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OPERATIONAL MANAGEMENT ANALYSIS IN OPTIMIZING CHITOSAN FERTILIZER PRODUCTION BASED ON SWIMMING CRAB SHELL WASTE AT THE CANGKANG SALONA GROUP, LOKTUAN VILLAGE

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ABSTRACT

This study aims to analyze the implementation of operational management in the production of chitosan fertilizer based on swimming crab shell waste at the Cangkang Salona Group, Loktuan Village, Bontang City. The research uses a descriptive qualitative approach with a case study method, through observation, in-depth interviews, and documentation analysis. The results show that aspects of operational management such as production planning, raw material management, production processes, and cost control have not been implemented optimally. The main constraints are limited human resource capacity in cost accounting, simple production technology, and irregular supply chains. However, this business has great potential in supporting sustainable agriculture and local community empowerment. Recommendations given include the implementation of structured production planning, continuous training on production cost calculation, implementation of simple digital recording systems, and strengthening partnerships with external parties. The implementation of these recommendations is expected to improve operational efficiency, business sustainability, and positive impacts on the local economy.

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1. INTRODUCTION

The development of micro and small industries based on local resources is one of the strategies to encourage economic growth and community empowerment. The Chitosan Fertilizer Production House of the Cangkang Salona Group in Loktuan Village, Bontang

City, is a business that converts swimming crab shell waste into environmentally friendly organic fertilizer. This business not only has economic potential but also contributes to waste management and sustainable agriculture. However, in its operational practice, this business faces various challenges, especially in terms of operational management that includes production planning, raw material management, production processes, and production cost control.

Good operational management is essential to ensure efficiency, productivity, and business sustainability. In the context of small industries, limited resources are often an obstacle in implementing systematic operational management. Therefore, this study aims to analyze the implementation of operational management at the Chitosan Fertilizer Production House of the Cangkang Salona Group and provide improvement recommendations based on operational management principles.

2. LITERATURE REVIEW

Operational management encompasses all activities related to the process of transforming inputs into outputs in the form of goods or services (Heizer & Render, 2016). Main aspects of operational management include production planning, inventory management, quality control, and cost management. In small industries, operational management is often carried out informally, which can lead to inefficiencies (Slack et al., 2019).

Calculation of production costs is an important component in operational management. Accurate calculation of production costs helps in determining competitive selling prices and evaluating business profitability (Horngren et al., 2018). In the context of chitosan fertilizer production, production costs include raw material costs, direct labor costs, and production overhead costs.

Sustainable operational management also considers environmental and social aspects. The concept of *green operation* emphasizes efficient use of resources and waste reduction (Sarkis, 2012). The chitosan fertilizer production business that utilizes swimming crab shell waste is an example of *green operation* implementation.

3. RESEARCH METHOD

This study uses a qualitative approach with a case study method. Data were collected through observation, in-depth interviews with 7 employees and business managers, and analysis of documents in the form of community service reports and production records. Data analysis was conducted descriptively by identifying operational management practices, constraints faced, and improvement opportunities. The research was conducted from May to June 2024 at the Chitosan Fertilizer Production House of the Cangkang Salona Group, Loktuan Village, Bontang City.

4. RESULTS AND DISCUSSION

Production Process and Supply Chain

The chitosan fertilizer production process includes several stages: (1) collection and sorting of swimming crab shell waste, (2) washing and drying, (3) grinding into powder, (4)

deacetylation process using chemical solutions, and (5) packaging. The raw material supply chain still depends on local fishermen and swimming crab processing industries, which causes irregular availability of raw materials. The absence of long-term agreements with suppliers often disrupts production planning.

Production Cost Calculation

Based on interviews and document analysis, the calculation of Cost of Goods Sold (COGS) is still done simply without a structured recording system. Employees have been given training on the concept of COGS that includes raw material costs, direct labor costs, and production overhead costs, but its application in daily practice is still limited. For example, overhead costs such as electricity and equipment depreciation are often not calculated in detail. This causes the calculated production costs to be inaccurate, affecting the determination of selling prices and profitability evaluation.

