



THE EFFECT OF EUCALYPTUS (MELALEUCA CAJUPUTI) FORESTRY PROGRAM ON INCREASING INCOME OF FOREST FARMERS IN GUNUNG KIDUL REGENCY SPECIAL REGION OF YOGYAKARTA

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ABSTRACT

Forests play an important role in terms of poverty alleviation, increasing welfare and providing additional income. Forests in Indonesia can be cultivated for farmers on the basis of social forestry programs. The Special Region of Yogyakarta has a forest area of around 19,030ha with the proportion of 15,711.70ha being production forest and 4,318.80ha being protected forest. Community income derived from forests is very fluctuating so that a suitable program is needed to be implemented. This study aims to analyze the increase income of forest farmers participating in the Eucalyptus forestry program. The number of respondents collected was 74 forest farmers and interviews and observations were carried out to obtain detailed results. The next test is the t test, which compares the average income between eucalyptus forest farmers and non-eucalyptus forest farmers. The average between in the income of forest farmers with and without eucalyptus is 24%. The results of the t test show that the value of Sig. shows the number 0.000 or <0.005 so that it can be said that the difference in income between forest farmers with eucalyptus and forest farmers without eucalyptus is significant.

INTRODUCTION

Forests play an important role in terms of poverty alleviation, increasing welfare and being an important factor in food security (Bahar et al., 2020; Miller

et al., 2022; Sunderland, 2011). We must pay serious attention to the existence of forests as a support for achieving the development of a country. Forests in Indonesia can be cultivated for farmers on the basis of social forestry programs. The Special Region of Yogyakarta has a forest area of approximately 19,030ha with the proportion of 15,711.70ha being production forest and 4,318.80ha protected forest (Daerah DIY - Kawasan Hutan (Luasan), n.d.). The Benggolo Block is one of the production forest blocks under the coordinator of the Panggang Forest Regional Section of Gunung Kidul Regency, D.I Yogyakarta.

The Yogyakarta Special Region Forestry and Plantation Service through the Yogyakarta Forest Management Unit Office (Yogyakarta KPH Office) carries out forest land management activities in the Benggolo block together with the community around the Benggolo block forest area. Based on the Regulation of the Minister of Environment and Forestry number 83/MenLHK/SETJEN/KUM.1/10/2016 concerning Social Forestry, Balai KPH Yogyakarta implements a forestry program for eucalyptus and rainfed rice to improve the welfare of communities around forest areas (Permen No 83 Tahun 2016 – Perhutanan Sosial – Direktorat Pengendalian Kerusakan Gambut, n.d.).

Communities around the Benggolo block forest area are very concerned about forest sustainability, but on the other hand they also need additional income to strengthen their family economy. The involvement of the community around the forest area has been proven to help preserve the forest (Madarász et al., 2021). Planting various types of plants can protect forests from erosion and other surface damage (Dou et al., 2023; Teng et al., 2019; Zeng et al., 2022). Farming methods by planting several types of plants in one land with the hope of increasing income (Mahendra & Priambodo, 2022). Eucalyptus plants are considered suitable for planting in the Benggolo block with mixed lime soil types and also these plants have good economic value for forest farmers (Desta et al., 2023).

The level of welfare and income of forest farmers can influence their attitudes towards preserving the forests around them (Addison et al., 2023; Tan et al., 2021). Community income derived from forests is very fluctuating so that a suitable program is needed to be implemented. The welfare of forest farmers can increase if the forests around them are managed properly and sustainably (Dewu & Røskaft, 2018). The Eucalyptus forestry program implemented in the Benggolo Block is expected to be able to increase the income of local forest farmers. Increasing the income of forest farmers will greatly help improve the economy of villages in Gunungkidul Regency. Eucalyptus (*Melaleuca Cajuputi*) is suitable for development in tropical forests and has been proven to increase income for forest farmers (Sari & Ratnaningsih, 2020).

This study aims to analyze the increase in income of forest farmers participating in the eucalyptus forestry program. It is hoped that the government program can reach forest farmers residing throughout Indonesia. Some research

regarding the analysis of government policies aimed at improving the welfare of farmers has shown positive results (Mahendra et al., 2021, 2022). This research is considered important because it can determine the extent to which the success rate of government programs directly increases the income of forest farmers.

