



Journal home page: <http://ajarcde-safe-network.org> ISSN 2581-0405

Implementation of PM-UPUD Cage Management for Fattening Bali Cattle in Balangan Village, Kuwum, Mengwi, Badung

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ARTICLE INFO

Article History:

Received: 11 September 2025

Final Revision: 07 October 2025

Accepted: 16 October 2025

Online Publication: 18 October 2025

KEYWORDS

Bali Cattle, Stage, Partner, community service

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A B S T R A C T

Cattle fattening has been carried out for generations, but has not been intensive, and partners want to increase its quantity and quality. Partners lack knowledge in the field of housing and feed preservation, which causes them to experience obstacles in fattening cattle. The group requested training and assistance regarding the requirements for housing for fattened bulls. Fattening bulls is a side business carried out by farmers in Kuwum village that must be preserved and maintained in each region to maintain local wisdom and the population of Bali cattle. The solution implemented to resolve the problems faced by partners involves applying previous research results from the proposers, which are already published. This is achieved by Providing Appropriate Technology for Bali cattle maintenance and preserving local wisdom through cattle farming. The method used is the method of active community participation and exploration. This Community Service activity supports IKU 2, where students gain experience outside the campus, and IKU 3, where lecturers engage in activities outside the campus. The activity lasted for 10 months, involving 2 students, by recognizing several courses.

Contribution to Sustainable Development Goals (SDGs):

- SDG 1 – No Poverty
- SDG 2 – Zero Hunger
- SDG 8 – Decent Work and Economic Growth
- SDG 12 – Responsible Consumption and Production

1. INTRODUCTION

There are 25 Balinese Nandini cattle breeders in Balangan Kuwum Village, Mengwi. Kuwum Village is located in the Mengwi sub-district of Badung Regency, Bali. It is located approximately 20 km north of Denpasar, towards the tourist villages of Bedugul and Taman Ayun. The population predominantly works as farmers and raises Balinese cattle. Balinese cattle are traditionally raised during a part-time, intermittent planting period [1]. Swing Village has the potential to be developed as a tourism village for the maintenance and use of Balinese cattle for hijacking/ploughing (traditional metekap).

Balinese cattle are gempalm that must be preserved, which is supported by this government policy is a golden opportunity for cattle breeders in Bali in particular, because Bali is one of the sources of Balinese cattle seeds and the only area that is believed to have pure genetics of Balinese cattle [2]. More efficient marketing will be able to provide higher prices for farmers. Thus, a more efficient marketing system must be considered, so that cattle farms can provide additional higher income for farmers. The increase in income will encourage them to raise more cows. In addition, it will encourage farmers to carry out maintenance in a better way [3].



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Fig. 1. Environmental Atmosphere of Kuwum Village.
Source: Field documentation, 2025

As a result of discussions with potential partners, it was found that several production distribution processes, including the procurement of production facilities at partner locations, can be said to have no problems. Locations near city and sub-district centres, along with the government's increased focus on road infrastructure, are very supportive and make the distribution process less of an obstacle. The cattle maintenance management process that occurs in partners is straightforward, as it is simply necessary for livestock to survive. Planning for the production of organic fertiliser from cow manure has already taken place, but only the planning phase has not yet been implemented.

Direct observation in the Nandini and Karya cattle groups in Kuwum village, Abiansemal District, illustrated that the Balinese cattle rearing activities of partners are significantly constrained by capital, mainly seed and cage capital, feed, cattle maintenance management, processing and livestock manure channels and how to increase farmers' income from the Balinese cattle rearing business. The main problems to be addressed in problem-solving are the poor management of Balinese cattle rearing related to cages, low productivity in processing livestock manure into organic fertiliser, and the low business efficiency and sustainability of organic fertiliser products from livestock manure. The results of this activity are expected to increase production and productivity, leading to optimally grown cattle. Cows that grow optimally will be able to increase the sales and income of Balinese cattle farmers in Kuwum Village.



Fig. 2. Nandini cattle barn

Based on the observations that have been made on partner livestock groups, for the sake of sustainability and its existence it is very feasible to receive guidance and assistance from universities on an ongoing basis so that it can increase the capacity, quality and income of Balinese cattle breeders through

the processing of superior products of Balinese cattle in Kuwum Village, coaching and improving the management of Balinese cattle rearing, processing cow manure into organic fertilizer and marketing of organic fertilizer products and other interrelated aspects that can provide an increase in farmers' income, with an increase in the income of farmers in Bali cattle farmers become prosperous.

