

Making Compost and Cultivating Maggot in Community Empowerment to Overcome Scarcity of Fertilizer and Feed

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Abstract: To overcome the scarcity of fertilizers and feed in the era of the Covid-19 pandemic, where the distribution of fertilizers and feed to farmers and breeders was hampered. Communities to overcome this problem can make alternative fertilizers and feed from organic waste that comes from daily leftovers. Organic waste originating from household waste and organic waste has not been utilized properly. The community is still united with organic waste and inorganic waste which is then burned, this results in the environment being exposed to carbon dioxide from the waste incineration system. Empowerment of pilot communities to process organic waste as compost and maggot cultivation for native chickens was carried out in Nyalindung Village, Nyalindung District, Sukabumi City, West Java Province.

Keywords: scarcity; fertilizer; maggots; compost

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I. Introduction

Nyalindung Village is one of 10 villages in Nyalindung Subdistrict, Sukabumi Regency. The area of Nyalindung Village is 1,150 Ha. Nyalindung Village is at an altitude of 700-900 meters above sea level. Topographically, Nyalindung Village consists of plains, mountains and hills. The area of Nyalindung Village has a wet tropical climate which has rainfall of 2000-3000 mm per year. Nyalindung village has a high enough rainfall intensity so that the air temperature is low, so it can support community activities in agriculture.

Potential in the fields of agriculture, plantations and animal husbandry are superior potentials found in Nyalindung Village, both for rice, corn and climate vegetables as well as the ability of farmers to farm. Apart from farming, the people there also develop livestock such as cows, rabbits, sheep and native chickens.

Nyalindung Village is one of the villages located in the capital of Nyalindung sub-district so it is very supportive of economic activities in Nyalindung Village. There is a main road which is an accessibility or connecting route that connects Sukabumi and Cianjur Regencies which is a connecting route for marketing agricultural and livestock products. Adequate drains and supported by adequate water sources.

The problems faced by the people of Nyalindung Village, Nyalindung District include:

- a. The community processes waste by burning it (Figure 1).
- b. Expensive and rare feed for free-range chickens (Figure 2).
- c. Farmers use chemical fertilizers which are increasingly scarce due to the Covid-19 pandemic situation



Figure 1. Burnt Organic Waste create smoke



Figure 2. Chicken feed using commercial Pur

II. Materials And Methods

2.1 Test material

Organic waste from leftover food and leaves, EM4, maggot larvae, water, soil, bamboo.

2.2 Methods

Solutions to overcome the problem of scarcity and expensive fertilizers and feed for farmers and ranchers are given the following solutions:

1. Education is carried out in the form of counseling and waste management training. The community, farmers and breeders are trained on how to sort organic waste and process it into something useful for agriculture and livestock.
2. Cultivate maggot with organic waste media for feed
3. Make organic fertilizer composters from organic waste from household waste and fallen leaves.

The output that will be generated from this activity is that the community can sort organic and non-organic waste, the availability of compost for agriculture, the availability of high protein animal feed based on maggot for village chicken farmers. To solve problems faced by the community regarding organic waste management, it will be implemented:

1. Counseling on sorting waste
2. Cultivating Maggots
3. Making Compost Fertilizer

Garbage is a waste or leftover from one thing that is no longer suitable for use. Basically, this type of waste is divided into two groups, namely organic waste and non-organic waste. Well, it is these two types of waste that are actually recommended to be separated. The most fundamental difference between the two types of waste is the time it takes to break down. Organic waste is a type of waste that can and is relatively quickly decomposed. On the other hand, non-organic waste is difficult to decompose and takes a long time. Organic waste can decompose even if it's just thrown away and will disappear by itself. Some examples of waste that fall into the category of organic waste include food scraps, fruit skins, cooking leftovers from the kitchen, and leaves. Usually this type of waste can also be reprocessed into animal feed, biogas, and even fertilizer. Conversely, non-organic waste will usually be difficult to decompose. Included in this type of waste list are beverage bottles, plastics, and cans. This trash won't be destroyed for a long time even if it's burned. However, it turns out that non-organic waste still has economic value and can be used as something more usable.

Maggot cultivation as an alternative to native chicken feed refers to research by Reni et al., 2019. Where maggots are bred from black army fly eggs in organic waste media. The maggots that are formed are given to free-range chickens in combination with Azolla. In the research of Melta et al., 2009 that maggot can improve the growth and health of fish. Maggot is a high source of animal protein because it contains a protein range of 30-45% (Akhmad azil et al, 2017).

