

# 1 Zero Waste for Sustainability: Utilization of Household Organic

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3 <sup>1</sup>Diana Airawaty, <sup>2</sup>Yuli Harness

4 <sup>1</sup>Mercu Buana University Yogyakarta, <sup>2</sup>Pilgrim Hospital, Boston, Lincolnshire

5 Email: [diana@mercubuana-yogya.ac.id](mailto:diana@mercubuana-yogya.ac.id)  
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## 7 *Abstract*

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9 *The issue of household organic waste remains a significant environmental challenge. Instead of discarding organic*  
10 *waste, it can be repurposed into valuable resources, contributing to a zero-waste environment. A simple and*  
11 *practical solution involves fish farming. Certain fish species can thrive on feed derived from vegetable and fruit*  
12 *scraps, as well as leftover food. This approach offers an alternative strategy for effectively reducing waste. Not only*  
13 *does it address the largest component of landfill waste—household organic waste—but it also transforms it into*  
14 *consumable products for humans, providing economic value. This sustainable practice not only minimizes*  
15 *environmental impact but also presents an innovative way to integrate waste management with resource production.*

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17 **Keywords:** household organic waste, zero-waste environment, fish farming, sustainable waste management  
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## 19 **Introduction**

20 Waste becomes a problem if it is not treated properly. Not only in developing countries  
21 such as Indonesia but also in developed countries. However, in developed countries, waste has  
22 been regulated in the law so that people are obliged to comply with it. For example, in European  
23 countries that have modern and environmentally friendly waste processing methods. In Asia,  
24 there are several countries that implement environmentally friendly waste management, one of  
25 which is Japan. In the Land of Sakura, waste management policies have been established along  
26 with recycling technology. With this policy, Japan has been able to gradually reduce the overall  
27 waste pile since 2005.

28 Another policy made by the Japanese government is the Waste Cleanup Law which has  
29 three objectives. Namely, improving public health, addressing pollution and life protection  
30 issues, and establishing a society understanding a healthy recycling cycle. In other words, waste  
31 management methods in Japan prioritize the implementation of 3R (Reduce, Reuse and Recycle).  
32 They also strictly carry out waste sorting.

33 The problem of household organic waste is increasingly a global concern, including in  
34 Indonesia, which faces major challenges in waste management. Most household waste is in the

35 form of organic materials such as food scraps, leaves, and kitchen waste, which are often thrown  
36 away, causing environmental pollution.

37 It is necessary to think seriously and handle waste from households which are the largest  
38 contributors to waste in landfills or landfills. However, there is great potential in utilizing this  
39 organic waste for more productive purposes, one of which is through tilapia cultivation. Tilapia  
40 (*Oreochromis niloticus*) is a type of freshwater fish that has fast growth and can be maintained in  
41 an environmentally friendly aquaculture system (Fadilah & Nurdiana, 2020).

42 Household organic waste can be used as natural feed for tilapia with the right processing.  
43 Through the technology of making fish feed from organic waste, such as composting or  
44 fermentation, household waste that was initially an environmental problem can be turned into a  
45 valuable resource (Suryanto et al., 2019). This tilapia cultivation program not only provides  
46 solutions for waste management but also opens up new economic opportunities for the  
47 community. Thus, tilapia cultivation based on the use of household organic waste is an  
48 innovative approach to support environmental sustainability and improve community welfare.

#### 49 **Simple Ways to Cultivate Tilapia with Artificial Ponds**

50 Choosing fish farming as a solution to manage household organic waste has many  
51 benefits, especially in supporting food security. Household organic waste, such as leftover  
52 vegetables, fruits, and rice, can be used as cheap and nutritious feed for fish. The use of organic  
53 waste as alternative feed can reduce the amount of waste wasted and divert it into productive  
54 resources. With the right processing process, such as fermentation or composting, feed from this  
55 organic waste can increase the nutrient content needed by fish, so that it can accelerate their  
56 growth (Suryanto et al., 2019).

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Figure 1. Tilapia Cultivation

60 In addition, this organic feed is more affordable compared to commercial feed, which is often  
61 expensive and difficult to reach by people with economic limitations (Fadilah & Nurdiana,  
62 2020). In the long term, fish farming supported by organic feed can also strengthen food security,  
63 especially at the household or community level. This not only increases the availability of animal  
64 protein at low cost, but also creates a more sustainable system by utilizing existing waste  
65 (Sutrisno, 2021). Thus, fish farming by utilizing household organic waste is a smart and  
66 environmentally friendly solution to support food security at the local level.

