Prosiding PKM-CSR, Vol. 8 (2025)
e-ISSN: 2655-3570

MAGGOT CULTIVATION FOR WASTE MANAGEMENT AND SUSTAINABLE TOURISM IN CIAKAR VILLAGE, TANGERANG

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Abstrak

Ciakar Village in Panongan District, Tangerang Regency, has great potential as an eco-based agro-tourism area due to its agricultural resources and active community groups such as farmer groups (POKTAN) and women's associations (PKK). However, the village faces major challenges, including suboptimal management of household organic waste and agricultural residues, as well as the previous failure of Black Soldier Fly (BSF) maggot cultivation. This Community Service Program aims to provide an appropriate technological solution through training on BSF maggot cultivation as an efficient and economically valuable method of organic waste management. The implementation method consists of three stages: (1) interviews and field observations to map existing conditions; (2) technical training on maggot cultivation, organic waste processing, construction of semi-permanent cages using local materials, and socialization of waste separation; and (3) evaluation through reflection and the formation of a sustainable management team. The results show increased knowledge and skills among partners in maggot cultivation and waste management, as well as higher awareness of environmental issues. A prototype BSF maggot cage made from bamboo was produced, and a joint management group from POKTAN and PKK was established. This program creates new economic opportunities and supports the development of Ciakar Village as an educational agro-tourism destination.

Kata Kunci : Cultivation, BSF Maggot, Waste Manegement, Tourism Village, Sustainable Tourism

INTRODUCTION

Ciakar Village is one of the seven villages in Panongan District, Tangerang Regency, Banten, Indonesia. Covering an area of approximately 7.59 km^2 with a population of 32,550 people in mid-2023, it is most populous village in the district. The village holds significant potential in agriculture and livestock farming, which are still practiced traditionally by the local community. The presence of Farmers' Groups (POKTAN) and the Family Welfare Empowerment organization (PKK) serves as important social capital in supporting village development, both in terms of agricultural productivity and community empowerment.

One of the main challenges faced by Ciakar Village is the suboptimal management of organic waste, originating from both households and agricultural activities. Ineffective waste management not only affects environmental cleanliness but also results in the loss of opportunities to transform waste into economically

valuable resources. This issue is particularly crucial since Ciakar Village has the potential to be developed into an agriculture-based tourism destination (agrotourism) that promotes environmental sustainability and local community empowerment. The development of a tourism village not only enhances the agricultural and livestock sectors but also contributes to improving residents' income and environmental conservation, in line with the concepts of Community-Based Tourism (CBT) and sustainable tourism (Herdiana, 2019; Julita et al., 2022; Yulianto, 2024).

One innovative solution to address the issue of organic waste management is the cultivation of Black Soldier Fly (BSF) maggots. BSF maggots have been proven effective in decomposing organic waste while producing derivative products such as compost and animal feed with economic value (Manan & Irfan, 2013; Sholahuddin et al., 2021; Syafitri, 2024). However, previous attempts made by the Farmers' Group (POKTAN) in Ciakar Village to cultivate BSF maggots encountered failure, as the larvae and flies disappeared without a known cause. This failure highlights the need for more systematic technical training and continuous assistance to ensure that maggot cultivation programs can operate effectively and sustainably.

Therefore, this Community Service Program (PkM) is crucial in addressing two key issues identified together with local partners:

1. The absence of an efficient and sustainable for managing organic waste, which has implications for both environment and public health.
2. The substantial potential for agrotourism has not been optimally utilized due to limited knowledge, skills, and supporting infrastructure.

Through an educational, participatory, and sustainable approach, this PkM activity aims not only to strengthen the community's capacity in managing organic waste but also to promote the integration of sustainable agricultural practices with the educational agrotourism potential of Ciakar Village.

METHODS

The implementation method of the Community Service Program (PkM) in Ciakar Village was designed systematically and participatively through three main stages, actively involving local partners throughout the activities. The primary partners in this PkM are the Farmers' Group (POKTAN) and the Family Welfare Empowerment organization (PKK), who play strategic roles as field implementers, activity facilitators, and beneficiaries.

The first stage was interviews and field observations, aimed at comprehensively understanding the existing conditions in Ciakar Village, particularly community awareness of organic waste management, challenges in previous BSF maggot cultivation, and the village's potential to be developed into an education- and environment-based agrotourism destination. At this stage, POKTAN and PKK partners participated by providing necessary information, granting access to activity locations, and selecting group members to join the training. They also committed to providing land for the construction of the BSF maggot cage and contributed directly during the preparation phase.

The second stage was the implementation phase, consisting of two main activities: (1) technical training on BSF maggot cultivation to equip participants with practical knowledge and skills, including the BSF life cycle, ecological and economic benefits of maggot cultivation, preparation of feed media from household and agricultural organic waste, harvesting, and maintenance. During this training, the PkM team also designed a prototype semi-permanent maggot cage made from local materials such as bamboo and mesh netting. (2) Strengthening the potential of education-based agrotourism, in which the concept of educational gardens and organic farming was developed collaboratively with partners. Members of the PKK were trained as local guides to assist in educational tourism visits from students and communities, thereby enabling them to play an active role in supporting and introducing village activities to visitors.

