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Exploring Local Technology Potential and Community Engagement: The 'The Gade Integrated Farming' Program as a CSR Initiative by PT. Pegadaian for Sustainable Farming

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Abstract

The "The Gade Integrated Farming" initiated by PT. Pegadaian is an effort for social transformation through the integration of agriculture, fisheries, and livestock using local technology. This study aims to illustrate the process of institutional collaboration formation in the implementation of this program and to describe the strategy to strengthen the main products relied upon by the program. The methodology employed is a case study with a qualitative approach, involving document analysis and in-depth interviews with relevant stakeholders. Institutional theory and local partnership are utilized in this research. The findings indicate that institutional collaboration involving PT. Pegadaian, local government, research institutions, and the farming community facilitates the effective implementation of local technology. The strategy to strengthen main products, which identifies and develops products with high market potential, has increased the added value and bargaining position of the farmers.

Keywords: CSR, The Gade Integrated Farming, Sustainable Farming

1. INTRODUCTİON

The "The Gade Integrated Farming" program operated by PT. Pegadaian is a Corporate Social Responsibility initiative aimed at enhancing social welfare through the utilization of local technology and community engagement. The program integrates various aspects of agriculture, fisheries, and livestock, with a focus on using resources and technologies available at each location. This initiative reflects a holistic approach to sustainable and inclusive agricultural development, which not only supports environmental sustainability but also strengthens the local economy. The high cost of fertilizers and feed,

along with imbalanced harvest yields followed by environmental pollution due to the use of chemical fertilizers, constitutes the root problems facing farmers and livestock owners(Oja & Tambajong, 2018).

2. LİTERATURE REVİEW

According to (Malia & Sopia, 2020) by utilizing this theory of institutional and local partnerships, PT. Pegadaian not only provides economic benefits to local farmers through the "The Gade Integrated Farming" program but is also involved in efforts to improve the welfare and education of the surrounding community. The connection of this theory to the collaboration with the Indonesian Farmers and Fishermen Association is very important in extending the positive impact of the "The Gade Integrated Farming" program. With PT. Pegadaian joining this organization, they can have broader access to the community of farmers and fishermen throughout Indonesia. This collaboration can assist in disseminating knowledge and modern agricultural technology to more regions, improving farmers' welfare, and contributing positively to agricultural development in Indonesia. literature review presents an analysis of scientific sources on a specific topic in the last ten years that correspond to the research topic. Present the issues and actual scientific debates critically in the research topic and determine the existing research's research position. Review literature can be arranged chronologically, thematically, methodologically, and or theoretically.

3. RESEARCH METHOD

All In the research conducted on the "The Gade Integrated Farming" program, qualitative methods and purposive sampling were used. The qualitative method allows researchers to obtain more in-depth and detailed data about the subject of study, as well as enabling more complex and interpretive analysis. Purposive sampling, in turn, allows researchers to select study subjects who have a significant connection to the research topic, ensuring that the collected data is more relevant and accurate(Lawrence Neuman, 2014). In this study, this method enables researchers to gain a clearer and more detailed understanding of how the "The Gade Integrated Farming" program can enhance food security and reduce the dependence on synthetic chemical fertilizers and pesticides, involving farmers and other stakeholders.

4. RESULT

In a program, there must be specific stages that precede its creation and development. Similarly, this program certainly encompasses several key stages such as:

1. Planning Process

The first step in realizing this program is to undertake planning. The "The Gade Integrated Farming" initiative emerged from the inspiration of Rully Yusuf, Executive Vice President of the TJSL Division at Pegadaian, who was determined to create a CSR program focused on agriculture. Rully had discussions with his close friend, Guntur Subagja Mahardika, the Chairman of the Indonesian Farmers and Fishermen Association, who introduced him to the potential of using organic fertilizer. This connection led Rully to Ustad Bahar, an agriculture enthusiast with a special interest in organic fertilizer, who had previously won an award for his fertilizer innovation that was even appreciated in Hiroshima and Nagasaki. From there, they started implementing the program in the area where Ustad Bahar comes from in Bogor, where samples of organic fertilizer received positive feedback from the local community and the program rapidly expanded to eight other regions. Initially, the use of this fertilizer was empirical, based on Ustad Bahar's basic understanding without a well-defined framework and formula within an environmental context. However, after Pegadaian joined the 'Kedaireka' platform, a comprehensive proposal from Jenderal Soedirman University was received that refined the program into a more systematic and organized one.

