AJARCDE
ASIAN JOURNAL OF APPLIED RESEARCH FOR COMMUNITY DEVELOPMENT AND EMPOWERMENT

Journal home page: http://ajarcde.safetainability.org ISSN 2581-0405

Implementation of Waste Processing from the Source by the Traditional Village of Cagaan, Tampaksiring District, Gianyar Bali

Made Yaya Sawitri[1], Dewa Ketut Suryawan[1], Anak Agung Sagung Putri Risa Andriani[2]

[1]*Faculty of Political Science, Warmadewa University, Denpasar, Indonesia*
[2]*Faculty of Agriculture, Warmadewa University Indonesia*

ARTICLE INFO

Article History:
Received: 17 August 2020
Final Revision: 20 November 2020
Accepted: 01 December 2020
Online Publication: 09 Dec 2020

KEYWORDS

waste processing, organic waste, inorganic waste, tourist villages, community service

CORRESPONDING AUTHOR

**E-mail:: yayasawitri@warmadewa.ac.id*

A B S T R A C T

The Cagaan Traditional Village, which is located in Pejeng Kangin Village, Tampak Siring District, is one of the traditional villages that are currently seriously developing the village's potential as a tourist village. One of the efforts to improve that is now being promoted is regarding the cleanliness of the village. However, currently, there is no comprehensive system capable of managing most of the waste generated by villagers. This village already has a waste bank but it only manages around 30% of the total waste generated. Organic waste which is much larger in quantity is still dumped in the "teba" or backyard. Another problem is the presence of residual waste, which has so far been collected and then transported to a landfill (TPS). The problem raised in this "community service program" is the public's ignorance of government policies regarding waste management and the proper procedures for managing waste from sources. Therefore, to support the government's efforts in realizing a waste management system from sources and to support the efforts of traditional villages to develop their potential as a tourism village, education on waste management from sources in the traditional village of Cagaan, Pejeng Kangin was implemented. Activities that have been carried out include the socialization of government regulations regarding waste processing at the source, optimization of waste banks, and processing of organic waste using the composting method. The implementation of Waste Processing from the Source by the Traditional Village of Cagaan, Tampaksiring District, Gianyar " received a good reception from the community and full support from the management of the Cagaan Traditional Village.

1. INTRODUCTION

1.1. Research Background

The problem regarding solid waste currently in Bali has reached a critical stage. Based on data from the "Bali Partnership", in 2019 it was found that the amount of waste in Bali reached 4,281 tons per day. Of these, 48% of them ended up in the final disposal site (TPA) or were recycled, while the remaining 52% had not been handled properly. The garbage is only burned or thrown into waterways and ends up in the sea. The amount of plastic waste that flows into the sea when it is accumulated reaches 1.5 million tons per year [1]. If this condition is not handled properly, then this problem can reduce the natural quality of Bali, which is the basis for the survival of the community and the tourism industry.

Many environmental activists regret that the waste management system is only concentrated in the downstream part. More waste generated by households and industry is only collected and then transported to the TPA without being previously sorted. The large volume of waste transported to the TPA causes the capacity of the TPA in Bali to become overloaded. In addition, the management of the TPA is not good enough that it often causes fires, such as what happened to TPA Suwung (Badung & Denpasar), TPA Temesi (Gianyar), TPA Mandung (Tabanan), and TPA Bengkala (Buleleng).

