

## **INCREASING ENVIRONMENTAL AWARENESS THROUGH WASTE BANK AND TECHNOLOGY WASTEWATER TREATMENT PLANT (WWTP) OSOWILANGON BENOWO TAMBAK SURABAYA**

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### **Abstrak.**

Lingkungan hidup yang sehat merupakan kebutuhan masyarakat yang sangat diperlukan. Namun, kesadaran masyarakat akan kebutuhan tersebut tidak sejalan dengan kenyataan. Masalah sampah dan sanitasi rumah tangga merupakan masalah yang belum terpecahkan. Program pengabdian melalui Kuliah Kerja Nyata (KKN) telah dilaksanakan di RW 04 Kelurahan Tambak Osowilangon. Kegiatan ini dilakukan dengan konsultasi tata cara pendirian bank sampah dan pembuatan teknologi instalasi pengolahan air limbah yang efisien dan murah. Wujud dari program pengabdian ini adalah berkembangnya kesadaran masyarakat terhadap pemeliharaan kesehatan diri dan lingkungan. Masyarakat dapat mengelola sampah secara modern melalui bank sampah dan memiliki instalasi pengolahan air limbah yang ramah lingkungan.

**Kata kunci:** bank sampah, IPAL rumah tangga.

### **Abstract.**

*A healthy living environment is a necessity for the community. However, public awareness of these needs is not in accordance with reality. The problem of waste and household waste water sanitation is an unresolved problem. The service program through Real Work Lectures (KKN) was carried out in RW 04, Tambak Osowilangon village. This activity was carried out by providing information on the procedures for establishing a waste bank and making healthy and inexpensive WWTP technology. The form of this service program is the growth of public awareness to maintain personal and environmental health. The community can manage waste in a modern way through a waste bank and have an WWTP that is safe for the environment.*

**Keywords:** waste bank, household WWTP (Waste- water Treatment Plant).

### **Introduction.**

Through the Environment Agency (DLH) and the Sanitation and Green Open Space Service (DKRTH), the Surabaya City government has launched a Smart city competition for all RW/RT areas. As one of the assessment criteria for the competition is environmental cleanliness. Several things related to the environment are how waste can be appropriately managed so that it is valid and efforts to preserve clean water [1][2][3][4].

Wijaya Putra University Research and Community Service Institute (LPPM) conducts community service programs through the KKN program. The KKN program is spread to several areas in the western Surabaya area and parts of the Gresik area that are close to the campus. This team consists of students accompanied by a lecturer. The work program is based on the situation and conditions of the local community. So that the output produced has an impact that is under the needs of the community.

The location of this service is in the East Osowilangon Tambak area, to be precise in RT 01 and 02 RW 04, Tambak Osowilangon sub-district, Benowo sub-district. There are about 200 families, and the houses are located along the river. This area is surrounded by Warehousing and crossed by two rivers. Most people work as employees and a few as fishermen or fish farmers. Residents' houses are very close together, and there are almost no gaps or alleys between houses. Motorbikes can only pass the front of the house, and at the back, it coincides with a river and a warehouse boundary fence.

The problems in the RW 04 area, especially RT 01 and RT 02, include: 1) people still throw garbage anywhere, in rivers, roadsides or vacant land. 2). The community does not yet have proper latrines (WC). So that the dirt immediately flows into the river. There are several public latrines built over the river. Hundreds of houses adjacent to the river have built latrines that directly lead to the river. As a result, the river looks shallower and full of trash. Several points of land are also used to dispose of residents' waste and burn it. These conditions become material for thought and discussion to find alternative solutions.



