

APPLICATION OF APPROPRIATE TECHNOLOGY TO OVERCOME ORGANIC AND INORGANIC WASTE TO SUPPORT A GREEN ECONOMY IN THE ASOKA PKK IN TANGERANG CITY

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ABSTRACT

PKK Asoka, located at Jalan Karyawan 3, RT 002, RW 09, Karang Tengah District, Cileduk Tangerang, complained that in their environment there was a lot of organic waste from cooking leftovers in the form of vegetables and fruit peels, as well as plastic waste that piled up, so that the environment became dirty and smelled bad which could cause many diseases. The problem was they did not have knowledge of organic and non-organic waste management and did not have the facilities for its management. The PKM UBL Team conducted observations and planning to provide character building for the PKK Asoka team in the application of appropriate technology, to overcome waste, so that they could support the Green Economy in the environment. The result of this PKM activity was, the community learned about the importance of managing waste, through technological processing, using a composter tool, where this organic waste is processed by fermentation to produce liquid fertilizer. Inorganic waste can be recycled into valuable and useful items such as wallets, trash cans that can be sold, so that the income of the PKK Asoka Management increased. They were able to record waste processing results, for sales and purchase processes, and understand how to prepare financial reports. They received training on recording financial transactions and sales techniques, using smart financial application software provided by the Budi Luhur University Student Creativity Program (PKM) team. The output of this PKM program was publications at international seminars and intellectual property rights (IPR).

Keywords : Appropriate Technology, Green Economy, Non-organic, Organic, Waste Processing

1. INTRODUCTION

The Tangerang district government, Banten, has established a waste bank program so that Waste can have economic value and residents do not throw away waste carelessly. This program was implemented because the local government experienced obstacles in management. waste. In this waste bank activity, if it is developed on a mass scale and seriously, it will can be a pillar of economic growth for the community itself. From the data tribunnews.com, environmental service, Tangerang city on January 7, 2024, Head of the environmental service, Wawan Fauzi, expressed his complaint that in the sub-district The central reef is piling up rubbish to the point of blocking access to the financial complex, as seen in figure 1 [1].



Figure 1. Piles of Garbage in Karang Tengah District

Based on the survey results of a team of lecturers and students after meeting with the head of the PKK Asoka whose address is Jalan Karyawan 3, RT 002, RW 09, Karang Tengah District, Cileduk Tangerang, where the head of the PKK Asoka named Mrs. Puji Hastuti also complained that in their environment there is a lot of organic waste from leftover cooking in the form of vegetables and fruit peels from housewives that are not processed, and plastic waste

that accumulates so that the environment becomes dirty and smells bad, this can cause disease. Organic waste is waste that comes from nature or is produced from natural activities that can experience weathering (decomposition) and break down into smaller, odorless materials (I Gusti A, et al., 2021) . In general, the most abundant component in waste in several cities in Indonesia is plant remains which reach 80-90% (Alfi T et al. 2021). (Novi M, 2014), (Andy et al., 2019), sometimes even more. The waste in the PKK Asoka environment is also like that, the waste from cooking in the kitchen and other waste is thrown into a place until it piles up, if not handled in the near future it will have an impact on the unhealthy environment which will certainly cause health problems for the surrounding residents because it can cause disease.

Research shows that by habitually disposing of waste according to its classification, the community will become more skilled in processing waste, in managing waste, and the community is able to be creative with inorganic waste by transforming paper and plastic waste into works of art as added economic value (Kieso 2017), (Dewi K, et al. 2021), (Lukas 2019). With this recycling, it is hoped that it can overcome environmental pollution. Processing waste that was previously worthless will become more valuable (Zico FR, et al., 2021), in addition to contributing to preventing environmental pollution and reducing greenhouse gas carbon emissions (Aliva P, et al., 2021). Proper waste processing will increase the income of the community, especially in this case the Asoka PKK administrators. Another problem for partners is that PKK Asoka members when they make purchases generally do not keep records, because they do not understand the proper method of recording sales and preparing financial reports, so that miscalculations often occur and they also do not have the technical knowledge of how to sell well and correctly to be successful.

