



Synergty and Community Empowerment in Organic Waste Management in Wringinanom, Gresik

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ABSTRACT: This research aims to examine the processing of organic waste into useful products for the community. Departing from the high volume of organic waste produced (61.97 kg per RT per day) along with bad impacts, the strategy used is the processing of waste followed by the dissemination of processing results by the composter method. This research used is descriptive analytic and participatory rural appraisal (PRA) approach which aims to encourage community participation in program implementation. This research was carried out in Pasinan Lemah Putih Village, Wringinanom Subdistrict, Gresik Regency by collaborating with several stakeholders, namely the local village government, community, and implementor/expert/academic team. Data source in the form of narratives resulting from discussions and observations, secondary data, and documentation. The results show that the processing of organic waste can reducing waste volume per day and adverse effects. From an economic perspective (livelihood), processed organic waste is capable of producing 15-20 liters of liquid organic fertilizer (POC) valued at IDR 975,000 to IDR 6,000,000 in one RT per day. From a social and environmental perspective, organic waste processing, which is continued with dissemination, has provided environmental insights and new experiences for all levels of society in Pasinan Lemah Putih Village in the form of improving the quality of life of the community, the spirit of preserving environmental beauty, the spirit of preventing littering, and reducing the adverse effects of waste such as bad smell and disease.

Keywords: Waste Management; Organic Composter; Community Empowerment



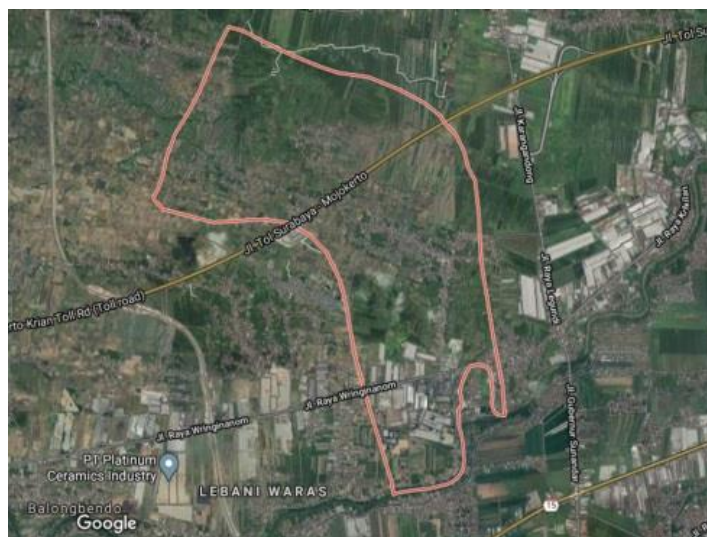
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INTRODUCTION

Pasinan Lemah Putih Village is a village located in Wringinanom District, Gresik Regency. Located at coordinates -7.3786616 and 112.5383703, Pasinan Lemah Putih Village is bordered by Kedamean District (north), Sidoarjo Regency (south), Sumengko Village and Watestanjung Village (west), and Driyorejo District (east). The area of Pasinan Lemah Putih Village reaches 3.12 km² or 4.98% of the total area in Wringinanom District with an area of 30 meters above sea level

([Pemerintah Desa Pasinan Lemah Putih, 2020](#)). The distance from the village center to the Wringinanom District Center is 7 km and takes 10 minutes and the Gresik Regency Center is 45 km and takes 1 hour ([Pemerintah Desa Pasinan Lemah Putih, 2020](#)).

Figure 1. Administrative Area of Pasinan Lemah Putih Village, Wringinanom District,



Gresik Regency (Red Border)

Source. Maps (accessed 2022)

Administratively, regionally and demographically, Pasinan Lemah Putih Village is divided into 4 hamlets, namely Pasinan Hamlet, Lemah Putih Hamlet, Mrunggi Hamlet, and Sidokandeg Hamlet with 4 RWs and 21 RTs ([Pemerintah Desa Pasinan Lemah Putih, 2020](#)). With a population of 6,094 people (consisting of 3,087 men and 3,007 women), the number of household heads (KK) reached 1,868 heads of families and the population density in Pasinan Lemah Putih Village reached 1,953 people/km². With an area of 3.12 km², Pasinan Lemah Putih Village produces more than 340 tons of final waste per year ([Pemerintah Desa Pasinan Lemah Putih, 2020](#)).

