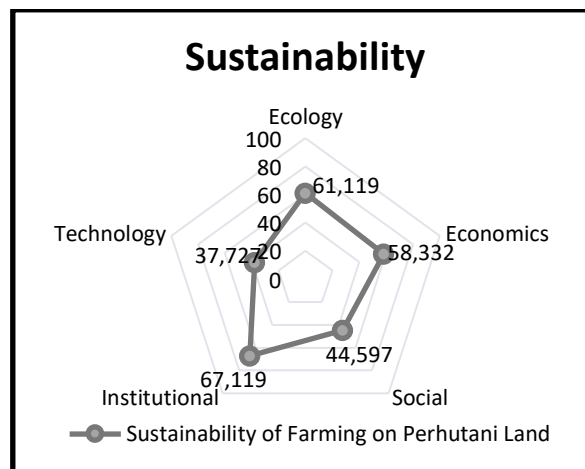


Figure 1. Farming Sustainability Index on *Perhutani* Land

The kite diagram of the Farming sustainability index on *Perhutani* Land in Bambang Village is in Figure 1. This shows the highest sustainability index value on the institutional dimension due to the institution in the agroforestry program of land use in the *Perhutani* area is supported by *Perhutani* which provides fertilizer subsidies to Bambang Village farmers. However, the smallest sustainability index value is the technology dimension since the farmers in Bambang Village haven't mastered yet or understood how to use agricultural technology optimally.

The results of the *Rapfarm* analysis from showing the sustainability index value also obtained the Monte Carlo value. The interval between the Monte Carlo value and the sustainability index is less than one, it is indicating the validity of the *Rapfarm* simulation results. Monte Carlo and MDS values in each dimension are less than one (Fauzi A. 2019), as shown in Table 2.

Table 2. Sustainability Index and Monte Carlo

Dimensions	Index	Monte Carlo	Interval
Ecology	61,119	60,996	0,123
Economics	58,332	58,301	0,031
Social	44,597	44,391	0,206
Institutional	67,119	67,061	0,058
Technology	37,727	37,587	0,14

According to (Fauzi, 2019), the *RapFarm* analysis has a leverage analysis. Leverage analysis determine by most influential attribute relative to the others seen from the Leverage index. The greater the leverage index, the more sensitive it is said to attribute. The selection of sensitive attributes is carried out based on the priority order of the results of the leverage analysis by looking at the shape of the Root Mean Square (RMS) change. The greater the RMS change value, the greater the role of these attributes in improving the status of farming sustainability in the forestry sector.

Leverage analysis results of five dimensions produce 25 sensitive attributes. Those attributes serve as key factors for each of their attributes. Sensitive attributes being basic information about factors that need to be improved or enhanced for the sustainability of farming on *Perhutani* land. Sensitive attributes are presented entirely in Table 3.

Table 3. Key Attributes That Affect the Sustainability of Farming on *Perhutani* Land

Dimensions	Sustainability Indicator
Ecology (X1)	(X1.1) Diversity of plant species in the field (X1.2) Area of land that implements conservation with agroforestry (X1.3) Utilization of <i>Perhutani</i> land edges (X1.4) Use of livestock waste as organic fertilizer (X1.5) Critical land conservation
Economics (X2)	(X2.1) Ownership of land for farming crops (X2.2) Community welfare with the PHBM program (X2.3) Marketing of agricultural products (X.2.4) Capital for farming (X2.5) Farming income
Social (X3)	(X3.1) Farming experience (X3.2) Awareness of preserving forests (X3.3) Education level of farmers (X3.4) Intensity of counseling about land conservation (X3.5) Frequency of conflicts
Institutional (X4)	(X4.1) The benefits of having BUMDES (X4.2) Benefits of having a PHBM program for farmers (X4.3) Benefits of the existence of farmer groups (X4.4) Participation in agricultural cultivation counseling (X4.5) The benefits of the existence of microfinance institutions
Technology (X5)	(X5.1) Farmers' Perceptions of new technology (X5.2) Post-harvest technology (X5.3) Pest and disease control technology (X5.4) Ownership of agricultural machinery (X5.5) Ability to use technology

4.1.1. Sensitive Attribute of Ecology

The analysis of sustainability status in terms of the socio-cultural dimension includes five attributes namely: (X1.1) Diversity of plant species in the field (X1.2) Area of land that implements conservation with agroforestry (X1.3) The Utilization of *Perhutani* land edges (X1.4) The Utilization livestock waste as organic fertilizer (X1.5) Critical land conservation. The results of the analysis leverage in terms of ecology dimensions could be seen in Figure 2.