The problems and their descriptions can be seen in the following table:

Table 1. Problem Description

No	Problems	Description
1.	Piling up of organic waste	The Asoka PKK management collects organic waste and will be given training on making liquid fertilizer from organic waste, specifically vegetables and fruit.
2.	Accumulation of inorganic waste	The Asoka PKK management collects inorganic waste and will be given training on recycling inorganic waste to make useful items such as wallets, tissue holders, etc.
3.	There is no understanding of how to summarize the income and sales of a product and they also do not understand the correct marketing techniques.	Asoka PKK administrators will be introduced to a knowledge system and training on recording financial transactions and sales techniques using smart financial application software.

Based on the background above, the purpose of this PKM activity is to provide learning about the importance of overcoming waste problems, through several activities, this worthless waste will be made valuable through technological processing, using a composter tool, where organic waste will be processed through fermentation, so that it can produce liquid fertilizer. While inorganic waste will be recycled into valuable and useful items such as wallets, trash cans, which can be sold so as to increase income from the Asoka PKK.

2. METODE

The stages of the problem-solving method are divided into 4 stages:

- a. Socialization
- b. Training
- c. Application of technology
- d. Mentoring and evaluation
- e. Sustainability of the program

Socialization

Initial Survey and signing of partnership letter dated March 24, 2025

Socialization to partners to separate organic and inorganic waste began in June 2025. The output of this stage is the separation of organic and inorganic waste, identification of data needed for learning, counseling and training in making liquid fertilizer, inorganic waste recycling handicrafts and related data. The output of this stage is the availability of

data needed to determine the volume of waste that is routinely obtained and the data needed to compile teaching modules and marketing and accounting training.

Machine design and equipment purchase for liquid and solid fertilizer manufacturing in May 2025. The output of this stage is the design of machines and equipment that have been made in the machine shop. Preparation of modules for liquid fertilizer manufacturing training; June 2025. The output of this stage is the availability of 1 training module for liquid fertilizer and compost manufacturing. Preparation of a module for making handicrafts from inorganic waste, May 2025 The output of this stage is the availability of 1 training module for making handicrafts. Preparation of accounting and sales technique modules using the Pintar application system July 2025. The output of this stage is the availability of 1 training module for finance and marketing techniques.

Training and implementation of technology

Training and Implementation of liquid fertilizer manufacturing technology will be carried out in July 2025. The output of this stage is an increase in the partner team's ability to produce organic fertilizer in liquid form.

Training on making handicrafts from recycled inorganic waste in July 2025. The output of this stage is an increase in the partner team's ability to make handicrafts from inorganic waste. Accounting training using the Pintar application for trading businesses and marketing techniques in June 2025. The output of this stage is an increase in the PKK group's ability to make simple bookkeeping and marketing techniques.

Implementation of learning/practice of TTG for making liquid fertilizer July 2025 The output of this stage is the continuous implementation by partners in producing liquid fertilizer. Implementation of learning/practice of making recycled inorganic waste handicrafts in stages July 2025. The output of this stage is the continuous implementation by partners in producing handicrafts made from inorganic waste. Implementation of Smart application software The output of this stage is the continuous implementation by partner groups to use the Smart application software.

Mentoring and Evaluation

Monitoring will continue to be carried out for the implementation of the manufacture of liquid fertilizer, solid fertilizer, handicrafts, and the implementation of the financial accounting system, income and expenditure of money starting August 2025. The output of this stage is the continuous and consistent implementation by partners in the manufacture of liquid fertilizer, handicrafts and the implementation of a simple financial accounting system using the Pintar application.

Sustainability of the program

The sustainability of the production of liquid fertilizer and handicrafts from waste will continue to be carried out by monitoring and providing assistance if there are problems in the field, in the future.

This activity involves partners, in this case the PKK Management, to participate in providing facilities needed by the team outside the team's budget (RAB), such as land for waste processing. Partners are also expected to follow all directions from the PKM Team. Partners will participate in socialization, learning, training, and apply techniques for making liquid fertilizer, handicrafts from inorganic waste, and the implementation of financial systems and marketing techniques. This will be beneficial for partners.

3. RESULTS AND DISCUSSION

RESULTS

The implementation of PKM activities in the form of the Application of Appropriate Technology (TTG) to deal with organic and inorganic waste at the Asoka PKK, Tangerang City, has provided several tangible results, including:

Application of Organic Waste Processing Technology

- 1) Asoka PKK residents have successfully implemented simple *composting technology* based on tiered buckets (takakura and biopori) to process kitchen waste.
- 2) Of the total 15 kg of household organic waste per week, around 80% can be processed into compost.
- 3) The compost is reused for medicinal plants and vegetables in the yard, thus reducing dependence on chemical fertilizers.

