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Impact Assessment of the Coffee Rejuvenation and Rehabilitation Project to Coffee Farmers

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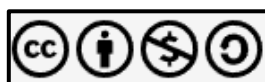
Abstract

This study assessed the impact of the coffee rejuvenation and rehabilitation project on coffee growers in Brgy. Talbak, Doña Remedios Trinidad, Bulacan. The study employed a descriptive research design to assess the impact of the project on 36 coffee farmers in the study area. The result characterized the socio-demographic and farm profiles, the usefulness of the intervention provided, the benefits of the project, and the problems encountered by coffee farmers. The majority of coffee farmers surveyed were male, married, and members of the farmers' group. Though many of them were elementary and high school undergraduates, they had already received training in coffee production and processing. The majority were owners of the farm and planted the Robusta variety of coffee. The findings showed that from 2018, coffee rejuvenation and rehabilitation have led to a decrease in production from an average of 257.25 kg to 142.28 kg and income from an average of ₱28,297.50 to ₱17,073.33. Timing is crucial for successful rejuvenation; ideally, it should begin during the rainy season or when soil moisture is sufficient to promote optimal plant recovery and minimize stress. Also, some external factors were observed to contribute to the decrease in coffee production. One of these was the insufficient technical training provided to coffee growers, as each farmer attended only an average of five to six trainings covering coffee production to marketing. Furthermore, the improper and insufficient application of fertilizer was also identified as a reason for the lower coffee yields. Lastly, given the observed decrease in production and income, ongoing and targeted assistance from local and regional agricultural offices and extension workers is crucial to effectively guide farmers through the revitalization process and ensure the long-term success and sustainability of coffee yield in the municipality.

Keywords: *coffee, coffee farmers, local, rehabilitation, rejuvenation*

Introduction

In 2024, the Philippines produced a total of 9.42 thousand metric tons of coffee, indicating a moderate level of national output within the global context. Robusta remained the dominant variety, accounting for 73.5% of the total production during the quarter, largely due to its higher yield potential, resilience to pests, and suitability to lowland growing conditions (Philippine Statistics Authority [PSA], 2023). Annual per capita consumption was estimated at 3.05 kg, reflecting not only the growing domestic demand but also the cultural significance of coffee in daily life. Despite this growing local market, coffee



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exports remained modest, with coffee exports valued at only USD 217,000, mainly shipped to the United Arab Emirates, Japan, and Qatar (OEC.world, 2024). This low export value suggests that the Philippines has yet to scale up its competitiveness in the international coffee market, possibly due to limitations in quality consistency, branding, and production volume.

At the regional level, SOCSARGEN (South Cotabato, Cotabato, Sultan Kudarat, Sarangani, and General Santos) emerged as the country's leading coffee-producing area, contributing 3,150.40 metric tons, or 33.4% of total national output. This concentration of production highlights the region's favorable agro-climatic conditions and established farming systems. It was followed by Northern Mindanao (13.7%) and the Davao Region (12.3%), both known for their elevation advantages and long-standing agricultural infrastructure. Central Luzon, including parts of Bulacan, contributed 470.75 metric tons, a comparatively smaller share, but still indicative of its potential as a coffee-growing area.

One notable coffee-producing locality in Central Luzon is Brgy. Talbak, Doña Remedios Trinidad (DRT), Bulacan, recognized since 2002 as the "Coffee Capital of Bulacan" under the One Town, One Product (OTOP) program (Mananghaya, 2002). Occupying about one-third of Bulacan's total land area, DRT's topography and elevation averaging 542 feet, with slopes favorable for water drainage, making it ecologically suitable for quality coffee production. Although its elevation is lower than ideal for high-grade Arabica, the slopes still provide a good environment for Robusta, which dominates local production. However, coffee production in DRT has been on a downward trend, primarily due to the aging of coffee trees, many of which are 20 to 30 years old. These older trees tend to produce lower yields, are more vulnerable to pests and diseases, and require higher maintenance—contributing to diminished productivity and farmer profitability. This mirrors a broader trend observed in many smallholder coffee regions where farm rejuvenation is delayed due to limited resources.