The results of the analysis of the sustainability index of farming on *Perhutani* land on the ecology dimension are 61.119%. This value is categorized as Sufficiently sustainable because the index value is in the 50.01-75.00 range (Fauzi A., 2019). The factors affected the sustainability are the attributes of the area of land that implements conservation with agroforestry. The percentage of land area that mechanically implements an agroforestry conservation system on *Perhutani* land to increase the chances of absorption of water in the soil and prevent erosion and reduce the need for fertilizer or nutrients from gardens due to recycling of crop residues (Ollinaho O. I. and Kröger M. 2021; Bishaw B., et al., 2022; Fahad S. et al., 2022).

Agroforestry also influences the ecology dimension as it is in line with (Ruhimat, 2015) opinion about agroforestry is a form of land use that combined to forestry crops with seasonal crops and livestock on the same land to protect the soil from rainwater crashing and prevents pest attacks. The attribute of a diversity of plant species on *Perhutani* land has little value compared to other attributes because the plant species cultivated on *Perhutani* land in Bambang Village are limited, specifically for corn and cassava. Even though the potential for corn production in Bambang Village is also increasing because the land in

the area is categorized as dry land, so that the corn plants are very suitable for cultivating dry land such as the Perhutani area (Mulyani, and Mamat, 2019). These attributes of Ecology are seen in Figure 2.

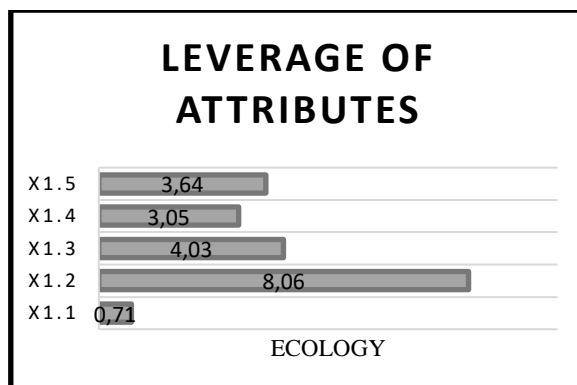


Figure 2. Ecology Dimension Leverage Value

4.1.2. Sensitive Attribute of Economics

Analysis of the status of sustainability studied from the economics dimension includes five attributes namely: (X2.1) Ownership of land for farming crops, (X2.2) Community welfare with the PHBM program, (X2.3) Marketing of agricultural products, (X2.4) Capital for farming, and (X2.5) Farming income. The results of the analysis leverage of sustainability studied from the economics dimension can be seen in Figure 3.

Based on Figure 3, the sensitive attributes affecting the level of sustainability are studied from the economic dimension, namely (X2.2) Community welfare with the Joint Forest Management program, with an RMS value of 7.59%. Bambang Village is one of the villages that has critical land in the area of agricultural cultivation, this is because sand mineral mining is carried out by some people as side workers besides doing agriculture (Hayati, 2018). The existence of a community forest management program apart from increasing farmer household income and helping reforest forests, farmers also get land loans for farming capital (Wirasanti et al., 2020).

Collaborative Forest Management activities able to achieve its goals, namely forest sustainability and community welfare. (Ardyanny et al., 2020) also explained that the success of Community Forest Management is largely determined by several factors, especially the support of the local and central government and course support from every element of the community involved. Most people in Bambang village work as farmers; therefore, using forest land for farming adds to the income of farmer households, in addition to create an employment opportunity for villagers around the forest (Ota, M. 2019; Septiana, R. M. 2020). In Figure 3. These five attributes are interrelated and explained the economic level of farmer households in Bambang Village as Sufficiently Sustainable.