Farmers in Nyalindung Village are trained to use garbage from fallen leaves to make compost. Composting is a method of organic waste management that aims to reduce and change the composition of waste into useful products (Suwatanti et al, 2017).

Making compost from organic waste refers to Mummy Yuniawati, 2012, by means of fermentation using EM4. This process is carried out in 2 stages, namely the raw material preparation stage which includes the preparation of organic waste and the manufacture of an EM4 starter and the composting stage, namely the raw materials are mixed and placed in a closed container in a dark room so that the anaerobic composting process occurs.

III. Results and analysis

Inorganic waste can be sorted for recycling or resale, while organic waste can be processed into compost and media for maggot cultivation.

Farmers in Nyalindung Village are trained to cultivate maggots using organic waste media to produce high protein feed. Starting from making maggot cages, hatching larvae, harvesting maggot, pupa, mating and laying eggs. The resulting maggots are given to their domesticated livestock (Figure 3).



Figure 3. Maggots are cultivated with organic waste media (a), Feeding maggot to native chickens (b).

Waste sorting counseling is carried out and is open to the Nyalindung community. The public is given knowledge about the types of waste, the dangers of waste for health, how to sort waste. The Waste Bank was formed to accommodate organic and inorganic waste. Organic waste is processed into compost which is produced and given to the plants. The activity of sorting, utilizing organic waste into compost (Figure 4).



Figure 4. Training on sorting waste and compost

The steps taken when composting compost are waste that has been sorted, in this case, household organic waste such as used food and leaves, garden tools such as sexop, hoe, and water spray. containers such as buckets, compost bags in the form of black plastic mulch, hammer, and saws, EM4 solution, wood and tarpaulin for making composting media. Household organic waste and large leaves can be cut into small pieces or crushed using a sickle or crusher and then put into a composting container or bucket. For coating on composting media, humus soil is used. Then it is compacted and doused with EM4 liquid that has been diluted with water. Finally, cover the media with plastic / tarpaulin and cover it tightly with the media cover then leave it for 6 weeks. After 6 weeks the compost has been formed, and the results are immediately applied by the farmers who participated in the training.

In order for the program to be sustainable, people who take part in the training can become facilitators in their environment, so that equipment and materials are donated to process organic waste into compost (Figure 5).



Figure 5. Composter tools and materials assistance to training participants to be applied in their environment as a facilitator.

IV. Conclusion

The resulting waste can be managed and sorted so that it is of economic value for agriculture and livestock, from organic waste in the form of leaf waste, people can make and obtain alternative fertilizers in the form of compost and apply it to their agricultural plants. For livestock feed, people can get alternative feed that contains nutrients, especially protein. namely from maggot. Community empowerment processing waste and maggot cultivation has economic value for farmers and breeders in Nyalindung Village, Nyalindung sub-district, Sukabumi Regency.

V. Suggestion

The government needs to pay attention to the management of agriculture and animal husbandry in Nyalindung sub-district, as well as the need for field assistants for farmers and breeders. Thank you to RISTEK / BRIN for funding community empowerment through PKMs grants, and also to the Institute for Research and Community Empowerment, University of Muhammadiyah Sukabumi.

References

- [1]. Akhmad Azir, Helmi Harris, and Ranga Bayu Kusuma, 2017. Production and Nutritional Content, Fish, Journal of Aquaculture Research, Vol 4 No 2 (2009)
- [2]. Suwatanti, P. Widiyaningrum. 2017. Utilization of Vegetable Waste MOL in Compost Making Process, Journal of MIPA 40 (1) (2017): 1-6.
- [3]. Mummy Yuniwati, Frendy Iskarima, Adiningsih Padulemba. 2012. Optimization of the Condition of the Process of Making Compost from Organic Waste by Fermentation Using EM4, Journal of Technology, Vol 5 No 2 (2012).
- [4]. Melta Rini Fahmi, Saurin Hem, I Wayan Subamia. 2009. Potential of Maggots for Increasing Growth and Health of Maggots (*Chrysomya Megacephala*) Using Different Culture Media Composition, Journal of Fisheries and Aquaculture Sciences Volume 12, Number 1, June 20
- [5]. Reni Mulyani, Dikdik Mulyadi, Nurhayati. 2019. Proximate test of magoot pellets for fish feed, Seminar of BAPEDA Sukabumi City, 2019.