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Waste Processing as Organic Compost Fertilizer Using Smart Composter in Sei Ular Village, Secanggang District, Langkat Regency

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Abstract. The activity was carried out in Sei Ular Village, Secanggang District, Langkat Regency from May-November 2021. The problems faced by partners are 1) The price of chemical fertilizers is relatively expensive and difficult to obtain. 2) Continuous use of chemical fertilizers destroys soil quality 3) There is a lot of unused agricultural and livestock waste. 4) People don't know what kind of waste can be used as compost. 5) People don't know how to process compost using smart composters. The purposes of implementing this activity are 1) The community can process agricultural and livestock waste into organic compost 2) The community can get fertilizer at a cheaper price and easily to obtained 3) Improve soil nutrients at the service location 4) To increase the income of the farmer. The results are in the form of training and mentoring services for making organic compost with the help of a smart composter. The approach method is carried out by overcoming partner problems and then resolving the problem through an activity program by referring to the science and technology approach. The results obtained after the implementation of counseling and training obtained that 85.71% of participants were interested in making compost by utilizing waste. The public feels organic compost fertilizer does not require too large a cost because it can utilize waste around the community.

Keyword: Sei Ular Village, Organic Compost, Smart Composter

Abstrak. *Kegiatan dilaksanakan di Desa Sei Ular Kecamatan Secanggang Kabupaten Langkat pada Mei-November 2021. Permasalahan yang dihadapi mitra adalah 1) Harga pupuk kimia yang mahal dan sulit didapatkan. 2) Pemanfaatan pupuk kimia yang terus menerus merusak kualitas tanah 3) Masih banyak limbah pertanian dan peternakan yang belum dimanfaatkan. 4) Masyarakat belum tahu limbah apa yang baik dijadikan sebagai pupuk kompos. 5) Masyarakat belum mengetahui cara pengolahan pupuk kompos dengan memanfaatkan komposter pintar. Tujuan dari pelaksanaan kegiatan ini adalah 1) masyarakat dapat mengolah limbah pertanian dan peternakan menjadi kompos organik 2) masyarakat mendapatkan pupuk dengan harga yang lebih murah dan mudah didapatkan 3) Masyarakat dapat memperbaiki unsur hara tanah 4) sebagai sumber peningkatan pendapatan petani. Adapun hasil kegiatan pada pengabdian ini berupa jasa pelatihan dan pendampingan pembuatan kompos organik dengan bantuan komposter pintar. Metode pendekatan dilakukan dalam mengatasi permasalahan mitra kemudian penyelesaian masalah dilakukan dalam bentuk program kegiatan dengan pendekatan iptek. Hasil yang didapatkan setelah pelaksanaan penyuluhan dan pelatihan didapatkan 85,71 % peserta tertarik untuk membuat pupuk kompos dengan memanfaatkan limbah yang ada. Rata-rata*

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masyarakat beralasan tertarik dikarenakan pupuk kompos organik pembuatannya tidak memerlukan biaya yang terlalu besar karena dapat memanfaatkan limbah di sekitar masyarakat

Kata Kunci: *: Desa Sei Ular, Kompos Organik, Komposter Pintar*

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1. Introduction

Langkat Regency is one of the regencies in North Sumatra which has 23 districts. Geographically, Langkat Regency is located at 3°14'00"– 4°13'00" North Latitude, 97°52'00' – 98° 45'00" East Longitude and 4 – 105 m above sea level. One of the sub-districts in Langkat Regency is Secanggang District which has the largest rice field area of all sub-districts in Langkat Regency, which is 5,884 hectares [1].

Secanggang district has an area of 223.27 km2 and has 16 villages and 1 sub-district. One of these villages is Sei Ular Village which has great potential in agriculture. As is known, Secanggang district has a large agricultural land so that it has a very large waste of rice straw, which so far has only been burned. In addition, there is also waste from Tebon corn, livestock feces and Hydrilla verticillate which can be used as compost. compost is very suitable in tackling the abundant amount of agricultural and livestock waste with the right processing technology, the long composting process can take place more quickly, besides that compost has the advantage of being safe for agricultural products and agricultural land [2].

Figure 1. Waste in Sei Ular Village

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Figure 2. Smart Composter

In this community service, the implementing team chose Sei Ular Village, Secanggang District, Langkat Regency. This service is carried out by utilizing waste that is around the location to be used as organic compost, by utilizing a smart composter in its processing. Compost is a mixture of various organic materials that have undergone a decomposition process [3] . The smart composter here is equipped with a temperature sensor so that during the manufacturing process when the temperature in the silo has reached the optimal temperature, the stirrer will stir the compost to lower the temperature, so this is expected to help the decomposition of materials optimally. Coupled with the potential of Sei Ular Village which has a large agricultural land so that compost is needed in this place to improve soil conditions, as stated by Sitorus [4] which states that the use of compost can increase the absorption of carbon in the soil. Based on the observations of the implementing team, which saw the potential for agricultural waste, especially rice straw, which was abundant and had not been used optimally because it was only burned, the team carried out this service by utilizing a smart composter in order to produce optimal compost then improve soil conditions and increase crop yields. and feed in Sei Ular Village, Secanggang District, Langkat Regency, while partners are interested in choosing to use a smart composter because the smart composter has a temperature sensor so partners don't need to mix compost manually when the temperature increases.

