



Model of food security through integrated farming for financial efficiency in Aisyiyah Boarding School Bandung

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Abstract:

Purpose: The activity aimed to provide knowledge in utilizing limited land in creating food independence through integrated farming and livestock with the ultimate goal of creating efficiency in the financial management of the Aisyiyah Boarding School Bandung

Methods: The methods used include FGD, socialization, training, field visits, and evaluations

Results: This program has successfully shown a significant impact in several aspects. Based on the results of the pre-test and post-test evaluations, there was an increase in participants' understanding of integrated agricultural cultivation techniques by 30%. In terms of land use, there was a drastic increase from 200 m² before the program to 3,000 m² after the program, accompanied by an increase in diversification of crops, vegetables (50 kg/month, fruits 30 kg/month), fisheries 120 kg/month, and livestock (chicken eggs 80 kg/month). The program's success is also reflected in the financial efficiency of Islamic boarding schools, which have savings of around 8%. The participation rate of participants in the program was also excellent. 76% actively contributed to discussions and practices during the training.

Conclusions: Implementing the integrated agricultural Model at the Aisyiyah Islamic Boarding School significantly improves the efficiency of financial management, food security, and economic independence. In addition to meeting internal food needs, this program opens sustainable business opportunities by selling production products to the surrounding community. The use of 15,000 m² of previously unused land is the main factor in the success of this program.

Keywords: Food security, Food independence, Integrated Farming, Financial efficiency, Sustainable farming

1. Introduction

Food security and independence are fundamental to realizing community welfare, especially in the Islamic boarding school-based education environment. Islamic boarding schools have a strategic role as a centre for education and da'wah and as agents of change in encouraging economic independence and local food security. Integrated agriculture is one of the solutions that can significantly improve the efficiency of financial management (Herawati et al., 2024) and the fulfilment of food needs independently. Integrated agriculture is a Model that integrates several types of farming in a single system that supports each other (Nasir et al., 2021). This Model includes food crop agriculture,



livestock, and fisheries, all of which can contribute positively to each other to increase productivity and efficiency. With this approach, waste from one sector can be used as input for other sectors, thus creating a sustainable production cycle with minimal waste.

Integrated agriculture is a system that integrates several components of agriculture, such as crops, animals, and natural resources, to achieve efficiency and sustainability (Paramesh et al., 2022). Recent studies show that integrated agriculture offers a wide range of economic benefits. Studies show that integrated agriculture can significantly increase productivity. Chai et al. (2021) showed that integrated farming systems can increase crop yields by up to 30% compared to conventional practices. Integrated agriculture makes it possible to diversify sources of income. Farmers who implement this system report an increase in income of up to 40% due to the variety of products produced (Singh et al., 2020). Integrating agriculture can reduce production costs by utilizing waste from one component as an input for another (Dasgupta et al., 2007). Farmers experienced up to 25% cost savings using organic waste as fertilizer. Integrated agriculture is economically beneficial and supports environmental sustainability (M.S. Gill et al., 2001). Emphasizes that these practices help maintain soil fertility and reduce water pollution, supporting long-term food security.

Suppose Islamic boarding schools do not have a program for food security and independence through integrated agriculture. In that case, several impacts can arise, including a higher dependence on external supply, potentially increasing the operational costs of Islamic boarding schools. It can affect financial stability and reduce the allocation of funds for educational activities and student development. In addition, limitations in the availability of healthy food can also impact the quality of nutrition and health of students. Islamic boarding schools that do not have an integrated agricultural Model also miss out on opportunities to empower students to have relevant agribusiness skills in the future.

The integrated agriculture Model in pesantren is a promising strategic approach to create long-term sustainability. As an educational institution, pesantren has the opportunity to integrate agribusiness skills into the curriculum. This step not only expands students' knowledge but also strengthens their economic independence in the future. This Model also contributes to several Sustainable Development Goals (SDGs). Regarding food security (SDG 2), the system increases diverse and sustainable local food production, reducing vulnerability to the threat of hunger. In the realm of education (SDG 4), the integration of agribusiness education encourages students' practical skills relevant to market needs. In addition, pesantren can become an agribusiness entrepreneurship training centre that creates job opportunities for students and the surrounding community, contributing to decent work and economic growth (SDG 8). With several economic, environmental, and social benefits, the integrated agriculture Model in pesantren is a powerful instrument to support the UN SDGs.

