



The Utilization of Household Waste in the Development of Organic Agriculture to Realize a Green Economy

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ABSTRACT

The Community Partnership Program (PKM) was implemented to promote the realization of a green economy through the utilization of household waste as raw material for organic agriculture. The program's partner is Jamaah Tani Muhammadiyah (JATAM), a local community group focused on sustainable farming. The activities began with training on organizational management and product management to strengthen internal capacity, followed by technical training on the use of waste-sorting equipment. The results of the program indicate an improvement in organizational capacity, particularly in task delegation, program coordination, and institutional strengthening. In addition, the organization's output orientation became more explicit with the introduction of waste processing into economically valuable products such as compost and liquid organic fertilizer (POC). These products not only serve as inputs for organic agriculture but also carry market potential as a source of sustainable funding. Conceptually, the program integrates the principles of circular economy and sustainability, framing waste as a valuable resource. In this way, the PKM contributes on two fronts: strengthening JATAM's institutional capacity while simultaneously creating an organic farming ecosystem that supports the green economy.

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A. INTRODUCTION

The problem of household waste and food security are two critical challenges that are interrelated in the context of sustainable development. Food security is one of the strategic issues that continues to receive attention amid increasing population, consumerism, and climate change challenges. One potential approach to support sustainable food security is the use of household waste as raw materials in organic agriculture. Household waste, especially organic waste such as food scraps, fruit peels, and vegetables, has nutrient content that can be processed into high-quality organic fertilizer. The utilization of this waste not only contributes to better waste management but also supports environmentally friendly and sustainable agricultural systems. Data shows that 60% of household waste in Indonesia is organic, such as food scraps and garden waste, which has the potential to be processed into organic fertilizer or compost. (Ahmad Rizal Fikri et al., 2024) (Dwi Bagaskoro et al., 2023). The rest accumulates in landfills (landfills) and contributes to environmental pollution (Misbahhudin et al., 2024). On the other hand, farmers' dependence on chemical fertilizers exacerbates soil degradation and threatens long-term agricultural productivity. (Irawan & Antriandarti, 2021).

In addition to reducing soil quality, dependence on chemical fertilizers also increases the burden of farmers' production costs. Salawaty et al. (2022) explained that the increase in the price of inorganic fertilizers has a direct impact on farmers' production costs and reduces profit margins. This condition puts farmers in a vulnerable economic position while exposing the environment to the threat of long-term degradation.

On the other hand, household organic waste, which actually has the potential to be a source of raw materials for organic fertilizers, is not managed productively. In fact, the composition of household waste in Indonesia is dominated by organic waste that can be used as fertilizer. Recent research also supports the importance of using organic waste for agriculture. Organic fertilizers derived from household waste significantly improve soil structure, microbial activity, and long-term productivity compared to synthetic fertilizers (Singh & Sharma, 2023). Thus, the integration of organic waste management and organic agriculture is an innovative solution that is able to overcome two problems at once.

This situation is the background for the importance of implementing the Community Service Program (PKM) with the Young Farmers Network (JATAM). As a community engaged in the organic agriculture sector, JATAM faces several fundamental challenges, ranging from the organization's management capacity that is not optimal, the lack of skills in processing organic waste into fertilizer with economic value, to the limited use of appropriate technology at the community level.

The PKM program is designed to answer these problems through a series of organizational capacity building activities and technical training. First, organizational management and product management training is aimed at strengthening the institutional aspects of JATAM, especially in terms of planning, coordination, and productive business orientation. Second, training on the use of waste sorting tools and organic fertilizer production techniques is expected to be able to reduce farmers' dependence on chemical fertilizers while utilizing household waste as an input for organic agriculture. This initiative is in line with the concept of circular economy, where waste is positioned as a resource with use value. The circular economy aims to minimize waste and make the most of resources through



regeneration and recycling (Geissdoerfer et al., 2017). By implementing a circular economy at the community level, this PKM not only improves the agricultural production system, but also creates a new value chain from waste that has been considered useless.

Jamaah Tani Muhammadiyah (JATAM) is a group of Muhammadiyah farmers under the guidance of the Ponorogo PDM Community and Environmental Empowerment Council which consists of 50 farmers in Ponorogo Regency. The formation of this group is fairly new, because it was only initiated on December 27, 2023. Several activities have been carried out by JATAM.