The Governor of Bali began efforts to deal with the waste problem in Bali in 2018 by promulgating the Governor of Bali Regulation No.97/2018 concerning the Limitation of Single-Use Plastic (SUP) Waste. This regulation prohibits three types of single-use plastic, namely plastic bags, polystyrene (styrofoam), and plastic straws. SUP itself is defined as any form of tool/material made of or containing plastic, synthetic latex or polyethylene, thermoplastic synthetic polymeric, and intended for single-user. This Governor Regulation requires every person and institution, whether supplier, distributor, producer, seller to provide a replacement or substitute for SUP. Also prohibiting the distribution and provision of SUP by the community, business actors, traditional villages, and others [2]. The desired end goal is to reduce single-use plastic waste and prevent environmental damage.

https://doi.org/10.29165/ajarcde.v4i3.58

On November 21, 2019, the Governor of Bali issued the Governor of Bali Regulation Number 47 of 2019 concerning Source-based Waste Management. This Governor Regulation consists of 13 chapters and 40 articles to create a culture of clean living and improve the quality of the environment and public health. It is hoped that with this Governor Regulation, there will be a paradigm shift from centralized waste management downstream to waste management from the source [3].

The main key to implementing this Governor Regulation is the active role of the community, especially from customary villages. Synergy is expected to be established between traditional villages and sub-districts. The problem is that not many residents know about this Governor Regulation. Even if they are aware of this Governor Regulation, public knowledge regarding waste management from sources in an appropriate manner is still minimal.

Cagaan Traditional Village is located in Pejeng Kangin Village, Tampak Siring District. Until now, the Cagaan adat village has not had a properly integrated waste processing system. Currently, there is already a waste bank that is managed by village youths, but this waste bank only uses a manual recording system. This waste bank can only handle inorganic waste which is estimated to only occupy about 30% of the total waste production in the village.

Organic waste which is much larger in quantity is still dumped in the "teba" or backyard. Of course, this is not very nice to look at. Not to mention the problem of residual waste, such as diapers, Styrofoam, and oil paper, which are just collected and then transported to the TPS.

Since 2019, the Cagaan traditional village has also seriously developed village's potential as a tourist village. One of the efforts to improve that is now being promoted is regarding the cleanliness of the village. However, currently, there is no comprehensive system that can manage most of the waste generated by villagers. To support the government's efforts in realizing a waste management system from sources and supporting the efforts of traditional villages to develop their potential as a tourism village, we want to provide education and assistance so that the Cagaan Traditional Village can carry out the implementation of waste management from sources in the traditional village of Cagaan, Pejeng Kangin.

1.2. Literature Review

Management of household solid waste is a problem faced by all developing countries. The acceleration of waste accumulation is influenced by the rate of population growth, economic activity, urbanization, and industrialization [4,5].

Biodegradable solid waste is usually burned or simply dumped in the field [6,7]. which can cause health and environmental problems. One of the efforts to solve the problem of biodegradable waste is composting.

Composting has several advantages over incineration and landfill and is an effective solution for recycling such waste. This is because it has lower operating costs, reduces environmental impact, and most importantly, the final product can be used as fertilizer [8]. This composting not only reduces the amount of waste sent to landfills but socially, ecologically, and economically it contributes to providing the best alternative for the management and transformation of organic waste [9].

Meanwhile, for non-organic waste, in several places in Indonesia, Waste Banks have been developed. The waste bank emerged as an initiative of the local community to participate in dealing with existing problems. The 3R waste management strategy (Reduce, Reuse and Recycle) based on the community can change the imagination of most people to waste that has no economic value [10].

A waste bank is a social engineering activity that teaches people to sort waste and raises public awareness in managing waste wisely and in turn will reduce waste that is transported to the TPA (Final Disposal Site). The construction of a waste bank is the initial momentum to foster community collective awareness to start sorting, recycling, and utilizing waste because waste has a fairly good selling value, so Environmentally sound waste management has become a new culture for Indonesia [10].

1.3. Research Objective

The research aimed to see the acceptance of the local community and local government support regarding the implementation of organic waste processing through composting and non-organic waste through the construction of a waste bank.

2. MATERIALS AND METHOD

Based on the problems that have been described previously, the solutions mapped in this community service activity are divided into two. The first is the introduction of regulations related to waste processing in Bali, especially Governor Regulation No. 97 of 2018 and Governor Regulation No. 47 of 2019. The second solution is to build a system and provide assistance in processing waste from the source. Education and assistance will be provided to the community, mainly focused on women who are members of the PKK and young people who are members of the 'Sekaa Truna-Truni' (STT) of Cagaanan.