2. Institutional Collaboration Process

The subsequent step taken was to engage in institutional collaboration to enhance the program through Kedaireka. Kedaireka is a collaboration platform developed by the Directorate General of Higher Education, Research, and Technology under the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia, with the primary objective of facilitating partnerships between universities and the business and industrial world. This platform is designed to accelerate the process of innovation and creativity, leading to the development of products that can directly benefit society. Its function includes collecting information from users to manage and streamline the usage process of the platform and serve as a repository for creative and solutive ideas as a source of inspiration. Platform users can discover creative ideas, submit proposals of interest, and participate in collaborations between universities and the business/industrial world. Kedaireka offers a variety of collaboration patterns between universities and business/industry partners, including the Matching Fund program, which aims to improve cooperation by providing joint funding from the government and partners for research, development, and implementation of university research findings. Moreover, Kedaireka has ensured compliance with the obligations to maintain user privacy in accordance with applicable laws and regulations.

In its synopsis, Kedaireka is introduced as a collaboration platform created to enhance the partnership between universities and the business and industrial sectors. Its function is to serve as a gathering place for creative and solution-oriented ideas, to put forward proposals of interest, and to participate in collaborative programs. Additionally, Kedaireka also emphasizes the Matching Fund program, which aims to increase funding sources for research, development, and the application of research outcomes produced by universities.

On Tuesday, October 3, 2023, the proposal of programs and budgets was discussed in the Offline Rekapitch Innovation Fund 2023 Event. During the discussion, several aspects were considered, including the relevance of the proposed program to the needs of industry partners, the benefits of the proposed program, and the track record of the proposer. The discussion results showed that PT Pegadaian welcomes every innovation proposal submitted by innovators in response to the business case presented in the Innovation Fund program. In addition, PT Pegadaian invited two innovators, namely Prof. Dr. Ir. Tamad, M.Si. from Jenderal Soedirman University, and Prof. Dr. Ir. James Hellyward, MS., IPU., ASEAN Eng. from Andalas University, to discuss further the innovative ideas offered. As an industry partner, PT Pegadaian hopes that each innovator is willing to comply with and implement all set administrative and technical provisions.

From the discussion of the proposal, Kedaireka found that the proposal from Prof. Dr. Ir. Tamad, M.Si. was the most suitable for their program. Therefore, a cooperation agreement signing was held between Jenderal Soedirman University on Monday, October 16th, 2023, in Purwokerto, where a meeting was conducted between two parties. The first party was represented by Prof. Dr. Ir. Elly Tugiyanti, M.P., IPU, acting as the Head of the Community Service Agency of Jenderal Soedirman University, based on the Rector's Decision of Jenderal Soedirman University number 1971/UN23/KP.08.01/2023. Meanwhile, the second party was represented by Rully Yusuf, SE, M.S.M., serving as the Head of the Division of Social and Environmental Responsibility of PT Pegadaian, on the basis of power of attorney number 724-S/00026.02/2023. PT Pegadaian is a Limited Company located in Central Jakarta. This meeting is a preliminary part of the collaboration between Jenderal Soedirman University and PT Pegadaian.

