
INTEGRATED DOMESTIC WASTE MANAGEMENT IN ACCORDANCE WITH KAMPUNG IKLIM PROGRAM AT WARAKAS VILLAGE, TANJUNG PRIOK JAKARTA UTARA

Nonon Saribanon¹, Noverita¹, Bhakti Nur Avianto², Angga Septian Erdiyanto³, Sara Pebrina³, Astri Oktavina³

1Faculty of Biology, Universitas Nasional, Jakarta, Indonesia,

2Faculty of Politic, Universitas Nasional, Jakarta, Indonesia,

3PT. Indonesia Power Priok POMU, Jakarta Utara, Indonesia

Email: nonon.saribanon@civitas.unas.ac.id

Abstract: Warakas Village is located in Tanjung Priok District, North Jakarta, with a population of 60,122 people and an area of 100.4 Ha. The increase in population and consumption patterns that continue in society can lead to the amount of landfill waste. Stunting toddlers have become a serious concern for the government. The real impact of stunting is that it can reduce intelligence in children, as the next generation of the nation. The Program conducted in the Warakas Village is to add insight and knowledge, as well as improve skills from environmental, economic, and health aspects, especially in the case of stunting by prioritizing integrated waste/garbage management with prospects for creating innovations in the field of feed and fish farming catfish. The Program is implemented using a participatory approach and an adult learning system, both in training by inviting expert speakers and assisting in the application of the knowledge provided. The benefits obtained are increasing the skills of residents in developing the ability to make solid and liquid fertilizers, plant cultivating with hydroponic system, and production of fish feed independently. All of these activities are interrelated, and can become a place/forum for discussion between residents and other stakeholders. In the health sector, this activity is believed to be able to meet the need for animal protein sources, especially in the Stunting Prevention Action activities which prioritize animal protein intake. Lastly, in the environmental field, waste management activities can support environmental quality improvement by reducing waste piles that are disposed of at garbage dump.

Keyword : Integrated domestic waste, Kampung Iklm, rrbn agriculture

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INTRODUCTION

Warakas Village is located in Tanjung Priok District, North Jakarta, with a population of 60,122 people and an area of 100.4 Ha. The population density of this urban village is very high, reaching 49,014 people/km². Warakas Village is a developed area. However, because it is located in the lowlands, every rainy season floods often occur. Many residents choose to survive the threat of flooding every year because there is no alternative house (Dermawan, et al., 2022).

The increase in population and consumption patterns that continue in society can lead to the amount of landfill waste. This population density is a burden on the environment, thus providing little public space for the community (Cahyono, 2012), as a result, it has an impact on increasing the number of unemployed so that the economy can be disrupted and cause several other problems such as health problems such as stunting (Agustin, et al., 2017).

Stunting toddlers have become a serious concern for the government. The government through Presidential Regulation Number 72 of 2021 has regulated the Acceleration of Stunting Handling, this has indicated that the problem of stunting is a serious issue that needs to be resolved immediately. The real impact of stunting is not only a matter of physical condition but can reduce intelligence in children, of course, this problem will be detrimental to the country in the next few decades as the nation's next generation (Dermawan, et al., 2022; Agustin, et al., 2017).

Activities to manage urban agriculture, manage domestic waste, and manage health, especially stunting cases in the Warakas Village, need to be carried out (Masruroh, 2021). The importance of the relationship between waste management activities carried out at the community level to improve environmental quality (Nirmalasari, 2020).

Humans can produce up to 1 kg of waste every day. According to data from the Ministry of Environment, the average urban person in Indonesia in 1995 generated 0.8 kg/day of waste and continued to increase to 1 kg per person per day in 2000. It is estimated that waste generation in 2020 for each person per day is of 2.1 kg.