Two main foundations must continue to be maintained to build food security, namely the issue of accessibility and food availability (Su et al., 2023). Food independence is an absolute policy that must be pursued and realized. Food security and independence are important and necessary for all levels of society (Azadi et al., 2023), especially in survival conditions, such as during the COVID-19 pandemic that hit Indonesia and other countries



worldwide. Food security became an important national issue at the pandemic's beginning (Otten et al., 2023). The fulfilment of food needs involves the fulfilment of fundamental needs and affects the survival of a person, family or community in their daily lives (Beyene et al., 2023). Implementing the Large-Scale Social Restrictions (PSBB) policy in all regions and regional isolation from other regions had caused food supply disruptions due to obstacles in distributing foodstuffs. This condition forces the community to increase creative and independent innovation to maintain food security by procuring cheap and affordable food.

Islamic boarding schools and educational communities in the community also experienced the same problem during the COVID-19 Pandemic. Islamic boarding schools must continue to meet the food needs of all its students and always increase concern to build the community around the boarding school to meet food needs during the PSBB and PKKM with the available amount and low and affordable prices. Limited access to the outside world and lack of information on cheap and easy food procurement are obstacles for Islamic boarding schools in managing food security. It will eventually become a problem in the financial management of Islamic boarding schools. Efforts to prepare a food independence management strategy for Islamic boarding schools will impact the efficiency of expenditure to meet the food needs of students and the efficiency of financial management of the boarding school.

So far, the food needs of the boarding school are all very dependent on the market. The dependence on meeting the food needs of the Aisyiyah Boarding School from outside, with prices fluctuating following demand and supply, will be complicated for the Islamic Boarding School. When the distribution of food is hampered, which causes an increase in prices, the budget for meeting food needs also increases. Meanwhile, in terms of student payments, it is unlikely that they will increase. What happens is that there are demands from parents to reduce tuition payments because many parents' income has decreased.

It certainly causes an increased risk of insecurity and a decrease in food quality if the Islamic boarding school is not creative enough to take innovative steps to meet food needs immediately. Cost limitations pose a risk of insecurity and a decrease in food quality, which can impact the development of students (Ridwan et al., 2022). Food supply sourced from within is a solution to achieve food independence (Amalia et al., 2022). Local food production aims to produce some or all of their food needs by optimally using all existing potentials (Ridwan et al., 2022). Optimizing land use that can be used for local food production must continue to be instilled and improved at all levels of society, including Islamic boarding schools (Rinanda et al., 2022). Education about the importance of food independence for students can be carried out through training programs, extracurriculars, or included in the curriculum so that there is concern from students about the importance of efforts to achieve food independence (Arwin et al., 2023)

Aisyiyah Boarding School has a land area of 20,000 m². Of the total land used by the building, it is only around 5000 m², so there is still much land that has not been used appropriately. A land area of nearly 15,000 m² is sufficient if used to create integrated agriculture and livestock to support Islamic boarding schools' food independence.

This program is also expected to be a role Model for other Islamic boarding schools in adopting an integrated agricultural Model to strengthen economic independence and

food security in the Islamic boarding school environment and create a more independent and sustainable economic ecosystem for opportunities to develop agribusiness-based productive businesses. In addition, this Model can also be a practical educational tool for students to understand the concept of food independence and agriculture-based entrepreneurship. Under the mockup of the development plan in Figure 1, the land will become green with flowers and shady trees. It can be seen that the land has not been used appropriately.