Figure 1. Conditions in the neighborhood of the village



Figure 2. Collection conditions in the waste bank



Figure 3. River conditions in the environment

From the results of observations and discussions with the Team, two objects became a problem: waste management and processing of waste treatment installations from latrines. So, two solutions were chosen, namely: 1) A waste bank and 2) A healthy and inexpensive WWTP design. Some of the reasons that make this waste bank the choice are because it has economic, environmental and social benefits. The establishment of a waste bank is the relatively easiest and cheapest. Because it does not require much money and only requires citizen participation. With the implementation of this waste bank, a green community will indirectly be formed that manages household inorganic waste to support Green City. To overcome the latrine problem, the Team designed a simple WWTP from used materials, such as plastic drums, bottles and pipes. This WWTP is very cheap but functions according to health standards [5][6].

### **Implementation Method.**

The methodology for community service activities is summarized in Figure 3 below:

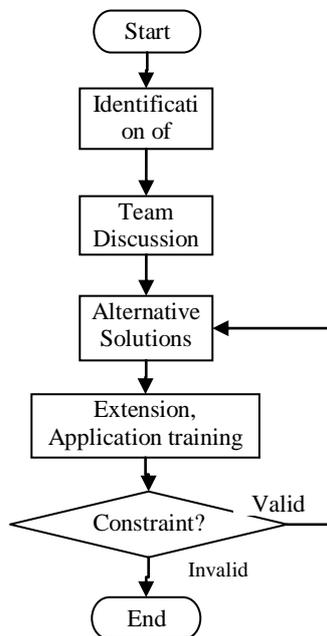


Figure 4. Community Service Activity Methods

Problem identification was carried out by conducting site surveys and interviews with heads of RW, RT and residents. Two central problems were obtained from the identification results: waste management and sewage sanitation. Furthermore, discussions were carried out by the Team to find alternative solutions to these problems. As a result, two alternative solutions were obtained, namely the need for waste management through waste banks and household WWTP processing. After alternative solutions have been determined, it is necessary to socialize the management of waste banks and healthy latrines. This activity intends to carry out community service by providing an introduction and counselling on using biofuels as alternative energy. Furthermore, help convey or provide knowledge and insight to workshop operators, namely mechanics/technicians. As well as providing solutions for implementing alternative energy biofuels to the performance of motorized vehicles. This community service will be held on 20-21 August 2022 at the Hardjo-Motor workshop, Jl. Alas Malang No. 14, Bringin, Kec. Sambikerep, City of Surabaya, East Java 60218. The training was attended by 8 participants (1 supervisor and seven mechanics/operators).

**Results and Discussion.**

**a. Garbage Bank Activities**

In this activity, counselling was carried out to residents regarding global environmental issues, knowledge of types of waste, waste bank organizations and waste bank financial management. In addition, the material on environmental issues and the harmful consequences of waste that is not appropriately managed were conveyed to residents and the heads of RW and RT. Thus, people will be more aware and care about their environment.

The community is also knowledgeable about the types of waste and their characteristics. This is very important so that residents can distinguish between productive and unproductive waste. This includes types of waste that are categorized as dangerous and toxic. Waste that can be managed directly by a waste bank is inorganic waste, such as plastic, paper, glass, metal and rubber, for organic waste, such as used cooking oil and Karak (dried leftover rice). Each type of waste has a different variety and price. This will assist residents in sorting waste for waste bank activities.