Regarding the management of Bali cattle maintenance partners, the conditions of each of these partners can be described:

The management of Balinese cattle rearing in partners is not carried out professionally because it is managed in a family and traditional manner and is not a staple livelihood, Balinese cattle rearing is only a part-time filler for free time on the sidelines of farming which now mostly has used labor both in soil cultivation, seeding, and harvesting. Likewise, bookkeeping tasks such as diaries, cash books, and calculations of production costs, profits, or losses are not properly available. Regarding human resource management, it is still unclear how the division of labour is defined between each other.

Partners lack an effective cattle rearing system due to the limited knowledge and abilities of the farmers. The management of cow manure and manure channels has not been properly handled. It should still be processed into organic fertiliser and sold to farmers to increase the income of cattle farmers. The facilities owned by the partners are in the form of makeshift cowsheds. As seen in the picture. 2. Based on the results of observations on both partners, there are several problems that are obstacles including:

The division of labour in cattle farming is unclear because cattle rearing is managed casually, using family labour and maintenance only as a part-time activity during free time on the sidelines of farming. So it is not the main business or livelihood of the partner. The equipment they have, such as grass sickle tools and baskets for grass, has reached the end of its economic life. Partners cannot afford the equipment, so it often takes a long time to find animal feed.

There is no cow manure sewer system, which causes a smell and makes the cowshed dirty. This cow manure has not been processed as an organic fertiliser that can provide additional income for farmers, so it needs tools to be processed into organic fertiliser. It is necessary to provide knowledge of agricultural product marketing so that our farmers do not focus solely on production and can increase their entrepreneurial spirit. The solutions to address problems in this 2nd year include:

socialising effective cattle maintenance methods and cages that support good growth, emphasising the importance of cages in cattle rearing, and focusing on cage sanitation with eco-enzymes. Procurement of facilities and infrastructure that support cattle rearing activities is one of them. Providing sickle assistance to each member of the partner livestock group ensures that breeders can easily and quickly find cow feed.

2. METHODS

The implementation of this Community Partnership Program is carried out through several systematic and structured stages, as follows: Providing an understanding of cattle maintenance management in Bali through the socialisation of PM-UPUD activities, with the intention of equalising perceptions and strengthening the institutions of partner groups. Providing cattle management training to the community, especially to partner

groups. So far, there has been no public knowledge, especially marketing issues related to Natural Resources Cultural Tourism. Providing training on making organic fertilizer in partner groups from cow manure. Providing socialization to partner groups related to the importance of cages in cattle rearing and providing socialization to partner groups related to the natural resource management and arrangement system, as well as completing natural resource facilities and preparing natural resource tourism governance and management and providing materials, socialization, and understanding of natural resource tourism support facilities. The second phase of socialization of the service team held a meeting with the Nandini Cattle group and the people of Kuwum Village to introduce the program to be implemented. This socialization aims to: Explain the objectives, benefits, and program activity plan. Identify problems faced by partners in more depth, Build agreement and commitment between the service team and the community to actively participate in the program. This training will focus on two main aspects, namely good and efficient cow pen techniques. Provide farmers with knowledge and skills on how to build a cowshed. This training covers both theory and practice, allowing participants to directly apply the techniques taught. \



Fig.3. Sanitation of the Cage

Application of Technology After Training. At this stage, farmers begin to apply the techniques they have learned in their daily activities. The service team provides Materials and tools needed for the process of making cages, such as cement, scrap, water, and wood. Practical Guide, which is to compile practical guidelines that farmers can use as a reference in applying the techniques that have been taught. Mentoring and Evaluation This stage involves continuous mentoring from the community service team. The team conducts regular visits to Provide guidance and technical support to farmers in the application of fattening cow cage manufacturing techniques.



Fig.3. Individual Cowsheds

Evaluate the results achieved, both in terms of improving the quality of cages, crop yields, and farmers' understanding of economic aspects. This evaluation is carried out through surveys and interviews with farmers. Program Sustainability To ensure the sustainability of the program, the service team Builds a network between farmers and related parties, such as government agencies, academics, and non-governmental organisations, to support further development. Develop a follow-up plan that includes further training and capacity building for farmer groups, enabling them to continue implementing the techniques they have learned and adapt to changes in the field. Encourage farmers to share experiences and knowledge with each other to create a community that supports sustainable agricultural management. The participation of partners, specifically the Nandini Cattle group, is crucial for implementing community service programs. Partners are actively involved in every stage of the activity, from planning to evaluation. Here are some ways in which partners can participate in the implementation of the program: Involvement in Planning: Partners are invited to provide input and opinions on their needs and challenges. This will ensure that the program is designed according to the context and the real needs in the field. Participation in Training: Members of the livestock group are involved in training held by the service team. They are not only participants but can also act as facilitators in specific sessions, sharing experiences and best practices they have implemented. Technology Implementation: Partners play an active role in the application of new technologies, such as manure fermentation processes. They are trained to carry out the techniques taught and are expected to be implemented. Feedback and Discussion: During the implementation of the program, partners are invited to provide feedback on the process and the results achieved.



