International Journal of Advanced Technology and Social Sciences (IJATSS)
Vol.3, No.1, 2025: 11-18

Strategies to Increase the Production of Cork Fish Crackers in UMKM in Tanggulangin Sub-District, Sidoarjo District

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A R T I C L E I N F O

Keywords: Catfish, Alternative Feed, Pellet Feed, Catfish Farming, MSME, Increase Production

Received : 5 November
Revised : 23 December
Accepted: 23 January

A B S T R A C T

Micro, Small and Medium Enterprises (UMKM) play an important role in Indonesia's economic recovery, contributing 61% to GDP and absorbing 97% of the workforce. In Sidoarjo Regency, culinary MSMEs, especially processed fish such as cork fish crackers, are leading the way. Sidoarjo's fisheries production reached 79,108 tons in 2021, with cork fish (Channa striata) as a potential commodity that requires sustainable management. Cork fish has quality meat and high market demand, with a price of IDR 35,000 to IDR 45,000 per kg. However, the production of cork fish crackers in Tanggulangin is still simple and needs improvement for value maximization and business sustainability. For sustainability, the fisheries sector adopts the zero waste principle, including selective fishing and efficient and innovative utilization of waste. The research objective is to determine the strategy to increase the production of cork fish crackers using the Analytical Hierarchy Process (AHP) method. The research method is This research uses qualitative and quantitative approaches, and uses Analytical Hierarchy Process (AHP) Analysis. The results showed that the calculation of alternative level combinations showed that the first priority was increasing access to capital with an eigenvalue of 0.2384). Increasing access to capital shows that increasing access to capital has an effect on increasing the production of cork fish crackers

DOI: https://doi.org/10.59890/ijatss.v3i1.154
E-ISSN : 3026-2410
https://jurnalinternasional.com/index.php/IJATSS

INTRODUCTION

Micro, small and medium enterprises (UMKM) play an important role in Indonesia's economic recovery, accounting for 99.9% of total businesses, absorbing 97% of the workforce (117 million people), and contributing 61% of national GDP by 2023. MSMEs, in accordance with Law No. 20/2008, cover a wide range of productive economic sectors, including culinary, fashion, and crafts, which contribute significantly to Indonesia's creative economy GDP, with culinary contributing 40.02%(Amin et al., 2022). Meanwhile, the fisheries sector, which contributes 2.54% of GDP includes aquaculture production in East Java with a significant contribution from Sidoarjo Regency of 79,108 tons in 2021.

Fishery production in Sidoarjo Regency encompasses the cultivation of various pond fish species, including shrimp, milkfish, tilapia, carp, and the snakehead fish (Channa striata), also known locally as cursed fish. While snakehead fish hold significant economic value and play a crucial role in the food web of freshwater ecosystems, they can also pose a threat as an invasive species when their populations become uncontrolled or expand into new habitats. As apex predators, snakehead fish primarily feed on small fish and aquatic invertebrates, potentially leading to a decline in native species populations, disruption of ecosystem dynamics, and a reduction in biodiversity in cases of overpopulation.

The implementation of the zero waste concept within the fisheries sector is designed to enhance sustainability by reducing environmental impact. Key principles of zero waste include the adoption of selective fishing practices using environmentally friendly gear that avoids harmful substances, optimizing the utilization of fish waste, and innovating the conversion of this waste into value-added products. This methodology not only yields more sustainable products but also promotes responsible fishing practices. Furthermore, snakehead fish (Channa striata) is regarded as a high-value commodity, appreciated for its firm, white meat and low allergenic risk. The health benefits associated with its protein and albumin content have notably increased market demand, with prices ranging from Rp35,000 to Rp45,000 per kilogram, contingent upon seasonal fluctuations and size (Adquisiciones et al., 2019).