Figure 5. Socialization of the project to residents in the neighborhood

JENS	KUALITAS	Harga / Kg		CONTOH BARANG
		Cash	Tabungan	
Tembaga	Campur	40.000	43.000	Isi kabel, Tembaga Dinamo
Kuningan	Semua kuningan	20.000	24.000	Kran dalamnya warna kuning,
Aluminium	Semua Perunggu	6.500	7.000	keran air,kampas rem, (tidak lengket dgn magnet)
	Piat	9.500	10.000	Lempengan Aluminium yang tebal
	Siku	9.500	10.000	Tirai, Kusain almini, Plat nomor
	Panci	9.500	10.000	Panci Bekas
	Kaleng Aluminium	8.500	9.000	kaleng Pocari, Sprite dari almini (Lunak), tdk lengket magnet
	Wajan Almini	7.500	8.000	Wajan Almini, Teflon ( Tdk Lengket Magnet )
	Besi	Super/ Tebal	2.200	2.200
Grabang Igreed		1.500	1.500	Pipa, Magic Jar, Payung, Kompor, Logam tipis
Paku		1.000	1.000	Paku bekas
Kaleng		1.000	1.000	Kaleng susu, blek, kawat, dll
Seng		500	500	Seng bekas
Kertas	Kardus Bagus	1.300	1.300	kardus Warna Coklat yang bagus
	Kardus Jelek	1.000	1.000	Kardus Berminyak, Kardus tebal warna putih
	Koran	2.500	2.500	koran jawapost, dll
	Kertas HVS	2.200	2.200	kertas putih dengan atau tanpa tinta
	Kertas Buram / LKS	1.000	1.000	kertas yang warnanya agak coklat/abu2
	Sak semen	1.300	1.500	kemasan semen
Botol	Duplek	400	400	kertas rokok,kertas jelek,karton wama,brosur,dll
	Botol sirup (per biji)	100	100	Sisa botol Marjan,orson,dll
	Kecap /saos besar (per biji)	400	400	bango, abc, dll
	Bensin bagus (per biji)	1.000	1000	-
	Bir (per biji)	600	600	hanya botol bir bintang
	Beiling (per Kg)	50	50	Lampu, Botol Lain-lain
	Botol Putih (per Kg)	150	150	botol you c 1000, putih

Figure 6. Types and prices of waste

Knowledge of waste bank management, especially bank organization and administration, is also conveyed to prospective waste bank administrators. Candidates for management are selected from people with passion and a sense of concern for the environment. Residents who influence society, such as the heads of RW, RT, PKK or Karang Taruna, also have an essential role in the sustainability of the waste bank. In general, the organizational structure of the waste bank is straightforward. They consist of the chairman, treasurer/finance, waste receiving section, waste

segregation section and weighing section. There are eight or more members, depending on the number of customers or the volume of waste handled by the waste bank.

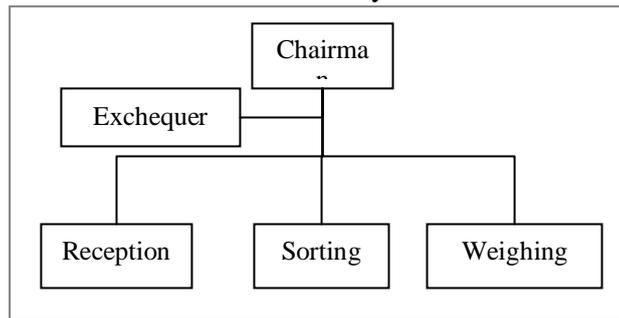


Figure 7. Waste bank organizational chart

The flow of waste bank activities is shown in Figure 8. Officers process inorganic waste from residents who are brought to the waste bank according to its type. The waste is then weighed and recorded in the customer's savings book. The type, weight and nominal (price) of waste are recorded in the savings book. After much waste has been collected, then the waste is sold to the Surabaya Main Garbage Bank or existing collectors. Every month a financial report consists of income, expenses, the amount of customer savings and the final balance.

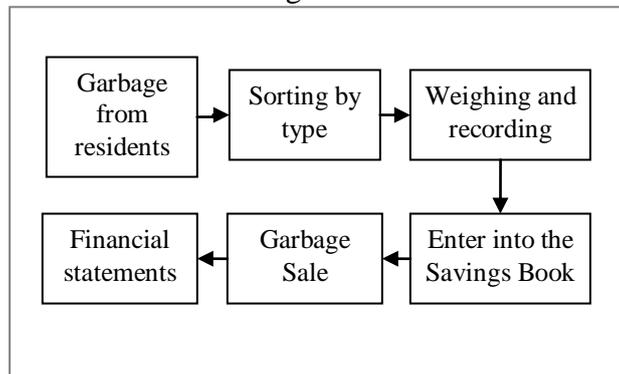


Figure 8. Waste bank activity flow

b. Domestic wastewater treatment (WWTP)

In this activity, socialization was carried out regarding standards in household waste processing. Waste from the defecation of residents must be processed first before being discharged into the environment, such as rivers or soil, following the Regulation of the Minister of Environment of the Republic of Indonesia No. 26 of 2012 [7].

