

Analysis of Business Process Improvement Using the Business Process Improvement (BPI) Method in the Catfish Fisheries Sector in Batuliman Indah Village, South Lampung Regency

Akmal Sahuda¹, M. Oktavianur², Niki Agus Santoso³

^{1,2,3} Business Administration Study Program, Bandar Lampung University, Lampung

Article Info

Article history:

Received May, 2026

Revised Jun, 2026

Accepted Jun, 2026

Keywords:

Business Process Analysis;
Business Process Improvement;
Catfish Farming.

ABSTRACT

This study examines business process improvement in catfish farming enterprises using the Business Process Improvement (BPI) method in Batuliman Indah Village, South Lampung Regency. Catfish farming plays an important role in supporting local livelihoods and meeting increasing market demand; however, many small-scale producers continue to face operational and managerial challenges that reduce efficiency and business sustainability. Data were collected through field observations, semi-structured interviews with 9 respondents consisting of catfish farmers and related stakeholders, and document analysis. The study begins by mapping the existing business processes (As-Is) across key production stages, including pond preparation, seed stocking, feeding, maintenance, harvesting, and marketing. The BPI framework is then applied to identify value-added and non-value-added activities, analyze root causes of process inefficiencies, and design proposed improved processes (To-Be). The findings reveal that major problems in the current business processes include the absence of standardized operating procedures and systematic record-keeping, inefficient feed utilization, unstable water quality management, relatively high fish mortality rates, and strong dependence on intermediaries in the marketing process. Based on the BPI analysis, proposed process improvements focus on workflow simplification, standardization of operational procedures, enhancement of monitoring and documentation systems, and reduction of non-value-added activities. The study concludes that an integrated application of Business Process Improvement can significantly improve operational efficiency, managerial control, and consistency of catfish farming activities, thereby supporting more sustainable and competitive small-scale aquaculture enterprises. The results of this research are expected to provide practical insights for farmers, extension agencies, and policymakers in improving business process management within the fisheries sector.

This is an open access article under the [CC BY-SA](#) license.



Corresponding Author:

Name: Akmal Sahuda

Institution: Business Administration Study Program, Bandar Lampung University, Lampung

Email: akmal.22121041@student.ubl.ac.id

1. INTRODUCTION

The catfish aquaculture sector plays a significant role in supporting local economic development and food security in Indonesia, particularly in rural areas where aquaculture activities serve as a primary source of income for small-scale farmers [1]. In South Lampung Regency, Batuliman Indah Village has emerged as one of the areas with considerable potential for catfish farming due to favorable environmental conditions and increasing market demand [1]. However, despite this potential, catfish farming businesses in the village continue to face various operational challenges that hinder productivity, efficiency, and business sustainability [2]. These challenges are not only related to technical cultivation aspects but also to the way business processes are managed and executed on a daily basis. In many small-scale aquaculture enterprises, production activities are often managed based on farmers' experience rather than standardized operating procedures and data-driven management systems, resulting in inefficiencies in feed utilization, water quality control, and production planning [3].

This condition results in the absence of standardized operating procedures, weak documentation, inefficient resource utilization, and limited control over production activities. In the context of catfish farming in Batuliman Indah Village, such issues manifest in inconsistent pond preparation practices, unplanned stocking densities, inefficient feed management, unstable water quality control, and heavy dependence on intermediaries in the marketing stage. These problems collectively contribute to high production costs, fluctuating yields, elevated fish mortality rates, and uncertain income for farmers, indicating that the existing business processes have not yet been optimized [4].

Business Process Improvement (BPI) is a systematic approach that focuses on analyzing and redesigning business processes to enhance efficiency, effectiveness, and value creation [5]. By identifying value-added and non-value-added activities, BPI provides a

structured framework for understanding process inefficiencies and developing targeted improvement strategies. Unlike purely technical interventions, BPI emphasizes the integration of operational, managerial, and organizational perspectives, making it particularly suitable for improving small-scale agribusiness and aquaculture operations where process inefficiencies often stem from both technical limitations and managerial gaps.