Garbage produces greenhouse gas (GHG) emissions in different ways, while its contribution to the global warming effect reaches 15%. Organic waste disposed of in landfills decomposes anaerobically to produce methane gas, which according to the Global Warming Potential Index, has an effect 21 times more toxic than carbon dioxide gas. More methane is released into the atmosphere from human activities (anthropogenic) than from natural processes. Organic waste treatment can reduce carbon emissions released into the atmosphere when compared to burning organic waste (Darusman, 2000).

The role of the community can produce empowerment with several benefits, including contributing to efforts to make the maximum use of it, arousing enthusiasm, arousing a spirit of independence and cooperation with the community to reduce government resources and guarantee greater acceptance of everything that is built so that it will generate pride, as well as prevent and accelerate stunting rates (Ministry of Health, 2018; Arthatiani and Zulham, 2019).

The management of urban agriculture is based on activities by utilizing narrow land for productive activities that can be carried out anywhere. Such as the use of yards for vegetable cultivation, hydroponics, and catfish farming. This activity certainly requires supporting materials such as fertilizers and pellets (Palupi, 2015; Food Security Agency, 2012). But its presence in the market at a fairly expensive price can also be a problem. So that the domestic waste management activities that have been carried out by Warakas Village residents can be utilized for this activity. For example, organic waste is used as fertilizer, and fish meal waste can be used as pellets. But of course, this activity needs training and assistance from the people in Warakas so that they can optimize independently for the sustainable development of their area.

METHOD

To achieve the objectives of this Community Service activity, several steps are used:

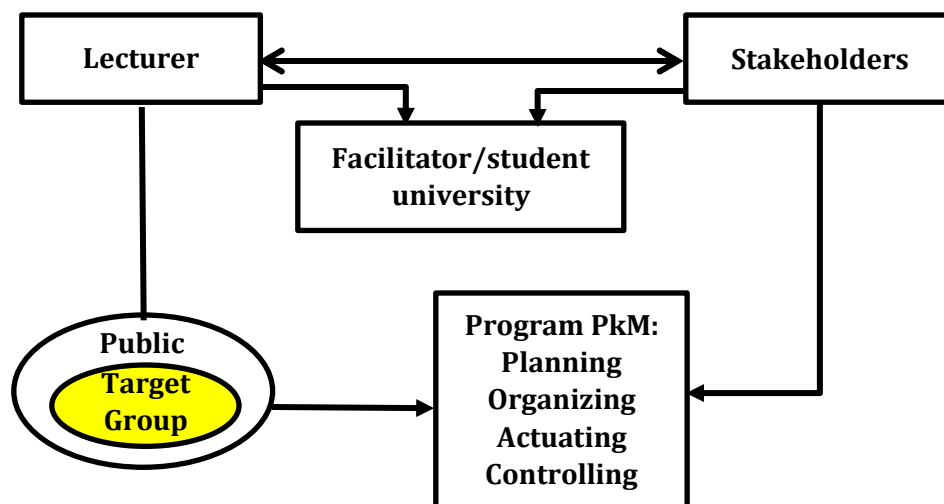
1. Lectures

The lecture method is used in the delivery of materials on the Production of Solid and Liquid Fertilizers, Hydroponic Planting, and Independent Production of Fish Feed.

2. Practice

The second method used is the practice method. This method takes the form of training and mentoring which directly invites experts from related fields.

The Program is implemented using a participatory approach and an adult learning system, both in the implementation of training and program assistance. In general, the description of the mentoring activities is as follows,



RESULT

The utilization of fish waste resulting from cleaning activities Bar Screen Water Intake is processed into fish meal and used as a mixed raw material for making Catfish Feed. This feed is packaged and distributed to the Foster Partners (Comdev) Catfish Farming Locations (Comdev) of PT. Indonesia Power PRO POMU.

Fish waste can be processed into a fish meal where this fish meal will be used as the main raw material (largest composition) in making fish feed. Based on the results of research by Lestari, et al., (2013) shows that fish waste that is processed into fish meal has a chemical composition that is in accordance with the quality standards of fish meal as a raw material for fish use. The process of processing fish waste into a fish meal is washing the fish waste, then boiling it for 2 minutes or soaking it in hot temperatures (approximately 80°C) and drying it for 24 hours in the sun. Furthermore, the dried fish is cut into small pieces and the last one is ground to become a fish meal.