Garbage or waste is the residue or the end result of the consumption process which is often considered not useful for society. Based on information from the government in Pasinan Lemah Putih Village, the impact caused by waste is very detrimental to the community considering that the density of buildings in Lemah Putih Village is very high and it is close to an industrial area. This condition is in accordance with the statement of Pongpunpurt et al. (2022) that industrial areas and densely populated towns are areas that produce waste with a significant capacity ([Pongpunpurt et al., 2022](#)). On the other hand, the condition of garbage or waste pollution can be a good opportunity if efforts to change behavior can be made in dealing with this waste and the community knows that basically waste can be processed into efficient products ([Dhiman & Mukherjee, 2021](#); [Metcalf et al., 2012](#)). In addition, waste originating from the ignorance of the community in management efforts has an impact on reducing the carrying capacity of the environment and threatens the survival of the community in the future ([Jayasubramanian et al., 2015](#); [Waluyo et al., 2019](#)). The decline in the carrying capacity of the environment has several symptoms such as changes in land use, suboptimal land use, environmental degradation, pollution of the physical environment, and lack of integration between the management of human, natural

and man-made resources. According to Law Number 18 of 2008, waste comes from the remains of daily activities or natural processes in solid form. The type of waste itself is very diverse and is divided into organic or biodegradable waste, inorganic or non-biodegradable waste, and toxic/hazardous waste.



Figure 2. The condition of the waste in the TPA of Pasinan Lemah Putih Village

Source. Documentation (2022)

One of the contributions to the increase in the volume of waste depends on the intensity of public consumption. The more often and the more consumption patterns, the more waste will be produced if there is no management effort. For people in residential areas in Pasinan Lemah Putih Village, waste is a problem that must be addressed. This is due to the high volume of waste in the midst of densely populated settlements, industrial areas, narrow drainage, and being on river banks. Based on information from the local village government, an average of 0.5 kg volume of organic waste per household per day (or more than 340 tons per year in 1 village) is generated from household activities. The high volume of waste is also exacerbated by the inadequate final disposal site (TPA) and proper management. As a result, garbage only piles up and has a bad impact on the residents' settlements in Pasinan Lemah Putih Village. For this reason, good efforts to control, handle and process organic waste are needed. This effort is at the same time an environmental management process that is not only oriented towards improving the quality of social and environmental aspects, but also uses a mathematical calculation perspective to make waste more useful (Ouro-Salim & Guarnieri, 2022).

The complexity of the waste problem in Pasinan Lemah Putih Village has a negative impact on the condition of the community. Along with cultural progress, this complexity is influenced by several aspects such as consumption patterns, increasing population, socio-economic conditions, and technological advances (Matsumoto, 2011; Rhofita, 2014). In addition, to overcome the waste problem requires high management attention, expensive operational costs, and the need for a large enough management space so that the community will also be affected (Novianty, 2014; Puspitawati & Rahdriawan, 2012; Riswan et al., 2012; Wardi, 2011). Efforts that can be made is to turn waste into products that are useful and beneficial to the environment through cooperation and commitment between interested parties in managing village areas. Several parties carrying out the synergy of empowerment include the local village government, the local community, and

experts/executors of the waste management program into valuable products for socio-economic and environmental benefits.

METHOD

The research was conducted using a qualitative research method with an analytical descriptive approach and participatory rural appraisal (PRA). The qualitative method is a research procedure that seeks to produce descriptive data in the form of oral notes and the observed object's behavior, followed by an exploration of meaning ([Cresswell, 2013](#); [Taylor et al., 2015](#)). Meanwhile, the analytical descriptive approach is a method that seeks to obtain data in the form of numbers or documentation with deep meaning ([Sugiyono, 2012](#)). The PRA approach itself aims to increase aspects of empowerment and increase community participation which leads to community involvement in a program([Supriatna, 2014](#)).

Data collection techniques consisted of in-depth informal interviews (with the village government and several key informants), written topic statistical data (village monographs and BPS data), field documentation (activities from preparation to outreach), and observations made in Pasinan Lemah Putih Village. Data processing is carried out in the form of compiling data from field observations, sorting or reducing data that is relevant to the research topic, and compiling a narrative of research results. In addition, when conducting field research, researchers encouraged the community to explore village problems (based on the perspectives of the community, village government, and a team of experts), formulate alternative solutions, and make mutual agreements regarding the processing of organic materials. waste in Pasinan Lemah Putih Village, Wringinanom District, Gresik Regency.

RESULT AND DISCUSSION

Organic Waste Processing into Liquid Composter

The problem of waste management in Pasinan Lemah Putih Village has obstacles in the form of the absence of a special system or location for waste management in the village. Existing landfills tend to lack adequate standards and are located in main residential areas of local communities. The TPA that is owned is also not permanent, or only still using village land, which then the community is free to hoard waste without any separation of organic and inorganic resulting in overload. The impacts range from bad odors, damaging the quality of the soil, disturbing the view of the area, to other impacts that are very detrimental to the community. Another consequence is that people often litter on the roadside, along rivers, or in their yards. There is no effort or comprehensive retribution for residents to carry out integrated waste management.