Production Planning and Scheduling

Production planning is done informally based on raw material availability and product demand. There is no fixed production schedule or clear production targets. This causes production inefficiencies, such as work accumulation at certain times and idle time at other times. Production capacity is also limited by simple equipment, with production capacity of only about 50 kg of chitosan fertilizer per month.

Quality Control

Quality control is done visually by employees without standardized testing procedures. There are no clear quality parameters for the final product, such as chitosan content or solubility level. This can affect product consistency and customer satisfaction.

Human Resource Management

Most employees are housewives with high school education backgrounds. Although they have high enthusiasm, their understanding of production management and cost accounting is still limited. Training that has been provided through community service activities has increased understanding, but continuous mentoring is still needed.

Operational Efficiency Analysis

Analysis using operational efficiency theory shows several improvement areas:

1. Production Process: The deacetylation process still uses manual methods and requires a long time (up to 48 hours). Process optimization through temperature and time adjustments can improve efficiency.
2. Inventory Management: Raw material inventory is not recorded properly, causing shortages or excess inventory.
3. Technology Use: Production equipment is still simple, such as manual grinders and open drying. Using more efficient technology can increase productivity.

Social and Economic Impact

This business creates employment for 12 local residents, mostly women. In addition, this business contributes to environmental preservation by utilizing swimming crab shell waste that was previously only disposed of. Economically, this business has the potential to increase local community income, especially if production efficiency can be improved.

5. RECOMMENDATIONS

Based on the analysis results, the following operational management improvement recommendations are given:

1. Implementation of Structured Production Planning
   Develop production schedules based on demand forecasting and raw material availability. Use simple planning tools such as production calendars.
2. Development of Digital Recording System
   Implement a simple digital recording system using spreadsheet applications to record raw material inventory, production costs, and production results.
3. Continuous Training and Mentoring
   Conduct regular training on production cost calculation, production planning, and basic quality control. Establish a remote mentoring system through communication applications.
4. Production Process Optimization
   Conduct experiments to optimize the deacetylation process by adjusting chemical concentration, temperature, and time to reduce process time.
5. Supply Chain Strengthening
   Build partnerships with swimming crab shell suppliers through long-term agreements to ensure raw material availability.
6. Implementation of Appropriate Technology
   Consider using more efficient equipment, such as mechanical dryers or finer grinders, to improve product quality and production capacity.
7. Periodic Evaluation System
   Implement monthly evaluations of production performance, production costs, and product quality to identify improvement areas.

6. CONCLUSION

Operational management at the Chitosan Fertilizer Production House of the Cangkang Salona Group has not been implemented optimally. The main constraints are limited human resource capacity, simple production technology, and unstructured production planning. However, with improvements in production planning, implementation of digital recording systems, continuous training, and process optimization, operational efficiency can be significantly improved. This business has great potential to develop into a sustainable small industry that supports local agriculture and empowers the community. Further research can be conducted to measure the impact of operational management improvements on business productivity and profitability.

7. REFERENCES

Asy'ari, A. (2019). *Analisis Biaya Produksi dan Harga Pokok Produksi dalam Perspektif Akuntansi Manajemen*. Universitas Negeri Semarang.

Heizer, J., & Render, B. (2016). *Operations Management: Sustainability and Supply Chain Management* (12th ed.). Pearson.

Horngren, C. T., Datar, S. M., & Rajan, M. V. (2018). *Cost Accounting: A Managerial Emphasis* (16th ed.). Pearson.

Laporan Pengabdian Masyarakat: Sosialisasi Penentuan Harga Pokok Produksi pada Rumah Produksi Pembuatan Pupuk Chitosan Kelompok Cangkang Salona Kelurahan Loktuan (2024). Universitas Mulawarman.

Mulyadi. (2016). *Akuntansi Biaya: Konsep, Metode, dan Aplikasi* (Edisi 5). Salemba Empat.

Sarkis, J. (2012). A boundaries and flows perspective of green supply chain management. *Supply Chain Management: An International Journal*, 17(2), 202-216.

Slack, N., Brandon-Jones, A., & Johnston, R. (2019). *Operations Management* (9th ed.). Pearson.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.