In response, the Department of Agriculture launched a coffee rejuvenation and rehabilitation project in 2018. The initiative aimed to revitalize aging coffee trees and improve farmer livelihoods through a series of targeted interventions. 101 farmer beneficiaries participated, receiving technical training, farm equipment, and agricultural inputs, such as fertilizers and seedlings. These resources were intended to enhance cultivation practices, improve yields, and modernize production techniques. Prior to the project, local farmers sold their unprocessed coffee beans to a private company, which transported them to Batangas for value-adding and marketing—a system offered limited returns. With support from the government, the growers have since organized into a coffee farmers' association, enabling them to process and market their own coffee products locally. This shift signifies a transition from being raw material suppliers to active players in the value chain, potentially increasing their income and community development.

This study aims to evaluate the impact of the Department of Agriculture's coffee rejuvenation and rehabilitation project on coffee growers in Brgy. Talbak, Doña Remedios Trinidad, Bulacan. Specifically, it examines how the intervention has influenced coffee yield performance, farmer income levels, and local enterprise development. By interpreting production statistics and tracing their causes and outcomes, the study contributes to a better understanding of how targeted agricultural interventions can address systemic issues in local coffee farming and promote sustainable rural development.

Materials and Methods

The researcher used descriptive design in this study, focusing on socio-demographics of the coffee growers, farm profile, production, and marketing, the usefulness of the intervention, benefits of the project, and problems encountered by coffee growers, and the situation of coffee growers after rejuvenation. The researchers asked permission from the Provincial Agriculture Office of Bulacan to obtain the necessary documents needed to carry out the study. Data collection was carried out using the

survey method, which involved face-to-face interviews with selected respondents. A pre-tested questionnaire was used to gather the necessary information from 36 purposely selected coffee growers who served as respondents of the study. The survey questionnaire's content was subjected to reliability and validity test using Cronbach's alpha and pre-tested to 30 farmer respondents who shared the same characteristics but were not included as respondents of the study. The respondents were chosen from the 2018 list of coffee growers who benefited from the Department of Agriculture's coffee rehabilitation and rejuvenation project. The collected data was summarized, tabulated, and analyzed using statistical analysis software (Statistical Package for the Social Sciences [SPSS]). Percentages and frequencies were utilized to determine the socio-demographic characteristics of coffee growers, such as age, sex, civil status, and educational attainment. Additionally, they were applied to assess farm profile such as land tenure status, total farm size, area allocated for coffee cultivation, area dedicated to the project, total number of coffee trees, number of trees allocated for the project, and years of experience in coffee farming. Tests of means and standard deviation were used to determine the usefulness of the intervention provided, the benefits of the project, and the problems encountered by the coffee growers. The study followed basic ethical guidelines for research with people. All respondents gave their informed consent before joining the study.

Results and Discussion

Socio-Demographic Profile of Coffee Farmers

The socio-demographic profile of coffee producers in terms of gender, civil status, educational attainment and source of income is presented in Table 1.

Table 1

Socio-Demographic Profile of Coffee Farmers

Category	Frequency	Percentage
Age		
Young Adults (18-35)	1	2.78%
Middle-aged adults (36-55)	14	38.89%
Older adults (56 and above)	21	58.33%
Sex		
Male	34	94.44%
Female	2	5.56%
Civil Status		
Single	2	5.56%
Married	33	91.67%
Widow	1	2.78%
Highest Educational Attainment		
Elementary Level	11	30.56%
Elementary Graduate	6	16.67%
High School Level	11	30.56%
High School Graduate	6	16.67%
College Graduate	1	2.78%
Vocational	1	2.78%
Source of Income		
Farming	27	75%
Salary	4	11.11%
Business	5	13.89%

n = 36

The majority of coffee growers (58.33%) were classified as older adults, suggesting that younger people may not be interested in farming. This trend could lead to future challenges, such as a shortage of agricultural labor and decreased coffee production. Ngeywo et al. (2015) concluded that coffee growers had reached adulthood, with ages ranging from 50 to 70 years, indicating that they had attained their peak productivity. Furthermore, the study found that young adult participation in coffee cultivation was minimal both before and after the rejuvenation. This suggests a potential scarcity of coffee farmers in the coming years.