The parties, consisting of a Public Legal Entity University and a Limited Company engaged in the business of loan distribution, specified their identities and objectives before entering into a collaboration. The Public Legal Entity University, as the first party, affirmed its role in education, research, and community service. Whereas the Limited Company, as the second party, described its activities in loan distribution using various principles and technologies. Both agreed to collaborate in the areas of education, research, and community

service without disrupting their respective primary duties. Based on this agreement, Pegadaian and Jenderal Soedirman University concurred to create a Cooperation Agreement on "STANDARDIZATION AND CERTIFICATION OF ORGANIC/BIOLOGICAL FERTILIZER FOR THE GADE INTEGRATED FARMING PROGRAM" with definitions that were mutually agreed upon. The standardization and certification of Organic/Biological Fertilizer are intended to align the quality of organic/biological fertilizers across Indonesia produced by local communities in the villages assisted by PT Pegadaian, while also protecting the intellectual property rights of the product.

The scope of work to be conducted by the research team from Jenderal Soedirman University, based on this Agreement, encompasses several main aspects. First, under the category of direct personnel costs from October 16, 2023, to March 31, 2024, THE FIRST PARTY is required to provide a team consisting of a Team Leader, Marketing Management Expert, Research Expert, Field Staff, IT Expert, and Supporting Staff. Second, under the category of direct non-personnel costs, the tasks to be executed include various activities such as testing of organic/biological fertilizers, research on enrichment and improvement of organic/biological fertilizers, assistance in the utilization of agricultural and livestock waste, standardization of raw materials for organic/biological fertilizers, and the provision of equipment such as shakers (equipment for organic/biological fertilizer production) and SOP for Organic/Biological Fertilizer Production. Lastly, Jenderal Soedirman University also has responsibilities for tasks such as serving as a presenter at national seminars, submitting research and community service articles, creating documentary videos, reporting results, disseminating results, and conducting joint result presentations with PT Pegadaian.

The eight assistance locations in the areas sponsored by PT Pegadaian include Madiun, Tulungagung, Bantul, Kulon Progo, Magelang, Depok, Bekasi, and Bogor. Each of these locations is the primary focus for assistance in the cooperation program with PT Pegadaian. In an effort to improve community welfare and support innovation development, assistance is provided in various regions. With the presence in these areas, the assistance program is expected to have a positive and sustainable impact on the local communities and to strengthen the collaboration between PT Pegadaian and the relevant parties in those areas.

The Innovation Fund Program titled "The Gade Integrated Farming Based on Local Organic and Biological Resources to Support Fertilizer Self-Sufficiency, Food Security, and Sustainable Agriculture" involves a dedicated team from the Faculty of Agriculture at Unsoed. Leading the team is Prof. Dr. Ir. Tamad, M.Si., serving as the head of the program. Working alongside him are esteemed members such as Prof. Ir. Lockas Soesanto, M.S, Ph.D., Dr. Yanuar E. Restianto, S.E, M.Acc., Ak, CA, CPA., Dr. Ir. Agustinah Setyaningrum, M.P., Okti

Herliana, S.P., M.P., Ni Wayan Anik Leana, S.P., M.P., and Ahmad Fauzi, S.P.M.P., all contributing their expertise to the success of the program. Each member plays a significant role in advancing the objectives of the program within their areas of specialization.