LITERATUR REVIEW

Fishery production in Sidoarjo Regency showcases a variety of pond fish species, prominently including shrimp, milkfish, tilapia, carp, and snakehead fish (Channa striata). While the economic significance of snakehead fish is substantial, contributing notably to freshwater ecosystems, their identification as a potential invasive species highlights the necessity for diligent management strategies. These strategies are essential to avert population surges that could disrupt ecological equilibrium and threaten native species. To foster sustainability within the fishing industry, the application of the zero waste concept stands out as a critical approach. This concept advocates for selective fishing practices utilizing eco-friendly gear, promotes the efficient utilization of all fish parts, and encourages innovative waste processing techniques. Such sustainable methods not only yield environmentally friendly products but also

enhance the market attractiveness of snakehead fish, which is renowned for its high-quality and nutritious meat. The market price for this fish fluctuates between Rp35,000 and Rp45,000 per kilogram, influenced by factors such as size and seasonal availability, thereby spurring an increase in consumer demand.

Most of the demand for snakehead fish is still dependent on natural catches, but high fishing intensity can reduce the population. Therefore, snakehead fish cultivation needs to be developed to ensure the availability of sustainable stocks. This cultivation aims to optimize fish production by controlling pests and diseases, including parasites, which can reduce the quality, weight, and economic value of fish and reduce consumer interest. Snakehead fish has great potential to be processed into various products, such as shredded fish, nuggets, meatballs, pempek, and crackers(Asfar et al., 2022). In Sidoarjo, snakehead fish crackers are one of the most popular processed products, made by combining snakehead fish, wheat flour, sugar, eggs, salt, and garlic. These crackers are considered to have better quality than crackers without fish(Rahayuningsih & Astuti, 2017). However, the processing of snakehead fish crackers in Sidoarjo is generally carried out by housewives with simple equipment, so the size and shape of the product are not uniform. Other factors that affect production quality are the limited use of technology, minimal packaging, and lack of coaching and financial support for business development.

Increasing production is an important step for business actors to develop products through repairs, modifications, or new innovations to meet market needs and provide added value for consumers(Nailuvary et al., 2020). In this study, the focus of increasing the production of snakehead fish crackers in Tanggulangin District lies in improving the quality of existing products. Currently, the production of snakehead fish crackers by MSMEs is still limited, with a simple manufacturing process and using drying with sunlight. Product distribution is also still limited around Tanggulangin District, so there is a great opportunity to increase production. This study aims to explore strategies to increase snakehead fish cracker production in the area.

METHODOLOGY

This research uses qualitative and quantitative approaches to understand the problem in depth and scientifically and to analyze numerical data(Syahrizal & Jailani, 2023). The qualitative approach aims to explore meaning through inductive analysis, while the quantitative approach is used for statistical analysis. The subject of the study is the owner of a snakehead fish cracker MSME business in Tanggulangin District, Sidoarjo, and the object is a production improvement strategy using the Analytical Hierarchy Process (AHP) method. Data collection was carried out through interviews and questionnaires, with checklist tools used to collect relevant information to answer research problems(Sugiyono & Subandriani, 2017).

The data analysis method is a process of processing data into new information. This process is carried out so that the characteristics of the data become more understandable and useful as a solution to a problem, especially related to research. The data analysis method used in this study is a multi-

method analysis method which is a combination of quantitative research methods and qualitative research methods.

