

## Increasing the Economic Value of Cow Manure Into Vermicompost

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**Abstract.** The average farmer in Kota Datar Village has a owns livestock, especially cattle farming. Maintenance is carried out by keeping in the cage all the time, so that animal waste is only left to accumulate around the cage. Moreover, during the rainy season, livestock manure cannot be processed into compost, the resulting pollution has the potential to widen into the realm of social problems. The limited use of livestock manure as compost and its low selling value makes farmers feel unwilling to use it. With the cultivation of earthworms, this manure can produce vermicompost. In addition to the content of nutrients and growth hormones contained in vermicompost, the selling value of the fertilizer is also higher when compared to other compost fertilizers. This Community Service activities were carried out for a period of 6 months, from June to November 2021 at the Namora Farmers Group Association in Kota Datar Village, Hampan Perak District, Deli Serdang Regency with the number of participants 28 farmers. The method of implementing this service was by conducting socialization and training as well as the practice of making vermicompost.

**Keywords:** Compost, Cow Manure, Economic Value, Vermicompost

**Abstrak.** Rata-rata petani di Desa Hampan Perak memiliki ternak, terutama peternakan sapi. Pemeliharaan dilakukan dengan cara pemeliharaan dalam kandang sepanjang waktu, sehingga kotoran hewan hanya dibiarkan menumpuk di sekitar kandang. Terlebih lagi pada musim hujan, dimana kotoran hewan ternak tersebut tidak dapat diproses menjadi pupuk kompos sehingga polusi yang diakibatkan berpotensi melebar kedalam ranah permasalahan sosial. Pemanfaatan kotoran hewan ternak sebagai pupuk kompos yang terbatas serta nilai jualnya yang rendah menumbuhkan rasa malas peternak untuk memanfaatkannya. Dengan budidaya cacing tanah permasalahan tersebut dapat menghasilkan pupuk vermikompos vermicompost. Selain kandungan unsur hara dan hormon pertumbuhan yang terkandung dalam pupuk vermikompos vermicompost, nilai jual pupuk tersebut juga lebih tinggi jika dibandingkan dengan pupuk kompos lainnya. Kegiatan Pengabdian kepada Masyarakat ini akan dilaksanakan dalam jangka waktu 6 bulan mulai Juni sampai dengan bulan November 2021 yang bertempat di Gabungan Kelompok Tani (Gapoktan) Namora di Desa Kota Datar Kecamatan Hampan Perak Kabupaten Deli Serdang dengan jumlah peserta 28 Orang. Metode pelaksanaan pengabdian ini yaitu dengan menggunakan sistem sosialisai dan pelatihan serta praktek pembuatan pupuk vermikompos vermicompost.

**Kata Kunci:** Kompos, Kotoran Sapi, Nilai Ekonomis, Vermikompos Vermicompost

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## 1. Introduction

Hampan Perak District is an agricultural center, especially rice farming in Deli Serdang Regency. Half of Hampan Perak District area is agricultural land [1]. One of the villages in Hampan Perak that also contributes to the productivity of rice farming is Kota Datar Village. The main livelihood of the people in Kota Datar Village is farming by utilizing existing agricultural land in their village [2].

Beside being farmers, the average Kota Datar Village community also has a livelihood as a breeder, especially cattle and goat farming. Livestock rearing is done by keeping cows in cages all the time. However, animal manure is only allowed to accumulate around the cage, causing high pollution. Sometimes some other farmers buy the animal manure to be used as compost.

Cow dung or that has accumulated is only used for compost with limited use, so there are still a lot of cows dung is left. Moreover, during the rainy season, cows dung accumulates a lot and causes higher pollution. The utilizing of cow dung into compost cannot be carried out because before it can be processed for fertilizer, the very wet cow dung needs to be dried first [3]. The limited use of cow dung as compost and its low selling value not only causes pollution but also breeds unwillingness of farmers to use it. Therefore, the innovation that not only increases the utilization of cow kohe but also increases its selling value is needed.

The livestock manure is still a serious problem because it is only left as waste around the cage, especially on rainy season the manure will emit an unpleasant odor and potentially become a social problem. Processing of livestock manure into organic fertilizer is carried out conventionally, namely by letting livestock manure to be decomposed by itself (natural decomposition process), until fertilizer is formed. This process is not effective because it takes a long time and loses a lot of nutrients, washed away by rain water and air.

