

# Implementation of Blue Economy to Increase Lobster Production through Natural Feeding Efficiency

Dewi Shinta Achmad<sup>1</sup>, Muh Firyal Akbar<sup>2</sup>, Widiastuti Ardiansyah<sup>3</sup>, Susan Mokoolang<sup>3</sup>, Tusaban<sup>1</sup>

<sup>1</sup>Aquaculture Study Program, Faculty of Science and Computer Science, Muhammadiyah University of Gorontalo

<sup>2</sup>Master of Public Administration Study Program, Postgraduate Program, Muhammadiyah University of Gorontalo

<sup>3</sup>Animal Husbandry, Science and Computer Science Study Program, Muhammadiyah University of Gorontalo

Corresponding Author: Dewi Shinta Achmad

E-mail: [dewishintaachmad@umgo.ac.id](mailto:dewishintaachmad@umgo.ac.id)

**Abstract.** *Community Service Activities entitled Freshwater Lobster and Silkworm Cultivation, were carried out from September to November 2024. The need for freshwater lobster feed that is difficult to obtain makes natural feed such as silkworm cultivation, an alternative to be used as feed for freshwater lobster cultivation. In addition, Freshwater Lobster cultivation is still very rarely carried out in the Gorontalo area, thus providing opportunities and benefits for inmates to be able to become independent after leaving prison. The need for freshwater lobster feed that is difficult to obtain makes natural feed for larvae/fry such as silkworms, an alternative to be used as feed for freshwater lobster cultivation. This PKM activity is a new hope for inmates to get a sustainable livelihood and income.*

**Keywords:** *Freshwater Lobster, Silkworms, Gorontalo Prison*

Received: October 5, 2024

Received in Revised: October 27, 2024

Accepted: November 28, 2024

## INTRODUCTION

Class IIA Gorontalo Penitentiary is located on Jalan Jendral Katamso Number 33, Donggala Village, Hulonthalangi District, Gorontalo City, Postal Code 96133, Gorontalo Province. Previously, Class IIA Gorontalo Penitentiary occupied an old building built by the Portuguese in 1818. While the current building was built in 1983 and effectively operated in 1984 with a capacity of 210 (two hundred and ten) people (Kemenkumham RI Regional Office, 2023). Then in the last calculation based on the addition of the residential block building, the residential capacity became 600 (six hundred) people. The addition of inmates that exceeds the capacity certainly cannot have an impact on the activities and supervision carried out at the Penitentiary. Usually, inmates after being released from their prison term will fall back into illegal activities such as becoming drug dealers. Community service activities by providing additional skills for inmates at Class IIA Gorontalo Prison (Shinta Achmad et al., 2023).

Community service activities have target partners who are inmates and prison officers. Freshwater lobster (*Cherax quadricarinatus*), is one of the most widely distributed and cultivated

freshwater crayfish because of its high tolerance to various environmental conditions (Eprilurahman et al., 2021; Wie, 2017; Setiawan, 2010; Sopandi et al., 2023), Freshwater lobster or Red claw is a great climber and can get out of the aquarium if the water surface is close to the top (Masser et al., 1997), Crayfish is a type of shrimp (crustacea) that has high economic value and has adequate potential due to low survival rates, especially at the juvenile stage. This is often caused by inadequate feed quality for development.

However, the main obstacle faced in crayfish cultivation is the lack of seed availability so that nutritional needs are not met (Syahrul et al., 2024; Adi et al., 2024; Mujtahidah et al., 2023). The results of the study showed that the provision of live and fresh silkworms had a significant effect on the growth performance and survival of larvae (Tri et al., 2023). This PKM activity was certainly welcomed by the Prison to improve additional skills for inmates while serving their sentence. In addition, Freshwater Lobster cultivation is still very rare in the Gorontalo area, thus providing opportunities and benefits for inmates to be able to succeed independently after leaving prison. The need for freshwater lobster feed which is difficult to obtain makes natural feed such as silkworm cultivation an alternative to be used as feed for freshwater lobster cultivation. This service activity aims to improve additional skills for foster residents in the cultivation and marketing of crayfish and silk worms.

## **METHODS**

The methods of activities and stages carried out during skills training at Class IIA Gorontalo Prison include: 1). Preparation Stage 2). Location Survey 3). Socialization Stage 4). Training Implementation 5). Evaluation and Report.

