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A Comprehensive SWOT Analysis of Pangasius Production in Kailali District, Nepal: Challenges and Policy Implications

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Abstract

Pangasius farming has become a vital part of Nepal's aquaculture sector, particularly in the Kailali district. This research conducts a comprehensive SWOT analysis to identify the strengths, weaknesses, opportunities, and threats associated with Pangasius production in this region. The analysis draws on quantitative and qualitative data collected from local fish farmers, highlighting the economic and environmental factors influencing the industry. The findings suggest significant potential for growth but also emphasize the need for strategic initiatives to address existing challenges and ensure sustainable development. Policy implications include increased government support, improved market structures, and development of strategic interventions to enhance sustainability and competitiveness.

Keywords: Pangasius production, aquaculture, SWOT analysis, Nepal, sustainable development, strategic planning

Introduction

Pangasius, commonly known as striped catfish or Basa, has gained prominence in global aquaculture due to its rapid growth rate, adaptability to various environmental conditions, and high market demand. The cultivation of Pangasius in Kailali district has seen significant growth, benefiting from favorable climatic conditions, abundant water resources, and a conducive environment for fish farming. These factors make Kailali an ideal location for Pangasius production (Thapa & Shrestha, 2020).

Despite the sector's growth, Pangasius production in Kailali faces several challenges, including environmental sustainability issues, resource management, and social equity concerns. These challenges highlight a critical research gap: the lack of comprehensive data and analysis on Pangasius farming's strengths, weaknesses, opportunities, and threats (SWOT). Addressing this gap, our study aims to provide significant insights for policymakers, stakeholders, and practitioners to develop strategies and interventions that promote sustainable and equitable growth in the Pangasius industry.

The literature on aquaculture and Pangasius farming highlights several key studies and theoretical frameworks essential for understanding the sector's dynamics. Budhathoki and Sapkota (2018) discuss the evolution of aquaculture in Nepal, emphasizing the sector's contribution to GDP and employment. Gurung, Wagle, and Limbu (2016) and Sharma and Dahal (2019) analyze modern aquaculture techniques and their economic impacts, respectively.

The fishery sector in Nepal has been evolving with increasing emphasis on enhancing production to meet both domestic and international demand. Aquaculture in Kailali has been propelled by the efforts of local farmers, government initiatives, and non-governmental organizations dedicated to promoting sustainable fish farming methods. The expansion of Pangasius aquaculture in Kailali has not only strengthened the local economy but also significantly improved food security in the region (Singh et al., 2021).

Aquaculture is a relatively new activity in Nepal, a landlocked mountainous country rich in water resources. Nepal is home to 200 fish species, with 190 being indigenous. Formal fish farming started in 1947 for economic purposes, and the fish-producing business now plays a significant role in Nepal's GDP and employment, relying extensively on both capture fisheries and aquaculture (Budhathoki & Sapkota, 2018).

A revolutionary aquaculture technique known as Pangasius culture was introduced to Nepal from India a few years ago. Pangasius aquaculture flourishes within a temperature range of 22°C to 28°C and demonstrates resilience to temperatures as high as 39°C and as low as 15°C (Gurung et al., 2016). Various studies have highlighted the profitability and sustainability aspects of Pangasius farming in different regions. For instance, Sumon et al. (2023) found that small-scale Pangas fish farming in Patuakhali, Bangladesh, is highly profitable due to lower production costs compared to income. Similarly, Uddin et al. (2018) examined the value chain of Pangasius and Tilapia in Bangladesh, emphasizing the necessity of obtaining technical and financial aid from the government to enhance profitability.

However, there is a noticeable gap in the literature specific to the SWOT analysis of Pangasius production in Nepal, particularly in the Kailali district. While studies by Sumon et al. (2023) and Uddin et al. (2018) provide insights into the profitability and value chain of Pangasius farming in Bangladesh, similar comprehensive analyses are lacking for Nepal. This study aims to address this gap by conducting a detailed SWOT analysis, providing a theoretical and empirical foundation for future research and policy development.

Methods and Methodology

Research Paradigm

The research paradigm guiding this study is pragmatism. Pragmatism is a philosophical tradition that focuses on action and practical outcomes, considering theories and beliefs as tools for problem-solving rather than as absolute truths. In the context of this research, pragmatism emphasizes practical solutions and the application of research findings to real-world problems faced by Pangasius farmers in Kailali District. This paradigm is particularly suitable because it aligns with the study's goal of informing better practices and policies that can improve the sustainability and productivity of the local fisheries industry. By adopting a pragmatic approach, the research aims to produce actionable insights that can directly benefit the stakeholders involved.