In accordance with the target achievement II, partners are able to implement the manufacture of liquid fertilizer, are able to make handicrafts from recycled waste, are able to implement accounting using the Pintar application software, Increase level 100%.

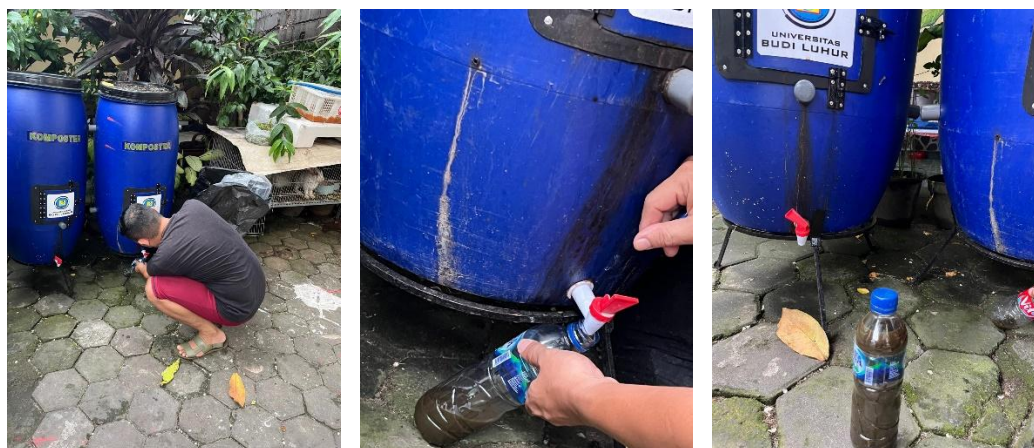


Figure 1. Residents have successfully practiced Composter technology to make liquid fertilizer.

Inorganic Waste Management with Sorting and Recycling Technology

- 1) Plastic, paper, and metal waste was successfully sorted at the source, with residents' discipline increasing by 65% compared to before the PKM activity.
- 2) Plastic waste is processed using a small-scale shredding machine which is then sold to collectors, generating an additional income of an average of IDR 300,000 per month for the PKK fund.



Figure 2. Residents are able to develop production
liquid fertilizer becomes economically valuable

Capacity Building and Environmental Awareness

- 1) A total of 15 members of the Asoka PKK participated in intensive training on waste processing technology, with a participant satisfaction rate of 92% (based on an evaluation questionnaire).
- 2) There has been an increased understanding of the concept of *the green economy* , particularly regarding the importance of waste circularity and the economic potential of waste management.

DISCUSSION

The implementation of Appropriate Technology (TTG) in the Asoka Family Welfare Movement (PKK) in Tangerang City has proven effective in addressing household waste management issues. The program's success can be analyzed from three main perspectives: **environmental, social, and economic** .

a. Environmental Aspects

This program can reduce organic waste by up to 80% through the use of simple composting technology. This aligns with the *waste-to-resource principle* , which emphasizes utilizing waste as a new resource. With the availability of liquid fertilizer and compost, residents' dependence on chemical fertilizers is reduced, while simultaneously encouraging the creation of a green ecosystem at the household level. Furthermore, the 65% increase in inorganic waste sorting demonstrates a shift in residents' behavior toward a *green lifestyle* .

b. Social Aspects

The increased public awareness of the importance of waste management is reflected in the high participation rate (15 active members) and 92% participant satisfaction with the training. This demonstrates the effectiveness of knowledge transfer. Furthermore, the involvement of the Family Welfare Movement (PKK) as a strategic partner has proven effective in strengthening social solidarity and the spirit of mutual cooperation in maintaining a clean environment.

c. Economic Aspects

Processing inorganic waste using a shredder has significantly increased income, with an average of Rp 300,000 added per month to the Family Welfare Movement (PKK) fund. Furthermore, financial record-keeping training using digital applications has increased transparency and accountability in community finances. This supports the development of a *green economy* at the community level, where economic and ecological aspects are integrated.

d. Challenges and Opportunities

While this program has shown positive results, several challenges remain, such as limited storage space for recyclable waste and the reliance on consistent community participation. Therefore, a sustainability strategy is needed, including:

- 1) Ongoing support from the academic team,
- 2) Regulatory support from local governments,
- 3) Integration with Tangerang city's environmental program,
- 4) As well as the development of derivative products from compost and recycled crafts to increase their economic value.