2. Method

The approach method used in overcoming partner problems after identifying the problems that occur in the farming community of Sei Ular Village, Secanggan District, Langkat Regency. Problems that have been identified are then resolved in the form of an activity program by referring to the science and technology approach. The science and technology approach is carried out to the community through several activities such as motivating, training, product manufacturing and mentoring. The science and technology approach given is processing waste as organic compost with the help of a smart composter. It is hoped that this approach will enable the community to make organic compost with the help of a smart composter, which can be used in the village to improve soil nutrients.

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In this activity, the composition of organic compost given to partners consisted of 50% cow feces, 25% hydrilla verticallate, 25%, corn stalks and leave, one bottle of EM4, 5 liters of molasses and sufficiently water. Then the ingredients are mixed evenly, then put in a smart composter and fermented for about 7 days.

Activities that will be carried out to solve problems are carried out according to the needs of partners in service activities, this is needed so that there is active participation from partners in activities. Evaluation is carried out every time the activity is carried out and regularly at the beginning of the month during this program. If a problem is found, corrective action is taken immediately. The evaluations carried out were recorded properly and in writing. At the end of the activity, an overall evaluation is carried out to determine the achievement of all activities that have been carried out. The evaluation carried out to partners is to assess the total waste used as organic compost and also the increase in the number of production and income of partners after the activity is completed.

Results and Discussion

This community service activity has been completed, namely training and assistance in making organic compost with the help of a smart composter. The stages of activities that have been carried out are as follows

3.1 Preparation and Planning of Activities

The preparatory activities were carried out by means of prior hearings with partners, in which our partners were Sei Ular Village, Secanggang District, Langkat Regency. The Service Team held discussions with village officials and community representatives to find out problems with partners. After that, the service team designs solutions that will be given to partners and also makes activity proposals to be submitted to the Community Service Institute. The problem obtained is that the wastes in Sei Ular Village, Secanggang District, Langkat Regency are still not utilized, especially livestock and agricultural waste. After the proposal was approved by the Community Service Institute, the team again coordinated with partners to convey the schedule of activities to be carried out as well as the rights and obligations of both parties, besides that the service team asked for an active role and commitment from partners to make the service activity a success.

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Figure 3. Livestock Waste

Figure 4. Agricultural Waste

3.2 Counseling and Training on Organic Composting with the Help of Smart Composter

Counseling and training on organic composting with the help of a smart composter has been done on Wednesday, September 8, 2021 at the Sei Ular Village Hall, Secanggang District, Langkat Regency. Partners consisting of village officials, chairmen and members of farmer groups and the community of Sei Ular Village, Secanggang District, Langkat Regency. In the first activity, questionnaires were distributed to assess the level of understanding of participants in processing organic compost and also the use of smart composters. After that, there was an explanation on how to make organic compost with the help of a smart composter and also waste that can be used as raw material for organic compost.

Compost is generally made from organic waste derived from leaves and animal waste, which are intentionally added to balance the nitrogen and carbon elements so as to accelerate the decomposition process and produce an ideal C/N ratio [5]. The results of the service before counseling and training obtained data that 23.80% of the community had tried to make organic compost and 76.20% had never made organic compost, then 100% of participants had never made organic compost with the help of a smart composter. Smart composter is suitable for use in this activity because it is equipped with an automatic stirrer that works based on a temperature sensor so that people have the opportunity to take full advantage of organic waste

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[6]. [7] added that the composter is equipped with a temperature sensor so that it will automatically reverse the fertilizer when the temperature has been reached. In addition, data was also obtained on how much waste is known to be used as organic compost. The results showed that 71.42% of participants answered that they only knew one ingredient of organic compost, namely livestock feces.

Figure 5. Counseling on Organic Composting with the Help of Smart Composter

Figure 6. Training on Organic Composting with the Help of Smart Composter

The results obtained after the implementation of counseling and training obtained that 85.71% of participants were interested in making compost by utilizing the existing waste in Sei Ular Village, Secanggan District, Langkat Regency. This is due to the active role of the community in activities so that the transferred science and technology can be well received by the community. On average, the public reasoned that they were interested because organic compost fertilizer did not require too much money because it could utilize the waste around the community.

3.3 Assistance, Monitoring and Evaluation Activities

Mentoring activities continue to be carried out with partners, until now partners have produced organic compost which has begun to be used by the people of Sei Ular Village, the service team continues to monitor the amount of fertilizer produced and the amount of waste used as compost by partners. Until now, there have been no obstacles faced by partners in the manufacturing

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process, only partners often ask about the existing wastes, which can be used as compost and its composition. The impact that partners have received so far is the reduction in the amount of waste that pollutes the environment and partners get additional income through the compost they produce. The role of village officials is very helpful in the sustainability of this activity, because village officials can monitor it at any time. In addition to mentoring, Monev has also been carried out by the Community Service Institution online which will be held on October 5, 2021. The results of the monitoring and evaluation activities have been carried out and published in the mass media, while the indicators that have been achieved are the utilization of agricultural and livestock waste so that it does not pollute the environment.\

Figure 7. Produced compost

Figure 8. Smart Composter Submission

Conclusion

The conclusion of this activity is that the community is very enthusiastic about participating in the activity, especially the process of making organic compost using a smart composter. The level of public interest in organic composting increased after the implementation of counseling

and training. Follow-up activities that require an experiment in making organic compost with different compositions and using other wastes. It is necessary to monitor and evaluate the quality of organic compost that has been made.

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