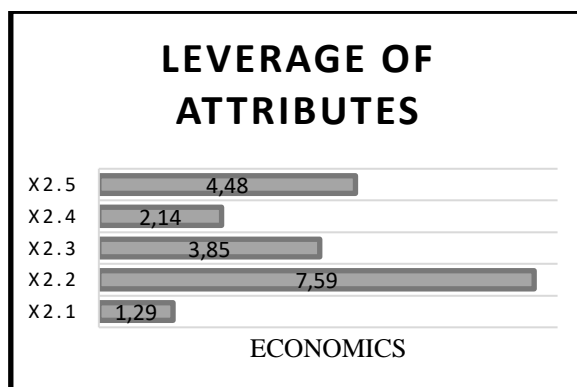


Figure 3. Economics dimension leverages value

4.1.3. Sensitive Attribute to Social

Analysis of sustainability status is studied from the social dimension including five attributes, namely: (X3.1) Farming experience (X3.2) Awareness of preserving forests (X3.3) Education level of

farmers (X3.4) Intensity of counseling about land conservation (X3.5) Frequency of conflicts. The results of the analysis of the status of sustainability studied from the social dimension can be seen in Figure 4.

Based on Figure 4. sensitive attributes affecting the level of sustainability are studied from the social dimension, namely (X3.4) Intensity of counseling about land conservation with an RMS value of 4.02%. Extension of land conservation is indeed extremely important to do, so that people understand the importance of conserving land. However, unfortunately the land conservation counseling rarely takes place in Bambang Village. Land conservation counseling is needed to provide knowledge to farmers who worked on Perhutani forest land, so that the sustainability and sustainability of farming is maintained (Kironoto et al., 2021).

The results of the social dimension sustainability analysis have an index of 44.597% of which are less sustainable due to the lack of awareness of farmers in protecting the forest. Many irresponsible individuals illegally cut the trees without *Perhutani's* permission. However, the participation of farmers in forest conservation efforts is very important. They do the collective action and active participation, such as activities to clean up the forest environment, reforestation, and selective logging (Haikal et al., 2020).

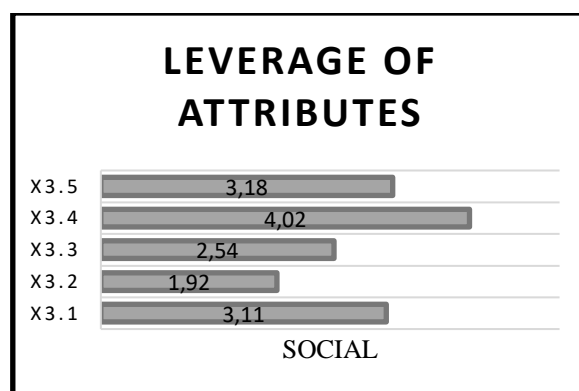


Figure 4. Social Dimension Leverage Value

4.1.4. Sensitive Attribute of Institutional

Analysis of the sustainability status studied from the institutional dimension includes five attributes, namely: (X4.1) The benefits of having BUMDES (X4.2) Benefits of the existence of farmer groups (X4.3) Benefits of having a PHBM program for farmers (X4.4) Participation in agricultural cultivation counseling (X4.5) The benefits of the existence of microfinance institutions. The results of the leverage analysis studied from the institutional dimension can be seen in Figure 5.

Based on Figure 5. the sensitive attributes affecting the level of sustainability are studied from the institutional dimension, exclusively the benefits of the existence of Farmer Groups in the village with an RMS value of 6.84%. In Bambang Village there are 3 Farmer Groups working there: Asih Wono 1, Asih Wono 2, and Asih Wono 3. The benefits from these Farmer Groups are still not evenly distributed. Unactive farmer group from Bambang Village is Asih Wono 2 Farmer group. The Farmers Group in Bambang Village is present become a facilitator of farming operations through the distribution of seeds, fertilizers, and agricultural medicines.