The Muhammadiyah Farmers Community is trying to develop organic agriculture, but the institution is still weak, the ability of members in organic agriculture is not qualified, and the substitution of cheap organic fertilizer materials has not been sufficient. Therefore, the assistance of the Muhammadiyah Farmers Community is a concrete step to support the organic farming orientation of the Muhammadiyah Farmers Association. The steps taken are to provide training on institutional strengthening, the use of waste as organic fertilizer and the downstream of organic agricultural products. By utilizing waste as the main ingredient for making fertilizer, it is hoped that it can reduce waste in the surrounding environment. With this training, it can support the green economy program that has been launched by the government.

B. METHODS

The approach used in this service program is designed to answer two core problems, namely the problem of household waste and the weak capacity of farmers in developing organic agriculture. Based on the uploaded documents, this activity was specifically carried out at Joglo Kelengkeng Jalan Rumpuk Kertosari Ponorogo with the aim of improving organizational management and increasing knowledge of organic farming techniques. This approach is carried out through two major paths: the management approach and the production approach. He further explained that the approach method that will be carried out in the community partnership program is to solve problems related to problems in the field of production and in the field of management.

In the management aspect, the approach is carried out by providing institutional strengthening training for JATAM, because the document notes that JATAM is still weak, members' capabilities in organic agriculture are not yet qualified, and the substitution of cheap organic fertilizer materials has not been sufficient. Therefore, organizational management training is directed to strengthen the structure, coordination, and planning skills of groups so that they are able to manage organic farming programs more professionally. This strengthening is important because JATAM is a farmer group that was just initiated on December 27, 2023 and still needs intensive assistance in building a solid work system.

In addition to strengthening management, the technical approach to production is also a core part of the program. JATAM members were given an understanding of the use of household waste for organic agriculture, and were given examples of innovations and organic agricultural products that are in demand by the community. Through this approach, farmers are not only taught how to sort waste, but are also directed to understand the economic and ecological value of processing waste into organic fertilizers. This is very relevant because the document emphasizes that the use of this waste not only contributes to waste management, but also supports an environmentally friendly and sustainable agricultural system.

This approach basically bridges two major problems, namely the abundance of household organic waste and farmers' dependence on chemical fertilizers. Farmers' dependence



on chemical fertilizers exacerbates soil degradation and threatens long-term agricultural productivity (Irawan & Antriandarti, 2021). This means that this PKM approach not only solves technical problems of waste management, but also provides ecological solutions for soil damage due to the use of chemical fertilizers. Therefore, appropriate technologies such as waste sorting tools, composting techniques, and liquid organic fertilizers are being introduced as real alternatives to improve soil quality and reduce dependence on chemical fertilizers. This participatory approach makes the community not only as a beneficiary, but as an active actor involved in every learning process and the application of innovation. The combination of technological approaches, management strengthening, and community collaboration shows that this PKM program is holistically designed to create sustainable change while supporting the green economic direction that the government has proclaimed.

Thus, this PKM approach not only provides technical solutions, but also strengthens institutions, empowers the community, and instills ecological understanding that is important for the sustainability of organic farming in Ponorogo.

C. RESULTS AND DISCUSSION

The Community Service Program (PKM) is designed to answer three main challenges faced by the Young Farmers Network (JATAM) in an effort to develop organic agriculture based on the use of household waste. JATAM faces a number of challenges. First, the limited capacity of organizational management, where the division of roles between members is often unclear, thus hindering the effectiveness of the program. This first challenge is fundamental because without a strong organizational structure, organic farming activities are difficult to run in a directional direction, and the group's ability to respond to field problems becomes low. Therefore, PKM is here to strengthen organizational management, starting from the division of tasks, internal coordination, to more systematic planning of activities.

The second challenge is related to JATAM's weak ability to manage and develop organic agricultural products. Product management capabilities are still weak, especially in maintaining quality, innovating, and penetrating the market. This causes the compost and liquid organic fertilizer (POC) produced to be not yet competitive and not able to provide economic added value for members. PKM responds to this problem through product management training, including quality standards, packaging techniques, and simple marketing strategies so that products can be marketed as part of the green economy.

The third challenge is the lack of appropriate technology in the waste sorting process and organic fertilizer production. The lack of use of simple technology such as waste sorting tools that can support organic farming activities is an important obstacle in increasing JATAM's productivity. In fact, waste sorting tools are needed to ensure that the quality of compost and POC raw materials is better maintained, while helping to reduce dependence on chemical fertilizers. This is relevant to farmers' dependence on chemical fertilizers exacerbating soil degradation and threatening long-term agricultural productivity.