2.1. Socialization of Bali Provincial Solid Waste Regulations

Waste is now a critical problem, so management needs to be carried out comprehensively and integrated from upstream to downstream. Solid waste regulations that have been issued, both by the central and local governments, then provide clarity on the responsibilities and authorities of the Government as well as the roles of the community and other stakeholders in the system. This regulation is also a reference for waste management methods that provide economic benefits, are healthy for the community, and are safe for the environment. For this reason, it is very important to ensure that these references have been socialized and known by the wider community.

In Bali, there are several regulations governing waste, especially those that are being aggressively promoted, namely Governor Regulation Number 97 of 2018 concerning Limitation of Plastic Waste Generation and Governor Regulation Number 47 of 2019 concerning Management of Waste from Sources. These two regulations indicate the government's intention to change the orientation of waste management from collect-transport-waste to reduce the volume of waste and handle it directly at the source.

Governor Regulation Number 97 of 2018 aims to prohibit the circulation, distribution, and supply of single-use plastics (SUP) by the community, business actors, traditional villages, and others. SUP itself is defined as any form of equipment/materials made of or containing plastic, synthetic latex or polyethylene, thermoplastic synthetic polymeric, and intended

 https://doi.org/10.29165/ajarcde.v4i3.58

for single use. This regulation prohibits three types of SUP, namely plastic bags, polystyrene (styrofoam), and plastic straws. This rule requires every person and institution, whether supplier, distributor, manufacturer, seller to provide replacement or substitute for SUP. The desired end goal is to reduce single-use plastic waste and prevent environmental damage.

Governor Regulation Number 47 of 2019 regulates waste management which must be carried out from the upstream. Waste is divided into 3 types based on its source, namely household waste, household waste, and specific waste. Management must start from the source where the waste is generated, where the waste must be sorted and then taken according to its type. Inorganic waste can be resold through waste banks or collectors. Organic waste can be used for composting. By processing the inorganic and organic waste at the source, what remains is only residual waste which can then be transported to the final disposal site (TPA).

This regulation also encourages the active role of traditional villages to cooperate with villages/wards in carrying out waste management by carrying out guidance and empowerment for the community in increasing responsibility for waste management. Customary villages can also arrange awig-awig / pararem traditional villages which aim to foster a culture of clean living in the authority of traditional villages, consistently implementing the provisions of awig-awig / pararem traditional villages; and applying customary sanctions against violations of the provisions of awig-awig / pararem customary villages. By knowing and understanding the mandate contained in the two regulations, it is hoped that public awareness to reduce the use of SUP and to manage it from the source will increase.

2.2. System Development and Mentoring

The system development that will be carried out in partner villages is divided based on the type of waste generated, namely non-organic waste management through optimization of Waste Banks and organic waste processing through composting. Based on the explanation above, this community service scheme can be made as a solution scheme (Figure 1).

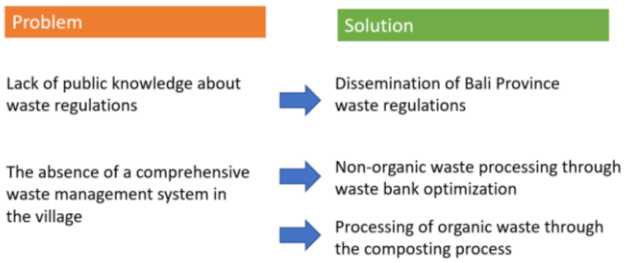

Figure 1. Solution Scheme of Waste Problem in the Traditional Village

3. RESULT AND DISCUSSION

The first output of this activity is the socialization of the Bali Provincial Waste Management Regulations. In Bali, there are several regulations governing waste, especially those that are being aggressively promoted, namely Governor Regulation Number 97 of 2018 concerning Limitation of Plastic Waste Generation and Governor Regulation Number 47 of 2019 concerning Management of Waste from Sources. These two regulations indicate the government's intention to change the orientation of waste management from collect-transport-waste to efforts to reduce waste volume and handle it directly at the source. This regulation is also a reference for waste management methods that provide economic benefits, are healthy for the community, and are safe for the environment. For this reason, it is very important to ensure that these references have been socialized and known by the wider community.