67 Tilapia cultivation using artificial ponds is one efficient way to produce fish using limited  
68 resources. Artificial ponds can be built with simple materials such as tarpaulin, cement, or  
69 fiberglass, depending on the scale of cultivation desired. Here are the simple steps to start tilapia  
70 farming in an artificial pond:

- 71 1. Pond Preparation Artificial ponds can be made from tarpaulins that are installed in sizes  
72 as needed. The common pool size is 4m x 3m for small scales. Before use, the pond must  
73 be washed to avoid contamination and leveled so that the water can flow properly  
74 (Fadilah & Nurdiana, 2020).

- 75 2. Water filling used for tilapia ponds should come from a source that is clean and free of  
76 pollutants. Ideally, the pH of the pool water should be in the range of 6.5-8.0 and the  
77 water temperature between 28°C-30°C (Suryanto et al., 2019).
- 78 3. Selection of Fish Seeds Choose healthy tilapia seeds, with a size of about 4-5 cm. Before  
79 being put into the pond, fish seeds must be quarantined to avoid the spread of the disease  
80 (Sutrisno, 2021).
- 81 4. Feeding Tilapia can be fed in the form of commercial pellets or natural feed such as  
82 worms, plankton, and fermented organic waste. Feeding is carried out 3-4 times a day  
83 with an amount that is appropriate for the size of the fish (Suryanto et al., 2019).
- 84 5. Pond Maintenance and Management Replace the water regularly and keep the water  
85 quality good. Fish health checks also need to be carried out to prevent disease. Some of  
86 the problems that often occur are parasitic and bacterial attacks that can be prevented  
87 with good sanitation management (Fadilah & Nurdiana, 2020).
- 88 6. Harvest Tilapia can be harvested once it reaches the desired size, usually after 4-6 months  
89 of maintenance. Tilapia is ready to be harvested if the weight has reached 200-300 grams  
90 per head. Harvesting is carried out carefully so as not to damage the fish or pond  
91 (Sutrisno, 2021).

92 The failure of tilapia cultivation in artificial ponds is often caused by several main factors,  
93 including poor water quality, improper feeding, and the spread of diseases. Unmaintained water  
94 quality, such as unstable pH or low oxygen content, can cause stress in fish and worsen their  
95 growth rate. Therefore, it is important to regularly check water quality and change water  
96 regularly (Fadilah & Nurdiana, 2020).

97 Inappropriate feeding, both in terms of quality and quantity, can also inhibit the growth of  
98 tilapia. Feed that does not contain enough nutrients can cause fish to grow slowly or even die  
99 (Sutrisno, 2021). To overcome this, feeding must be adjusted to the size of the fish and carried  
100 out regularly.

101 In addition, diseases caused by bacteria or parasites can be the main cause of failure. Poor  
102 sanitation management and high fish densities can exacerbate these conditions. Prevention can

103 be done by maintaining the cleanliness of the pond and quarantining the fish before putting them  
104 into the main pond (Suryanto et al., 2019).By managing these factors well, tilapia cultivation in  
105 artificial ponds can be successful and profitable.

106 Community service in fish farming by involving residents around housing is a very  
107 appropriate step to create a cleaner and more sustainable environment. One effective way is to  
108 take advantage of the potential of household organic waste, such as food scraps and kitchen  
109 waste, which can be used as fish feed. By inviting the community to be involved in fish farming,  
110 especially tilapia that can be cultivated in artificial ponds, we can reduce the amount of waste  
111 that is wasted and divert it into productive resources. This community service program not only  
112 helps reduce waste, but can also create new economic opportunities for local residents through  
113 marketable fish farming products. In addition, by educating the public about the importance of  
114 waste management and environmental sustainability, we can lead to the creation of more  
115 environmentally friendly housing with the principle of zero waste. This will have a positive  
116 impact on the quality of life of the surrounding community, both in terms of economy and  
117 environment. Community-based organic waste management and fish farming also support the  
118 achievement of sustainable development goals, creating a greener and resource-saving lifestyle.

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