Thus, the three main challenges, namely weak organizational management, low product management capacity, and lack of use of simple technology, are strong foundations for the implementation of PKM. All of these challenges are answered through a training, mentoring, and technology application approach designed to improve JAMAM's overall empowerment, both in terms of institutional and technical production. In the community development literature, strengthening institutional capacity is seen as a key requirement for the success of community-based programs (Ife & Tesoriero, 2014).

The implementation of PKM begins with internal training consisting of two main materials, namely organizational management and product management. Organizational management training is focused on strengthening partner institutions, in this case the JATAM

organization, in order to have more structured, transparent, and program sustainability-oriented governance. As conveyed by (Coulter, 2018) in his book *Management*, Organizational management is the backbone that ensures efficiency.



After strengthening internal capacity, the activity continued with technical training on the use of waste sorting equipment. This tool serves to separate organic and inorganic waste more quickly and effectively. Organic waste that has been sorted is then processed into compost or liquid organic fertilizer (POC) as the main raw material for organic agriculture. This approach is in line with the concept of *zero-waste* and *circular economy*, which emphasizes the importance of reducing waste through the principles of recycling and resource reuse. As affirmed by (Purnami, 2025), Circular economy-based waste management not only reduces waste piles, but also generates added value through the reuse of organic waste into agricultural products (Purnami, 2025). Thus, this PKM program has a dual function, namely to reduce waste problems while providing environmentally friendly organic agricultural raw materials.



The real impact of this program can be seen from two main aspects, namely the impact on the JATAM organization and the impact on organic agriculture in the community. From an institutional perspective, JATAM gains capacity building through

organizational and product management training. A neater organizational structure allows for clear division of tasks, effective coordination, and more participatory decision-making. This is in line with the findings (Wahyudi et al., 2021) that strong community institutions are key to the success of environmental management programs, as they can ensure the sustainability of initiatives despite reduced external support (Wahyudi et al., 2021). Thus, the sustainability of the PKM program is not only determined by the initial intervention, but also by the independence of the partner organization.



In addition, through product management training, JATAM has a clearer orientation towards processed household waste. Products in the form of organic fertilizers are not only considered as byproducts, but as commodities with economic value. With the ability to manage product quality, package well, and understand simple marketing principles, JATAM can make organic fertilizer products an alternative source of income. This is in line with Iskandar & Lestari's opinion that the application of the zero-waste principle in organic agriculture contributes significantly to increasing soil fertility while opening up economic opportunities for the community. (Sukanteri et al., 2023)



Another impact that is no less important is on organic farming. With the availability of compost fertilizers and liquid organic fertilizers from processed household waste, farmers can reduce their dependence on chemical fertilizers. In addition, soil quality can be maintained and even improved through environmentally friendly organic inputs. Research in Selasari Village shows that processing household waste into organic fertilizer can improve community skills, increase agricultural productivity, and maintain environmental quality (Hidayat, 2019). The findings support



that household waste processing has a direct impact on the agricultural sector while creating a healthier environmental ecosystem.

Furthermore, public awareness of environmentally friendly practices is increasing. Through direct involvement in sorting and processing waste, the community becomes more concerned about the surrounding environment. This awareness is very important because it is a social capital that supports the sustainability of organic farming practices. In Surakarta, research shows that go-green trainees already have high knowledge and interest in implementing organic farming systems, especially in mastering composting and organic garden technology (Santoso, 2021). This confirms that knowledge transfer through practical training can change people's mindset and behavior in a more pro-environmental direction.

From a sustainable development perspective, the PKM program supports three main pillars: economic, social, and environmental. The economic pillar is reflected in the potential to increase people's income through the production and marketing of organic fertilizers. The social pillar can be seen from the strengthening of the JATAM organization which is increasingly solid in managing community-based programs. Meanwhile, the environmental pillar is realized through reducing the volume of household waste and improving the quality of agricultural land through organic inputs. Thus, this PKM activity is a clear example of the application of the triple bottom line concept in sustainable development.