The third stage was program evaluation, conducted through discussion sessions and Q&A during the training to measure participants'

understanding and the effectiveness of the delivered material. The evaluation also included the establishment of a sustainable maggot cultivation management team from POKTAN members, who would be responsible for continuing the activities, expanding practices to other households, and ensuring the program's long-term sustainability. Partners also played an important role in formulating follow-up plans and utilizing the outcomes of the activities sustainably within the context of the local economy and sustainable tourism.

RESULTS AND DISCUSSION

The Community Service Program (PkM) conducted in Ciakar Village, Panongan, Tangerang Regency, resulted in several changes among the partners in terms of knowledge, skills, behavior, and tangible products in the form of prototypes. These changes serve as indicators of the program's success in addressing the needs and problems faced by the partners, particularly concerning organic waste management and the potential development of agrotourism.

1. **Improvement of knowledge and skills**
   Before the PkM was implemented, the community had very limited knowledge of BSF maggot cultivation, especially regarding maintenance and farming practices. Household and agricultural organic waste had not been systematically managed, and the community was unaware that waste such as food scraps, fruit peels, straw, vegetables, and crop residues could be utilized as natural feed for BSF maggots with high economic value.
   During the program, training was provided on the BSF life cycle, which consists of five stages: egg, larva, pre-pupa, pupa, and adult fly. The training also emphasized the importance of proper cage preparation and the creation of suitable organic-based feed media to ensure successful maggot harvests. This activity not only broadened theoretical understanding but also equipped partners with practical skills applicable to their daily agricultural activities.

2. **Prototype of BSF Maggot cage infrastructure**
   The PkM also produced a tangible output in the form of a prototype BSF maggot cage, constructed from bamboo and mesh netting on land provided by the partners. The cage functions as a learning facility, a maggot production site, and an initial component of the village's educational garden development plan.
   The outputs produced included a prototype of a BSF maggot cage, namely a semi-permanent cage measuring approximately 35 × 50 centimeters, intended as a reference for the construction of a full-scale cage. This prototype is also designed to be developed using locally sourced materials such as bamboo, wood, and mesh netting. The cage is structured to be easily accessible and manageable by the community, functioning as an environmentally friendly BSF larva cultivation facility as well as an educational medium for agrotourism.

   In addition, to facilitate the community in the BSF maggot cultivation process, a prototype in the form of a Maggot Container was also created. This container serves as a box for rearing BSF maggots, designed to be easily produced by POKTAN members and distributed among community members interested in engaging in BSF maggot cultivation.

Picture 1. (Maggot Cultivation Prototype)

In the futute, this prototype is expected to be adapted and replicated independently by the community at both household and group levels. This would expand the positive impacts of organic waste management, increase the production of alternative animal feed, and support the development of educational

attractions within the framework of sustainable agrotourism in Ciakar Village.

3. **Behavioral changes and increased community awareness**
   One of the most significant changes observed after the program was the increased environmental awareness of the community in sorting and managing organic waste. Previously, household waste—especially food scraps and agricultural residues—was disposed of without recycling. After the training, most members of POKTAN and PKK began sorting organic waste at home and using it as raw material for maggot feed. This demonstrates a behavioral shift toward more sustainable environmental management.
   PKK members, who were previously involved mainly in household activities, are now actively engaged in planning and implementing initiatives that benefit family economies and the surrounding environment. In addition to participating in the training, they also began taking roles as educational tourism guides, thus contributing to the development of the village's agrotourism potential. Together with the partners, the PkM team also initiated the design of an agrotourism concept highlighting maggot cultivation and organic farming as main attractions. This tourism model has the potential to become an educational destination for school students, environmental communities, and general visitors interested in integrated farming and sustainable waste management. Partners also began to recognize that what initially appeared to be merely "maggot farming" actually carries added value in terms of education and the creative economy.

Overall, the program produced significant changes for the partners, particularly in enhancing knowledge and skills in BSF maggot cultivation and organic waste management. Partners who previously did not recognize the potential of waste now began to utilize it as maggot feed media. The tangible outputs included locally made maggot cages and feed media derived from organic waste. Behavioral changes were also evident in the increased environmental awareness and active participation of partners, including PKK members trained as educational tourism guides.
The program's success is reflected in improved partner capacity, the establishment of simple infrastructure, and the emergence of sustainability commitments. Challenges faced included participants' limited time, the availability of BSF larvae, varying levels of technical understanding, and limited processing equipment. Nevertheless, the program was effectively carried out and demonstrated substantial potential for further development.

CONCLUSION

The Community Service Program (PkM) in Ciakar Village successfully produced a prototype BSF maggot cage made from local materials (bamboo and mesh netting), provided technical training on maggot cultivation to POKTAN and PKK members, and introduced the concept of educational tourism based on agriculture and organic waste management. The partners demonstrated improved understanding, technical skills, and awareness of the importance of waste management as well as the economic potential of maggot cultivation. They have now acquired basic skills in maggot farming and organic waste utilization and have begun planning the continuation of this program as part of the village's economic and educational activities. The initiative has also fostered collaborative efforts between POKTAN and PKK in independently managing waste. The program shows strong sustainability potential due to the active interest and participation of partners, along with the support of local resources.

It is recommended that further assistance be provided in the form of advanced training, strengthening group management, and fostering collaboration with private stakeholders or local government for the provision of facilities and the promotion of educational tourism. In addition, the development of integrated tourism packages that combine agricultural and environmental activities

would further enhance the attractiveness of Ciakar Village as a sustainable tourism destination.

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