



## UTILIZATION OF SHELL WASTE AS ORGANIC FERTILIZER IN GENDING, PROBOLINGGO REGENCY

Nourma Ulva K.D <sup>\*1</sup>, Nadilah Iskina Maulaya <sup>2</sup>, Ummu Athiyah Ismatul Maula <sup>1</sup>

<sup>1</sup> Program Studi Ilmu Administrasi Publik, Fakultas Ilmu Sosial dan Ilmu Politik, Universitas Panca Marga Probolinggo, Indonesia

<https://doi.org/10.58330/khidmatuna.v3i1.403>

Accepted: 16 December 2023. Approved: 07 January 2024. Published: 07 January 2024.

### ABSTRACT

Curahsawo Village, located in Gending Subdistrict, Probolinggo Regency, is famous for its marine products, making it one of the areas producing shellfish, especially mussels. In addition to providing economic value, the clam industry also produces waste in the form of discarded shells. The accumulation of shell waste in residential areas has become an environmental problem and impacted the local landscape. Although some shells are used for crafts, the demand is low. As a result, the accumulation of shell waste has increased, posing a threat to the environment. To address this issue, the implementation of the KKN program, Pancamarga University students will take a participatory approach by actively involving the Curahsawo Village community in every stage of the program. The first step will involve counseling on the importance of waste management and the benefits of clam shells as organic fertilizer. This program will not only raise community awareness about the environment but also help reduce the adverse impact of clam shell waste on the surrounding environment. In addition, making clam shell POC is relatively easy and does not require much cost. The production of this organic fertilizer is relatively simple, the raw materials needed for its production are quite easy to obtain, and the production cost is relatively cheap.

*Community Service Paper*

*Khidmatuna: Journal of Research and Community Service*

**Keywords:** Organic Fertilizer, Conch Shells, Recycling, Conch Shells, Organic Waste.

### INTRODUCTION

In Curahsawo Village, Gending District, Probolinggo Regency. This area is a seafood-producing area, so most of the people work as seafood seekers, one of which is shellfish. Shells can provide economic value to the community, but can also cause problems because the shells produce waste (Hasibuan et al., 2021). Shell waste comes from the surrounding community who work as shellers. The remnants of the shells accumulate in the yard of the residents' houses, causing an eyesore (Banu, 2020; Maduwiniarti & Taali, 2023).

Although clam shells have been utilized as craft materials, the amount is still very small due to low demand (Guerra-Tamez et al.,

2020; Marjenah et al., 2018). The emergence of shell waste is increasing and alarming. Continuous disposal of shell waste without proper treatment can cause environmental pollution. To solve this problem, scientists are trying to process shell waste in a way that makes it useful, so that it is no longer just garbage, but can generate profits in addition to reducing shell waste.

Currently, little use is made of shell waste used for fertilization. In general, the shells are only used as cosmetics, decorations and animal feed mixtures. Clam shells have mineral imposition consisting of a combination of calcium carbonate and more than 98.7% of the total mineral content of Mg,

\* Correspondance Address

E-mail: [nourmaulva@upm.ac.id](mailto:nourmaulva@upm.ac.id)



N, P, K, Na about 1.3% (Fe, Cu, Ni, B, Zn, and Si) (Firdiani et al., 2022; Satya et al., 2020).

The function of nitrogen for plants is as a component of protein, in plant growth and in fertilizing vegetable growth, making it suitable for leafy vegetable crops. Phosphorus acts as a protein building material, is needed for the formation of flowers, fruits and seeds, stimulates root elongation and strengthening so that plants are drought resistant. Lack of phosphorus fertilizer slows plant growth, flowering and seed formation, and plants become weak and easily collapse. Potassium is involved in metabolic processes such as photosynthesis and respiration (Grenz et al., 2019; Juradi et al., 2019).

The use of fertilizers can accelerate growth and development, accelerate plant growth, increase soil fertility so that it is expected to increase plant productivity. The use of chemical fertilizers has become a modern trend because it is considered more practical, even though the use of chemical fertilizers has many negative impacts, such as damaging the balance of nutrients in the soil and the health of the people who use them (Tuhuteru et al., 2021). Therefore, the selection of the right fertilizer is very important from the point of view of plant growth, if used wisely, fertilizer can have a good effect on plants, one of the environmentally friendly fertilizers is the use of manure organic.