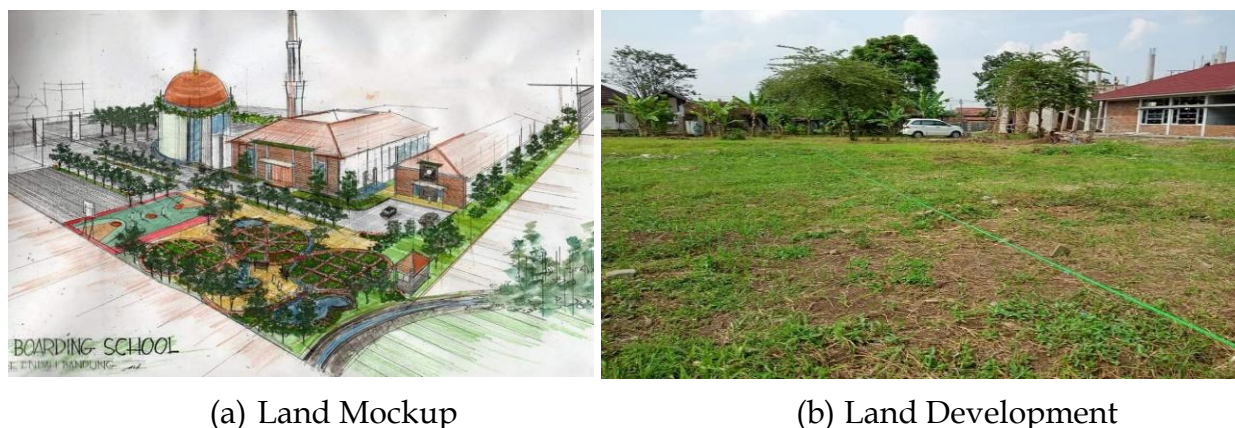


Figure 1: Land Mockup and Development of Aisiyyah Boarding School

Implementing integrated agriculture at the Aisiyyah Boarding School is expected to provide several benefits, including healthy student food, reducing dependence on external supplies, and helping the Islamic boarding school manage resources more efficiently and increase local food security. Based on the data in Table 1, it can be seen that the budget for providing food for students is quite large, so financial management will be more efficient if they provide their own food needs. From the data above, it almost absorbs 76.85% of the kitchen budget and about 20% of the entire budget for one year. The initial stage that will be prepared is to meet the needs of vegetables, chicken, eggs, and fish.

Table 1: Use of Kitchen Budget

N0	Information	Sum (IDR)
1	Fish, Meat, Vegetables	1,177,164,000
2	Drinking water	58,688,000
3	Gas	47,174,400
4	Kitchen staff salary	224,820,000
5	Kitchen Facility	24,000,000

Therefore, this community service activity aims to provide intensive training and assistance to managers and students at the Aisiyyah Boarding School in developing an integrated agricultural Model. Local food production requires identifying local potential, understanding possible optimization options, and skills in implementing technology. Provide knowledge in utilizing limited land to create food independence through



integrated agriculture and livestock to create efficiency in the financial management of the Aisyiyah Boarding School Bandung Islamic Boarding School.

2. Methods

The object of this service program is the student, the manager of the Aisyiyah Boarding School. Based on the problems formulated above, the activity begins with directions and assistance in land use to implement integrated agriculture and livestock. After that, it will be followed by implementing integrated agriculture and livestock. Below, the researcher describes implementing the activities used in this service using methods such as the first Forum Group Discussion (FGD). This method is used to identify the potential of the Aisyiyah Boarding School as input material for steps or stages in the implementation of integrated agricultural and farm programs with the criteria for FGD Participants: Islamic boarding school administrators who are directly involved in financial management and food security; Teachers or educators who have an interest in integrated agriculture; Senior students who have the potential to be the drivers of change in Islamic boarding schools.

Second, the socialization method is used to convey material on the importance of land use that has not been used properly, as well as material on budget and financial management for the fulfilment of student food at the Aisyiyah Bandung Islamic Boarding School. It is also the case with product marketing because there is an excess of production capacity to meet the internal food needs of Islamic boarding schools. At this stage, what materials will be delivered and the equipment needed during training activities is explained, as seen in Table 2.

Table 2: Training Materials and Tools

Category	Training Materials		Training Tools	
Introduction to Food Security and Independence	1.	The concept of food security and self-reliance.	1.	Print/digital training modules.
	2.	The principle of integrated farming.	2.	Projector and laptop/computer.
	3.	Agriculture or the financial efficiency of Boarding School	3.	Infographics and posters.
Agricultural Engineering & Integrated Agriculture	1.	Systems of Intercropping and crop rotation	1.	Plant seeds (rice, vegetables, fruits).
	2.	Cultivation of food crops (vegetables/fruits). -	2.	Cangkul, sabit, ember.
	3.	Livestock management (fish and ungags) as part of an integrated system.	3.	Media tanam (polybag/pot).
			4.	Mini Pool
			5.	Mini Poultry Cage
Financial Management for Islamic Boarding Schools	1.	Techniques for calculating agriculture costs and benefits	1.	Simple financial record book.
	2.	Simple financial statement of agricultural products.	2.	Template Report For Digital financials with Excel or an application
	3.	Reinvestment strategies for sustainability.		