Fig. 4. Group Cattle Enclosure

This discussion helps the service team to adjust the approach used. Program implementation evaluations are carried out periodically to assess the effectiveness and impact of the activities that have been implemented. The following are the steps of the evaluation steps carried out: Data Collection: Data was collected through surveys, interviews, and direct observation of changes that occurred in the field, such as increasing crop yields, fertilizer quality, and farmer knowledge. Outcome Analysis: The service team analyzes the data collected to assess the achievement of pre-defined performance indicators. This includes measuring the improvement of fertilizer quality, crop yields, and farmers' economic understanding. Evaluation Discussions: The results of the evaluation are discussed in a forum involving partners and service teams. This discussion aims to gain perspectives from all parties and formulate recommendations for future improvements.

The sustainability of the Program in the Field after the activities are completed is crucial to ensure that the benefits continue to be felt by the community. **Networking and Partnerships:** Establish networks with other agencies, such as the agriculture service and non-governmental organizations, to obtain ongoing support in the form of advanced training, market access, and other resources. **Periodic Monitoring:** The service team conducts monitoring after the program is completed to ensure that the practices taught are still applied and have a positive impact. This monitoring will also be an opportunity to provide additional support if needed.

3. RESULT AND DISCUSSION

Raising cows is very profitable because it not only provides meat and offspring but also generates manure and labour. The barn plays an important role in the rearing of cows. Several aspects need to be considered to create a healthy and comfortable cow pen environment, so that cows can grow well and productively.

1. **Cleanliness of the cage:** Make sure the cowshed is always clean of dirt and waste. Remove dirt regularly and clean the dirty cage.
2. **Ventilation:** Make sure the cowshed is well ventilated to reduce moisture and prevent bacterial growth.
3. **Lighting:** Make sure the cowshed has enough lighting, especially during the day.
4. **Comfort:** Make sure the cow has enough room to move and rest.
5. **Feed and Water:** Make sure cows have easy access to clean feed and water.
6. **Health:** Conduct regular health checks on the cow and vaccinate if necessary.
7. **Supervision:** Ensure the cow pen is regularly monitored to prevent accidents or loss of cows. It can be done in groups in the middle of rice fields or fields.

3.1. Preparation Of Facilities And Equipment

The cage can be made in double or single form, depending on the number of cows owned. In single-type cages, cows are placed in one row, while in double-type cages, they are placed in two rows that face each other or are opposite. Between the two rows, a path is usually made for the road. The manufacture of cages for fattening purposes (kereman) is usually single-form if the capacity of the livestock maintained is only small. However, suppose the cattle fattening activity is intended for commercial purposes. In that case, the size of the cage must be broader and larger so that it can accommodate a larger number of cows.

The floor of the cage must be kept clean to prevent the occurrence of various diseases. The floor is made of solid soil or cement, and it is easy to clean cow dung from it. The ground floor is lined with dry straw as a warm enclosure base. All parts of the cage and equipment that have been used must be thoroughly disinfected first with disinfectants, such as creolin, lysol, and other materials.

The size of the cage for an adult cow is 1.5x2 m or 2.5x2 m, for adult female cows it is 1.8x2 m, and for calves, it is sufficient at 1.5x1 m per head, with an upper height of 2-2.5 m from the ground. The temperature around the enclosure is 25-40 degrees C (average 33 degrees C), and the humidity is 75%. Maintenance

locations can be carried out at lowlands (100-500 m) to highlands (> 500 m).

The cage for the maintenance of cattle should be clean and not damp. The manufacturer of cages must pay attention to several basic requirements which include construction, location, size and equipment of the cage

1) Construction and location of the cage \\\

The construction of the cowshed is like a wooden house. The roof of the cage is in the shape of a bud, and one/both sides are slanted. The floor of the enclosure is denser, higher than the surrounding soil, and slightly inclined towards the ditch outside the cage. The point is to keep visible water, including cow urine, flowing easily outside the barn floor. The construction material of the cage is logs/boards derived from strong wood. The cowshed should not be tightly closed, but kept relatively open to ensure smooth air circulation. Clean drinking water is included in the range of cattle feed preparation. Drinking water is given *ad libitum*, meaning it must be available and not run out at any time.