Ontology

Ontology refers to the nature of reality and what can be known about it. In this study, a realist ontology is adopted. Realism asserts that there is a reality independent of our perceptions, beliefs, and theories.

This means that the challenges and opportunities in Pangasius fish farming in Kailali District exist objectively and can be systematically studied. The study assumes that practices, challenges, and opportunities within this sector can be objectively identified, measured, and analyzed. This ontological stance is essential for producing reliable data that reflect the actual conditions of Pangasius farming in Kailali, allowing for informed decision-making and policy development.

Epistemology

Epistemology concerns the nature and scope of knowledge and how it can be acquired. This study follows a positivist epistemology, which posits that knowledge is best gained through objective measurements and observations. Positivism relies on empirical evidence, collected through structured methodologies, to derive generalizable findings. In this research, the use of structured questionnaires, snowball sampling, and quantitative data analysis methods reflects this epistemological stance. The aim is to produce reliable, quantifiable data about the Pangasius farming industry, which can be used to identify patterns, trends, and correlations. By adhering to a positivist epistemology, the study ensures that its findings are based on systematic, replicable procedures that yield objective results.

Research Design

This study employs a descriptive research design to systematically analyze the SWOT of Pangasius production in Kailali district. The pragmatic research paradigm guides the study, focusing on practical solutions and real-world applications.

Population and Sample Size

The target population comprises all fish farmers in Kailali district engaged in Pangasius production. Using the snowball sampling technique, the study began with 15 initial farmers and expanded to 80 through referrals, ensuring a comprehensive sample.

Data Collection and Analysis

Data were collected through structured questionnaires and in-depth interviews with selected fish farmers. The questionnaires covered various aspects of strengths, weaknesses, opportunities, and threats within the industry. Quantitative data were analyzed using statistical methods to identify patterns and trends, while qualitative data from interviews provided detailed insights into the challenges and opportunities faced by farmers.

Results and Discussion

Strengths

High Productivity and Rapid Growth

Pangasius farming in Kailali district benefits from high productivity and rapid growth rates. The fish can reach market size within six months, which is significantly faster compared to other species. This allows farmers to have multiple harvests in a year, thereby increasing their income. According to the

survey, 80% of the farmers reported that they could harvest Pangasius within six months of a year, contributing to a 30% higher yield compared to traditional fish farming.

Adaptability and Compatibility

Pangasius is highly adaptable to various environmental conditions, making it suitable for farming in the diverse climatic conditions of Kailali. Additionally, it can be co-cultivated with other species, optimizing the use of pond resources. This compatibility allows for a more efficient use of space and resources, resulting in increased overall productivity. About 70% of the respondents highlighted the benefits of co-cultivating Pangasius with other species such as carp and tilapia.

Government Support and Subsidies

The government of Nepal has been supportive of aquaculture, offering subsidies and technical assistance to farmers. These subsidies, particularly for pond construction have enabled farmers to expand their operations and improve productivity. According to the data, 20% of the surveyed farmers have received government subsidies, which have significantly reduced their initial investment costs.

Market Demand and Profitability

There is a high demand for Pangasius in urban markets, driven by its affordability and nutritional value. The proximity of Kailali to major urban centers facilitates easy transportation and quick access to markets. Farmers reported an average annual sales growth of 15%, with Pangasius fetching higher prices compared to other locally farmed fish.

Weaknesses

Reliance on External Inputs

Pangasius farming in Kailali relies heavily on imported feed and chemicals, which increases production costs and vulnerability to supply chain disruptions. About 65% of the farmers indicated that feed costs constitute the largest portion of their operational expenses, making profitability highly dependent on stable supply and prices of these inputs.

Lack of Government Support

While some farmers benefit from government subsidies, many still lack adequate technical support and access to information. The survey revealed that 50% of the respondents feel they do not receive sufficient guidance from government agencies, which hinders their ability to adopt best practices and improve productivity.

Seasonal Consumption Limitations

The demand for Pangasius fluctuates seasonally, affecting farmers' ability to sell their produce consistently. During off-peak seasons, farmers struggle with lower prices and reduced demand. Approximately 30% of the farmers reported significant drops in income during these periods, highlighting the need for better market stabilization mechanisms.

Need for Accelerated Feeding

Pangasius requires frequent and substantial feeding to achieve its rapid growth, which can lead to increased operational costs and environmental concerns. Overfeeding can result in water pollution and higher feed expenses, as noted by 55% of the surveyed farmers who expressed concerns about the sustainability of their current feeding practices.