The majority of coffee growers (94.44%) were male, while females comprised only 5.56% of the population. Most growers (91.67%) were married, while the rest of them were single and widows. This suggests that coffee farming is mostly done by male heads of households, and women may have limited involvement in this work. It may also mean that decisions about farming and income are mainly made by men. To promote equal opportunities, it could be helpful to encourage more female participation and support women's roles in coffee farming. These findings are supported by Ngeywo et al. (2015), who stated that males were the empowered holders of farms rather than females, and that the majority of the farmers were married.

The table also shows that, in terms of educational attainment, most of the respondents were at the elementary and high school levels, each reflecting a high percentage of 30.56%. Additionally, the results indicated that the majority of the farmers relied on farming as their main source of income. This suggests that most respondents depend on farming for their livelihood, highlighting the need to support and strengthen this sector to help improve their economic well-being.

Farm Profile of Talbak Coffee Farmers

Long-Term Coffee Farming Experience

The participants' average of 28.78 years of experience in coffee farming indicates that they have a substantial background in coffee production. This extensive experience is important because it shows that these farmers have a comprehensive understanding of both the benefits and challenges of coffee cultivation. Specifically, they are well-equipped to adapt to changes in the market, economic conditions, and environmental factors, which are essential for maintaining a successful coffee farm. Results reveal that, experienced farmers are more likely to apply sustainable farming techniques and are better suited to dealing with these challenges. Since they personally recognize the possible long-term advantages of these techniques, Sarirahayu et al. (2018) also find that these farmers are more eager to engage in initiatives like farm rejuvenation.

Farm Size and Small-Scale Coffee Farming

The average farm size of 2.67 hectares, ranging from 0.5 to 3 hectares, indicates that most farmers in this study are small-scale producers. This characteristic aligns with global trends in coffee production, where smallholder farmers play a dominant role in the industry. The prevalence of small-scale farming in coffee production is significant because it highlights the importance of these operations in meeting global coffee demands.

Studies reveal that smallholder farmers can suffer from low yield, limited resources, and challenges using new technologies. Siles et al. (2022) determined that most of the world's coffee is produced on coffee farms ranging from 0.5 to 5 hectares. However, these farms often struggle with low yields due to limited access to modern agricultural technologies and required inputs such as fertilizers, herbicides, and mechanization. Quiroga et al. (2020) also noted how resource, technological, and infrastructure limitations cause smallholders to have reduced output. These results fit the observation of

the study that many farmers work with limited resources and land, therefore it is challenging to improve production efficiency.

Land Devoted to Coffee Rejuvenation Project

The average of 1.61 hectares set aside by farmers for coffee regeneration demonstrates their commitment to raising the yield of their crops. Maintaining older, lower-yielding coffee trees depends on rejuvenation, particularly in view of declining production and changing market needs. Maintaining the long-term viability and output of coffee farms depends on programs like transplanting aging coffee trees with better types (Willer and Kilcher, 2011). Coffee plants produce less as they age, hence rejuvenation is crucial to restore farm effectiveness. Furthermore, Djufry et al. (2022) emphasized that rejuvenation initiatives enhance both resilience to climate change and crop yields. When smallholder farmers have adequate resources and support systems, both essential to their long-term survival, they are more likely to engage in such ventures.

Table 2

Farm Profile of Talbak Coffee Farmers

Category	Frequency	Percentage
Tenurial Status		
Tenant	34	94.4%
Owner	2	5.6%
Total Farm Size		
Less than 1 hectare	4	11.1%
1.1- 2.0 hectares	18	50.0%
2.1-3.0 hectares	5	13.9%
More than 3.1 hectares	9	25.0%
Area Devoted in Coffee Farming		
Less than 1 hectare	5	13.9%
1.1- 2.0 hectares	26	72.2%
2.1-3.0 hectares	3	8.3%
More than 3.1 hectares	2	5.6%
Area Allotted in Coffee Project		
Less than 1 hectare	7	19.4%
1.1- 2.0 hectares	27	75.0%
More than 2.1	2	5.6%
Total Numbers of Coffee Trees		
Below 500 trees	1	2.8%
501-1000 trees	9	25%
1001-1500 trees	13	36.1%
1501-2000 trees	3	8.3%
More than 2001 trees	10	27.8%
Total Numbers of Coffee Trees Allotted in the Project		
Below 500 trees	1	2.8%
501-1000 trees	10	27.8%
1001-1500 trees	13	36.1%
1501-2000 trees	3	8.3%
More than 2001 trees	9	25%
Years of Experience in Coffee Farming		
Less than 15 years	2	8.3%
16- 20 years	21	58.3%
More than 31 years	12	33.33%