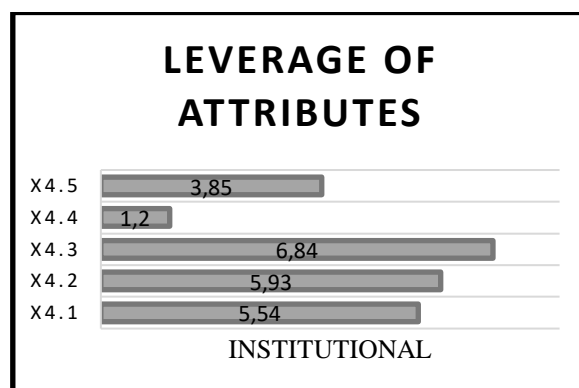


Figure 5. Institutional Dimension Leverage Value

Farmers who are members of Farmer Groups also receive counseling from the Department of Agriculture regarding knowledge and skills in farming management and efforts to eradicate pests that attack farm crops. The purpose of forming farmer groups is a group approach to improve and develop farmers' abilities as subjects of agricultural development (Sadapotto et al., 2020). According to the Regulation of the Minister of Agriculture, the roles of farmer groups are grouped into three, they are a vehicle for learning, a vehicle for collaboration, and a production unit. Indirectly farmer groups can be used as an effort to increase farming productivity through simultaneous farming management. Therefore, if you want to upgrade the sustainability of the institutional dimension to the best or sustainable, the main lever that can be considered is the formation and usefulness of the existence of Farmer Groups in the village (Nikoyan et al., 2020).

4.1.5. Sensitive Attribute of Technology

Analysis of the sustainability status studied from the technology dimension includes five attributes, namely: (X5.1) Farmers' Perceptions of new technology (X5.2) Post harvest technology (X5.3) Pest and disease control technology (X5.4) Ownership of agricultural machinery (X5.5) Ability to use technology. The results of the leverage analysis studied from the technology dimension can be seen in Figure 6.

Based on Figure 6, the sensitive attributes affecting the level of sustainability are studied from the technology dimension, namely (X5.4) Ownership of agricultural machinery with an RMS value of 4.93%. The use of traditional and modern agricultural machinery influences the modernization process of farming. Agriculture modernization is a changing from conventional to modern agricultural management by use of new technology (Fattahaya, 2017). Farmers in Bambang Village are not ready to transform towards a modern agriculture system because education about agricultural modernization is still minimal. The use of sophisticated tools will also affect farming activities so that the work will be faster, the yield will be bigger, and the energy used will be different to that used traditional tools when it is done with the latest agriculture (Adinugraha H., 2022).

Agricultural machinery tools are one of the supports for the sustainability of farming on Perhutani land in Bambang Village, which they still used traditional systems and has not yet switched to modern agricultural tools. If the sustainability index value of the dimension of agriculture technology is increase to be highly sustainable, the main levers thought about the ownership of conventional and modern agricultural machinery. Farmers are starting to switch to modern agriculture tools, so the agriculture management will be more effective and efficient (Lestari et al., 2019; Lensun et al., 2019).

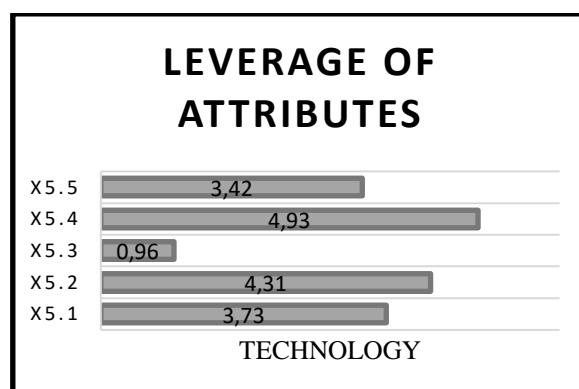


Figure 6. Technology Dimension Leverage

5. Conclusion

The result of the research proofing that sustainability index have value of 53.778%, so the value is categorized as Sufficiently sustainable in terms of the institutional dimension (67.119%), ecology dimension (61.119%), and economics dimension (58.332%). Meanwhile, the social dimension (44.597%) and the technology dimension (37.727%) are less sustainable. This index concluded that agriculture on forest land using an agroforestry system is quite sustainable. Coordination between farmers and forestry is very successful in farming activities using an agroforestry system that utilizes forest land.