Solid and liquid organic fertilizers can improve the physical, chemical and biological properties of soil. Sources of organic matter can be compost, manure, crop residues such as straw, corn cobs, sugar cane or coconut husks, livestock waste, industrial waste and municipal waste. Organic matter plays an important role as a carbon source, food source and energy source that supports the life and reproduction of various types of soil microbes (Rosalina & Febriadi, 2019). With organic fertilizer, people can consume plants well and healthy, and the environment is not polluted. For the village of curah sawo, the making of clam shell fertilizer is one of the efforts in recycling clam shell waste that accumulates around the homes of residents who live on the coast, then the results of making this fertilizer are then used can be distributed to the community both from the village of curah

sawo and from outside curah sawo, as one of the natural pesticides that can add calcium to plants.

To increase awareness, seaweed is used as a liquid organic fertilizer to reduce the amount of waste produced. The following are the stages of making clam shell organic fertilizer (Setiyaningsih et al., 2021): Collected clam shells (*Anadara granosa*) from the yard of a resident of Curahsawo Village, Gending District, Gending Regency, the clam shells are then washed with water until clean, the clam shells are dried in the sun for 4 days to remove the water, 7 Kg of clam shells are burned so that they are easy to crush, the clam shells that have been burned are then mashed and sifted to become 3 Kg of flour, Then put 15 liters of water (in 1 Kg of shell flour put 5 liters of water), then put EM4 as much as 300 ml (in 1 Kg of shell flour 100 ml), put 3 Kg of granulated sugar and stirred well, covered with plastic plastic containers, fermented for 15 days, After 15 days, the fertilizer can be used (Ayu, 2020; Darmawan et al., 2022).

Based on these problems. The purpose of this service program is to make Curahsawo villagers aware that clam shell waste (*Anadara granosa*) can be used as organic fertilizer. It is no longer redundant, but can be converted into rupees. The organic fertilizer obtained from the shell waste is also very effective for plant growth.

## METHODS OF EXECUTION

In implementing this KKN program, Pancamarga University students will take a participatory approach by actively involving the Curahsawo Village community in every stage of the program. The first step will involve counseling on the importance of waste management and the benefits of clam shells as organic fertilizer. Extension materials will be tailored to the local community's level of understanding, so that the messages delivered can be well received. The program will also involve socialization activities at a broader level, such as holding seminars or workshops for farmers in the surrounding area.

The aim is to share the knowledge and experience gained during the program with more people, so that the use of clam shell waste as organic fertilizer can spread and be

adopted by more communities. The data collection method used in this article is observation by conducting direct observation to the field in Karanganyar Hamlet RT. 05 Curahsawo Village, Gending District.

## RESULT AND DISCUSSION

This program not only increases community awareness about the environment but also helps reduce the adverse impact of clam shell waste on the surrounding environment. Pancamarga University students will take a participatory approach in the implementation of this KKN program by actively participating in the Curahsawo Village community throughout the program. In the first step, people will be educated on the importance of managing waste and the benefits of clam shells as organic fertilizer. The material provided will be tailored to the level of understanding of people in the area, so that the message can be well received.

After the counseling, hands-on practice of processing clam shell waste into organic fertilizer will be conducted. Students will work together with others to collect, dry and crush the shells. Afterwards, the processed shells will be enriched with other organic additives to produce high-quality fertilizer. This program not only increases the community's awareness of the environment but also helps reduce the hazards of shell waste. Throughout the program, Pancamarga University students will actively participate in the Curahsawo Village community. People will be educated about the importance of managing waste and the benefits of clam shells as organic fertilizer in the first stage. So that the message can be well received, the material provided will be adjusted to the level of understanding of people in the area.

After the counseling, the method of processing clam shell waste into organic fertilizer will be directly applied. To collect, dry and crush the clam shells, students will cooperate with others. Afterwards, the processed clam shells will be enriched with other organic additives to produce high-quality fertilizer.

Based on the background, namely the high shell waste in Curahsawo Village, the problem is to make a technology product for making liquid organic fertilizer from shell waste. In this case, the KKN team tried to introduce and socialize the method of making the Utilization of Clam Shell

Waste as Organic Fertilizer as a solution when the availability of subsidized fertilizers is scarce and prices are high. In addition, making clam shell POC does not require large costs, the materials are relatively easy to obtain, and the manufacturing method is quite simple. The finished products delivered to the farmers of Curahsawo Village are both in the form of basic raw materials for making clam shell POC and finished POC products made from finished clam shells. For the long-term technology program, the results of clam organic fertilizer can be marketed more widely so as to increase farmers' income and we hope that it can be further developed and marketed as widely as possible.