This study aims to analyze business process improvements using the Business Process Improvement (BPI) method in catfish farming activities in Batuliman Indah Village, South Lampung Regency. The research focuses on mapping existing business processes (As-Is), identifying key process-related problems and their root causes, and designing proposed improved processes (To-Be) that are more structured, efficient, and sustainable [6]. By applying the BPI approach, this study is expected to provide practical recommendations that can support farmers in improving operational performance, reducing non-value-added activities, strengthening process control, and enhancing overall business competitiveness. Furthermore, the findings of this research are expected to contribute to the broader discussion on the application of business process management approaches in the fisheries and aquaculture sector, particularly within the context of small-scale rural enterprises [7].

2. LITERATURE REVIEW

Business process management has become an essential approach for improving organizational performance across various sectors, including agriculture and fisheries. Business processes refer to a series of interconnected activities that transform inputs into outputs to create value for customers or stakeholders [8]. In the context of aquaculture, business processes encompass a wide range of activities, starting from input preparation and production to post-harvest handling and marketing. Previous studies emphasize that inefficient and unstructured

business processes often lead to increased operational costs, inconsistent product quality, and reduced competitiveness, particularly in small-scale farming enterprises where management practices tend to rely on experience rather than formal systems [9].

Business Process Improvement (BPI) is a structured methodology aimed at analyzing, redesigning, and optimizing existing business processes to enhance efficiency, effectiveness, and value creation. The BPI approach focuses on identifying value-added and non-value-added activities, eliminating process redundancies, and improving workflow integration. According to the literature, BPI is not merely a technical tool but a managerial framework that integrates operational analysis, human resource considerations, and organizational culture. This makes BPI especially relevant for small and medium enterprises, including aquaculture businesses, where process inefficiencies often arise from both technical limitations and behavioral or managerial factors [10].

Several studies have demonstrated the effectiveness of BPI in improving performance within agro-based and fisheries-related industries. Research findings indicate that the application of BPI can lead to reduced production costs, improved process transparency, better resource utilization, and enhanced decision-making through systematic documentation and monitoring [11]. In aquaculture settings, BPI has been applied to optimize feeding management, inventory control, harvesting processes, and distribution systems. These studies highlight that process improvements driven by BPI contribute not only to operational efficiency but also to business sustainability and resilience against market fluctuations [11].

Catfish farming is one of the most widely developed aquaculture activities in Indonesia due to its relatively low production cost, rapid growth rate, high survival potential, and strong market demand. However, feed costs, water quality management, disease control, and marketing remain critical challenges affecting productivity and business sustainability in

catfish farming operations [1], [12]. Previous aquaculture studies have shown that feed management and water quality monitoring are among the most important factors affecting fish growth, survival rate, and production efficiency. Feed expenses may account for more than half of total production costs, making feed conversion ratio (FCR) a key indicator of operational performance. In addition, regular monitoring of water quality parameters such as temperature, dissolved oxygen, and pH is essential to reduce fish mortality and improve farm productivity [3], [12], [13]. However, the literature also notes that catfish farming faces various challenges, including feed inefficiency, water quality instability, disease outbreaks, and marketing constraints. Many of these challenges are closely linked to inadequate business process management, such as the absence of standard operating procedures, limited use of data in decision-making, and weak coordination among production stages [14].

From a socio-technical system perspective, business process performance is influenced by the interaction between technical elements, such as tools, procedures, and technologies, and social elements, including human behavior, work habits, and organizational culture. Previous research emphasizes that process improvement initiatives are more likely to succeed when both technical and social dimensions are addressed simultaneously [13]. In small-scale aquaculture enterprises, traditional work practices and experiential knowledge often dominate, which may hinder the adoption of standardized and data-driven processes [12]. Therefore, integrating socio-technical considerations within the BPI framework is essential to ensure that proposed improvements are practical, acceptable, and sustainable for farmers.

Based on the reviewed literature, it can be concluded that Business Process Improvement offers a comprehensive framework for addressing operational, managerial, and structural challenges in aquaculture businesses [15]. However, empirical studies focusing on the application of BPI in small-scale catfish farming at the

village level remain limited. This research seeks to fill this gap by applying the BPI method to analyze and improve the business processes of catfish farming enterprises, thereby contributing both theoretical insights and practical recommendations for the fisheries sector [16].