This regulation also encourages the active role of traditional villages to cooperate with villages/wards in carrying out waste management by carrying out guidance and empowerment for the community in increasing responsibility for waste management. Traditional villages can also arrange awig-awig / pararem traditional villages which aim to foster a culture of clean living in the authority of the traditional village, consistently implementing the provisions of awig-awig / pararem traditional villages; and applying customary sanctions against violations of the traditional village awig-awig / pararem provisions.

Second, digitizing the waste bank. Plastic waste can be collected at the Waste Bank and then distributed back to the industry. Waste Bank is a program that invites people to sort non-organic waste to be exchanged for using money or savings deposits. This management system is communal and participatory by emphasizing togetherness and direct participation of its citizens. The purpose of Waste Bank is to reduce waste from its source by educating the public; creating an environment and livable area clean beautiful comfortable safe green; as well as increasing the economic value added of its members through its derivative businesses [11]. The waste management paradigm that has been applied so far must be changed with the understanding that people must collect their waste, people must sort waste from their waste, and people must save waste in a participatory formed Waste Bank to then receive a reward in the form of money or savings.

Third, make a video tutorial on how to compost organic waste. The organic waste composting business has the potential to be developed because the composition of organic waste in several cities in Indonesia is very large [12]. Organic waste is waste produced from biological materials that can be degraded by microbes or are biodegradable. This waste can easily be broken down through natural processes. This organic waste includes waste from the kitchen, food scraps, fruit skins, leaves and twigs [13].

Composting is a solid waste processing technique that contains biodegradable organic matter (which can be broken down by microorganisms). Apart from being an organic fertilizer, compost can also improve soil structure, increase the ability of the soil to absorb water and retain water and other nutrients. Natural composting will take a relatively long time, which is around 2-3 months or even 6-12 months. Composting can take place with a faster fermentation with the help of microorganisms [14]. So far, people still do not know how to do simple composting at home so it is necessary to create educational media to socialize how to compost in households. One of the ideas that can be developed is using household organic waste processing technology (OSAMA) [14]. From the output above, the social and economic impacts (outcomes) that have been felt have occurred, among others:

3.1. Increased knowledge of residents in the Cagaan Kaja Traditional Village about the regulations that underlie waste processing in Bali Province.

The posters have been distributed to 150 house groups including 300 heads of households (Figure 2). By knowing and understanding the mandate contained in the two regulations, public awareness to participate in reducing the use of SUP and managing from the source will increase.

Figure 2. Socialization of regulations through posters and billboards

3.2. Increasing Efficiency of Waste Bank Management

So far, partner villages have had a Waste Bank operated by Pemuda Potor who is part of the management of the Satya Pertiwi Garbage Bank (Figure 2). The operations carried out are still conventional, namely by manual weighing and recording. Manual weighing and recording also mean that the time needed to operate a waste bank is longer, even though this waste bank is still done voluntarily by volunteers from young people.

Figure 3. Waste Bank Activities with Applications

3.3. Increased knowledge of residents about composting.

So far, organic waste, which is much larger than inorganic waste, is still dumped in the "teba" or backyard. Of course, this is not very beautiful to look at and can pollute the environment. With an instructional video on how to make compost in the household, it is hoped that the community can practice it directly in their respective homes (Figure 4).