RESULTS

Tabel 1. Land Area and Its Use in Tanggulangin Subdistrict

No.	Village	Extent of land (Ha)		Pool	Pond	Quantity (Ha)
		Paddy Field	Dry Field			
1	Randegan	139.71	75.41	0.065	-	215.185
2	Long Algae	147.30	80.11	0.006	-	227.416
3	Ketegan	83.65	69.87	0.0035	-	153.5235
4	Ngaban	36.70	46.76	0.0600	-	83.52
5	Boro	23.71	57.07	-	-	80.78
6	Kludan	18.1	70.2	0.0035	-	88.3035
7	Kedensari	98.26	14.00	0.001	-	112.261
8	Kalisampurno	46.55	77.95	0.0600	-	124.56
9	Ketapang	18.00	88.06	1.50	-	107.56
10	Central Kalimantan	12.23	101.71	0.79	-	114.73
11	Kedungbendo	-	-	-	-	0
12	Gempolsari	64.74	51.71	0.06	-	116.51
13	Sentul	151.04	50.11	2.50	-	203.65
14	Penatarsewu	134.00	54.86	16.12	68.87	273.85
15	Banjarasri	108.50	117.50	2.78	89.00	317.78
16	Banjarpanji	36.70	14.70	5.26	350.00	406.66
17	Kedungbanteng	111.58	8.97	1.00	-	121.55
18	Kalidawir	71.00	30.19	1.80	-	102.99
19	Putat	80.30	24.57	0.07	-	104.94
Total		1.382.07	1.033,75	32,079	507,87	2.955,769

Sources: Tanggulangin District Monograph, 2023

Table 2. Production Data of Snakehead Fish Crackers in Tanggulangin District

No.	Village	Production Quantity (Kg)		
		2021	2022	2023
1	Penatarsewu	356	390	428
2	2021 Putat	808	835	2021 865
3	Banjarasri	525	554	580
SUM		1.669	1.784	1.953

Sources: Tanggulangin District Monograph, 2023

Table 3. Respondent's Biodata Questionnaire

Code	Name	Age (Year old)	Addres	Education level	Job	Capacity
1	Titi Noorani Atikavati	58	Jl. Jadamsari RT.03/05 Keboananom, Gedangan, Sidoarjo	S2	PNS	Fisheries Business Division, Sidoarjo Fisheries Office
2	Lita Eka Yufidah, AMD	48	Penatarsewu Village	D3	Private Hero	Group Leader
3	Ma'ani	56	Putat Village	High School	Private Hero	Word processing
4	Supriyanti S	43	Buduran Village	S1	Civil servants	Extension Officer
5	Suprihatin	53	Kalipecabean Village	High School	Civil servants	Cooperatives & MSMEs Office

DISCUSION

Tanggulangin District is part of Sidoarjo Regency which is located in the south. The population of Tanggulangin District at the end of 2023 reached 86,378 people. Meanwhile, the climatic conditions in Tanggulangin District include a rainy climate for 12 months from January to December and a dry climate for 1 year from January to December. Based on the monograph data of Tanggulangin District in 2023, the land area in Tanggulangin District is 2950.78 Ha, consisting of 1382.07 Ha of rice fields, 1033.75 Ha of dry land, 32,079 Ha of ponds, and 507.87 Ha of ponds. The land area and its use in Tanggulangin District in detail can be seen in Table 1.

Tanggulangin District has great potential in the freshwater and brackish water aquaculture sector, with catfish, gourami, catfish, milkfish, tilapia, vannamei shrimp, tiger shrimp, and caught fish such as cork, eel and catfish. This area also has the potential to become a center for fisheries and fish processing, especially fish crackers and fish smoking, thanks to the existence of polyculture ponds and earthen ponds that support fishery activities. The potential of the fisheries sector in Sidoarjo Regency makes it one of the fourth largest fishery producers in East Java Province, namely the potential of pond fisheries. Tanggulangin District is one of the contributors to fishery products in Sidoarjo Regency(Ristuningarum, 2019).

The fishery processing business in Sidoarjo Regency has grown rapidly due to the availability of raw materials such as shrimp, milkfish, and snakehead fish. The community has processed fishery products, both traditional and

modern. In Tanggulangin district, traditional processing includes fish crackers, grilled tilapia, smoked milkfish, otak-otak, and presto, while modern processing such as nuggets, meatballs, siomay, and grilled stretcher milkfish are also starting to develop. This development has contributed to the formation of processing and marketing groups as well as fish processing MSMEs. In the eastern region of Sidoarjo Regency, milkfish and shrimp products are superior commodities with high economic value. However, the fishery processing industry in Tanggulangin sub-district is still limited due to market constraints, simple technology, and problems with production quality and quantity(Shofa & Navastara, 2016).