Third, this method trains students and managers of Aisyiyah Boarding Schools on how to carry out integrated agriculture and livestock. Fourth Visits to Integrated Agriculture and Livestock Sites, to provide an overview, through this program, will visit two places



where money has applied the concept of agriculture and livestock in an integrated manner to utilize land that has not been productive. Namely in the Cileunyi Bumi Root Community and Biomethargreen Tanjungsari Education House.

Fifth, Evaluation: This method is used to evaluate the training results for students and managers of the Aisiyiah Boarding School. The evaluation of the success of the program is carried out through several main criteria. First, the improvement of participants' knowledge and skills was evaluated using pre- and post-test to measure their understanding of integrated agriculture cultivation techniques. Second, the success of the implementation of integrated agriculture in Boarding is measured based on the amount of land converted into integrated agricultural areas and the diversity of crop yields, which is documented through reports and photos of the development of activities. Third, the efficiency of Boarding's financial management is assessed by reducing expenditure on food needs and saving operational costs through waste treatment, which is compared using the analysis of financial statements before and after the program. Fourth, participant participation and involvement are monitored through attendance lists and direct observation during training activities to see the extent to which participants actively contribute to discussions and practices. Finally, the level of satisfaction of participants and stakeholders was assessed using questionnaires and qualitative interviews to get feedback on the effectiveness of the training and the benefits felt.

3. Results and Discussion

One of the first steps in implementing this program is through a Forum Group Discussion (FGD). This method is used to identify the potentials and challenges in the Aisiyiah Boarding School as input material in formulating steps or stages of implementing the integrated agriculture and livestock program. Through the FGD, stakeholders, including Islamic boarding school managers, students, educators, and competent external parties, will be involved in an in-depth discussion and analysis process. FGD allows for a constructive exchange of ideas so that every input generated can be the basis for planning and implementing programs more effectively and on target.

FGD activities at the Aisiyiah Boarding School Bandung Islamic Boarding School succeeded in identifying several potentials that can support the implementation of integrated agriculture and livestock programs, including:

1. Adequate Land Resources

Islamic boarding schools have vacant land that is large enough and strategic to be optimized as an integrated agricultural area. The soil conditions are fertile and suitable for several horticultural crops, such as vegetables (kale, mustard greens) and fruits (bananas, papaya). ABS has the potential for 15,000 vacant land that can be used for integrated farming.

2. Available Labor

Boarding has sufficient human resources, namely students and staff, who can be involved in managing agricultural and livestock activities. This potential also supports hands-on practical learning for students.

3. Existence of Initial Facilities

The Boarding already has several basic facilities, such as fish ponds, chicken coops,

and garden areas, which can be optimized or upgraded to implement an integrated system.

4. Support from Islamic Boarding School Leaders

The leaders of the Boarding have a strong commitment to supporting this program as part of the mission of empowering the Boarding economically and educationally for the students.

5. Local Market Opportunities

Crops from agricultural and livestock activities can be marketed locally to residents around Islamic boarding schools or the Aisyiyah community, thus supporting economic independence.

The next step is socialization. This method is used to convey material on the importance of land use that has not been used properly, as well as material on budget and financial management for the fulfilment of student food at the Aisyiyah Boarding School. This socialization will also include product marketing aspects, considering the possibility of excess production capacity after the internal food needs of the Islamic boarding school are met. Thus, Islamic boarding schools can sell agricultural and livestock products to the surrounding community, creating new economic opportunities supporting Islamic boarding schools' independence. The PKM team coordinates with the management of the boarding school regarding the preparation of material that will be discussed and delivered during the training. Materials are prepared with efforts to solve problems faced by partners, design methods for delivering materials, and prepare the necessary tools and materials during the training and mentoring process.

The next stage is training. This method trains students and managers of the Aisyiyah Boarding School in integrated agricultural and animal husbandry practices, as seen in Figure 2. This training will include food crop cultivation techniques, livestock management, and waste management so that it can be used as organic fertilizer or animal feed. Through this training, students and managers will acquire hands-on skills that can be applied in daily activities at the Islamic boarding school. In addition, this training also aims to build the capacity of Islamic boarding schools to manage natural resources efficiently and sustainably.