3. METHODS

This study adopts a qualitative descriptive research design with a case study approach to analyze business process improvements using the Business Process Improvement (BPI) method in catfish farming activities in Batuliman Indah Village, South Lampung Regency. The qualitative approach is selected to allow an in-depth exploration of existing business processes, operational practices, and managerial behaviors of catfish farmers within their real-life context.

Data collection was conducted through direct observation, semi-structured interviews, and document analysis. Observations focused on production activities, including pond preparation, seed stocking, feeding, maintenance, harvesting, and marketing processes. Semi-structured

interviews were conducted with 9 key informants consisting of catfish farmers and related stakeholders involved in catfish farming activities in Batuliman Indah Village, decision-making mechanisms, and business management challenges. Secondary data were obtained from production records, inventory notes, previous research, and official publications related to aquaculture and business process management.

The analysis began with mapping the existing business processes (As-Is Process). The mapped processes were evaluated using the Business Process Improvement framework to identify value-added and non-value-added activities, process bottlenecks, and inefficiencies. Root cause analysis was then performed to determine the underlying causes of process-related problems by incorporating socio-technical perspectives. Based on the findings, a proposed future-state process (To-Be Process) was developed to improve workflow efficiency, standardization, monitoring systems, and documentation practices.

4. RESULTS AND DISCUSSION

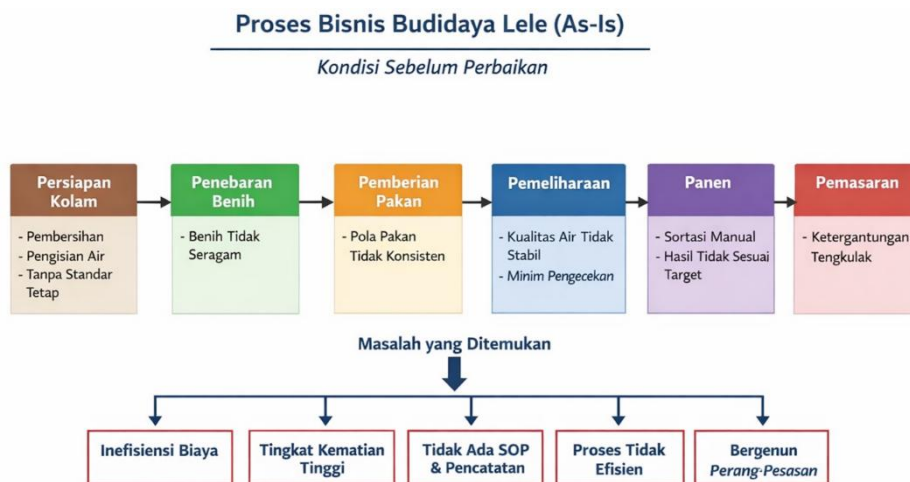


Figure 1. Business Process Diagram of Catfish Farming (As-Is) Before Improvement

The figure illustrates the mapping of the business processes involved in catfish farming activities in Batuliman Indah Village prior to process improvement (As-Is condition), developed using the Business Process Improvement (BPI) approach. The diagram presents a sequential flow of

operational activities, starting from pond preparation and ending with the marketing of harvested fish, while also highlighting various issues encountered at each stage of the business process. The business process begins with the pond preparation stage, which includes pond cleaning and water

filling activities. At this stage, no standardized operating procedures are implemented, causing pond preparation practices to rely heavily on individual farmers' experience and habits. This condition potentially leads to variations in cultivation media quality across different ponds. The next stage involves seed stocking, where catfish fry is released into the ponds without clear standards regarding size uniformity and stocking density. The lack of regulation in this process increases the risk of fish stress and results in uneven growth rates throughout the rearing period. Subsequently, the feeding process is carried out manually with inconsistent schedules and quantities. Feed distribution is based solely on estimation and visual observation of fish behavior, without systematic record-keeping. This practice may lead to feed wastage, which directly contributes to production cost inefficiencies.