RESEARCH METHODS

This research was conducted in the forest area of the Benggolo Block, Gunung Kidul Regency, D.I Yogyakarta Province. In order to get good and representative results, the method used is descriptive quantitative (Chapman et al., 2001; Mahendran et al., 2022; Ramírez-Rivera et al., 2018). This study focuses on analyzing the income of forest farmers who develop eucalyptus plants. Site selection in this study was carried out on the basis of eucalyptus forestry development locations managed by forest farmers.

Method of Collecting Data

Data collection in this study was carried out using a purposive sampling method, namely collecting data on forest farmers who joined the eucalyptus forestry program with the same area of land being managed. The number of respondents collected was 74 forest farmers and interviews and observations were carried out to obtain detailed results. From 74 respondent were then divided into two groups that participated in the eucalyptus program and a comparison group

After the data was obtained, a comparison was made with forest farmers who were not members of the eucalyptus forestry program with the same number of 37 forest farmers. The land managed by forest farmers, whether participating in the eucalyptus program or not, is the same, namely 2000m² so that income comparisons can be made. Observations, field data collection and data analysis were carried out from January to March 2023.

Data Analysis Method

Empirical Model

Data that has been collected from the field will be analyzed for its normality level with the Kolmogorov Smirnof test. Data that is normally distributed is strong data and can be tested further in statistics (El Bouch et al., 2022). The calculation of forest farmer's income is from forest management income of 2000m². Farmers who participate in eucalyptus forestry will be compared with forest farmers who do not participate in eucalyptus forestry. The next test is the t test, which compares the average income between eucalyptus forest farmers and non-eucalyptus forest farmers. The t test can produce data which, if interpreted, can show the level of significance (Leiva & Roy, 2022; Roy

et al., 2015). Statistical testing in this study was assisted by IBM SPSS software, which is software that can help calculate statistics (Čaplová & Švábová, 2020) Paired t test using the statistical formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} - 2r\left(\left(\frac{S_1}{\sqrt{n_1}}\right)\left(\frac{S_2}{\sqrt{n_2}}\right)\right)}}$$

Description:

\bar{X}_1 = Sample mean non eucalyptus farmer

\bar{X}_2 = Sample mean eucalyptus farmer

S_1 = Standart deviation non eucalyptus farmer

S_2 = Standart deviation eucalyptus farmer

n_1 = Sum of sample non eucalyptus farmer

n_2 = Sum of sample eucalyptus farmer

The decision making of the paired t test is:

1. $t_{\text{test}} > t_{\text{table}}$ There is a significant difference between non eucalyptus farmers' income and eucalyptus farmers (H_0 rejected)
2. $t_{\text{test}} < t_{\text{table}}$ There is no significant difference between non eucalyptus farmers' income and eucalyptus farmers (H_0 received)

RESULTS AND DISCUSSION

The forestry service has an important role in managing eucalyptus forestry in the Benggolo Block. Initially, the management of eucalyptus in the Benggolo Block may not have been well organized. However, along with awareness of the importance of conservation and sustainable use, the eucalyptus forestry program was implemented. Forestry aims to ensure responsible management, protection against environmental damage, and sustainable use (Ceccherini et al., 2020; Loft et al., 2022). Protection of forest sustainability spearheaded by the government will work in a more directed manner (Alam et al., 2022; Phong & Nuong, 2023; Wang et al., 2023). The data collected from this research helps in formulating more effective management policies.

The managing eucalyptus forestry in the Benggolo Block, the forestry service also plays a role in regulating land use. They identify areas that are important for conservation and protection, as well as areas that can be used for sustainable economic use. Utilization of forests for sustainable economic growth is a factor in alleviating poverty (Hansjurgens et al., 2016; He & Deng, 2023; Khan et al., 2020; Li et al., 2022; Lin & Yuan, 2023). This land use regulation is carried out by considering environmental needs, economic sustainability, and the welfare of the local community (Fan et al., 2022; Gong et al., 2020; Morán-Ordóñez et al., 2022).

The forestry service is also responsible for supervising activities related to eucalyptus in the Benggolo Block. They monitor illegal activities, such as illegal logging or uncontrolled exploitation. In addition, the Forestry Service also enforces laws against violations related to eucalyptus management, to maintain the sustainability of these natural resources.

In a holistic management effort, the forestry service also involves the local community. They held outreach, training, and active community participation in eucalyptus management. By involving the community, the forestry service seeks to create awareness of the importance of environmental sustainability, promote sustainable practices, and empower communities in using eucalyptus in an environmentally sound manner (Ahammad et al., 2023; Ehara et al., 2023; Kala, 2023; Živojinović et al., 2023).