In addition to these factors, crops treated with organic fertilizer are generally more suitable for consumption. Long-term use of fertilizers, organic materials also increase soil fertility and are rich in nutrients. This social program is also expected to spark the enthusiasm of the community to carry out organic farming, starting from the smallest scale such as planting ecological and healthier organic fruit or vegetable plants in the yard, as well as long-term soil fertilization. The longer it grows, the more fertile and nutritious it becomes (Putri et al., 2022).

In addition, making kerrang shell POC is relatively easy and does not require much cost. The manufacture of this organic fertilizer is relatively simple, the raw materials needed for its manufacture are quite easy to obtain, and the production costs are relatively cheap. In addition, it is expected that the community/farmers will gradually reduce dependence on chemical fertilizers and gradually adopt organic fertilizers.

The Figure above is the result of documentation during the presentation of material by the resource person in the form of the benefits of organic liquid fertilizer derived from shellfish shells, which is one of the unresolved waste problems by the people of Curahsawo village.

In the Figure 1c, the atmosphere looks very dynamic with the presence of a group of participants who are actively participating. Participants were seen sitting or standing in groups, intensely involved in discussions, and exchanging ideas regarding the use of shellfish waste as organic fertilizer. In the middle of the group, there is a speaker or facilitator who may provide an explanation, guide, or demonstration

regarding the shellfish waste processing process. The image background displays a projector screen or whiteboard containing presentation material,

such as diagrams, practical steps, or related research results.



(a)



(b)



(c)

**Figure 1. (a) Provision of Socialization Materials (b) Providing Material (c) Photo with Socialization participants**

Participants looked enthusiastic and serious, reflecting a high level of involvement in this workshop topic. Apart from that, around the workshop location, there were samples of shellfish waste and organic fertilizer products produced, giving participants the opportunity to see real results from the use of shellfish waste. Figure 3 represents a positive atmosphere and active learning in order to understand and apply the concept of using shellfish waste as organic fertilizer.

#### ACKNOWLEDGMENTS

Our gratitude goes to: Chairman of the Panca Marga University KKN Committee in 2023, Mr. Hosnol Wafa, S.S., M.Hum; Field Supervisor (DPL) KKN Curahsawo Village in 2023, Mr. Raihan Wishal Nafis, SE, MM.

#### CONCLUSION

Based on the analysis of the research results, the following conclusions were obtained: Organic fertilizer of clam shell waste (*Anadara granosa*) Utilization of Clam Shell Waste as Organic Fertilizer as a solution when there is a scarcity of availability and high prices of subsidized fertilizers. For the long-term program, the technology of making clam shell organic fertilizer as a result can be marketed more widely, so that it can increase income for farmers.

#### Author's declaration

#### Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of

results. The authors read and approved the final manuscript.

### Funding

Write down the research funding, if any.

### Availability of data and materials

All data are available from the authors.

### Competing interests

The authors declare no competing interest.