Figure 2: ABS Students Manager ABS Practicing Planting Vegetables

Next is a visit to an integrated farm and livestock site, as seen in Figure 3. This program includes visits to two locations that have successfully implemented the concept of integrated agriculture and livestock, namely the Cileunyi Bumi Root Community and the Tanjungsari Education House Biomethargreen. This visit aims to provide a practical overview to students and Islamic boarding school managers regarding the implementation of the concept of integrated agriculture and livestock, as well as the use of land that has not been productive. By seeing firsthand the process and results achieved in other places, it is hoped that the participants will get inspiration and motivation to apply the same in Islamic boarding schools.



(a) Visiting Biomethargreen Education House



(b) Practicing Seeding

Figure 3: Visiting Biomethargreen Education House and Practicing Seeding

The last step is evaluation. This method is used to evaluate the results of the training and the entire series of activities carried out for the students and managers of the Aisyiyah Boarding School. This evaluation includes measuring the participants' understanding, skills acquired, and the extent to which the concept of integrated agriculture can be applied in the Islamic boarding school environment. The results of this evaluation will be material for improvement for further program development in the future. The program evaluation results show a significant impact in several aspects. Based on the bar graph in Figure 4 comparing the pre-test and post-test scores, there was an increase in the average participant's understanding of integrated agricultural cultivation techniques by 30%, from an average score of 55 on the pre-test to 85 on the post-test. It reflects the success of the training in improving the knowledge and skills of participants.

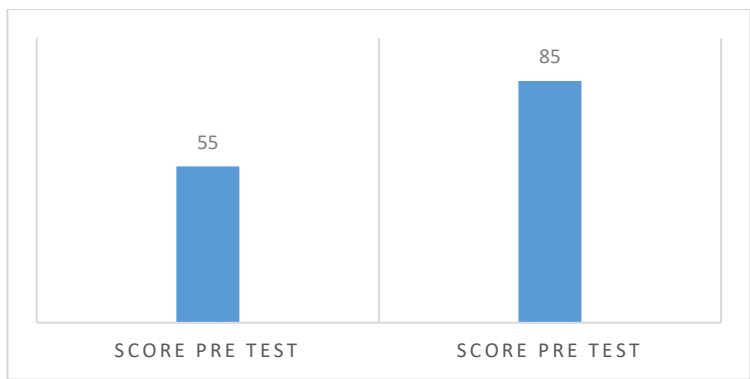


Figure 4: Score Pre and Post Test

Regarding land use, the area used for integrated agriculture has increased dramatically, from 200 m² before the program to 3,000 m² after. Boarding financial efficiency is also achieved through savings in monthly food costs. Before the program, expenditure on food needs reached IDR 1,531,846,400, while after the program, it was reduced to IDR 1,423,753,750, resulting in savings of 108,092,650 or 8%. This increase is accompanied by diversification of crop yields, including vegetable production of 50 kg/month consisting of kale, pokcoy, mustard greens, and cucumbers. Fruit (20 banana bunches and 10 papayas/month). Catfish 60 kg/month, Tilapia 60 kg/month, Chicken Eggs 80 Kg/month, as seen in figure 5, figure 6 and figure 7.