2) Cage Size

Before making a cage, it is better to first take into account the number of cows to be kept. The size of the cage for an adult bull is 1.5 x 2 m. As for an adult female cow, it is 1.8 x 2 m and for a calf 1.5x1 m is enough.

3) Cage Equipment

Included in the cage's equipment are feed and drinking containers, which should be made outside the cage, but still under the roof. The feed place is made slightly higher so that the feed given is not trampled on/mixed with dirt. The drinking water container should be made permanent in the form of a cement basin and slightly higher than the floor surface. Thus the feces and urine are not mixed in it. Other equipment that needs to be prepared includes a broom, a comb, a shovel, a sickle, and a place to bathe cows. All of this equipment is to clean the cage so that the cows avoid disturbances. Diseases can also be used to bathe cows.

The functions of the barn in cattle rearing are: **Protect from the weather:** The roof of the cowshed protects the cow from direct sunlight, rain, and wind. **Reduces stress:** With a roof, cows can feel more comfortable and calm, thus reducing stress. **Prevents disease:** The roof of the cowshed can prevent cattle from being directly exposed to extreme weather, thereby reducing the risk of disease. **Increase productivity:** Cows that feel comfortable and healthy will be more productive in producing milk or meat. **Protecting equipment:** The roof of the cowshed also protects the equipment and facilities of the barn from damage caused by the weather.

The importance of the type of cage roof in cattle rearing is significant. Roof materials for cattle cages that are commonly used include **tile:** Clay or concrete tiles can be a good choice because they are durable and weatherproof. **Zinc:** Corrugated zinc or flat zinc can be an economical and easy to install option. **Asbestos:** Asbestos can be a good choice because it is fire resistant and weatherproof, but it is necessary to pay attention to its health safety.

Polycarbonate: Polycarbonate can be a good choice because it is lightweight, durable, and allows natural light to enter.

Metal roof: Metal roofs such as spandex or bondek can be a good choice because they are durable and weatherproof.

Thatched roofing: A thatched roof can be an environmentally friendly and economical option, but it needs more frequent maintenance. In choosing roofing materials, it is necessary to consider several factors such as: Cost, Durability, Ability to drain rainwater, Ventilation and health safety. Choose a roofing material that suits your needs and budget. Additionally, consider a simple but effective manure fermentation system that uses bioactivators to speed up the decomposition process. Size: The fermentation capacity can be adjusted according to the needs of the group, with the size of the fermentation container accommodating between 500 and 1000 kg of livestock manure per batch. Specification: Container The fermentation is made of corrosion-resistant and easy-to-clean materials, equipped with vents for good air circulation. The fermentation process will last for 2-4 weeks, depending on the type of ingredients used.



Fig.5. With Group Members in Banjar Balangan

Feeding can be done in 3 ways: namely pasture fattening, dry lot fattening, and a combination of the first and second methods. Grazing is carried out by releasing cows in pastures, usually in areas where the pastures are large enough, requiring about 5-7 hours per day. In this way, there is no need for additional booster feed rations because cows have eaten various types of grass. Feed can be given by rationing/serving, which is known as kereman. Caged cows and feed are obtained from fields, rice fields/other places. Every day, a cow needs feed of about 10% of its body weight and also an additional feed of 1%-2% of its body weight. Additional rations include fine bran, coconut meal, gapek, and tofu pulp, which are given by mixing grass into the feed at the place. In addition, minerals can be added as a booster in the form of table salt, kapus. Cow feed in mixed form, with a specific amount and ratio, is known as a ration.



Fig. 6. Group Discussions

3. Productivity Increase Utilization Capabilities: By using fermented fertilizers, it is expected that the productivity of horticultural crops can increase by up to 20-30% compared to the use of conventional fertilizers. Community Involvement: This technology is designed to be easy for farmers to understand and implement, thereby increasing community involvement in fertilizer management and sustainable agriculture.



Fig. 7. After the Group Discussion

Training and Training Assistance: The service team will provide practical training on making and using fermented fertilisers, along with effective livestock waste management techniques. Mentoring: After the training, the team will conduct regular mentoring to ensure that this technology is implemented correctly and delivers the expected results

4. CONCLUSION

This program can increase agricultural productivity and reduce negative environmental impacts by using manure fermentation technology. The factors affecting the production and price of manure include the amount of materials used to mix fertiliser, the increased production of fertiliser, the lower capital cost of manure, and the ability of this fertiliser to improve environmental conditions. A decrease in fly populations of at least 30% within 3 months. Farmers can calculate the cost of production and selling price with at least 90% accuracy

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