Number of Coffee Trees Devoted to Rejuvenation

The 1,558.33 coffee trees committed to rejuvenation efforts represent a major investment in raising farm output by replacing outdated, low-yielding trees with more durable, high-yielding varieties. This proactive approach reflects a greater desire among farmers to improve yields and attain better economic possibilities. Méndez et al. (2010) claim that rejuvenation by the introduction of better tree kinds can significantly raise coffee quality and production. Smallholder farmers who lack the means to replant their entire farm at once will find this particularly beneficial. Likewise, Department of Agriculture (2015) indicate that farmers who take part in government-sponsored rejuvenation programs or cooperatives are more likely to successfully implement new farming techniques and technologies because these programs offer essential financial and technical support that helps the process.

Land Tenure Status

The study revealed that majority of the coffee grower were tenants (94.4%) while 5.6% are farm owners. The large number of tenant farmers in this study has a significant impact on their willingness to invest in long-term projects like coffee rejuvenation. According to Djufry et al. (2022) and Mbudzya et al. (2022), having secure land tenure is critical for motivating farmers to make long-term investments, such as those needed for rejuvenating coffee farms. Without the guarantee of land security, tenants are likely to be reluctant to invest in costly farm improvements due to the possibility of losing access to the land.

Variety and Marketing Practices Coffee Growers

Table 3 shows the variety and marketing practices of coffee growers. This table provides an overview of coffee production, utilization, marketing, and market destination.

Table 3

Variety and Marketing Practices Before and After the Project

	Frequency	Percentage
Variety		
Liberica	0	
Robusta	36	100%
Arabica	0	
Excelsa	0	
Utilization of Produce		
Consumption and Sold	6	16.67%
Sold	30	83.33%
Give away	0	
Ways of Marketing		
Raw Beans	0	
Dried Beans	36	100%
Processed	0	
Market Destination		
Cooperatives	36	100%
Nestle	0	

The results show that 100% of the coffee growers planted Robusta coffee on their farms because this variety can adapt well to the climate and topography of their area. This also suggests that farmers favor Robusta due to its ease of cultivation and greater reliability in local growing conditions. However, depending on just one variety could be risky if problems like pests or market changes affect Robusta coffee. This finding aligns with Aderolu et al. (2014), who stated that Robusta coffee was primarily cultivated in the region due to its resilience to temperature and soil conditions, as well as its capacity to

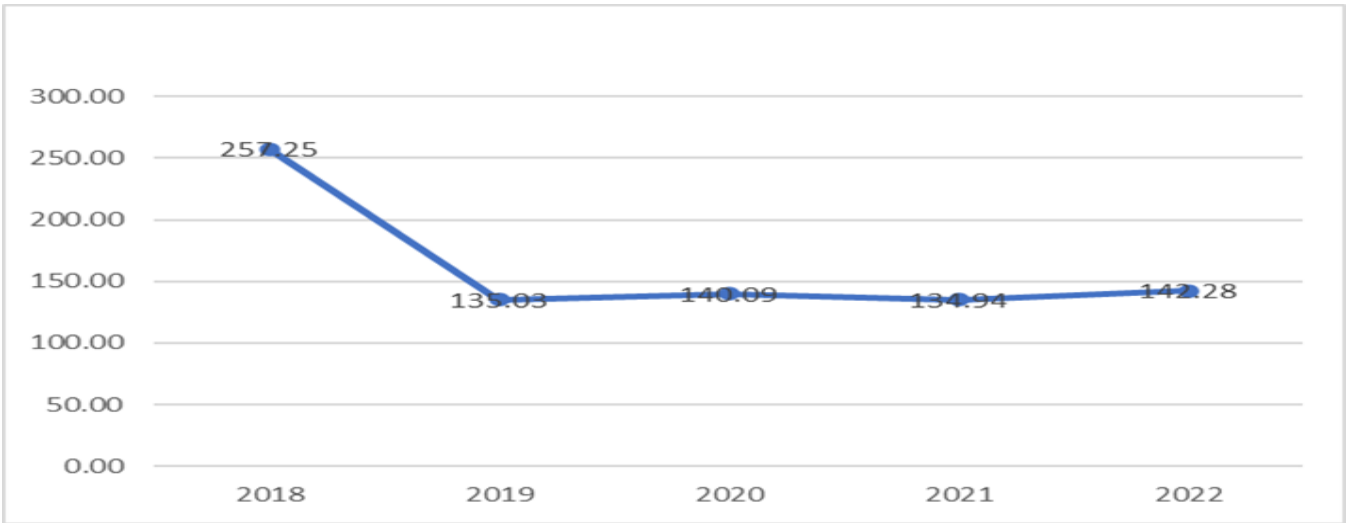
survive despite high sunlight intensity.