The maintenance stage includes water quality management and monitoring of fish conditions. As depicted in the diagram, water quality tends to be unstable due to infrequent routine inspections and the absence of water quality measurement tools. Maintenance actions are generally reactive, performed only after signs of environmental degradation or fish mortality appear. Harvesting is conducted manually using simple sorting methods. The absence of standardized size criteria often results in harvested fish that do not meet market expectations in terms of size and production volume. Consequently, this condition leads to price fluctuations and income uncertainty for farmers. The final stage is marketing, which remains highly dependent on middlemen or collectors. This dependency weakens the bargaining position of farmers, as selling prices are largely determined by intermediaries rather than by the farmers themselves. Overall, the diagram demonstrates that the catfish farming business process prior to improvement faces several major challenges, including cost inefficiencies, relatively high fish mortality rates, the absence of standardized operating procedures and business documentation, as well as unstructured and inefficient work

processes. This As-Is business process mapping serves as a crucial foundation for identifying process-related issues that will be analyzed further in the subsequent subsection and acts as a reference for designing proposed business process improvements using the Business Process Improvement (BPI) method.

The identification of business process issues represents a subsequent stage following the mapping of the pre-improvement business processes (As-Is Process). This phase aims to systematically reveal various constraints, obstacles, and inefficiencies occurring in each activity of the catfish farming business processes in Batuliman Indah Village. Problem identification is conducted as a foundational step for analyzing the root causes of existing issues and for formulating proposed business process improvements using the Business Process Improvement (BPI) method. The issues identified in this study are derived from field observations, interviews with catfish farmers, and an analysis of the As-Is business process diagram. This approach enables the researcher to examine problems not only from a technical production perspective but also from managerial and operational aspects of the business.

The pond preparation stage serves as the fundamental starting point in the catfish farming cycle. Based on the research findings, the primary issue at this stage is the absence of standardized operating procedures (SOPs) governing pond preparation activities. Farmers conduct pond cleaning, drying, and water filling according to individual practices and experience, without consistent technical guidelines. The lack of SOPs results in inconsistent cultivation media quality across ponds. Variations in water conditions and pond bottom characteristics may affect fry adaptation and fish growth in subsequent stages. Furthermore, farmers rarely perform initial water quality measurements, such as pH and temperature, which increases the risk of failure during the early phase of the cultivation cycle.

At the seed stocking stage, the main issues encountered are the lack of consistency in determining stocking density and seed

quality. Seed selection is largely based on price and availability, without adequate consideration of size uniformity and overall health conditions of the fry. The number of seeds introduced into the ponds is determined through estimation rather than calculations based on pond capacity. As a result, significant variations in stocking density occur among farmers. Excessively high stocking densities increase the risk of fish stress, feed competition, and mortality during the early rearing phase. Feed management represents the largest cost component in catfish farming operations. Based on the research findings, the primary problems at this stage are the absence of measurable feed requirement calculations and the lack of systematic feed usage records. Farmers rely on experience and intuition when distributing feed, without calculating the Feed Conversion Ratio (FCR). This condition leads to feed inefficiency, which directly contributes to increased production costs. Moreover, inconsistent feeding patterns may hinder fish growth and reduce the quality of the harvested product. During the maintenance stage, the main challenges include unstable water quality and limited monitoring of the cultivation environment. Water quality management practices are predominantly reactive, with corrective actions taken only after signs of deteriorating water conditions or fish mortality appear.

Farmers rarely utilize water quality measurement tools such as pH meters or thermometers. Operational decisions are mostly based on visual indicators, including water color and fish behavior. This practice increases the risk of disease outbreaks and fish stress, which can negatively affect survival rates and overall productivity. The harvesting and sorting stages also present several issues that impact business performance. Fish sorting is conducted manually without clear size standards, resulting in harvest outputs that are often inconsistent and misaligned with market demand. In addition, farmers do not maintain detailed records of harvest outcomes, including quantity, total weight, and production success rates. The absence of such

data makes it difficult for farmers to evaluate business performance and plan improvements for subsequent production cycles. At the marketing stage, the primary issue is the high dependency on middlemen or collectors. Farmers lack adequate alternative marketing channels, which weakens their bargaining position.