The resulting fish meal is then made into the fish feed which consists of various stages including size reduction, premixing, mixing, and printing activities.

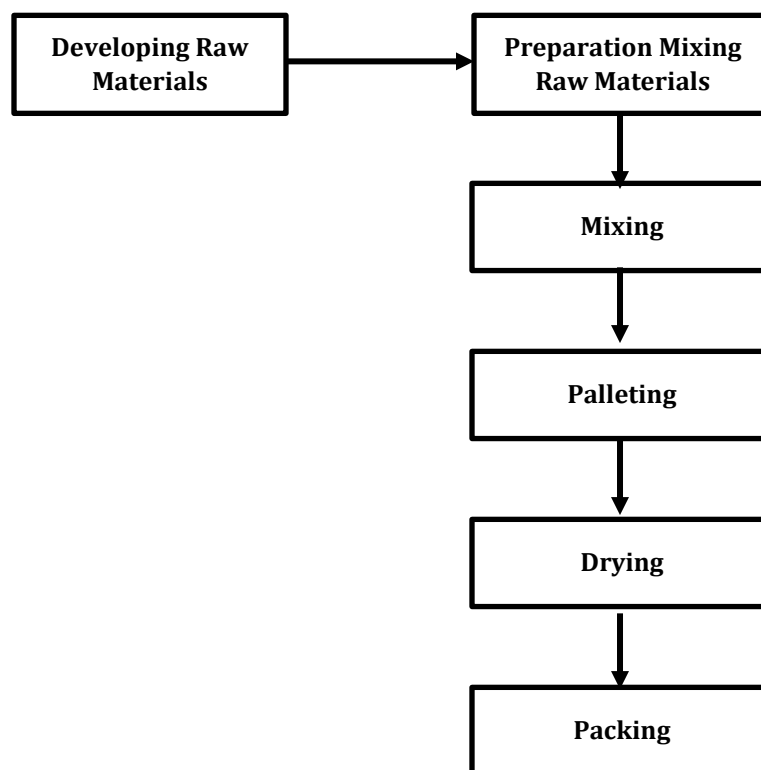


Figure 1. Flow Process in Fish Feed Production

Composition of Fish Feed

Every day humans can produce up to 1 kg of waste. According to data from the Ministry of Environment, the average person in urban areas in Indonesia in 1995 produced 0.8 kg/day

of waste and continued to increase to 1 kg per person per day in 2000. It is estimated that the landfill in 2020 for each person per day is 2.1 kg.

Discarded waste produces greenhouse gas (GHG) emissions in different ways, while its contribution to the global warming effect reaches 15%. The first way is for organic waste that is disposed of in landfills to decompose anaerobically to produce methane gas, which is a greenhouse gas emission that, according to the Global Warming Potential Index, has an effect of 21 times more toxic than carbon dioxide gas. Meanwhile, Darusman (2000) said that more methane released into the atmosphere comes from human activities (anthropogenic) rather than the result of natural processes. Processed organic waste can reduce carbon emissions released into the atmosphere when compared to burning organic waste.

Increased knowledge and understanding of waste management and waste management can reduce the amount of waste transported to landfills. Through the integration model, it is hoped that there will be an increase in the economic activity of activity managers, efficiency and effectiveness so that the sustainability and independence of activities can be achieved.

Output and Benefits

The benefits that can be provided from the integrated domestic waste management model are:

1. Improving the skills of RW 008 residents in developing the skills of making solid and liquid fertilizers, growing hydroponics, and making fish feed.
2. As a forum for exchanging ideas between residents of RW 008 and universities.