### **Preparation**

In the preparation stage, the community service team prepares materials and props for the Community Service activities. Preparation of materials and tools takes 1 month starting from June - July 2024 to determine training needs. Equipment and materials for freshwater lobsters and silkworms as shown in the following picture:



Figure 1. Freshwater lobster



Figure 2. Silk worms



Figure 3. Cultivation equipment

### **Observation**

In the preparation stage, the community service team first conducts field observations. Field observations (outdoor studies) are needed to understand and gain knowledge, especially a description of the community service location (Nurkhozin et al., 2022). In line with the research using an analytical research design with a cross-sectional approach, the analysis that explains descriptively the research variables in the form of data (Muhamad et al., n.d.).

### **Socialization**

The implementation of this activity is carried out using the lecture method, by providing materials with the abilities and absorption of participants (Mohi & Akbar, 2021). Socialization is

carried out before the training activities, by discussing with prison officers, and recording data on inmates who are interested in participating in the training activities.

### Training

The socialization activity was carried out in October 2024, attended by 55 inmates and 10 prison officers. At this stage, the methods implemented were lectures, discussions, questions and answers, demonstrations and direct practice. However, before that, the community service team conducted an initial test (pre-test) in the form of a written test to determine the extent of all participants' knowledge of Freshwater Lobster and Silkworms. Furthermore, participants were given training materials in the form of how to cultivate Freshwater Lobster and Silkworms. After receiving the training materials, participants were given training by means of demonstrations, then direct practice.

### Evaluation and Reporting

Participants were given the opportunity to ask questions if there was anything they wanted to ask or something that was unclear. If the direct training had been completed, participants were then given questions again as a final test (post-test) to determine the level of increase in knowledge of the training participants. Evaluation was carried out at the end of the activity through harvesting, economic feasibility, and sustainable marketing.

## RESULTS AND DISCUSSION

### Preparation Stage

In the preparation stage of the community service, the community service team prepares equipment and materials for freshwater lobsters and silkworms. The equipment used is as follows:

Table 1. Equipment and materials for cultivating freshwater lobsters and silkworms

No	Name of goods	Type
1	Freshwater Lobster	Consumption/Decoration
2	Silkworms	Natural Feed
3	Aerator machine	Oxygen Machine
4	Hose	Oxygen Hose
5	PH Meter	Water Measuring Instrument
6	TDS	Water Quality
7	1 Inch and 2 Inch Shelter	Lobster House
8	Lobster Feed	Feed
9	Lobster Quarantine Container	Small Basket
10	200x100x50 Tarpaulin	Box Tarpaulin
11	Silkworm container	Plastic Container
12	30 Liter Bucket	Mud Container
13	Water Pump	Medium Size
14	Aerator Stone	Airstone
15	Generator (electricity backup)	Electricity

### Observation Stage

The Community Service Team at the observation stage visited several places in the prison, looking for the right location for the right location for cultivation. In the prison there are locations where ponds have been made for cultivation but have not been used optimally, many ponds are left unmaintained. Facilities such as water pumps and aerator machines are not yet available in several locations in the prison. Then continued with the installation of labels, banners, questionnaires, and equipment for socialization and training activities, as in the following picture:





Figure 4. Documentation of Observations and before training activities

### **Socialization Stage**

Socialization and discussion with the Class IIA Gorontalo LAPAS were also carried out at this stage, especially to determine the training materials and the number of participants who will take part in the training. Furthermore, the community service team prepared the materials. This preparation activity lasted for 1 month, starting from May to September 2024. In filling out the questionnaire, inmates were accompanied by students and prison officers. As in the following picture:



Figure 5. Documentation of Socialization and Questionnaire Completion

### **Training Stage**

At this stage, the methods implemented are lectures, discussions, Q&A, demonstrations and direct practice. However, before that, the community service team conducted an initial test (pre-test) in the form of a written test to determine the extent of all participants' knowledge of Freshwater Lobster and Silkworms. Furthermore, participants were given training materials in the form of how to cultivate Freshwater Lobster and Silkworms as in Figure 6. After receiving the training materials, participants were given training by means of demonstrations, then direct practice. Participants were interested and enthusiastic as seen from the Q&A discussion, this supports the sustainability of the program.



Figure 6. Documentation of Freshwater Lobster and Silkworm Training activities

### Evaluation and reporting stage

In between direct practice, participants are given the opportunity to ask questions if there is something they want to ask or something that is not clear. When the direct training has been completed, participants are then given questions again as a final test (post-test) to determine the level of increase in knowledge of the training participants. The description of the respondents' ages can be seen from the age criteria, as in the table below.