Catfish selling prices are heavily influenced by market conditions and the pricing policies of intermediaries. The absence of sales contracts or long-term pricing agreements leads to income fluctuations and uncertainty in business profitability. Beyond technical issues, catfish farming enterprises in Batuliman Indah Village also face managerial and administrative challenges. Farmers have not implemented a business recording system that documents production costs, feed usage, and harvest results. This lack of record-keeping prevents farmers from obtaining a clear overview of their financial performance. Consequently, business decisions are made intuitively rather than based on reliable data. Based on the identification results, the business process issues in catfish farming operations in Batuliman Indah Village can be summarized into several key points, including the absence of standardized operating procedures and business records, inefficiencies in feed utilization, unstable water quality, relatively high fish mortality rates, and weak marketing systems.

These issues indicate that the current business processes remain suboptimal and require comprehensive improvements. The identification of these problems serves as the foundation for the root cause analysis discussed in the following subsection, as well as for the formulation of proposed business process improvements using the Business Process Improvement (BPI) method. Following the identification of various issues in Subsection 4.3, the next stage of this study involves analyzing the underlying causes of business process problems in catfish farming enterprises in Batuliman Indah Village. This analysis aims to uncover the root causes of each identified issue, ensuring that the proposed business process improvements are targeted and sustainable. The cause analysis is

conducted using the Business Process Improvement (BPI) approach, integrated with the concepts of value-added and non-value-added activities, as well as the socio-technical system perspective. This approach enables the researcher to examine problems not only from an operational and technical standpoint but also from the perspectives of human resources, work habits, and business management systems. The primary issue at the pond preparation stage is the absence of standardized operating procedures (SOPs) that regulate work stages in a structured manner. Based on the BPI analysis, this condition is attributed to several key factors, including limited technical knowledge among farmers, insufficient continuous guidance from relevant institutions, and work habits that have been formed through generational practices. From a socio-technical system perspective, social factors such as personal experience and habitual practices dominate over technical considerations. As a result, pond preparation activities are not fully oriented toward value creation but are merely intended to meet basic requirements prior to seed stocking. This lack of standardization becomes the initial cause of inconsistency in cultivation media quality.

At the seed stocking stage, the primary cause of existing problems is the absence of pond capacity planning and standardized stocking density guidelines. Based on the analysis, this condition is influenced by farmers' limited understanding of technical cultivation calculations and the lack of record-keeping systems that support data-driven decision-making. Within the BPI framework, seed stocking activities conducted without considering pond capacity can be categorized as potentially non-value-added activities. Inappropriate stocking densities do not generate added value; instead, they increase the risk of fish stress and mortality. Social factors, such as the tendency to imitate other farmers' practices without proper evaluation, also contribute to the recurring nature of this issue. Feed use inefficiency is one of the main drivers of high production costs in catfish farming because feed commonly represents the largest

proportion of operational expenses. Inefficient feeding practices and the absence of Feed Conversion Ratio (FCR) monitoring may increase production costs and reduce profitability [3], [12]. The analysis indicates that the root cause of this problem is the absence of a structured system for calculating feed requirements and feed conversion ratios (Feed Conversion Ratio/FCR). From a BPI perspective, unmeasured and undocumented feeding practices make it difficult to distinguish value-added activities. Feeding should be classified as a value-added activity because it directly supports fish growth. However, without proper calculation and documentation, this activity becomes inefficient and prone to waste. Another contributing factor is the limited managerial literacy of farmers and the perception that business record-keeping is an additional, non-essential task. This reflects a gap between technical cultivation practices and business process management. Unstable water quality and increased disease risk are common challenges in aquaculture systems. Poor monitoring of water parameters such as temperature, pH, and dissolved oxygen may lead to fish stress, reduced growth performance, and higher mortality rates [7], [13]. BPI analysis reveals that the root cause of this issue is the absence of a scheduled and measurable water quality monitoring system.