Obstacles and Problems

However, several challenges remain that require attention. Therefore, ongoing mentoring, support from village policies, and integration with city-level environmental programs are necessary. Overall, the implementation of TTG in waste management at the Asoka Family Welfare Movement (PKK) has not only succeeded in reducing waste generation but also encouraged the creation of added economic value and strengthened the *green lifestyle culture*. This is clear evidence that appropriate technology-based PKM can serve as a model for replication in other areas in Tangerang City and its surroundings. Some obstacles and problems that occurred:

a. Limited Facilities and Infrastructure

- 1) Recyclable waste storage space is very limited, so if the volume of waste increases, it will cause difficulties in the processing and temporary storage process.
- 2) Equipment such as plastic shredders and composters are still small-scale, so production capacity is limited.

b. Consistency of Citizen Participation

- 1) Public enthusiasm tends to be high at the start of the program, but has the potential to decline over time.
- 2) Behavioral change requires long-term support to ensure that the habit of sorting and managing waste remains consistent.

c. Managerial and Marketing Aspects

- 1) Management of recycled products (compost, liquid fertilizer, and plastic crafts) is still hampered by marketing issues.
- 2) Limited distribution networks and promotional strategies mean that the product's selling value is not optimal.

d. Policy and Regulatory Support

- 1) The program is still local and community-based, so it is not yet fully integrated with environmental policies at the sub-district or city level.
- 2) The lack of regulations or incentives from local governments means that the program's sustainability depends entirely on the spirit of community self-reliance.

e. Uneven Environmental Awareness

- 1) There are still some residents who are not disciplined in sorting waste from home.

- 2) Continuous education is needed so that environmental awareness can be spread evenly, not only in PKK groups but also throughout the surrounding community.

The training results obtained by Asoka PKK participants are as follows:

a. Organic Waste Management

- 1) Participants are able to practice using **simple composting technology** (takakura, biopore, and tiered buckets).
- 2) Of the total of ± 15 kg of household organic waste per week, around **80% is successfully processed into compost and liquid fertilizer**.
- 3) The compost produced is used for medicinal plants and household vegetables, thus reducing dependence on chemical fertilizers.

b. Inorganic Waste Processing

- 1) Participants successfully **sorted plastic, paper and metal waste from the source**.
- 2) Residents' discipline in sorting waste increased by **65%** compared to before the training.
- 3) Plastic waste is processed using **a small-scale shredding machine** and then sold to collectors, generating an additional income of an average of **IDR 300,000 per month** for the PKK fund.
- 4) Participants also learned to make **handicrafts** (wallets, tissue holders, small baskets) from recycled plastic materials that have sales value.

c. Capacity and Knowledge Building

- 1) A total of **15 members of the Asoka PKK** participated in intensive training.
- 2) The level of participant satisfaction with the training reached **92%** (based on the evaluation questionnaire).
- 3) Participants understand the concept of **green economy** and the importance of waste circularity (*circular economy*).
- 4) Participants are increasingly aware that waste can have economic value if managed properly.

d. Finance and Marketing Training

- 1) Participants received training in recording financial transactions using **the Pintar application**.
- 2) They are able to prepare **simple bookkeeping** to record income and expenses from the sale of recycled products.
- 3) Participants acquire basic **marketing technique skills** to expand the sales reach of waste processing products.

4. CONCLUSION

The implementation of the Community Partnership Program (PKM) at the Asoka Family Welfare Movement (PKK) in Tangerang City through the application of Appropriate Technology (TTG) has successfully provided a concrete solution to the problems of organic and inorganic waste management. This program is able to:

- a. Reduce organic waste generation by up to 80% with simple composter technology, while producing liquid fertilizer and compost that are beneficial for family food security.
- b. Increasing the discipline of residents in sorting inorganic waste by 65%, as well as generating additional income of an average of IDR 300,000 per month through plastic recycling with a shredding machine.
- c. Providing increased knowledge and skills capacity for residents, as evidenced by the active participation of 15 PKK members and the level of satisfaction of training participants reaching 92%.
- d. Strengthening the green economy aspect *through* digital financial recording training and marketing techniques, thereby creating transparency and sustainability of environmentally-based businesses.

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