In terms of coffee utilization, 83.33% of respondents sold all of the coffee they produced, while 16.67% both consumed and sold their coffee. Regarding marketing, the respondents chose to sell their coffee in dried form, with 100% of the growers selling their harvest to the local cooperative, the majority (34) of whom were members.

The coffee growers mentioned that in the past, they sold their produce to Nestlé, which was first transported to Batangas for processing. However, over time, they stopped selling to Nestlé due to the low prices offered. As a result, the organization received a processing facility, enabling them to handle their produce independently. Now, all members deliver their harvest to this facility for processing, which contributes to generating additional income for the organization.

Figure 1

Coffee Project's Average Production After Rejuvenation (kg)



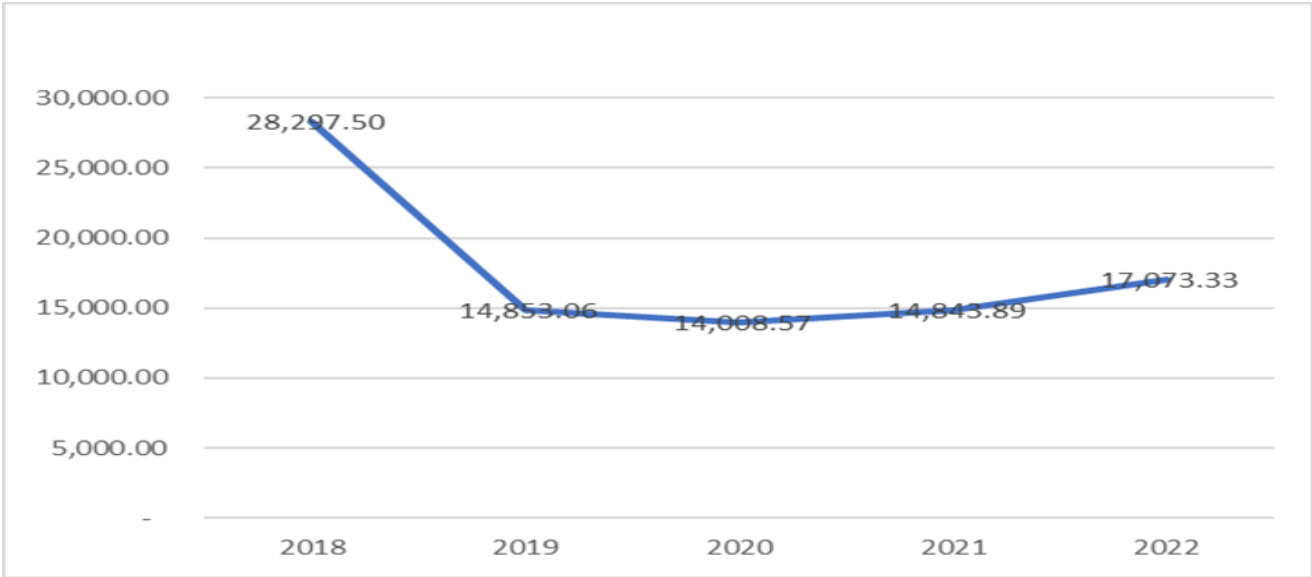
Following the coffee rehabilitation project in 2018, the Department of Agriculture initiated a rejuvenation program to revitalize old coffee plants and extend their productivity. As shown in Figure 1, coffee production decreased in 2019, averaging 135.03 kg, compared to 257.25 kg in 2018. However, the following year, production increased slightly by 1.06 kg, reaching an average of 140.09 kg in 2020. In 2021, production declined again to 134.94 kg. Furthermore, coffee production increased in 2022, with an average of 140.28 kg. This suggests that coffee revitalization negatively impacted production. According to respondents, one of the reasons for the lower yields was that some coffee trees failed to recover after rejuvenation.