The results of the leverage analysis shows the 25 sensitive attributes affected the sustainability of farming on Perhutani's land. This attribute considered to improve the agricultural system on Perhutani's Land, so that it is create land and forest are sustainable.

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Data sharing: The data supporting the findings of this study can be obtained upon request.

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References

- Adinugraha, H. H. (2022). Dampak Alat Pertanian Modern Padi Terhadap Kesejahteraan Masyarakat di Kabupaten Batang. *RISTEK: Jurnal Riset, Inovasi dan Teknologi Kabupaten Batang*, 6(2), 52-61.
- Adhy, M. T., & Kamaluddin, A. K. (2022). Pengelolaan agroforestri pada Blok Pemberdayaan Masyarakat KPH Bacan Kabupaten Halmahera Selatan. *Wahana Forestra: Jurnal Kehutanan*, 17(2), 135-147.
- Alisjahbana, Armida & Busch, Jonah. (2017). Forestry, Forest Fires, and Climate Change in Indonesia. *Bulletin of Indonesian Economic Studies*. 53. 111-136. 10.1080/00074918.2017.1365404.
- Anggiani, P., & Hikmawan, M. D. (2022). Dinamika Kemitraan Antara Perum Perhutani dengan Lembaga Masyarakat Desa Hutan (LMDH) dalam Pelestarian Hutan Mangrove di Pulo Cangkir KabupatenTangerang. *Journal of Social Politics and Governance (JSPG)*, 4(2), 112-127.
- Ardyanny, F., Santoso, B., & Cahyaningtyas, I. (2020). Aspek Hukum Model Pengelolaan Hutan Bersama Masyarakat (PHBM). *Notarius*, 13(1), 341-354.
- Bishaw, B., Soolanayakanahally, R., Karki, U., & Hagan, E. (2022). Agroforestry for sustainable production and resilient landscapes. *Agroforestry Systems*, 96(3), 447-451.
- Dewi, I. N. (2018). Kemiskinan masyarakat sekitar hutan dan program perhutanan sosial. *Buletin Eboni*, 15(2), 65-77.
- Efendi, E. (2016). Implementasi sistem pertanian berkelanjutan dalam mendukung produksi pertanian. *Warta Dharmawangsa*, (47).
- Fahad, S., Chavan, S. B., Chichaghare, A. R., Uthappa, A. R., Kumar, M., Kakade, V, & Poczai, P. (2022). Agroforestry Systems for Soil Health Improvement and Maintenance. *Sustainability*, 14(22), 14877.
- Fauzi, A. (2019). *Teknik analisis keberlanjutan*. Gramedia Pustaka Utama.
- Ferdaus, R. M. (2014). *Rekonfigurasi hutan Jawa: sebuah peta jalan usulan CSO: policy paper*. BP Arupa.
- Groenen PJF and Velden. (2004). *Multidimensional Scaling (Econometric Institue Report Rotterdam Unversity)*.
- Haikal, F. F., Safe'i, R., Kaskoyo, H., & Darmawan, A. (2020). Pentingnya pemantauan kesehatan hutan dalam pengelolaan hutan kemasyarakatan (studi kasus HKm Beringin Jaya yang di kelola oleh KTH Lestari Jaya 8). *Jurnal Pulau-Pulau Kecil*, 4(1), 31-43.
- Hidayah, Z., Nuzula, N. I., & Wiyanto, D. B. (2020). Analisa Keberlanjutan Pengelolaan Sumber Daya Perikanan di Perairan Selat Madura Jawa Timur. *Jurnal Perikanan Universitas Gadjah Mada*, 22(2), 101-111.