Table 2. Distribution of Respondents of Inmates Based on Age

No	Respondent Age	Number of people)	Percentage (%)
1.	Usia 21 - 30	17	17,31 %
2.	Usia 31 - 40	25	25,46 %
3.	Usia 41 -50	9	9,6 %
4.	Usia 51 - 60	4	4,70 %

From table 2. It can be seen that 25.46% of respondents are aged 31-40 years, aged 21-30 years 17.31%, this illustrates that respondents have great potential in following and implementing coaching and training well. The results of the level of knowledge of inmates of Class II A Gorontalo Prison before carrying out training are still lacking, as in the following picture :



Figure 7. Experience of inmates participating in freshwater lobster and silk worm training

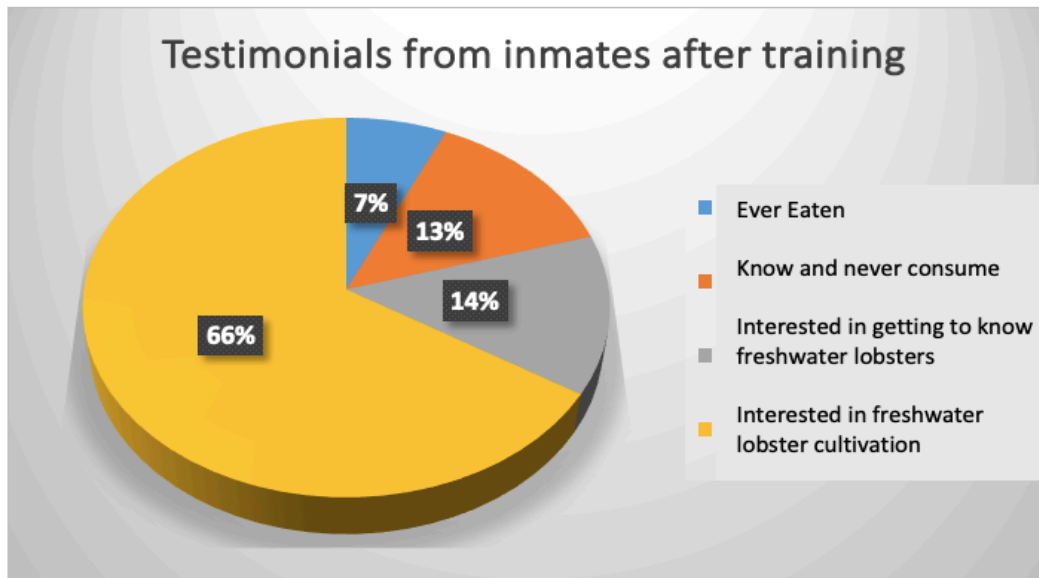


Figure 8. Testimonials from inmates after participating in the training.

The results of the inmates' questionnaire showed that there was an increase before the training in interest in cultivating freshwater lobsters and silkworms by 66%, interested in knowing 14%, knowing but not consuming lobster 13%, and never seeing or eating 7%. From the results of the skills training that has been carried out on inmates of Class IIA Gorontalo Prison in 2023. Inmates understand and know new skills in making aquariums and how to cultivate ornamental fish (Shinta Achmad et al., 2023; Jiler, 2006; Rhyne et al., 2017; Humphreys, 1857; Smith et al., 2012; Achmad et al., 2023). In general, the success of this training activity can be seen from the direct benefits obtained, namely the increased skills and knowledge of inmates in cultivating Freshwater Lobsters and Silkworms. Therefore, monitoring and evaluation were carried out after the training activities took place.

## CONCLUSION

From the results of the skills training that has been carried out on inmates of Class IIA Gorontalo Prison. Inmates are interested and know the skills of how to cultivate Freshwater Lobster and Silk Worms. Target partners have additional skills, as provisions after their prison term, and hope that this community service activity will continue.

## ACKNOWLEDGMENT

The author would like to thank the Ministry of Education, Culture, Research and Technology for funding the community service through the Community Service scheme with contract number 001/PK/LPPM-UMGO/VIII/2024. The author would also like to thank Renaldi Manampa, Rosyihikul Nango, and Arin Ismail for their assistance and student involvement during the community service activities.

## REFERENCES

- Achmad, D. S., Bakti, N. S., Tilome, A. A., Ardiansyah, W., Mokoginta, M. M., Indarwati, A., ... & Nurkhozin, A. A. (2023). Pembinaan Keterampilan Budidaya Ikan Hias dan Akuaskap Warga Binaan Lembaga Pemasyarakatan (LAPAS) Kelas IIA Gorontalo. *Huidu Jurnal Pengabdian Masyarakat Geoscience*, 2(2), 31-36. <http://dx.doi.org/10.31314/huidu.v2i2.2675>
- Adi, C. P., Panjaitan, P. S., Soeprijadi, L., Hidayah, E., Wulan, D. R., & Prajayanti, V. T. F. (2024). *Strategi Manajemen Kesehatan Dan Parameter Kualitas Air Dalam Budidaya Ikan Nila*. Penerbit P4I.