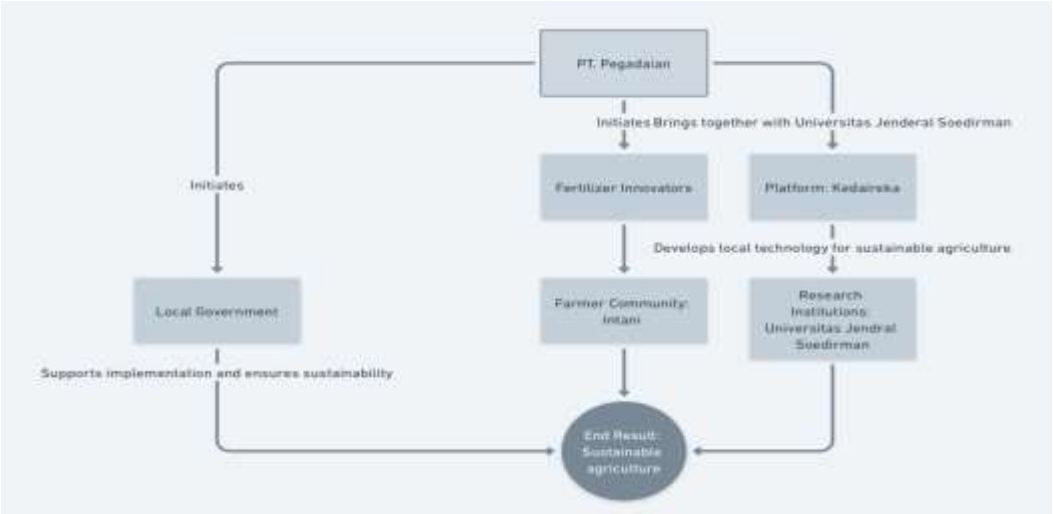

Figure 1. Institutional configuration structure diagram (Source: the researchers - 2024)

The small-scale sustainable agriculture initiative is characterized by a collaborative institutional framework involving key institutions. PT. Pegadaian spearheads the 'The Gade Integrated Farming' CSR program, thereby playing a pivotal role in convening stakeholders. Local government participation is crucial for program support and ensuring enduring agricultural practices. Research institutions like Universitas Jenderal Soedirman contribute through developing local technologies that bolster sustainable farming. Directly engaged in the program, the farmer community is imperative in adopting these sustainable practices. Kedaireka serves as a platform facilitating the interaction between PT. Pegadaian and Universitas Jenderal Soedirman. The local community benefits from this initiative, as it promotes the rental of their land to farmers for sustainable use. The end goal of this robust collaboration is the realization of sustainable agriculture, achieved via a strong partnership between PT. Pegadaian, fertilizer innovators, the local government, Kedaireka, Universitas Jenderal Soedirman, and the farming community, which collectively enables effective local technology implementation and reinforcement of the program's core products.

3. Strengthening the Main Products That are Utilized as Local Technology Central To the Program's Success

The third step involves strengthening the main product, namely fertilizer, as the cornerstone of local technology innovation. Various activities to reinforce the main product in The Gade Integrated Farming program can be maximized through the utilization of local technology developed in collaboration with Kedaireka and Jenderal Soedirman University. Consequently, the program can enhance competitiveness and sustainability in the agricultural sector.

The proposing team led by Prof. Dr. Ir. Tamad, M.Si., a distinguished professor of soil microbiology from Jenderal Soedirman University, has conducted in-depth research in the field of soil microbiology and the development of organic fertilizers. They have successfully produced various scientific publications, patents, and research products such as Phosphate Microbe Inoculum and Organic Biological Pesticide Fertilizer. This team has a notable reputation recorded on various academic platforms such as SINTA, Orcid, Scopus, and Google Scholar. They also have carried out several projects relevant to The Gade Integrated Farming program, including research to improve potato cultivation in Dieng and the development of organic fertilizers for Andisol soils. With support from a multidisciplinary team of experts in agronomy, horticulture, agroecology, and management, this team is expected to make a significant contribution to the program's success.

Efforts to maintain food security in the face of increasing population require a holistic approach. One suggested approach is through the Integrated Farming System concept, where plant and animal waste is recycled as resources. In this case, the use of liquid organic fertilizer becomes an environmentally friendly and sustainable alternative, as it reduces reliance on synthetic chemical fertilizers and pesticides that can degrade soil quality and fertility over the long term.

The Gade Integrated Farming program is an initiative that provides assistance and empowerment to farmer and breeder groups in agricultural cultivation, focusing on 8 different regions, tailored to local conditions. One of the products generated from this program is POC (Liquid organic fertilizer), which is derived from the fermentation of organic materials and agricultural waste. POC has advantages in plant absorption as well as containing readily available macro and micronutrient elements.