It is related to the content of harmful bacteria or viruses in human faeces. Most people who live along the river do not have proper processing. They do not have proper latrines (WC). Residents perform defecation and immediately dispose of it into the river through simple latrines behind the house or above the river. The house's condition, attached to the river's edge, makes it impossible to build an underground septic tank. Because the surface of the river water is parallel to the ground [8].

For this reason, the Team designed a simple WWTP with standard working principles. This WWTP comprises three parts: a holding tube, an anaerobic destruction tube and an aerobic decomposition tube. Materials are made from used materials, such as three plastic drums with a capacity of 200 litres as decomposing tubes, mineral water bottles for the residence of decomposing bacteria, and PVC pipes for connecting and disposal. The cost required is around Rp. 600,000,-. Cheaper when compared to making a permanent WWTP which costs millions of rupiah. It is straightforward to manufacture and is portable, easy to set up and move according to the conditions of the land or residents' houses.

The working principle of this portable WWTP is designed to be similar to a standard anaerobic biofilter waste treatment system. BAB waste enters the collection tube (tube 1), and at a certain height, the water from tube 1 flows into tube 2. In tube 2, the waste will be decomposed naturally

by anaerobic bacteria. The waste product is in the form of cloudy (blackish) water. Water flows into tube three at a certain height and will be naturally decomposed by aerobic bacteria. The result of tube 3 is that the water looks a bit clear and can be dumped into the ground or river. Under certain conditions, this wastewater can be made into zig-zag reservoirs equipped with nitrogen-absorbing plants such as water hyacinth so that the water becomes more precise and odourless. After that, they are just dumped into the ground or river.

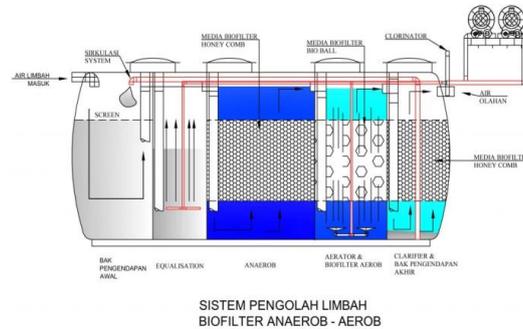


Figure 9. Permanent WWTP standards

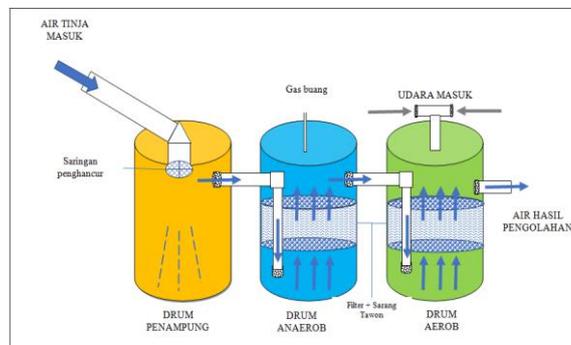


Figure 10. Portable WWTP designed by the Team

**Conclusion.**

The problem of household waste and wastewater is the main problem in this community service activity. Citizen awareness is an essential part of overcoming the problem. Socialising the waste bank and using a portable WWTP designed by the Team can be an alternative solution. The role of the heads of RW, RT, PKK and Karang Taruna residents is needed so that the planned activities can be adequately realised. Some of the activities that have been carried out need assistance so that the results can impact society and the environment. Subsequent developments will become material in future community service activities.

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