The role of all layers of society in waste management is a form of participation supported by awareness actions. This action is a form of the community's role in improving the quality of environmental improvement through managing household waste in homes and the surrounding environment. The sustainability of waste management efforts is also based on the ability and

willingness of local communities to optimize the quality of their homes. Actions to improve environmental quality will also be in vain if there is no joint commitment from the local village government, the community, and implementers/experts/academicians who run programs related to waste handling and management. The approach adopted is to encourage all levels of society to actively participate, starting from problem solving, analysis, to formulating strategies to reduce and convert waste into useful products. As stated by Rahman et al. (2022) that apart from having a social impact, this contribution also has the opportunity to have an economic impact even though it is not a profit-oriented movement ([Rahman et al., 2022](#)).

To prevent and reduce the increasing volume of waste, the effort that can be done is to make and convert organic waste into a composter. This effort involves all levels of society in Pasinan Lemah Putih Village starting from the village government and community organizations encouraging residents to sort waste, the community contributes to sorting and distributing organic waste, and the implementing team (experts/academicians) collects waste to then enter the next process. The local village government started activities with the help of community organizations to socialize the organic waste sorting and processing program to the village community. Collaboration between the village government and the implementing team also provides an understanding that waste is not only the responsibility of one party, but is a shared responsibility considering the impact it has on all levels of society and life's ecosystems. At the beginning of the initiation of the empowerment effort, in general it showed that the community was very enthusiastic, it's just that the local community did not really understand the classification of organic and inorganic waste. For this reason, efforts to collect organic waste are carried out as well as efforts to provide an understanding of the types of organic and inorganic waste. Within 1 day, an average of 0.5 kg of organic waste was collected per household with a total of 61.97 kg of organic waste per RT. The collected organic waste is then processed into a composter.



Figure 3. a) Routine of Organic Waste Collection/Separation; b) Organic Waste Entry Process; c) Composting Process by Karang Taruna Desa

Source. Documentation (2022)

Garbage or waste is the residue or result of the consumption process which is often considered not useful for society and becomes a challenge for the government ([Guerrero et al., 2013](#)). Various

technologies are used as an effort to deal with waste, starting from reducing waste ([Muhamad et al., 2020](#)), to using and recycling waste that is still suitable for use ([Kumar & Samadder, 2017](#)). Based on the previous conditions, parties with an interest in waste management in Pasinan Lemah Putih Village use composting technology. This technology is an advanced stage after the implementing team sorts and collects organic waste. Composting itself is a technique that is generally capable of producing compost which is useful as fertilizer for plants and strengthens soil structure with the help of bacteria (microbes) as decomposers. If using natural techniques, composting that is capable of producing compost is generally quite long. However, to speed up the composting process, executors use the help of a special bioreactor, organic matter as a mixture, and a source of microbial decomposers. The scale of composting itself can be done either by households or on a macro scale. For household scale, the technical process can use specially designed plastic drums to simplify and speed up the composting process. Some of the advantages of composting on a household scale include: first, it only uses a narrow area; second, easy to control so as to produce quality compost, and; third, the impact (eg smell) is not too disturbing.



Figure 4. The process of processing organic waste into liquid compost
Source. Documentation (2022)

For the composting process, preparations are made to collect the necessary tools and materials. Some of these tools and materials include: first, the equipment consists of a compost reactor (in the form of a modified machine with a drum capacity of 140 kg, and; second, materials in the form of organic waste (in the form of leaves, kitchen waste such as vegetables, rice, etc.) and decomposing bacteria (EM4 and M21 Decomposer Formulas). To avoid unpleasant odors, materials such as leftover meat, eggshells, bones, and organic matter from living things (animals) need to be avoided during the composting process. In addition, some of these materials will makes the composting process slower. During the composting process it is necessary to pay attention to the supply of incoming air and moisture. The better the aeration and humidity process, the better and faster the degradation will be considering these factors affect microbial growth. For this reason, during the composting process it must be carried out watering the compost mixture.