- Eprilurahman, R., Simarmata, A. K., Hakim, L., & Trijoko, T. (2021). Morphological and molecular characters of *Cherax quadricarinatus* (von Martens, 1868) from Sermo Reservoir and Tambakboyo Retention Basin, Daerah Istimewa Yogyakarta, Indonesia. *Biogenesis: Jurnal Ilmiah Biologi*, 9(1), 18. <https://doi.org/10.24252/bio.v9i1.16612>
- Humphreys, H. N. (1857). *River Gardens: Being an Account of the Best Methods of Cultivating Fresh-water Plants in Aquaria, in Such a Manner as to Afford Suitable Abodes to Ornamental Fish, and Many Interesting Kinds of Aquatic Animals*. S. Low, son, and Company.
- Jiler, J. (2006). *Doing time in the garden: Life lessons through prison horticulture*. New Village Press.
- Kemenkumham RI Kanwil. (2023). *Laporan Profiling Lembaga Pemasyarakatan Kelas IIA Gorontalo* (p. 10).
- Masser, M., Rouse, D., & Center, S. (1997). Australian red claw crayfish. *Southern Regional Aquaculture Center*, 244, 1–8.
- Mohi, W. K., & Akbar, M. F. (2021). *Capacity Building of Village Apparatus in Ulapato A Village , Blue Lake District , Gorontalo Regency*. 1(1), 19–25.
- Muhamad, Z., Deka Ishak, I., Ahmad, D. S., & Tilome, A. A. (n.d.). *Novateur Publication, India Proceedings of International Seminar on Indonesian Lecturer is Born to Report Regularly Relationship between Mother's Parenting Style and Stunting in Toddlers Aged 24-59 Months in the Working Area of the Kwandang Health Center Indonesia*.
- Mujtahidah, T., Sari, D. N., Putri, D. U., Mainassy, M. C., Ode, I., Yusuf, M. A., ... & Sari, Y. P. (2023). *Budidaya Perikanan*. TOHAR MEDIA.
- Nurkhozin, A. A., Achmad, D. S., Yasin, I. A., Bakti, N. S., Mokoginta, M. M., Pomolango, R., & Handayani, T. P. (2022). Pengenalan dan Penanganan Ikan Bersifat Invasif di Provinsi Gorontalo. *Huidu Jurnal Pengabdian Masyarakat Geoscience*, 1(2), 60. <https://doi.org/10.31314/huidu.v1i2.1923>
- Rhyne, A. L., Tlusty, M. F., Szczebak, J. T., & Holmberg, R. J. (2017). Expanding our understanding of the trade in marine aquarium animals. *PeerJ*, 5, e2949. <https://doi.org/10.7717/peerj.2949>
- Setiawan, C. (2010). *Jurus Sukses Budi Daya Lobster Air Tawar*. AgroMedia.
- Shinta Achmad, D., Syaia Bakti, N., Ara Tilome, A., Ardiansyah, W., Melani Mokoginta, M., Indarwati, A., Ayu Mutmainah Kurniawati, S., & Ainul Nurkhozin, A. (2023). *Pembinaan Keterampilan Budidaya Ikan Hias dan Akuaskap Warga Binaan Lembaga Pemasyarakatan (LAPAS) Kelas IIA Gorontalo*. 2(2), 2963–5535. <https://doi.org/10.31314/huidu.v2i2.2675>
- Smith, K. F., Schmidt, V., Rosen, G. E., & Amaral-Zettler, L. (2012). Microbial diversity and potential pathogens in ornamental fish aquarium water.
- Sopandi, T., Kusuma, P. S. W., & Ajiningrum, P. S. (2023). *Biologi dan Budidaya Lobster Capit Merah*. EBOOKU.
- Syahrul, Karim, M. Y., & Zainuddin. (2024). Study of Dissolved Glucose Feeding on the Juvenile Redclaw Crayfish(*Cherax quadricarinatus*) Maintenance. *Egyptian Journal of Aquatic Biology and Fisheries*, 28(3), 841–850. <https://doi.org/10.21608/ejabf.2024.360948>
- Tri, M., Sunarno, D., Samsudin, R., Sumartina, B., & Syamsunarno, M. B. (2023). *Feeding combination of live and fresh silkworms ( Tubifex sp .) for the growth performance and survival rate of larvae of baung ( Hemibagrus nemurus )*. 01018.
- Wie, K. L. C. (2007). *Pembenihan lobster air tawar; meraup untung dari lahan sempit*. AgroMedia.