In other perspective, the residents of RW 08 are more motivated to develop waste management, hydroponics, and yard plant cultivation, as well as catfish farming with the training and tools provided by the KKB Program. Increased economic activity is expected to have a direct impact on the income of residents managing activities. In addition, the indirect impact of these activities is the intensification of interaction between community members, thus increasing social cohesion and can become an informal forum to explore ideas and find solutions to various problems that arise in society, especially among residents of RW 08.

Contribution to Other Sectors

In the health sector, fish farming activities are believed to be able to meet the needs of animal protein sources, especially in the Stunting Prevention Action activities. In this case, it can be seen that in stunting prevention the priority is the intake of animal protein.

In the environmental sector, waste management activities can support environmental quality improvement by reducing waste generation to end garbage dump. Most of the organic waste has been utilized by residents of RW 08 as raw material for making compost and liquid organic fertilizer. Apart from that, residents are also developing organic waste treatment using the eco-enzyme method. The existence of a program for making fish feed

independently has led to more use of organic waste because around 10-16% of the material for making fish feed is taken from organic waste in the form of vegetable scraps.

From an environmental perspective, composting organic waste provides many benefits, including:

- Reducing air pollution from burning waste and releasing methane gas from decomposing organic waste due to methanogenic bacteria in landfills.
- Reducing the need for land for stockpiling.
- Improving soil fertility, nutrient retention/availability in the soil, soil water absorption capacity, soil microbial activity, crop quality (taste, nutritional value, and yield quantity),
- Provide hormones and vitamins for plants, suppress plant growth/disease attacks, and improve soil structure and characteristics.
- The role of organic matter on soil physical properties includes stimulating granulation, improving soil aeration, and increasing water holding capacity. The role of organic matter in soil biological properties is to increase the activity of microorganisms which play a role in nitrogen fixation and the transfer of certain nutrients such as N, P, and S. The role of organic matter in soil chemical properties is to increase the cation exchange capacity thereby affecting nutrient uptake by plants.

DISCUSSION

Integrated waste management must be accompanied by a follow-up plan in the form of similar activities which should be carried out continuously to increase knowledge and understanding of waste management and wise waste management. Thus reducing the amount of waste transported to the landfill. As well as the need for assistance with tools that can be used to increase the economic activity of activity managers, so that the sustainability and independence of activities can be achieved.

The Warakas community is more motivated to develop waste management activities, hydroponics and yard plant cultivation, as well as catfish farming. Increased economic activity is expected to have a direct impact on the income of residents managing activities. In addition, the indirect impact of these activities is the intensification of interaction between community members, thus increasing social cohesion and can become an informal forum to explore ideas and find solutions to various problems that arise in society, especially the Warakas community.

The social aspect is often the main factor in the composition and growth of development in a region. For example: health and adequate nutrition will increase the productivity of workers and society in general. In various economic activities it is proven that the positive impact of the social aspect can be seen from the productivity among activity managers, related to cooperation and capacity building or skills and insights (Budhi, 2012).

Programs implemented in Warakas are related to the management of urban agricultural activities, domestic waste management, and health management, especially stunting cases in the Warakas Village. There is a program called Ketapang Kuning which is the pioneer of the movement that deals with stunting by integrating waste management programs, agricultural programs for food self-sufficiency and improved nutrition and catfish farming programs. The existence of a catfish

farming program is expected to be able to meet the nutritional needs of families, especially children with stunting.

Various social aspects in Warakas have been able to contribute to urban communities based on the principles of trust, mutual support and mutual benefit. These three principles are basically owned by the people of Warakas Village as social capital. The community has experienced the benefits of the Ketapang Kuning program, such as: increased insight, experience, harmony, independence, and good cohesiveness or cooperation. In addition, the continuity of the program can be maintained, in addition to establishing good communication between residents, and accommodating community aspirations. Overall, through this program, people's welfare also increases.