---

## REFERENCES

- Ayu, D. (2020). Effect of Distribution Channels and Prices on Consumer Loyalty in SPBU SHELL Perbaungan. *Journal of Management Science (JMAS)*, 3(2, April), 31-37.
- Banu, L. S. (2020). Review: Pemanfaatan Limbah Kulit Bawang Merah dan Ampas Kelapa sebagai Pupuk Organik terhadap Pertumbuhan Beberapa Tanaman Sayuran. *Jurnal Ilmiah Respati*, 11(2), Article 2. <https://doi.org/10.52643/jir.v11i2.1125>
- Darmawan, A., Alamsyah, R., Koswara, R., & Ahmadi, D. (2022). Strengthen the Role of Village Owned Enterprises (BUMDes) to Improve Social Welfare and Reduce Inequality in Rural Areas: Lesson from Indonesia. *Proceedings of the 3rd International Conference of Business, Accounting, and Economics, ICBAE 2022, 10-11 August 2022, Purwokerto, Central Java, Indonesia*.
- Firdiani, D., Aminullah, A., Astari, R., Sulastina, S., Mufliha, M., & Elihami, E. (2022). Pemanfaatan Limbah Daun Pisang dan Kulit Bawang Merah sebagai Pupuk Organik Cair untuk Kesuburan Tanah di Desa Bambapuang. *MASPUL JOURNAL OF COMMUNITY EMPOWERMENT*, 4(1), 96-102. <https://ummaspul.ejournal.id/pengabdian/article/view/4048>
- Grenz, S., Baumann, P. T., Rückert, C., Nebel, B. A., Siebert, D., Schwentner, A., Eikmanns, B. J., Hauer, B., Kalinowski, J., Takors, R., & Blombach, B. (2019). Exploiting Hydrogenophaga pseudoflava for aerobic syngas-based production of chemicals. *Metabolic Engineering*, 55, 220-230. <https://doi.org/10.1016/j.ymben.2019.07.006>
- Guerra-Tamez, C. R., Dávila-Aguirre, M. C., Barragán Codina, J. N., & Guerra Rodríguez, P. (2020). Analysis of the Elements of the Theory of Flow and Perceived Value and Their Influence in Craft Beer Consumer Loyalty. *Journal of International Food & Agribusiness Marketing*, 1-31.
- Hasibuan, S., Nugraha, M. R., Kevin, A., Rumbata, N., Syahkila, S., Dhewanty, S. A., Fadillah, M. F., Kurniati, M., Trilanda, N., Afifah, S. N., & Shafira, T. (2021). Pemanfaatan Limbah Cangkang Telur sebagai Pupuk Organik Cair di Kecamatan Rumbai Bukit. *PRIMA: Journal of Community Empowering and Services*, 5(2), 154. <https://doi.org/10.20961/prima.v5i2.54635>
- Juradi, M. A., Tando, E., & Suwitra, K. (2019). Inovasi Teknologi Pemanfaatan Limbah Kulit Buah Kakao (*Theobroma cacao* L.) Sebagai Pupuk Organik Ramah Lingkungan. *AGRODIX: Jurnal Ilmu Pertanian*, 2(2), Article 2. <https://doi.org/10.52166/agroteknologi.v2i2.1586>
- Maduwinarti, A., & Taali, M. (2023). Business Governance and Collaboration in Village-Owned Enterprises (BUMDes) in Efforts to Improve Market Performance in The Madiun Residential. *International Journal of Social and Management Studies*, 4(2), Article 2. <https://doi.org/10.5555/ijosmas.v4i2.304>
- Marjenah, M., Kustiawan, W., Nurhifitiani, I., Sembiring, K. H. M., & Ediyono, R. P. (2018). Pemanfaatan Limbah Kulit Buah-Buahan Sebagai Bahan Baku Pembuatan Pupuk Organik Cair. *ULIN: Jurnal Hutan Tropis*, 1(2), Article 2. <https://doi.org/10.32522/ujht.v1i2.800>
- Putri, A., Redaputri, A. P., & Rinova, D. (2022). Pemanfaatan Limbah Kulit Pisang Sebagai Pupuk Menuju Ekonomi Sirkular (UMKM Olahan Pisang Di Indonesia). *Jurnal Pengabdian UMKM*, 1(2), Article 2. <https://doi.org/10.36448/jpu.v1i2.20>
- Rosalina, F., & Febriadi, I. (2019). Pemanfaatan Limbah Kulit Buah Pinang dan Batang Sagu dalam Pembuatan Pupuk Organik Cair. *Median: Jurnal Ilmu Ilmu Eksakta*, 11(3), 13-18. <https://doi.org/10.33506/md.v11i3.690>
- Satya, T. P., Puspasari, F., Prisyanti, H., & Saragih, E. R. M. (2020). Perancangan Dan Analisis Sistem Alat Ukur Arus Listrik Menggunakan Sensor Acs712 Berbasis Arduino Uno Dengan Standard Clampmeter. *Simetris: Jurnal Teknik Mesin, Elektro Dan Ilmu Komputer*, 11(1), 39-44.
- Setiyaningsih, D., Iswan, I., Bahar, H., & Erviana, E. V. (2021). Pemberdayaan Masyarakat dalam Pemanfaatan Limbah Cangkang

Telur Menjadi Produk Mozaik dan Pupuk Organik di Wilayah Kampung Cerewed Keluran Duren Jaya Bekasi Timur. *Prosiding Seminar Nasional Pengabdian Masyarakat LPPM UMJ*, 1(1), Article 1. <https://jurnal.umj.ac.id/index.php/semnaskat/article/view/8053>

Tuhuteru, S., Rumbiak, R. E. Y., Ronald, & Wanimbo, A. (2021). Pelatihan Pengolahan Limbah Kulit Buah Nanas Menjadi Pupuk Organik Cair di Distrik Bokondini. *Jurnal Pengabdian Nasional (JPN) Indonesia*, 2(2), Article 2. <https://doi.org/10.35870/jpni.v2i2.35>