From a socio-technical system perspective, technical limitations—such as the lack of water quality measurement tools—interact with social factors, including work habits that rely heavily on visual observation. This combination encourages corrective actions only after problems arise, rather than preventive measures. As a result, non-value-added activities in the form of repeated problem handling become more frequent, even though they could have been avoided. Problems at the harvesting and sorting stages stem from the absence of standardized fish size criteria and clear sorting procedures. The analysis suggests that the root cause lies in farmers' orientation toward harvesting speed rather than product quality and alignment with market requirements. In the context of BPI, non-standardized sorting processes

generate high variability in product quality, thereby limiting the value added at the harvesting stage. Another contributing factor is limited access to market information regarding size standards and consumer preferences. High dependency on middlemen during the marketing stage represents a structural issue driven by several underlying factors. The analysis indicates that limited marketing networks, weak cooperation among farmers, and the absence of collective marketing strategies are the root causes of farmers' weak bargaining position.

From a BPI perspective, poorly managed marketing processes hinder value creation at the final stage of the business process. Dependence on intermediaries prevents farmers from controlling selling prices and sales volumes. Managerial and administrative issues, particularly related to business record-keeping, arise from low awareness of the importance of business process management. The analysis shows that farmers tend to prioritize production activities over administrative management. The absence of records on costs, feed usage, and harvest outcomes leaves farmers without a reliable basis for evaluating business performance. From a BPI standpoint, this condition obstructs continuous improvement, as no historical data are available for analysis. Based on the analysis of each business process stage, it can be concluded that the main root causes of problems in catfish farming enterprises in Batuliman Indah Village include the absence of standardized operating procedures and record-keeping systems, low

managerial literacy, the dominance of traditional work practices, and limited use of data in decision-making. These root causes are interconnected and form recurring problem patterns across production cycles. Therefore, business process improvements cannot be implemented partially but must be carried out comprehensively through an integrated Business Process Improvement (BPI) approach. The findings of this analysis serve as the basis for formulating proposed business process improvements (To-Be Process), which are discussed in the following subsection.

The proposed business process improvements in this study are developed based on the results of problem identification and root cause analysis described earlier. The Business Process Improvement (BPI) approach is applied to enhance the effectiveness, efficiency, and consistency of catfish farming business processes. The improvements focus on simplifying workflows, reducing non-value-added activities, and strengthening operational control and documentation. The proposed To-Be business process is expected to address the weaknesses identified in the existing As-Is process, such as the absence of written standard operating procedures, unsystematic record-keeping, and weak monitoring and evaluation of cultivation activities. Consequently, the business processes are expected to become more structured, controlled, and oriented toward achieving optimal outcomes.

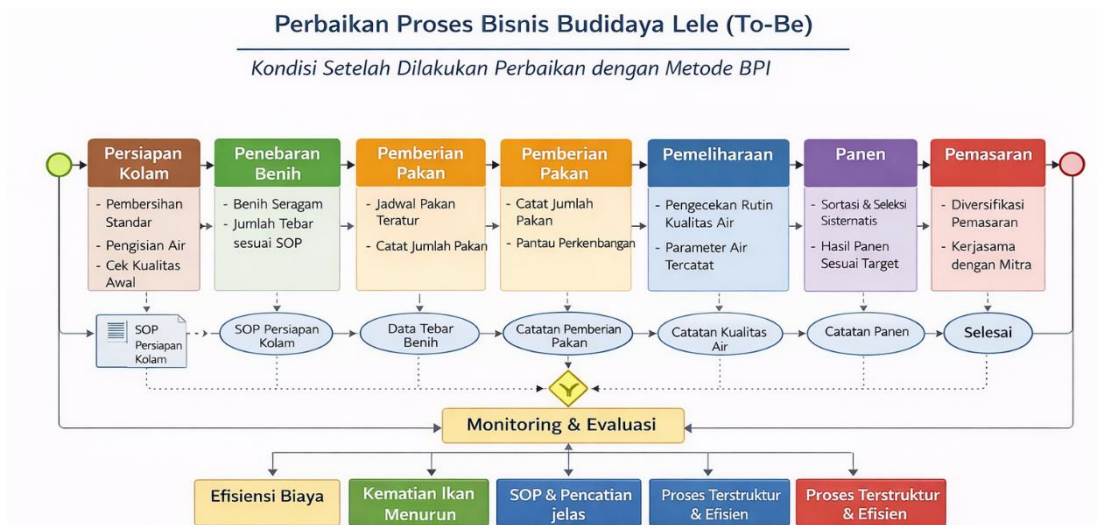


Figure 2. Proposed Business Process Improvement Model for Catfish Farming (To-Be) Using the BPI Method