Figure 4. Composter Practice Demonstration

4. CONCLUSION

"The implementation of waste processing from sources by the Cagaan Traditional Village, Tampaksiring District, Gianyar" has been largely carried out well. Socialization of solid waste regulations, digitizing the “Satya Pertiwi” Waste Bank, submitting communal composter, and making video instructions on how to make compost in households. The implementation of Waste Processing from the Source by the Traditional Village of Cagaan, Tampaksiring District, Gianyar "received a good reception from the community and full support from the management of the Cagaan Traditional Village.

REFERENCE

[1] Anonim. 2019. Data dan Sumber Sampah di Bali Tahun 2019. Tersedia pada : https://balibersih.com/2019/07/04/data-dan-sumber-sampah-di-bali-tahun-2019/ . Diakses pada tanggal 27 Juni 2020.

[2] Peraturan Gubernur Provinsi Bali Nomor 97 Tahun 2018 tentangPembatasan Penggunaan Timbulan Sampah Plastik SekaliPakai.

[3] Peraturan Gubernur Bali Nomor 47 tahun 2019 tentang Pengelolaan Sampah berbasis sumber.

[4] SRIVASTAVA, V.; ISMAIL, S. A.; SINGH, P.; SINGH, R. P. Urban solid waste management in the developing world with emphasis on India: challenges and opportunities. Reviews in Environmental Science and Bio/Technology, v. 14, n. 2, p. 317-337, 2015. http://dx.doi.org/10.1007/s11157-014-9352-4

[5] KUMAR, S.; SITH, S. R.; FOWLER, G.; VELIS, C.; KUMAR, J.; ARYA, S. et al. Challenges and opportunities associated with waste management in India. Royal Society Open Science, v. 4, n. 3, p. 1-11, 2017. https://doi.org/10.1098/rsos.160764

[6] AGARWAL, A.; SINGHMAR, A.; KULSHESTHA, M.; MITTAL, A. K. Municipal solid waste recycling and associated markets in Delhi, India. Resources, Conservation and Recycling, v. 44, n. 1, p. 73-90, 2005.

 https://doi.org/10.29165/ajarcde.v4i3.58

[7] TAYLAN, V.; DAYIHA, R. P.; SREEKRISHNAN, T. R. 2008. State of municipal solid waste management in Delhi, the capital of India. Waste Management, v. 28, n. 7, p. 1276-1287

[8] LI, Z.; LU, H.; REN, L.; HE, L. 2013. Experimental and modeling approaches for food waste composting. Chemosphere, v. 93, n. 7, p. 1247-1257

[9] Ana Kaline da Costa Ferreira, Nildo da Silva Dias, Francisco Souto de Sousa Junior, Daianni Ariane da Costa Ferreira, Cleyton dos Santos Fernandes,Tiago de Sousa Leite. 2018. Composting of household organic waste and its effects on growth and mineral composition of cherry tomato. Rev. Ambient. Água 13 (3) .

[10] (Makmur Selomo, Agus Bintara Birawida, Anwar Mallongi, Muammar. 2016. Bank Sampah Sebagai Salah Satu Solusi Penanganan Sampah Di Kota Makassar. JURNAL MKMI, Vol. 12 No. 4, Desember 2016

[11] Kementrian Lingkungan Hidup, 2012. Peraturan Menteri Negara Lingkungan Hidup Republik Indonesia Nomor 13 Tahun 2012 Tentang Pedoman Pelaksanaan Reduce, Reuse, Dan Recycle Melalui Bank Sampah

[12] Damanhuri, E dan Padmi. T. 2006. Pengelolaan Sampah. Diktat Kuliah Dep. Teknik Lingkungan ITB.Bandung

[13] Agung Suprihatin, Dwi Prihanto, Michel Gelbert. 1996. Pengolahan Sampah.MALANG : PPPGT / VEDC Malang

[14] Saptoadi, Harwin. 2003. " Utilization Of Organic Matter From Municipal Solid Waste In Compost Industries." Jurnal Manusia Dan Lingkungan, Vol.VIII, Desember, Hal 119 – 129