Technical requirements for liquid organic fertilizer have been set forth in the regulations of the Ministry of Agriculture, covering the content of organic C, macro and micronutrients, as well as maximum limits for heavy metals. These standards serve as a reference for the POC manufacturing industry, so the products produced can meet the established quality requirements. Hence, through the integration of various environmentally

friendly agricultural technologies and community-based approaches, sustainable and efficient food security is expected to be achieved.

The proposing team has submitted innovation and collaboration efforts to improve the production of POC produced by partners and assisted farmers. The challenge faced is the lack of standardization in production and testing of nutrient content in the POC. To address this, the team is proposing an activity titled "Integrated Farming System to Support Fertilizer Self-Sufficiency, Food Security, and Sustainable Agriculture."

Through this activity, the team aims to improve and perfect the POC production process with clear and measurable standards. Additionally, they will conduct regular nutrient content testing to ensure that the quality of the products meets the technical requirements that have been set. The collaboration between the proposing team, partners, and assisted farmers is expected to increase the efficiency and effectiveness of POC production and support long-term food security and sustainable agriculture.

The activities offered in the proposal include:

1. Testing the quality and nutrient content of POC in accordance with the requirements set out in the Ministry of Agriculture Regulation of 2019.
2. Enriching POC with various materials and microbes to ensure that its nutrient content meets the desired standards.
3. Laboratory-scale and screen house testing to evaluate the effectiveness and efficiency of the POC enrichment.
4. Studies on fertilizer application on different commodities and locations to understand its effects on plant growth and production.
5. Standardization of the liquid organic fertilizer production process and manufacturing to ensure consistency and quality of the product.
6. Education and assistance to livestock owners in using animal waste as raw material for producing liquid organic fertilizer.
7. Filing patents and marketing authorizations to protect the innovations generated and ensure product safety.
8. The process of packaging, labeling, and marketing liquid organic fertilizer products to ensure they are market-ready and easily recognizable by consumers.
9. Publication in national media, as well as dissemination of activities through national seminars and scientific journal publications to share the results and experiences of this program with the broader community.

With this series of activities, it is anticipated that quality, sustainable liquid organic fertilizer that meets the needs of farmers and the market can be created.

The proposing team, with an extensive history of research and development in organic fertilizers since 2013, offers a program aimed at empowering farmers through integrated agricultural practices that merge farming and livestock activities. This effort not only has the potential to increase self-sufficiency in fertilizer production but also promotes food security realisation and sustainable agricultural practices. This roadmap begins with the development of organic fertilizers that have yielded several patents, including phosphate-rich specific organic fertilizer and organic pesticide fertilizer. From 2020 to 2022, the team has focused on the formulation of Phosphate Microbe Inoculum and Biological Organic Pesticide Fertilizer.

This research progress aims to be applied to The Gade Integrated Farming program implemented in 2023, titled "Integrated Farming System to Support Fertilizer Independence, Food Security, and Sustainable Agriculture". The future plan is to scale up this program in 2024-2025, aiming to expand the capacity of partners and farmers in achieving fertilizer self-sufficiency and enhancing food security. Additionally, the proposing team desires to distribute research findings through various channels, including national media publications, seminars, and scientific journals. Meanwhile, for partners and assisted farmers, the goals of this program include the provision of sustainable raw materials, standardization of Proof-of-Concept products, the creation of SOPs for POC, and quality testing of POC in accordance with the standard of the Ministry of Agriculture Regulation 261/KPTS/SR.310/M/4/2019.

In the research conducted regarding The Gade Integrated Farming program, qualitative methods and purposive sampling were utilized. This qualitative method allows researchers to obtain more in-depth and detailed data about the research subject, as well as enabling more complex and interpretative analysis. Purposive sampling, in turn, permits researchers to select research subjects that have significant relevancy to the research topic, ensuring that the data gathered is more relevant and accurate. In this study, this method allows researchers to obtain a clearer and more detailed understanding of how The Gade Integrated Farming program can enhance food security and reduce dependency on synthetic chemical fertilizers and pesticides.