In the end, this activity can be seen as a model of integrative community empowerment. Institutional capacity building, technical skills enhancement, and market-oriented product development are complementary combinations to realize a community-based green economy. This kind of model is relevant to be replicated in other areas with similar challenges, especially in rural areas that have considerable potential for organic waste. As affirmed by (Mazaya et al., 2020), that community service programs that integrate economic, social, and environmental aspects have a greater chance of achieving sustainability. Therefore, the PKM program on the use of household waste in organic agriculture can be an important reference in developing environmentally friendly and socially just development practices.

The Community Service Program (PKM) carried out with the Muhammadiyah Farmers Network (JATAM) in Ponorogo is a real effort to encourage a green economy through the use of household waste for organic agriculture. This activity is designed with a multi-layered strategy, starting from strengthening institutional capacity through organizational management training, followed by product management training, and ending with technical training on the use of waste sorting tools to produce organic agricultural raw materials. This model is designed so that JATAM not only has the technical capacity to manage household waste, but also has adequate institutional and managerial capabilities to support the sustainability of the program.

The impact of PKM activities can be seen from two sides: JATAM institutions and the development of organic agriculture. From an institutional perspective, JATAM has experienced increased managerial capacity, better internal coordination, and the ability to design long-term programs. This is in line with the literature that states that strengthening the capacity of local organizations is an important factor in the sustainability of community-based programs (Chaskin, 2000). In terms of organic



farming, the results of the training resulted in an increase in the production of quality compost and POC, as well as opening up new market opportunities for JATAM member farmers. The organic products produced are not only used internally, but also have the potential to be marketed as superior local products.

Selain itu, dampak jangka panjang dari kegiatan ini adalah terbentuknya model ekonomi hijau berbasis komunitas. Dengan memanfaatkan sampah rumah tangga, JATAM mampu berkontribusi pada pengurangan volume sampah sekaligus meningkatkan kesejahteraan petani. Model ini sejalan dengan konsep circular economy yang menekankan daur ulang sumber daya untuk mengurangi limbah dan meningkatkan nilai tambah (Geissdoerfer et al., 2017)

1.1. Community Engagement Activities

One form of community involvement in this PKM program is an open workshop on processing household waste into organic fertilizer. This activity involved not only JATAM members, but also the surrounding community, especially housewives and village youth. Through this *workshop*, participants were given a practical understanding of how to sort waste, techniques for making solid and liquid organic fertilizers, and how to use these products for family farming. With direct involvement, the community is not only a spectator, but also an active actor in the processing process. This activity is also a shared learning space that encourages the formation of collective awareness about the importance of household-based waste management.

1.2. Community Engagement Activities

Activities in PKM that are designed to involve the community are organic product bazaars that display processed compost and liquid organic fertilizers produced by JATAM. This bazaar is a forum for the community to see firsthand the real results of the waste processing process, as well as provide opportunities for farmers and community members to market their products. Apart from being a means of promotion and sales, this bazaar is also a place for public education about the economic value of well-managed waste. Through these activities, people are encouraged to better appreciate organic farming practices, strengthen local marketing networks, and foster collective pride in the environment-based products produced by the community itself.

D. CONCLUSION

The PKM Program on the Utilization of Household Waste in Organic Agriculture to Realize a Green Economy has a significant impact both on institutional aspects and on sustainable economic development. At the organizational level, JATAM gains internal capacity building through organizational management training that is able to strengthen structure, communication, and coordination between members. This strengthening makes JATAM more adaptive in facing challenges, as well as more effective and sustainable in running programs. Meanwhile, product management training is leading JATAM to a sharper outcome orientation. Processed household waste products, in the form of compost and liquid organic fertilizer (POC), are now not only seen as byproducts, but as a new economic resource that can be marketed. Thus, JATAM not only promotes environmental sustainability through organic farming practices, but also strengthens the sustainability of the local economy through product marketing. This program can be



concluded to have succeeded in presenting a double transformation: strengthening the JATAM institution and at the same time creating a green economy ecosystem based on the circular economy. In the future, similar programs can be replicated in other communities by taking into account local contexts, policy support, and long-term sustainability.

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F. AUTHOR CONTRIBUTIONS

Although the program is doing well, some challenges remain. First, public awareness in sorting waste is still low, so continuous education is needed. Second, the marketing of organic products faces competition with cheaper chemical products. Third, the sustainability of the program requires local policy support, such as regulations on community-based waste management. Therefore, it is recommended that the program be expanded to involve village governments, schools, and the private sector to create a stronger green economic ecosystem.

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