The problem of piled cow dung can be solved by cultivating earthworms. The earthworm widely cultivated in Indonesia is the type of *Lumbricus rubellus*. The earthworm cultivation is able to produce waste in the form of vermicompost, which is very beneficial for plant growth. Vermicompost contains nutrients needed by plants such as N, P, K, Mg, Ca. The content of these nutrients, especially nitrogen, is higher than compost. Vermicompost also contains various plant growth-promoting microbes that can produce growth hormones. In addition, earthworms themselves can secrete plant growth hormones such as auxins and cytokinins. Excretion produced by earthworms can also stabilize humic acid thereby increasing the absorption and availability of these hormones for plants [4].

In addition to the nutrient content and growth hormone contained in vermicompost, the selling value of the fertilizer is also higher when compared to other compost fertilizers [5]. The selling value that can touch the price of IDR 15,000.00 per kilogram can be an additional income for cattle farmers or can be used as quality organic fertilizer for their agricultural land.

## **2. Methods**

### **2.1 Time and Place of Devotion**

This Community Service activity was carried out for a period of 6 months from June to November 2021 at the Namora Farmers Group Association in Kota Datar Village, Hamparan Perak District, Deli Serdang Regency with the number of participants 28 farmers.

### **2.2 Implementation Method**

The method of implementing the service was conducted by using a socialization system and training as well as the practice of making vermicompost. The socialization was carried out to provide an understanding of the care and cultivation of earthworms as the main decomposer for converting cow dung into vermicompost. The socialization also explained about online media-based entrepreneurship to provide an overview and marketing procedures for vermicompost. After the socialization was carried out, the next activity was training and practice of making vermicompost.

Training activities and the practice of making vermicompost were carried out through several stages, namely the manufacture of worm houses, management of worm cultivation media, maintenance of worms as the main decomposer, harvesting of vermicompost, as well as packing and sales of vermicompost. The training activities were monitored and guided by the Community Service Team, the Village Government, and the Guidance Team from the Namora Farmers Group Association. The process of monitoring and mentoring was carried out until the vermicompost of worms could be produced.

### **2.3 Stages of Practical Learning and Implementation**

Community service activities start from a pre-survey conducted by the team. then the team identified the problems faced by the community. Prior to implementation activities, the team gave instructions to farmers in making vermicompost. The process of making vermicompost takes a maximum of 1 month. After that, vermicompost can be used on farmers' rice fields

Vermicompost was compost obtained from the decomposition of organic matter carried out by earthworms. Vermicompost was a mixture of earthworm manure with the rest of the media or feed in earthworm cultivation, therefore vermicompost was an organic fertilizer that was environmentally friendly and had its own advantages compared to other composts, the

advantage of vermicompost was that the process was fast and the compost produced (vermicompost = ex-worms) contained high nutrients.

Vermicompost was an organic fertilizer using earthworms in its decomposition. The presence of worms facilitated the decomposition process, because the material that would be broken down by decomposer microorganisms, had been decomposed by worms first, and the end result was called vermicompost. Worm droppings could be a very good solution for vegetable crops, annual crops, fruits and ornamental plants, which were environmentally friendly. The vermicompost was characterized as granular, fibrous and black in color.

### 3. Results and Discussion

#### 3.1 Implementation of Community Service Activities



**Figure 1.** Presentation of Resource Person Muhammad Khaliqi, S.P., M.Si

Community service was held on Saturday, September 11, 2021 in Kota Datar Village, Hamparan Perak District, Deli Serdang Regency. The implementation of the activities went according to the plans that had been prepared by the service team from the USU LPPM (The Institution of Research and Community Services of Universitas Sumatera Utara).

The trip was carried out starting at 08.00 am from Medan to the location for the implementation of service activities. The journey from Medan City to the location of the service took approximately 2 hours. The service activity was carried out at the Kota Datar Village Office and was attended directly by the Kota Datar Village Head as well as opening community service activities to be carried out by the team.

The implementation of this service activity began with a presentation on the explanation of vermicompost, its understanding, uses and benefits if farmers ran this vermicompost business.

This presentation was delivered directly by the head of the service team, Muhammad Khaliqi, S.P., M.Sc. The 28 farmers listened carefully and enthusiastically when the presenter explained the potential that farmers would get if they ran a vermicompost business.

After carrying out the presentation about vermicompost, farmers were invited to do it directly step by step in making vermicompost. The team brought *Lumbricus rubellus* worms, bin, cow dung and also organic waste in the form of vegetable scraps from the market around Tanah Datar Village.