One of the programs that is carried out regularly is training which aims to broaden insight and knowledge, as well as improve skills for program managers in particular and the Warakas community in general. As one example, the training conducted was the manufacture of catfish feed by utilizing company waste in the form of fish meal, and residents' organic waste in the form of leftover vegetables. This activity was developed so that managers of catfish farming are not completely dependent on fish feed or pellets on the market, which generally have a relatively expensive price. From the social aspect, the activity of making fish feed independently led to systemic changes in social ties that became higher between program managers, companies and community as a whole. Systemic changes that occur with this program include:

- a. Collaboration is established between activity units, such as between waste banks, liquid organic fertilizer and compost production units, catfish farming units, and opinion stalls, as well as stunting management programs.
- b. Development of better institutional management, due to increased management capacity and institutional capacity, which can be seen from the existence of SOPs and program management flows.
- c. The realization of a learning society that always tries to find solutions to problems that exist in its environment, including those related to the problem of waste, stunting, and economic activity to increase income.

The community involved in the catfish farming program are all members of the farmer group, namely as many as 18 people, which then also involve their families, so that the number of people involved and benefiting from the program is quite a lot. Not only is the number of residents involved increasing, but also the intensity of communication is increasing, and the facilities are available to accommodate residents' aspirations, as well as support creative efforts in utilizing existing resources and finding solutions to problems.

The trainings aim to broaden insight and knowledge, as well as improve skills for program managers in particular and the Warakas community in general. As one example, the training conducted was the manufacture of catfish feed by utilizing company waste in the form of fish meal, and residents' organic waste in the form of leftover vegetables. This activity was developed so that managers of catfish farming are not completely dependent on fish feed or pellets on the market, which generally have a relatively expensive price. From the social

aspect, the activity of making fish feed independently led to systemic changes that were visible in social ties that became higher between program managers, companies and residents as a whole. Systemic changes that occur with this program include:

- a. There is collaboration between activity units in the Ketapang Kuning program, such as between waste banks, liquid organic fertilizer and compost production units (Herdiyanton, 2015), catfish farming units, and opinion shops, as well as stunting management programs.
- b. Development of better institutional management, due to increased management capacity and institutional capacity, which can be seen from the existence of SOPs and program management flow.
- c. The realization of a learning society that always tries to find solutions to problems that exist in its environment, including those related to the problem of waste, stunting, and economic activity to increase income.

The people involved in the catfish farming program are all 18 members of the farmer group. Of the 18 people, their families were also involved, so that the number of people who were involved and benefited from the program was quite a lot. Not only is the number of residents involved increasing, but also the intensity of communication is increasing, and the facilities are available to accommodate community' aspirations, as well as support creative efforts in utilizing existing resources and finding solutions to problems.

Artificial feed is one of the most important factors in aquaculture activities and should be able to stimulate the growth of catfish. The use of good feed has nutritional content that is in accordance with the needs of the fish that are kept so that it is appropriate in determining the success of feeding activities in aquaculture which is also determined in the selection of local raw materials (Kushartono, 2000). Artificial feed ingredients are agricultural, fishery, livestock and industrial products which contain nutrients and are suitable for use as feed. Several requirements in the selection of feed raw materials include nutritional value adjusted according to needs, easy to digest so that the feed efficiency value is high enough, does not contain poisons that can cause illness or death of fish, these feed ingredients are easy to obtain and should consider the efficiency of the feed to be made by selecting cheaper raw materials (Khairuman, TS and K. Amri. 2008).

Selection of raw materials is one of the first steps in the manufacture of feed where the required raw materials are selected and selected with the content, quality and quantity according to the specified content. Materials used in the manufacture of feed serve as a source of macronutrients such as protein, carbohydrates and fats, and contain other micronutrient components such as vitamins and minerals. Raw materials for standard catfish feed to be used in this study include: fish meal, corn flour, fine bran, tofu dregs, wheat

flour, fish oil, corn oil, and vitamins. In making artificial feed for fish, the first thing to consider is the raw material requirements for feed, namely:

1. Raw materials for feed should not compete with human food ingredients. If humans need it a lot, this raw material should not be given to fish.
2. This raw material must be available for a long time, or its availability must be continuous. Raw materials that existed at one time and then disappeared, must be avoided. Mass-produced rice causes the availability of bran and bran to be abundant. On the other hand, limited production of raw materials will also produce limited materials.
3. Prices of raw materials; although it can be used, but if the price is expensive then the use of the material or the role of the raw material as a raw material is already set aside. In fact, cheap or expensive raw materials must be judged by the benefits of these materials, which are a reflection of the quality of these materials. Fish meal, for example, is expensive, but when compared with the high protein content and completeness of amino acids, the use of fish meal is cheap.
4. The nutritional quality of raw materials is another important requirement. Even though the price is cheap, there are many of them in Indonesia, and the availability is continuous, but if the nutritional content is poor, of course this raw material cannot be used.

In the manufacture of artificial feed used tools that require an understanding of the function and properties of the tool. The equipment used in the manufacture of household-scale artificial feed, namely: artificial feed storage devices, grinding tools, mixers, pellet molding machines, dryers, packing equipment. Community leaders need to know and understand the workings and functions of the tools used in the manufacture of artificial feed. This is done by understanding the workings and functions of each feed making tool to make fish feed perfectly. The introduction of these tools includes the types of tools, knowing their names, understanding the shape, function and workings of these tools. Each tool is designed differently from one another and has specific functions, as follows; scales, basin, flour sifter, glass, tablespoon, grinding ingredients, aluminum oil, oven if you have one, where the temperature can be adjusted to 40-50°C or drying in the sun, as well as a manual printer.

For the health aspect, fish farming activities are believed to be able to meet the needs of animal protein sources, especially in preventing stunting activities. In this case it can be seen that in stunting prevention the priority is intake of animal protein. For the environmental aspect, waste management activities can support environmental quality improvement by reducing the generation that is disposed of to temporary landfills. Most of the organic waste has been used as raw material for making compost and liquid organic fertilizer. The community is also developing organic waste treatment using the eco-enzyme method. The existence of a program for making fish feed independently has led to more use of organic waste, because around 10-16% of the ingredients for

making fish feed are taken from organic waste in the form of vegetable scraps. From an environmental perspective, composting organic waste provides many benefits, including:

1. Reducing air pollution from burning waste and releasing methane gas from decomposing organic waste due to methanogenic bacteria in landfills
2. Reducing the need for land for stockpiling
3. Improving soil fertility, nutrient retention/availability in the soil, soil water absorption capacity, soil microbial activity, crop quality (taste, nutritional value, and yield quantity),
4. Provide hormones and vitamins for plants, suppress plant growth/disease attacks, and improve soil structure and characteristics
5. The role of organic matter on soil physical properties includes stimulating granulation, improving soil aeration, and increasing water holding capacity. The role of organic matter in soil biological properties is to increase the activity of microorganisms that play a role in nitrogen fixation and the transfer of certain nutrients such as N, P, and S. The role of organic matter in soil chemical properties is to increase cation exchange capacity thereby affecting nutrient uptake by plants (Gaur, 1980).

Integrated waste management must be accompanied by a follow-up plan in the form of similar activities which should be carried out continuously to increase knowledge and understanding of waste management and wise waste management. Thus reducing the amount of waste transported to the landfill. As well as the need for assistance with tools that can be used to increase the economic activity of activity managers, so that sustainability and self-sufficiency of activities can be achieved.

CONCLUSION

Waste Management Integration Model with economic and social activities resulted in a change in behavior in the community of RW 08 Warakas Village from previously only relying on garbage collection services by the city government, also in relation to stunting prevention. Now the community is actually actively managing domestic waste, growing vegetables and medicinal plants in their own environment, as well as cultivating fish, to fulfill nutrition, overcome stunting, and increase income. On the urban agricultural activity side, the existence of this program can change the behavior of some farmers from previously using chemical fertilizers for their agricultural needs, now people are starting to use organic fertilizers made by themselves.

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