Yearly income trends of coffee farmers following rejuvenation is shown in Figure 2. In 2018, coffee growers in Brgy. Talbak had an average income of ₱28,297.50. However, this amount declined to ₱14,853.06 in 2019 and further dropped to ₱14,008.57 in 2020. By 2021, there was a slight increase, maintaining an income of ₱14,008.57, which later rose to ₱17,073.33 in 2022. The decline in revenue after rejuvenation is consistent with earlier research findings. When coffee trees undergo rejuvenation techniques such as heavy pruning or stumping, they may face a temporary decline in yield. This occurs as the trees prioritize the regrowth of their leaves and branches instead of bearing fruit (Vaast et al., 2006). This corresponds with the income decline experienced in 2019 and 2020, a period when farmers faced difficulties stemming from reduced productivity.

The study indicates that rejuvenation affects the income of Talbak coffee growers, as coffee trees take time to recover after the process. Additionally, coffee growers highlighted those fluctuations in coffee bean prices also influenced income variations, with prices being high in some years and relatively low in others.

Figure 2

Coffee Farmers' Average Income per Year After Rejuvenation (PHP)



The Usefulness of Intervention Provided

In terms of the perceived usefulness of the interventions provided under the coffee rejuvenation and rehabilitation program, the respondents gave an overall weighted mean of 4.18 (SD = 0.95), which is verbally interpreted as *moderately very useful*. The provided farm inputs like fertilizers and other soil ameliorants obtained the highest mean score (M = 4.61; SD = 0.55) with a verbal interpretation of *very useful*. While the lowest gained mean was the provided technical assistance and the regular monitoring of the project was a mean score (M = 3.61; SD = 1.23) value with a verbal interpretation of *useful*. These findings suggest that the intervention provided to the respondents was moderately useful in improving their production and income, as they used it to support their coffee farming activities.

Table 4

The Usefulness of Intervention Provided

Indicator	Mean	SD	Verbal Interpretation
Conducts technical training on coffee rejuvenation and rehabilitation projection	4.47	0.88	very useful
Provides various farm equipment (for example pruning shear and chain saw)	4.03	1.13	moderately useful
Provides farm inputs (fertilizer and other ameliorants)	4.61	0.55	very useful
Provides technical assistance and regular monitoring of the project.	3.61	1.23	useful
Grand Total	4.18	0.95	moderately useful

Legend: 4.21–5.00 = very useful, 3.32–4.20 = moderately useful, 2.61–3.40 = useful, 1.81–2.60 = slightly useful, 1.00–1.80 = not useful

Benefits of the Project

In terms of the overall benefits of the project, the study revealed a high level of perceived benefit among coffee farmers (weighted mean = 3.53; SD = 0.88), as presented in Table 5. The improved quality of coffee beans produced the highest mean score (M = 3.89; SD = 0.78), verbally interpreted as *high*. It was noted that the respondent who chose to rehabilitate “pruning” only their coffee tree said that the quality of the coffee beans they produced had improved. Generally, pruning enhances the quality of coffee beans by eliminating diseased or damaged branches and improving sunlight exposure and air circulation throughout the tree (Viana, 2022). As a result, the organization was awarded a processing facility where they will prepare the obtained produce themselves. Currently, all of the members' produce is delivered to the processing plant to be processed, which can generate more income.