5. DİSCUSSİON

The Gade Integrated Farming program initiated by PT Pegadaian is an effort aimed at creating an integrated farming system amongst their fostered groups of farmers and breeders. Through this program, PT Pegadaian strives to promote sustainable agriculture by leveraging the interconnectedness between the agriculture, plantation, livestock, and fisheries sectors. The primary goal is to optimize the utilization of existing resources,

particularly in rural communities, in order to increase land productivity, economic income, and natural resource conservation. Additionally, the program aims to empower small-scale, vulnerable farmer and breeder groups that face constraints in their agricultural and livestock endeavors. The main focus of this program is on enhancing the skills, knowledge, and support for the farmers and breeders, thereby enabling them to overcome barriers that have previously inhibited the progress of their ventures. Thus, The Gade Integrated Farming program is not solely focused on improving agricultural productivity but also on the empowerment of farmer and breeder groups to achieve sustainability in their agricultural and livestock operations.

The initial step in the mentoring process within The Gade Integrated Farming program is the provision of basic infrastructure support to the assisted farmer groups. This basic infrastructure includes group production houses and equipment, digesters, and maggot cages. The group production house becomes the center of agricultural activity, where group members congregate, discuss, and produce various derivative products. With this basic infrastructure in place, groups can be more effective in producing various derivative products, enhance productivity, stimulate innovation, and create new economic opportunities. Moreover, the production house also becomes a center for social interaction that strengthens solidarity within the group and facilitates the exchange of knowledge and experience, which is at the core of an empowerment-based program. The provided group production houses, digesters, and maggot cages hold a significant role in supporting the continuity of integrated farming programs like TGIF. The group production house functions as a hub for farming activities, where group members gather, discuss, and produce derivative products. Not only does it increase the efficiency of group production, but it also facilitates innovation, creates new economic opportunities, and strengthens social interactions among group members. On the other hand, digesters play a role in transforming organic waste such as animal manure into biogas, which can be utilized as cooking fuel and for other household needs. The function of these digesters is not just to support the efficient management of organic waste but also to reduce the environmental impact and provide a source of renewable energy. Meanwhile, maggot cages are used for cultivating BSF larvae (maggots) that can act as decomposers of organic agricultural waste and as a high-protein feed for fish. Consequently, all three elements collaborate to support sustainable agriculture that is efficient in resource management and environmentally friendly within the framework of the TGIF program.

Ultimately, this program will lead farmers towards a sustainable livelihood through initiatives like TGIF, achievable through several strategic steps. First, by adopting organic farming techniques and the use of organic fertilizers, the program helps create a sustainable

agricultural ecosystem. Organic fertilizers consistently improve soil fertility, creating healthier and more fertile lands, as well as enhancing the quality and quantity of agricultural produce. Furthermore, the use of organic pesticides contributes to effective pest eradication, reducing the dependence on chemical pesticides that can harm the environment and human health. Second, through the production of diversified crops such as rice, vegetables, plantation commodities, and elephant grass for animal feed, The Gade Integrated Farming program assists group members in diversifying their sources of income and food. Hence, they are not solely reliant on one type of crop or product but possess a more stable and sustainable portfolio. Third, by utilizing technology such as digesters to produce biogas from livestock waste, the program not only aids in managing agricultural waste efficiently but also in reducing dependence on fossil fuels, lowering greenhouse gas emissions, and supporting more sustainable and environmentally friendly farming practices.

Therefore, through a holistic approach that includes organic farming practices, diversification of agricultural production, and the use of environmentally friendly technology, this program can help group members move towards a sustainable livelihood, improve economic well-being, and minimize negative impacts on the environment. The integrated farming program by PT Pegadaian can be related to the concept of Sufficient Economy Theory, which emphasizes the sustainable management of natural resources, community self-reliance, and the enhancement of economic welfare (von Feigenblatt et al., 2022). Through the application of Sufficient Economy Theory principles, the program promotes the use of organic fertilizers and pesticides, biogas production from livestock manure, and organic farming practices to maintain environmental balance and reduce negative impacts on the ecosystem. Moreover, the program also encourages the autonomy of farmers and breeders in managing their own agricultural and livestock businesses, thus creating economic sustainability at the community level. Consequently, the TGIF program not only provides economic benefits to the community but also aligns with the values of Sufficient Economy Theory, which highlight the importance of sustainable resource management, self-reliance in the face of economic challenges, and holistic improvement of community well-being.