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- Hidayat, F. R., Luchman Hakim, & Parmawati, R. (2023). Analysis of Community-Based Coffee Agro-tourism Sustainability in East Java, Indonesia. *HABITAT*, 34(1), 1–12.
- Howes, M., Wortley, L., Potts, R., Dedekorkut-Howes, A., Serrao-Neumann, S., Davidson, J., Smith, T., & Nunn, P. (2017). *Environmental sustainability: A case of policy implementation failure Sustainability (Switzerland)*, 9(2), 1–17.
- Ikramatoun, S., Khairulyadi, K., & Riduan, R. (2020). Pemberdayaan Masyarakat melalui Pengelolaan Hutan Pinus di Kecamatan Linge Aceh Tengah. *Jurnal Sosiologi Agama Indonesia (JSIAI)*, 1(3), 238-249.
- Irhamasyah, F. (2019). *Sustainable Development Goals (SDGs) dan Dampaknya Bagi Ketahanan Nasional*. Jurnal Kajian Lemhanas RI, 38, 45–54.
- Kironoto, B. A., Yulistiyanto, B., & Ollie, M. R. (2021). *Erosi dan Konservasi Lahan*. UGM PRESS
- Lensun, C. D. Y., Mandei, J. R., & Timban, J. F. J. (2019). Adopsi Petani Terhadap Inovasi Alat Pertanian Modern Padi Sawah Di Kelurahan Woloan Dua Kecamatan Tomohon Barat Kota Tomohon. *AGRISOSIOEKONOMI*, 15(2), 355–362.
- Lestari, P. M., Irawati, R. P., & Mujimin, M. (2019). Transformasi alat pertanian tradisional ke alat pertanian modern berdasarkan kearifan lokal masyarakat Jawa Tengah. *Widyaparwa*, 47(1), 1-10.
- Mulyani, A., & Mamat, H. S. (2019). Pengelolaan lahan kering beriklim kering untuk pengembangan jagung di Nusa Tenggara. *Jurnal Sumberdaya Lahan*, 13(1), 41-52.
- Mushi, G.E.; Di Marzo Serugendo, G.; Burgi, P.-Y. (2022). Digital Technology and Services for Sustainable Agriculture in Tanzania: A Literature Review. *Sustainability*, 14, 2415. <https://doi.org/10.3390/su14042415>
- Nikoyan, A., Kasim, S., Uslinawaty, Z., & Yani, R. (2020). Peran dan manfaat kelembagaan kelompok tani pelestari hutan dalam pengelolaan Taman Hutan Raya Nipa-Nipa. *Perennial*, 16(1), 34-39.
- Ollinaho, O. I., & Kröger, M. (2021). Agroforestry transitions: The good, the bad, and the ugly. *Journal of Rural Studies*, 82, 210-221.
- Ota, M. (2019). Focusing on forest administration systems in analyzing joint forest management: A case study of PHBM in Java, Indonesia. *KnE Social Sciences*, 162-169.
- Peraturan Menteri LHK No. 83 tahun 2016, tentang perhutanan sosial. Jakarta: Lingkungan Hidup dan Kehutanan
- Perum Perhutani. (2007). *Pedoman Pengelolaan Sumberdaya Hutan Bersama Masyarakat Plus (PHBM PLUS)*. Jakarta: Perum Perhutani.
- Perum Perhutani. (2001). *Pengelolaan Sumberdaya Hutan Bersama Masyarakat (PHBM)*. Jakarta: Perum Perhutani
- Pretty J et al. (2020). Assessment of the growth in social groups for sustainable agriculture and land management. *Global Sustainability* 3, e23, 1–16. <https://doi.org/10.1017/sus.2020.19>
- Rahmadanty, A., Handayani, I. G. A. K. R., & Najicha, F. U. (2021). Kebijakan pembangunan kesatuan pengelolaan hutan di Indonesia: suatu terobosan dalam menciptakan pengelolaan hutan lestari. *Al-Adl: Jurnal Hukum*, 13(2), 264-283.
- Rahmawaty, M. A. (2019). Analisis Potensi Lahan Pertanian Pangan Berkelanjutan Di Kabupaten Lamongan Tahun 2018. *Geo Media: Majalah Ilmiah dan Informasi Kegeografian*, 17(2).
- Raharjo, S. (2023). Standar Izin Pemanfaatan Hasil Hutan Bukan Kayu (HHBK). *STANDARD: Better Standard Better Living*, 2(2), 15–19
- Rajagukguk, C. P., Febryano, I. G., & Herwanti, S. (2018). *Perubahan Komposisi Jenis Tanaman dan Pola Tanam pada Pengelolaan Agroforestri Damar (The Change of Plant Species Composition and Plant Pattern on Management of Damar Agroforestry)*. Jurnal Sylva Lestari, 6(3), 18-27.