One of the fish caught in nature, namely snakehead fish or kotok fish, is processed into value-added products such as snakehead fish crackers. Tanggulangin District has potential in processing snakehead fish crackers in the villages of Penatarsewu, Banjarasri, and Putat. There are 24 snakehead fish cracker processors in Tanggulangin district. The data of snakehead fish cracker processors and snakehead fish cracker production data can be seen in table 2.

This study aims to determine a strategy to increase snakehead fish cracker production by applying the Analytical Hierarchy Process (AHP) method. The number of respondents who filled out the questionnaire was 5 people. The following are the respondents in the AHP listed in table 3.

The results of the calculation of the combination of alternative levels show that the first priority is to increase access to capital with an eigenvalue of 0.2384, followed by the second priority is to increase the capacity of technology, production equipment, and raw materials (0.2145), the third priority is to increase business legality (0.1919), the fourth priority is to strengthen the institution of the snakehead fish cracker business group (0.1851), and the fifth priority is to improve the competence and work skills of human resources (0.1701). The results of the calculation of the combination of the first priority alternative level, namely increasing access to capital, show that increasing access to capital has an effect on increasing the production of snakehead fish crackers, including:

1. ***Capital***

Capital allows manufacturers to purchase more modern and efficient equipment and machinery. Better machines can improve production capacity and product quality. With capital, manufacturers can automate multiple processes, which reduces production time and increases efficiency.

2. ***Quality Raw Materials***

Sufficient capital allows producers to purchase high-quality raw materials. The quality of the raw materials greatly affects the taste and final quality of the crackers produced. With sufficient capital, producers can keep stock of raw materials to avoid supply shortages in certain seasons.

3. ***Research and Development***

Capital allows business actors to try new innovations and develop their businesses to create new product variations, such as crackers with different flavors or ingredients.

4. Marketing and Distribution

Sufficient capital can be used to develop effective marketing strategies, such as advertising and promotion, that can increase sales. Capital is also important to build efficient distribution channels, ensuring that products can reach consumers well.

5. Human Resource Training

Capital allows business actors to take part in training. Capital is a key factor in increasing cracker production.

Capital is essential for increasing snakehead fish cracker production, as it allows for investment in equipment, raw materials, marketing, and human resource development. Thus, manufacturers can improve the efficiency, quality, and competitiveness of products in the market. In addition, increasing technological capacity, production equipment, and quality of raw materials also plays an important role. Modern technologies such as automatic machines allow for faster and higher quality production, as well as opening up opportunities to create new variants of crackers with added flavor and nutrients.

Investments in advanced equipment increase cracker production capacity, speed up the production process, reduce waste, and ensure consistent size and shape. The quality of fresh snakehead fish raw materials greatly affects the taste and nutritional value of crackers. The increase in production capacity also opens up opportunities to explore different sources of raw materials, which helps to maintain a smooth supply. Good processing techniques, such as pickling, extend the shelf life of the product and provide added value. These three aspects support each other in increasing the quantity and quality of snakehead fish crackers.

CONCLUSIONS AND RECOMMENDATIONS

Increasing access to capital is the top priority to increase the production of snakehead fish crackers in Tanggulangin District, which has great fisheries potential, including the production of snakehead fish crackers which continues to increase from year to year. There are 24 snakehead fish cracker processors with a production of around 1,669 kg to 1,953 kg between 2021 and 2023. Despite challenges, such as the use of simple technology and non-uniform production results, the potential for MSME development is huge if the right improvement strategy is implemented. By using the AHP approach, increasing access to capital is expected to help obtain modern equipment, quality raw materials, and improve human resource skills, which has an impact on product efficiency, quality, and competitiveness. Better technology and equipment will also increase production capacity and product consistency

FURTHER STUDY

Some suggestions that can be applied include the provision of low-interest financing, skills training for employees, research and development of new products, and the use of digital marketing to expand the market. Collaboration between producers is also encouraged to strengthen their positions through the sharing of resources and information.