**Figure 2.** Types of Worms Used in Service

The process of making vermicompost began by enumerating organic waste that had been prepared by the service team. Enumeration was carried out by farmers.



**Figure 3.** Organic Waste Cutting Process



**Figure 4.** The Process of Entering All The Materials That Have Been Provided

The process of entering the ingredients for making vermicompost is as follows:

1. Husk



**Figure 5.** The Process of Putting the Husk into the Bin

2. Cow Dung



**Figure 6.** The Process of Putting Cow Manure into the Bin

3. Organic Waste

4. Worms



**Figure 7.** The Process of Putting Organic Waste and Worms Into the Bin

5. Cow Manure

6. Organic Waste

Furthermore, the bin could be covered with gauze first so that the worms inside could not get out. Bin should not be closed and placed in a place that had sufficient lighting but not hot in order to prolong the life of the worms decomposing the organic waste. The decomposition process by the worm was going naturally. The process needed approximately 40 days for gaining optimum result. Every week, the mixture was checked to see whether the decomposition process had been going well or not. If organic waste had been reduced, farmers could add organic waste again as feed for worms.

The results of this decomposition process then became vermicompost which could then be used by farmers as fertilizer in their paddy fields, but the results from the use of vermicompost could not be seen directly because it required a slightly longer process and time. In addition, farmers got provisions in the form of abilities and other skills which could then be implemented in their farming businesses.



**Figure 8.** Vermicompost Fertilizer Used by Farmers in Their Rice Fields

### **3.2 The Results of Implementation Activities**

Table 1 shows that 100% of farmers participating in this activity felt the importance of the implementation activities in order to empower them to work independently, and 82,15% of farmers participating in the activity felt that the activities carried out by the team had been

satisfactory and able to empower farmers so that farmers were able to work independently. In the amount of 96,4% of farmers participating in this activity felt that the activities were very important and accordance with the needs of farmers, whereas the remaining (3,6%) felt that the activities were important and accordance with the needs of farmers, and 100% of farmers participating in this activity felt that the activities carried out by the team had been satisfactory and had been carried out in accordance with the needs of farmers. 100% of the farmers participating in this activity felt that the activities were very important and provided provisions for farmers in the form of thinking skills or other skills, and 92,85% of the farmers participating in this activity felt that the activities carried out by the team were satisfactory and had provided farmers with the ability to think or gaining other skills. 100% of the farmers participating in this activity felt that the activities were important and the implementation of this learning effort was able to improve the farmers' reasoning power, and 92,85% of the farmers participating in this activity felt that the activities carried out by the team were satisfactory and had been able to improve the farmers' reasoning power. 100% of farmers participating in this activity felt that the activities were very important and 89,29% of farmers participating in this activity felt that the activities carried out by the team had been very satisfactory and farmers had benefited or been assisted in solving farming problem.

**Table 1.** Results of the Implementation of Community Service Activities

Community Needs	Importance Level of the Material		The Performance of Community Service Team	
	Importance	%	Satisfaction	%
The implementation of the activities was able to empower the participating farmers so that farmers were able to work independently	Very Important	0	Very Satisfied	17,85
	Important	100	Satisfied	82,15
Activities were carried out according to the needs of farmers participating in these activities	Very Important	96,4	Very Satisfied	100
	Important	3,6	Satisfied	0
The activities provided provisions for participating farmers in the form of thinking skills or other skills	Very Important	100	Very Satisfied	92,85
	Important	0	Satisfied	7,15
Implementation in the learning efforts of farmers participating in the activities were able to increase the reasoning power of farmers	Very Important	0	Very Satisfied	7,15
	Important	100	Satisfied	92,85
Farmers participating in the activities benefited or were assisted in solving their problems from the implementation of this activities	Very Important	100	Very Satisfied	89,29
	Important	0	Satisfied	10,71

#### 4. Conclusions

Based on the results of the implementation of community service activities carried out by the USU LPPM team (The Institution of Research and Community Services of Universitas Sumatera Utara), farmers participating in the activity felt that the activities carried out by the

team had been very satisfactory and able to empower farmers so that farmers were able to work independently. 28 farmers who participated in this activity, all of them planned to implement this activity in their fields. After the implementation of community service activities, the community service team plans to help the marketing process of vermicompost products produced by farmers.

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