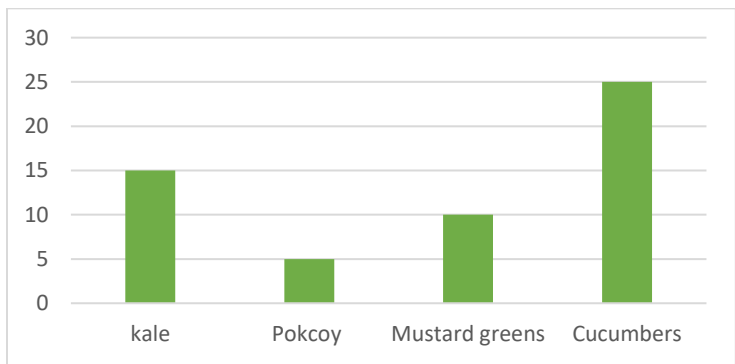


Figure 5: Vegetable Agricultural Products

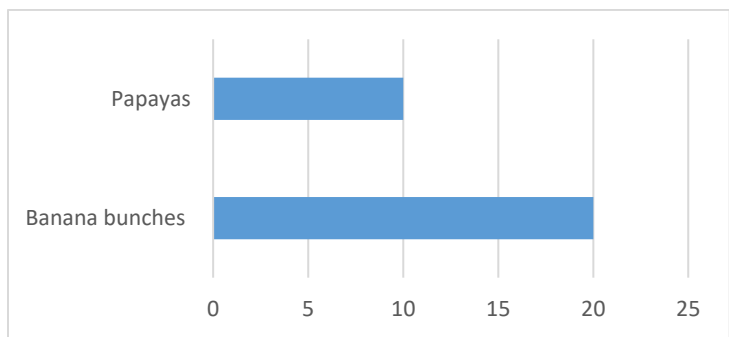


Figure 6: Fruit Agricultural Products

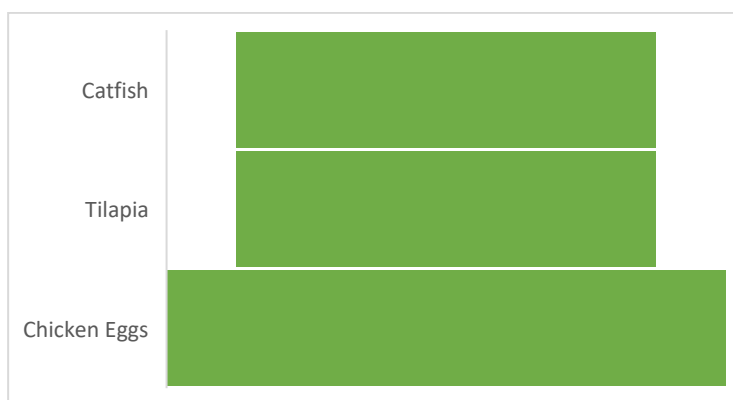


Figure 7: Poultry and Fish Agricultural Products

Participant participation was also excellent, as shown by the diagram in Figure 8. Of the 25 participants, 19 (76%) actively contributed to discussions and practices during the training, demonstrating a high level of engagement. On the other hand, the satisfaction rate of participants and stakeholders reached 90%, based on the results of questionnaires and interviews, which indicates that this program is effective and provides direct benefits for participants and Boarding.

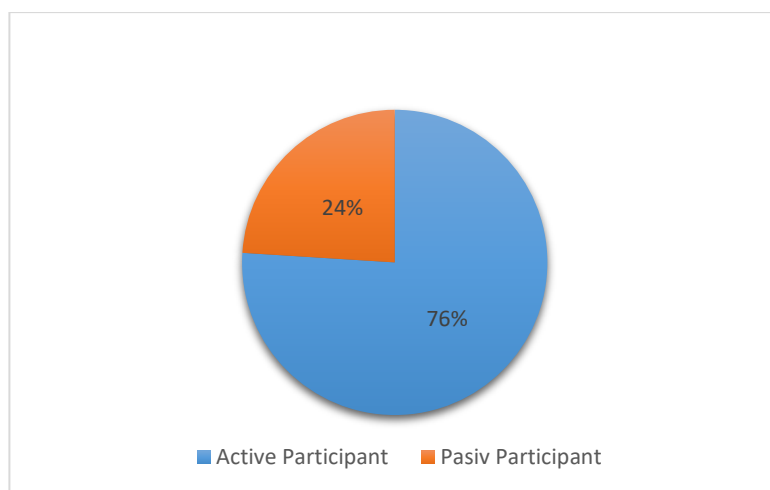


Figure 8: Participant Participation Rate

4. Conclusion

Implementing the integrated agricultural Model at the Aisyyah Islamic Boarding School significantly improves the efficiency of financial management, food security, and economic independence. In addition to meeting internal food needs, this program opens sustainable business opportunities by selling production products to the surrounding community. The use of 15,000 m² of previously unused land is the main factor in the success of this program.



This program has successfully shown a significant impact in several aspects. Based on the results of the pre-test and post-test evaluations, there was an increase in participants' understanding of integrated agricultural cultivation techniques by 30%. In terms of land use, there was a drastic increase from 200 m² before the program to 3,000 m² after the program, accompanied by an increase in diversification of crops, vegetables (50 kg/month, fruits 30 kg/month), fisheries 120 kg/month), and livestock (chicken eggs 80 kg/month). The program's success is also reflected in the financial efficiency of Islamic boarding schools, which have savings of around 8%. The participation rate of participants in the program was also excellent. 76% actively contributed to discussions and practices during the training.

Strategic partnerships with government, private, and academic institutions need to be enhanced to support the development and sustainability of the program. In addition, regular evaluations must be carried out to ensure the program's effectiveness in the long term. Integrating food security and agribusiness materials into the pesantren curriculum will increase students' awareness and skills in realizing economic independence and sustainable food security.

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