Table 1. Descriptive Analysis of Forest Farmer's Income

	N	Minimum	Maximum	Mean	Std. Deviation
Eucalyptus	37	3100000	3500000	3260810.81	98696.459
Non eucalyptus	37	2200000	2700000	2445945.95	98867.461
Valid N (listwise)	37				

Source: Primary Data Processed

From table 1 it can be seen that forest farmers with eucalyptus forestry have an average income of IDR 3,260,810 while non-eucalyptus forestry program forest farmers have an average income of IDR 2,445,945. The average difference in the income of forest farmers with eucalyptus forestry program and without eucalyptus program is IDR 814,845 or 24%, this can be said to be large when viewed from the economic level of forest farmers in the area. The results of this descriptive analysis show similarities with the results of research (Indrajaya et al., 2012) where in this study in one year it can generate a profit of IDR 42,000,000. If it is developed further to the oil refining business, the results will be more significant (Prastyono et al., 2020). Forest farmers who also cultivate eucalyptus plants in their business have seen differences in income from ordinary forest farmers. Ordinary forest farmers in the Benggolo Block, Gunung Kidul Regency, depend only on crops of corn, rainfed rice, bamboo and teak wood.

Forest farmers are often part of an economically vulnerable group of people. With an increase in income, they have a greater chance of moving out of poverty and improving their living conditions. Increasing the income of forest farmers can also help reduce economic disparities in rural areas (Lu et al., 2020).

With higher incomes, forest farmers can invest in better agricultural infrastructure, technology, and management methods (Dou et al., 2023). They can improve irrigation systems, use modern farming equipment, and adopt sustainable farming practices. This can increase agricultural productivity, reduce pressure on natural resources, and increase environmental sustainability.

Increasing the income of forest farmers can reduce their pressure to engage in environmentally damaging practices. Welfare farmers tend to be better able to

access sustainable economic alternatives and maintain the sustainability of natural resources. This can reduce deforestation, forest degradation, and other environmental damage associated with agricultural activities.

Table 2. T Paired Test

Pair 1	Mean	t	N	Sig.(2tailed)
Eucalyptus Noneucalyptus	814864.865	39.415	37	.000

Source: Primary Data Processed

Based on table 2, it can be seen the results of Sig. shows the number 0.000 or <0.005 so that it can be said that the difference in income between forest farmers with eucalyptus and forest farmers without eucalyptus is significant. The results of this study are in line with research (Dewan Nurlatu et al., 2019) which says that eucalyptus farmers have a positive economic impact. With the increasing market demand for eucalyptus oil, farmers can generate income from selling their product. This can help improve the standard of living and livelihood of farmers and encourage economic growth in the area (Che Mat et al., 2019, 2022).

With increased income, forest farmers can have better access to basic needs such as food, clothing and shelter. They can obtain more balanced and nutritious food for their families, improve housing conditions, and meet other basic needs (Szparaga et al., 2021). This directly contributes to improving the welfare of farmers and their families. Increased income for farmers can accelerate agricultural mechanization for the future (Xu et al., 2023).

Forest farmer activities that focus on eucalyptus cultivation can also have a positive impact on nature conservation. By prioritizing maintenance of eucalyptus trees and sustainable actions in their management, smallholders can help maintain biodiversity in forests and protect associated ecosystems (Isah et al., 2023; Kueh et al., 2018; Nguyen Thi Hai et al., 2019).

Increased income can provide forest farmers with a sense of self-confidence and economic autonomy. They can take a more active role in economic and social decision-making in their communities. With increased income, they can also act as agents of change in the community, contribute to local development, and support wider social initiatives.

Forest farmers involved in eucalyptus cultivation have a significant impact on eucalyptus production, local economies, nature conservation and innovation. However, it is also necessary to pay attention to the challenges that may be faced in maintaining the sustainability of eucalyptus cultivation in the future.

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

Forest farmers play an important role in maintaining environmental sustainability and providing valuable natural resources. However, they often face challenges in terms of adequate income. To achieve economic sustainability and maintain the welfare of forest farmers, innovation and collaborative efforts are needed. The eucalyptus forestry program has been shown to significantly enhance forest farmer income in the Benggolo Block, Gunung Kidul Regency, D.I Yogyakarta.

Suggestion

Government programs aimed at forest farmers in Indonesia greatly impact rural economic growth. In the future, we hope that the program aimed at improving the welfare of forest farmers will be reproduced and expanded.

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