The figure illustrates the proposed business process model (To-Be Process) for catfish farming activities in Batuliman Indah Village, developed using the Business Process Improvement (BPI) approach. The proposed model represents an improved version of the existing business process by introducing standardized operating procedures, systematic monitoring, and better documentation practices throughout the cultivation cycle.

The process begins with pond preparation using standardized procedures, followed by seed stocking based on appropriate stocking density calculations. Feeding activities are supported by feed requirement planning and Feed Conversion Ratio (FCR) monitoring to improve efficiency. Water quality is monitored regularly through scheduled inspections and measurements of key parameters such as temperature and pH. Harvesting and sorting activities are conducted according to predefined quality standards to ensure product consistency and market suitability. Finally, marketing activities are strengthened through improved record-keeping and the development of alternative marketing channels to reduce dependency on intermediaries.

Overall, the proposed To-Be process is expected to improve operational efficiency, reduce non-value-added activities, enhance

managerial control, and support sustainable catfish farming practices.

5. CONCLUSION

This study concludes that the business processes of catfish farming enterprises in Batuliman Indah Village, South Lampung Regency, are still characterized by various inefficiencies and structural weaknesses that limit operational performance and business sustainability. The analysis of the existing business processes (As-Is) reveals the absence of standardized operating procedures, weak documentation practices, inefficient feed management, unstable water quality control, and a high dependency on intermediaries in the marketing stage. These issues are not only technical in nature but are also closely related to managerial limitations, traditional work practices, and the lack of data-driven decision-making, which collectively contribute to increased production costs, relatively high fish mortality rates, and uncertain income for farmers. The application of the Business Process Improvement (BPI) method proves to be effective in systematically identifying value-added and non-value-added activities, uncovering the root causes of process inefficiencies, and designing structured improvement strategies.

Through the development of proposed business processes (To-Be), this study demonstrates that workflow simplification, process standardization, and the implementation of monitoring and record-keeping systems can significantly enhance process efficiency, control, and consistency. The integration of socio-technical perspectives further highlights the importance of aligning technical improvements with farmers' work habits and managerial capabilities to ensure the feasibility and sustainability of the proposed changes. Overall, the findings indicate that business process improvements in catfish farming cannot be implemented partially but

require a comprehensive and integrated approach. The proposed BPI-based improvements are expected to support better resource utilization, reduce non-value-added activities, strengthen managerial control, and improve overall business performance. This study contributes to the application of business process management concepts in the fisheries sector, particularly within small-scale rural aquaculture enterprises, and provides practical insights for policymakers, extension services, and farmers in designing more efficient and sustainable catfish farming business processes.

