Marine Ornamental Fish Marketing Sustainability Strategy

Mauli Kasmi, Akmal Abdullah, Andi Ridwan Makkulawu, Andryanto Aman, Yusri Muhammad Yusuf
(Politeknik Pertanian Negeri Pangkajene Kepulauan, Pangkep, Sulawesi Selatan, Indonesia)

Abstract: Indonesia has great potential for ornamental fish cultivation. However, excessive exploitation can also disrupt the ecosystem in its waters. Problems regarding maintenance, such as costs and technology, are also often encountered. Therefore, there is a need for optimization in ornamental fish cultivation, which is creating a repeat cycle in the business use and cultivation of marine ornamental fish. The study conducted for six months on South Sulawesi’s waters used a descriptive analysis method. Data collection involved interviews with fishers and traders/collectors, employing purposive sampling. This research focused on the efficiency of ornamental fish marketing (SWOT analysis), analyzing price data as a key indicator. Marine ornamental fish is one of the most valuable assets for the country. Catching, processing, and marketing ornamental fish requires a maximum strategy. Based on research results, 26,686 ornamental fish were successfully exported to various countries. Based on the results of SWOT analysis, three priorities were identified: 1) minimizing net operating costs of fishmeal by producing fish we ourselves eat; 2) expanding market share by expanding the marketing network; 3) joining exhibitions to stimulate local or domestic consumers. To increase sales, it is necessary to expand the marketing network and actively participate in product exhibitions. In addition, it is also necessary to collaborate with fish feed suppliers so that feed needs are always met to reduce production costs. The strategy that has been prepared must also be implemented optimally.

Keywords: marketing sustainability strategy; marine ornamental fish; cultivation

海洋观赏鱼营销可持续发展策略

Mauli Kasmi, Akmal Abdullah, Andi Ridwan Makkulawu, Andryanto Aman, Yusri Muhammad Yusuf
(庞卡杰内群岛州立农业理工学院, 邦格, 南苏拉威西岛, 印度尼西亚)

摘要:
印尼观赏鱼养殖潜力巨大。然而，过度开发也会破坏其水域的生态系统。维护方面的问题，例如成本和技术，也是经常遇到的。因此，观赏鱼养殖需要优化，从而造成海洋观赏鱼的商业利用和养殖的重复循环。这项研究对南苏拉威西水域进行了六个月，采用了描述性分析方法。数据收集涉及对渔民和贸易商/收集者的访谈，采用有目的的抽样。本研究重点针对观赏鱼营销效率（SWOT分析），将价格数据作为关键指标进行分析。海洋观赏鱼是国家最宝贵的资产之一。观
1 Introduction

Indonesia with its tropical climate owns ornamental fish potential of 300 million heads/year, consisting of 240 types of marine ornamental fish and 226 types of freshwater ornamental fish [9]. Seawater ornamental fish are currently being overexploited as a source for consumption in the fishery industry, without being offset by techniques capable of handling the increased demand for the fish. If the sea is continuously exploited, it will damage its ecosystem. One of the marine biota used by the public are coral reefs. According to Samsul Bahri, a region with a good environment and supported by good management will increase the health and productivity of coral reef ecosystems. Corals are used by cultivators as internal biofilters in aquariums. However, current field observations show that coral maintenance is still classified as very low, causing anemones and coral reefs to be taken from the natural dead and broken sea ecosystem. Soft corals are a popular type of reef rock among fans of seawater aquariums [28,37].

So far, the fans of aquariums and marine ornamental fish tend to use filter maintenance and treatment, which are quite expensive and complicated [27,32]. However, the filter system is capable of defending the right anemone and coral reef only for about 4-6 months [8]. After more than 6 months, the color of the anemone and coral reef will start to fade and die. At that point, the anemone and coral reef must be quickly replaced to avoid disrupting the ecosystem inside the aquarium [21,33,34]. Besides that, in an aquarium as an artificial sea ecosystem, a special technique is needed to maintain and sustain water quality during the coral aging in it. The recirculation system is a system that uses the principle of returning water used for cultivation activities. Two important components in the recirculation system are cultivation and filters [24,28]. The system cycles repeat this process, providing affordable, safe, and effective filtering of particles dissolved in the air [1,39]. Water quality, including anemones and coral reefs, is crucial for up to one year of usage. Processing waste in a recirculation system can involve physical, biological, and chemical filtration. The objective of this research is to optimize the results of catching and cultivating seawater ornamental fish to be marketed to consumers by implementing a repeated cycle in the business use and cultivation of seawater ornamental fish [42]. The results of this research are expected to provide academic and practical benefits, such as promoting socialization through seminars for fishers, farmers, and business actors in the fishery industry [4,23,35]. The activities include cultivating plants and fish in a cyclical aquaculture system, which contributes to the development of knowledge. One of the novel aspects of this research is the technology used for breeding seawater ornamental fish, which was previously more common for freshwater ornamental fish [12].