Table 5

Benefits of the Project

Indicator	Mean	SD	Verbal Interpretation
Low incidence of pest and diseases	3.75	0.77	high
Decrease cost of production	3.53	0.74	high
Increase in yield	3.25	1.05	moderate
Increase in income	3.25	1.08	moderate
Improve the quality of coffee bean produce	3.89	0.78	high
Grand Total	3.53	0.88	high

Legend: 4.21–5.00 = very high; 3.32–4.20 = high; 2.61–3.40 = moderate; 1.81–2.60 = low; 1.00–1.80 = very low

On the other hand, lower mean scores were observed for the increase in yield and increase in income, both with a mean of 3.25 and standard deviations of 1.05 and 1.08, respectively. However, these were still verbally interpreted as moderate. Based on the accounts of the interviewed farmers, rejuvenated trees often die because the timing of the intervention was not suitable. It was reported that rejuvenation was carried out during the dry season when there was no rain. Additionally, the trees selected for cutting and rejuvenation were already 20 to 30 years old.

Therefore, the yield and income of the coffee farmers did not increase either. According to some respondents, rejuvenation should be carried out at the beginning of the rainy season in regions with clear wet and dry cycles. This timing ensures adequate water availability and more favorable growing conditions to support the development of new coffee shoots.

Problems Encountered of Coffee Growers

Table 6 presents the problems encountered by the coffee farmers, which include poor attendance in technical training, irregular pruning practices, insufficient fertilizer application, and limited interaction with technical personnel.

Among the problems encountered, the highest mean score was for the lack of technical training in coffee production (M = 4.58; SD = 1.11), which was reported as being encountered *always*. Based on the interview, an average of five to six trainings were attended by each farmer regarding coffee production to marketing, usually done by the Department of Agriculture in collaboration with various agencies. These data indicate that one of the reasons for lower coffee production is not being able to apply sufficient fertilizers.

However, the lowest weighted mean score was recorded for access to technical people in coffee production (weighted mean = 3.81; SD = 1.56), with a verbal interpretation of *very often*. It can be noted that the number one problem of the coffee farmers in Brgy. Talbak, DRT, in the coffee rejuvenating and rehabilitation project was inability to regularly meet the technical person in coffee.

The training and farm visitation is usually conducted by LGUs through the agriculture extension workers of the Municipal Agriculture Office and Provincial Agriculture Office with the support of the Department of Agriculture and its attached agencies.

Table 6

Problem Encountered of Coffee Growers

Indicator	Mean	SD	Verbal Interpretation
Lack of technical training in coffee production that can enhance my knowledge and skills.	4.58	1.11	always
Difficulty to perform a regular pruning on many coffee trees	4.50	0.81	always
Availability fertilizer on my farm to enhance soil fertility and crop yield.	4.14	0.99	very often
Access to technical people in coffee (Research, Agricultural Extension Worker, and etc.)	3.81	1.56	very often
Grand Total	4.26	1.12	always

Legend: 4.21–5.00 = always; 3.32–4.20 = very often; 2.61–3.40 = sometimes; 1.81–2.60 = rarely; 1.00–1.80 = never

Conclusions

The impacts of the coffee rejuvenation and rehabilitation project in Brgy. Talbak, DRT earned notable advantages to the farming practices and profitability of the coffee farmers. These include lower frequency of pests and diseases, reduced production costs, and improved coffee bean quality. However, the project also led to a decline in coffee production, from an average of 257.25 kg to 142.28 kg, and a decrease in income, from an average of ₱28,297.50 to ₱17,073.33. This decline was attributed to the fact that the coffee trees subjected to rejuvenation and rehabilitation were over 30 years old and unable to recover. Additionally, the project was conducted during the summer season, which affected water availability, further limiting the coffee plants' ability to survive.

The coffee growers shared that they used to sell their harvest to Nestlé, which would then be transported to Batangas for processing. However, they eventually stopped doing so because the prices offered were too low. In response, the association was provided with a processing facility for government, allowing them to process their own coffee. Today, all members bring their harvests to this facility, helping the association earn additional income. Additionally, various government agencies have invited the association to present their processed coffee as part of efforts to establish new market linkages.

Recommendations

To address the decline in production and income, it is recommended that future coffee rejuvenation and rehabilitation projects focus on younger or more viable trees to ensure better recovery and productivity. The timing of project implementation should also take into account the seasonal availability of water to avoid placing stress on the plants. Moreover, continuous technical support and training should be provided to help farmers adopt better management practices. Strengthening the association's processing and marketing efforts should also be prioritized, including assistance in developing branding, improving product quality, and expanding market linkages to ensure higher and more stable income for coffee growers.

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