REFERENCES

- [1] F. and A. O. (FAO), "The State of World Fisheries and Aquaculture 2024: Blue Transformation in Action," 2024.
- [2] D. Bakotić and A. Krnić, "Exploring the Relationship Between Business Process Improvement and Employees' Behavior," *J. Organ. Chang. Manag.*, vol. 30, no. 7, pp. 1044–1062, 2017, doi: 10.1108/JOCM-06-2016-0116.
- [3] D. Budiayanto, S. Prasetyo, and R. Kurniawan, "Reimagining Catfish Cultivation: Crafting Sustainable Feed for Economic Prosperity and Eco-Friendly Practices," *Asian J. Fish. Aquac.*, vol. 12, no. 1, pp. 45–58, 2025.
- [4] D. Rahmawati, R. I. Rokhmawati, and A. R. Perdanakusuma, "Analisis dan Pemodelan Proses Bisnis Bidang Pelayanan Perizinan Menggunakan Business Process Modelling Notation (BPMN) Studi pada Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu Pemerintah Kota Malang," *J. Pengemb. Teknol. Inf. dan Ilmu Komput.*, vol. 1, no. 11, pp. 1337–1347, 2017.
- [5] R. Y. L. Hende, N. Y. Setiawan, and Y. T. Mursityo, "Perancangan Perbaikan Bisnis Proses Menggunakan Metode Business Process Improvement pada Layanan Penerbitan Majalah (Studi pada PT East Java Liberty Coy)," *J. Pengemb. Teknol. Inf. dan Ilmu Komput.*, vol. 2, no. 3, pp. 1328–1336, 2018.
- [6] Sunoto, "Evaluasi Proses Bisnis Akademik STIKOM Dinamika Bangsa Melalui Pendekatan Business Process Improvement," *J. Ilm. Media Sisfo*, vol. 14, no. 2, pp. 94–110, 2020, doi: 10.33998/mediasisfo.2020.14.2.851.
- [7] K. Kairbekov, A. Rahman, and M. Yusuf, "Design and Implementation of a Low-Cost Water Quality Monitoring System for Aquaculture in Indonesia," in *Proceedings of International Conference on Fisheries Engineering*, 2024, pp. 55–63.
- [8] M. Darmaji, "Optimizing Catfish Farming Through IoT-Driven Water Quality Monitoring," *Int. J. Learn. Educ. Res.*, vol. 23, no. 5, pp. 114–126, 2024.
- [9] W. Ambarwati, A. Setyawan, and R. Hidayat, "Sustainability Analysis and Development Strategy for Fish Farming," *J. Fish. Mar. Res.*, vol. 8, no. 2, pp. 120–130, 2024, doi: 10.21776/ub.jfmr.2024.008.03.5.
- [10] S. D. Larasati, S. A. Wicaksono, and N. H. Wardani, "Perbaikan Proses Bisnis Menggunakan Metode Business Process Improvement (BPI) (Studi pada Bagian Riset Pemasaran dan Pusat)," *J. Pengemb. Teknol. Inf. dan Ilmu Komput.*, vol. 1, no. 11, pp. 1425–1432, 2017.
- [11] M. Hasan, A. Firdaus, and N. Sari, "Business Performance and Feed Management Efficiency in Small-Scale Catfish Farming Enterprises," *Indones. Aquac. J.*, vol. 19, no. 2, pp. 89–101, 2023.
- [12] M. Engle, C. Boyd, and D. Stone, "Factors Affecting Feed Conversion Ratios in Commercial Catfish Production Ponds," *Aquac. Econ. Manag.*, vol. 28, no. 1, pp. 1–15, 2024.
- [13] F. Aljehani, I. N'Doye, and T. M. Laleg-Kirati, "Feeding Control and Water Quality Monitoring in Aquaculture Systems: Opportunities and Challenges," *Aquac. Eng.*, vol. 102, p. 102356, 2023.
- [14] P. T. Chountalas and A. G. Lagodimos, "Paradigms in Business Process Management Specifications: A Critical Overview," *Bus. Process Manag. J.*, vol. 25, no. 5, pp. 1040–1069, 2019, doi: 10.1108/BPMJ-01-2018-0023.
- [15] S. Rushanti, Y. Rohayati, and A. Aisha, "Perbaikan Proses Bisnis Penyusunan Rencana Kerja DISKOPERINDAG Menggunakan Metode Business Process Improvement Berdasarkan PERMENDAGRI Nomor 54 Tahun 2010 serta Klausul 7.3 ISO 9001:2008," *JATI UNIK J. Ilm. Tek. dan Manaj. Ind.*, vol. 1, no. 1, pp. 11–23, 2017, doi: 10.30737/jatiunik.v1i1.65.
- [16] Z. Kurniawan, M. Arifin, and R. Saputra, "Predicting Catfish Growth and Feed Efficiency Using Machine Learning," *Int. J. Artif. Intell. Data Min.*, vol. 4, no. 2, pp. 87–96, 2024.