Community Empowerment Efforts through Outreach and Dissemination

Making liquid compost to produce liquid compost or liquid organic fertilizer (POC) is an effort to use appropriate technology. This technology was adopted for 2 reasons: first, to reduce and process household waste in Pasinan Lemah Putih Village into products of economic value, and; second, increasing the capacity and understanding of the local community in utilizing unused waste. In connection with the purpose of adopting this technology, a form of community empowerment is needed so that people are able to apply simple technology but are able to produce products that are useful and valuable for everyday life. Environmental empowerment itself is intended so that the community is jointly able to overcome environmental problems (such as waste), produce social innovations, and share experiences in creating a beautiful environment in the midst of sustainable development trends ([Avelino et al., 2019](#); [Babaci et al., 2015](#); [Kaur & Deswal, 2019](#); [Kimengsi & Gwan, 2017](#)). At the same time, this empowerment also requires a shared will from stakeholders to create effective and efficient waste management ([Cohen et al., 2021](#)).



Figure 5. a) The Harvest of POC; b) POC Trial on Plant Seeds; c) Socialization of POC Production

Source. Documentation (2022)

Empowerment is carried out in the form of socialization of the results of using simple technology with the aim of explaining the benefits of processing waste into valuable products. These benefits are both in the aspects of livelihood and aspects of life. The socialization carried out is a joint commitment between the village government, the community, and the implementing team/experts/academicians in order to achieve the goal orientation of waste reduction and its impact. At the end of the empowerment process through the socialization pattern, there appears to be a positive response from the village government, residents, implementers, and all parties to new innovations in Pasinan Lemah Putih Village. In this socialization, it was seen that people from

various backgrounds ranging from ordinary people, academics, agricultural practitioners, farmers, housewives, environmentalists/enthusiasts and other layers discussed interactively regarding organic waste, waste processing, the bad effects of waste, to sharing experiences on how to using the right technology in utilizing waste that is no longer useful. Community empowerment efforts in an environmental program or movement aim to increase awareness, attachment between village internal implementers, to a sense of belonging from improving an environment ([Bradford, 2017](#); [Puteh et al., 2018](#)). On the other hand, participation in the empowerment of implementing components is directed at increasing the level and precision of program success and the sustainability of an environmental improvement movement ([Didi, 2021](#); [Tuuli, 2018](#)).

Based on the results of the composting process, the collected waste of 61.97 kg is capable of producing around 15 to 20 liters of POC per RT. This capacity can be used as household scale fertilizer and watering yard plants. When viewed from the economic benefits (livelihoods aspect), the market price of POC is in the range of Rp. 65,000.00 -Rp 300,000.00 per liter in 2019 (<https://www.agroaggie.id> , accessed 2022). This means that if POC is able to be carried out in a sustainable manner, there will be an additional economic value of Rp. 975,000.00 up to Rp. 6,00,000.00 in one RT per day. This figure is not an exact figure, but the range is the lowest to the highest economic rate depending on the quantity and quality of POC produced during composting. This is in line with a study conducted by Andooz et al (2023), Cong and Thomsen (2021), and that waste which is often considered useless will have a positive impact when managed properly ([Andooz et al., 2023](#); [Cong & Thomsen, 2021](#)).

Other benefits aside from the economic aspect (livelihoods) are social and environmental benefits (life). These benefits stem from the existence of new knowledge and experience in utilizing residual waste that is generally considered useless into a product that turns out to provide significant benefits for surrounding life, improve plant growth patterns, and increase nutrient content in the soil. Other benefits include improving the community's quality of life in the form of maintaining the beauty of the environment, preventing littering, and reducing the adverse effects of waste such as bad odors and disease. Organic waste itself is a component that will always be there considering the existence of humans and other living things that carry out consumption activities.

CONCLUSION

Organic waste which incidentally is an item or component that is no longer useful has an impact in the form of a negative impact and a positive impact. The negative impact is the nature of the waste which, if left unchecked, will have a negative impact on the surrounding environment, from the short term to the long term. On the other hand, waste will have a positive impact if there is a commitment to process and increase use value both economically and non-economically. The processing is carried out in the form of using simple appropriate technology in processing waste which is continued through a community empowerment process. This effort is carried out through the joint commitment of all elements in Pasinan Lemah Putih Village, Gresik. As a result, apart from providing economic benefits, processing organic waste into useful products also provides social and environmental impacts in the form of new knowledge and experience. The challenge going forward is that the higher the population, the more likely consumption activities will increase.

Based on this, it is certain that the organic waste produced as a residue from consumption activities will also be higher. So the recommended solution is that the community and other elements in Pasinan Lemah Putih Village must be responsive to understand this through sustainable environmental preservation efforts. In addition, the dynamics of using technology in an increasingly advanced and developing future must be utilized in such a way that the sustainability and cleanliness of the environment in Pasinan Lemah Putih Village is maintained.

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