- Rivaie, A. A. (2015). Potensi Penyediaan Pangan dan Konservasi Lahan Pulau–Pulau Kecil di Maluku: Peran Agroforestri Berbasis Aren. *Jurnal Litbang Pertanian*, 21(1), 173-193.
- Ruhimat, I. S. (2015). Status keberlanjutan usahatani agroforestri pada lahan masyarakat: studi kasus di Kecamatan Rancah, Kabupaten Ciamis, Provinsi Jawa Barat. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan*, 12(2), 29181
- Sadapotto, A., Awaluddin, A., & Djafar, Z. (2020). Sosialisasi Pembentukan Kelompok Tani Perempuan; Bentuk Integrasi KKN Dengan Pembangunan Desa Di Kecamatan Rumbia Kabupaten Jeneponto. *Jurnal Pengabdian Masyarakat Hasanuddin*, 10-14.
- Septiana, R. M. (2020). Benefit Sharing Allocation on Community Collaborative Forest Management (PHBM) In Java, Indonesia. *Jurnal Silva Tropika*, 4(1), 206-221.
- Setianingtiyas, R., Baiquni, M., & Kurniawan, A. (2019). Pemodelan indikator tujuan pembangunan berkelanjutan di Indonesia. *Jurnal Ekonomi Dan Pembangunan*, 27(2), 61-74.
- Shalati, S. N. (2022). Analisis Ekonomi Politik Agraria dalam Akses Hutan di Wilayah Perhutani Melalui Program Perhutanan Sosial an Analysis of Agrarian Political Economy in Forest Access in Perhutani-Managed Areas Through Social Forestry Programs. *Jurnal Perempuan*, 27(1), 73-84.
- Suhartini. (2017). *Penyusunan DED (Detail Engineering Design) Pemulihan Kerusakan Lahan Akses Terbuka Kabupaten Malang Jawa Timur*. Laporan Akhir kerjasama antara Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia dengan Universitas Brawijaya, Malang.
- Syahputra, O. H. (2022.). Masa Depan Kedaulatan Pangan: Dukungan Agroforestri Dalam Produksi Pangan Melalui Perhutanan Sosial. In *Prosiding Seminar Nasional Pertanian* (Vol. 4, No. 1, pp. 255-266).
- Tamrin, M., Sundawati, L., & Wijayanto, N. W. (2015). Strategi Pengelolaan Agroforestri Berbasis Aren di Pulau Bacan Kabupaten Halmahera Selatan. *Risalah Kebijakan Pertanian dan Lingkungan Rumusan Kajian Strategis Bidang Pertanian dan Lingkungan*, 2(3), 243-253.
- Waskitho, N. T. (2022). Pemberdayaan Masyarakat Sekitar Khdtk Umm Dalam Konservasi Kawasan Hutan Melalui Sistem Agroforestri. *BUDIMAS: Jurnal Pengabdian Masyarakat*, 4(2), 333-338.
- Wirasanti, A., Tjahjono, H., & Suharini, E. (2020). Peranan Program PHBM (Pengelolaan Hutan Bersama Masyarakat) Terhadap Peningkatan Pendapatan Masyarakat Hutan Desa Kalimendong Kecamatan Leksono Kabupaten Wonosobo. *Geo-Image*, 9(1), 8-13.