This program provides comprehensive training to the targeted community, starting from land preparation, seeding, sowing, vegetation nutrition, generative nutrition, waste processing, to soil processing and the creation of soil humus. Each training point is uniform in content, but the nutritional materials or fertilizers are tailored to the conditions of the region and the availability of local materials. The training also includes good seedling techniques, effective nutrition provision, and the use of organic pesticides. This support is given for free, with the hope that these farmers will be able to produce derivative products.

Next, the farmers are trained in the making of various derivative products such as fertilizers and organic pesticides. This training is designed to provide the necessary skills and knowledge so that farmers can produce more environmentally friendly agricultural inputs. As a result, they can reduce their reliance on harmful chemicals and move towards more sustainable farming practices. After gaining the knowledge and skills in the creation of such derivative products, the next step is land preparation to implement integrated farming practices. Through this comprehensive approach, The Gade Integrated Farming program assists farmers in developing more sustainable and quality farming practices so that they can sustainably increase their agricultural yield while preserving the environment. The last step taken by PT Pegadaian is to gradually give responsibility to the community in managing the program, so that they can progressively take full control of it.

6. CONCLUSİON

From the information above, it can be concluded that the collaboration between Jenderal Soedirman University and PT Pegadaian in the standardization and certification of organic/biological fertilizers demonstrates an advantage in improving the quality of local agricultural products, supporting fertilizer self-sufficiency, and strengthening cooperation between educational institutions and industry. The research team led by Prof. Dr. Ir. Tamad, M.Si., has in-depth expertise in soil microbiology and organic fertilizer development, and thus can make a significant contribution to agricultural product development and innovation.

The integrated agricultural technology applied in The Gade Integrated Farming program by PT Pegadaian can be said to be sustainably accepted and utilized based on the following descriptions:

1. Community Acceptance and Involvement: This technology has been well-received by the target community, especially by small-scale farmers and breeders. The community is actively involved in the program, showing interest and commitment to adopting the technology in their farming and breeding practices.
2. Increased Productivity and Welfare: Through the application of integrated agricultural technology, the program has successfully increased the productivity of the community's farming and breeding ventures. This has had a positive impact on increasing income and improving the economic welfare of the community, which is an indicator of long-term sustainability.
3. Sustainable Resource Management: This technology promotes sustainable natural resource management, such as the use of organic fertilizers and pesticides, biogas production from livestock manure, and organic farming practices. Thus, the program

helps maintain environmental balance and minimize negative impacts on the ecosystem.

4. Autonomy and Program Continuity: Through a community empowerment approach, this program encourages the autonomy and continuity of the program at the community level. The community is involved in decision-making and empowered to independently manage the program, thereby ensuring that the program can continue sustainably without dependence on external parties.

From this overview, it can be concluded that the integrated agricultural technology in the TGIF program has been sustainably accepted and utilized by the community, providing sustainable economic, social, and environmental benefits to the local community.

However, there are limitations in terms of the implementation and development of research products, which require adequate resources and time to achieve optimal results. Additionally, special attention is needed to maintain the sustainability of the collaboration program and to ensure compliance with regulations and standards. Potential application of this research includes the dissemination of information and research findings to the scientific community, agricultural practitioners, and other relevant parties. Moreover, the outcomes of the research and collaboration can serve as an exemplary model for other educational institutions and industries to establish sustainable partnerships in support of innovation and local product development.

Consequently, the collaboration between Jenderal Soedirman University and PT Pegadaian, as well as the application of this research, contributes positively to the development of sustainable agriculture, fertilizer self-sufficiency, and community empowerment through collaboration between various stakeholders.

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