ACKNOWLEDGMENT

This research was supported by the Sidoarjo Regency Fisheries Office, under the guidance of Mr. Dwijo. Their help and insight were invaluable in completing this research.

REFERENCES

Adquisiciones, L. E. Y. D. E., Vigente, T., Frampton, P., Azar, S., Jacobson, S., Perrelli, T. J., Washington, B. L. L. P., No, Ars, P. R. D. a T. a W., Kibbe, L., Golbère, B., Nystrom, J., Tobey, R., Conner, P., King, C., Heller, P. B., Torras, A. I. V., To-, I. N. O., Frederickson, H. G., … SOUTHEASTERN, H. (2019). No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する共分散構造分析Title. *Duke Law Journal*, *1*(1), 40–51.

Amin, A., Mispa, S., Nuramal, N., Rinaldy, S., Kanji, L., Wiyana, A., & Nurhasanah... (2022). Sosialisasi Perhitungan Dan Pelaporan Pajak Untuk Usaha Mikro Kecil Menengah Di Kabupaten Pinrang. *Nobel Community Services*, 1–4. https://e-jurnal.nobel.ac.id/index.php/ncsj/article/view/2867%0Ahttps://e-jurnal.nobel.ac.id/index.php/ncsj/article/download/2867/1281

Asfar, A. H., Gunadi, E., Reftiana, L., Utami, A., & Adriansyah, S. (2022). Pendampingan Modifikasi Kemasan dan Rasa pada Kerupuk Ikan Payus di Desa Pontang Serang. *Jurnal Ilmiah Pengabdian Kepada Masyarakat JIPAM*, *2*(1), 1–60.

Nailuvary, S., Ani, H. M., & Sukidin, S. (2020). Strategi Pengembangan Produk pada Handicraft Citra Mandiri di Desa tutul Kecamatan Balung Kabupaten Jember. *JURNAL PENDIDIKAN EKONOMI: Jurnal Ilmiah Ilmu Pendidikan, Ilmu Ekonomi Dan Ilmu Sosial*, *14*(1), 185. https://doi.org/10.19184/jpe.v14i1.11872

Rahayuningsih, C. K., & Astuti, S. S. E. (2017). Jurnal penelitian kesehatan 58. *Jurnal Penelitian Kesehatan*, *15*(1), 58–63.

Ristuningarum, C. P. (2019). Analisis Sistem Pengupahan Pandego Tambak(Studi Pada Tambak Desa Penatarsewu Kecamatan Tanggulangin, Kabupaten Sidoarjo). *Jurnal Ilmiah Mahasiswa FEB*, *7*(2).

Shofa, S. U., & Navastara, A. M. (2016). Faktor Penentu Pengembangan Industri Pengolahan Perikanan Di Kabupaten Sidoarjo melalui Pengembangan Ekonomi Lokal. *Jurnal Teknik ITS (SINTA: 4, IF: 1.1815)*, *4*(2), C76–C80. https://ejurnal.its.ac.id/index.php/teknik/article/view/10863%0Ahttps://ejurnal.its.ac.id

Sugiyono, L. P., & Subandriani, D. N. (2017). Gambaran Pengetahuan, Sikap, Praktik Serta Identifikasi Bakteri Escherichia Coli Dan Staphylococus Aureus Pada Penjamah Dan Makanan Di Pt Psa (Pelita Sejahtera Abadi) Description. *Jurnal Riset Gizi*, *41*(2), 8.

Syahrizal, H., & Jailani, M. S. (2023). Jenis-Jenis Penelitian Dalam Penelitian Kuantitatif dan Kualitatif. *Jurnal QOSIM Jurnal Pendidikan Sosial & Humaniora*, *1*(1), 13–23. https://doi.org/10.61104/jq.v1i1.49