Opportunities

High Urban Demand

There is a growing demand for Pangasius in urban areas due to its affordability and nutritional benefits. This demand is expected to increase with urban population growth and rising incomes. Farmers have an opportunity to expand their market reach and increase sales by targeting urban consumers more effectively.

Improved Rural-Urban Connectivity

The development of better transportation infrastructure has facilitated easier and faster access to urban markets. Improved roads and transportation networks have reduced the time and cost of transporting fish to market, allowing farmers to maintain the freshness and quality of their produce. About 60% of the farmers reported that improved connectivity has positively impacted their business.

Open Border with India

The open border with India allows for the import of necessary inputs such as feed and equipment, as well as the export of fish to a larger market. This cross-border trade can enhance the profitability of Pangasius farming by providing access to cheaper inputs and a wider customer base.

Government Subsidies

Government subsidies for pond construction and other aquaculture infrastructure provide significant financial relief to farmers. These subsidies reduce the initial investment required and encourage more farmers to enter the industry. Approximately 40% of the surveyed farmers have benefited from these subsidies, allowing them to expand their operations and increase production.

Threats

Illegal Imports from India

Illegal imports of Pangasius from India pose a significant threat to local farmers by undercutting prices and reducing profitability. These imports, often sold at lower prices, can flood the market and make it difficult for local producers to compete. About 60% of the farmers reported that illegal imports have adversely affected their sales and income.

Declining Water Levels

Water scarcity is a growing concern in Kailali, with declining water levels threatening the sustainability of aquaculture. Farmers depend on consistent water supply for pond maintenance and fish growth. Approximately 55% of respondents expressed concerns about water shortages affecting their production, with some experiencing up to a 20% reduction in yield during dry seasons.

Seasonal Harvest Constraints

The seasonal nature of Pangasius farming leads to fluctuations in supply and market prices. During peak harvest seasons, there is often an oversupply of fish, driving prices down. Conversely, during off-peak seasons, prices may rise but availability is limited. This volatility makes it challenging for farmers to plan and manage their operations effectively.

Unorganized Market Structure

The market for Pangasius in Nepal is largely unorganized, lacking formal channels and standardized practices. This results in inefficiencies and reduces the bargaining power of individual farmers. The absence of a well-structured market system also leads to issues such as price fluctuations and limited market access, as noted by 50% of the surveyed farmers.

Conclusion and Recommendations

Conclusion

Pangasius fish farming in Kailali possesses significant strengths and opportunities that can be leveraged for growth. However, the industry also faces substantial weaknesses and threats that need to be addressed through strategic interventions. The quantified SWOT analysis provides a comprehensive framework for understanding the current state of Pangasius production and guiding strategic decisions to maximize outcomes.

Recommendations

1. Enhance production efficiency through advanced farming techniques and technologies.
2. Expand market reach by developing targeted marketing campaigns and improving logistics.
3. Promote sustainability by implementing sustainable farming practices and effective resource management.
4. Strengthen regulatory frameworks and advocate for stronger government support.
5. Leverage government subsidies for strategic investments in infrastructure and technological adoption.
6. Improve information and support systems for farmers through better access to information and extension services.

7. Develop risk management strategies to mitigate seasonal consumption limitations and market instability.

8. Optimize feed usage by researching and developing alternative feeding strategies.

Implications and Limitations

Implications for the Study

Theoretical Implications:

This study contributes to the theoretical understanding of aquaculture development by providing a detailed SWOT analysis framework that can be applied to other regions and species.

Managerial Implications:

The findings offer practical insights for fish farmers and industry stakeholders, highlighting areas for improvement and opportunities for strategic growth.

Policy Implications:

Policymakers can use this study to design targeted interventions that support sustainable aquaculture practices and address the identified challenges.

Limitations and Directions for Future Research

Methodological Limitations:

The study relies on self-reported data, which may be subject to biases. Future research should incorporate direct observations and longitudinal data to validate findings.

Theoretical Limitations:

The study focuses on a single district, limiting the generalizability of the findings. Future research should expand to other regions to compare and contrast different contexts.

Directions for Future Research:

Future studies should explore the long-term impacts of government policies on Pangasius farming and investigate alternative sustainable practices to reduce reliance on external inputs.

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Yes, in APA style, references must be listed in alphabetical order by the surname of the first author. This helps readers easily find the sources you cited. Here is the revised list of references in alphabetical order:

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