High production can push implementation activity involved in marketing a number of institutions [12,13,20,28]. Marketing is an important activity in operating fisheries business because marketing is an influential action in the economy, helping fishers navigate the ups and downs of income [28]. Production will be in vain if prices are low, so marketing must be efficient. Marketing the product is necessary after production to gain more attention because it is key in development efforts [11,31,41,43]. Perishable fishery products are easily damaged, which necessitates special attention in marketing. According to Arinong and Kadir, channel marketing is responsible for distributing goods from producers to consumers. The length of the marketing channel will determine the quality of marketed products, costs, margins, marketing efficiency, and revenue [17,19]. Strategic marketing involves adjustments in response to market conditions. It is essential to carefully observe internal factors, strengths and weaknesses, and external factors, opportunities and threats, to determine the most effective marketing strategy for a company.
2 Materials and Methods

This research was carried out for six months from September 2022 to March 2023 in the waters of South Sulawesi. Primary data were obtained from interviews with group fishers and fishers from the information location fishing area [5,6]. The respondents were selected using purposive sampling, i.e., choosing those actively engaged in the marketing of ornamental fish resources. Respondents consisted of fishers, traders/collectors, TPI officers, and KP service officers. The primary data cover the condition of marketed products, the fish marketing system, and an overview of marketing channels in South Sulawesi [3,14,30]. The analysis used a descriptive method. Ornamental fish prices are useful indicators in evaluating marketing efficiency by comparing the price received by the producer/fisher to the price paid by the consumer (the farmer's share) [15,30].

![Fig. 1 Research stages (Developed by the authors)](image)

3 Results

The following data pertain to the export of catfish from the waters of South Sulawesi.

According to the data provided, it is evident that there is a significant amount of angelfish being exported as ornamental fish from the waters of South Sulawesi [10,38].

Fishers in South Sulawesi market their catches by selling them through fish auction held at fish landing sites. There are eight places for fish auction (TPI). In the fish marketing system, the products are weighed and separated by type. Subsequently, TPI officers communicate the prices of each type of fish that has been caught. The pricing is determined by the traders/collectors and TPI officers. If a fisher disagrees with the price, the TPI officer will engage in negotiations with the trader/collector. This aligns with the research by Nikijuluw et al., which highlights the significant role of traders/collectors in influencing fish prices and supporting manufacturers.

Traders/collectors are appointed by TPI to manage the procurement of fish from fishers. According to records from the Maritime Affairs and Fisheries Service, there are currently 23 traders/collectors and 170 traders/retailers in South Sulawesi [17,20].

Ornamental fish marketing is conducted by the companies through both export and domestic channels. The primary export destinations include Taiwan, Japan, Hong Kong, Korea, and Singapore. For export, the companies offer a discount of up to 20% on the production, which amounts to 385 Arowana tails. For the domestic market, they allocate 80% of the production, totaling 1,542 tails, to areas such as Jakarta, Surabaya, and regions in Sumatra.

In export, the companies utilize the FOB (Free on Board) marketing system, where they cover the delivery costs only up to the harbor or cargo area of origin. Subsequently, the buyer is responsible for the costs from the origin to the final destination. Below are the operational costs.

\[\text{Preparation} \rightarrow \text{Selection of respondents} \rightarrow \text{Primary data collection}\]

![Fig. 1 Research stages (Developed by the authors)](image)

\[\text{Results} \rightarrow \text{Strategy Analysis} \rightarrow \text{SWOT Analysis}\]

### Tab. 1 Data on the export of angelfish from the waters of South Sulawesi (Developed by the authors)

<table>
<thead>
<tr>
<th>Year</th>
<th>TT (3-5 cm)</th>
<th>H (5.1-8 cm)</th>
<th>S (8.1-11 cm)</th>
<th>M (11.1-15 cm)</th>
<th>L (15.1-25 cm)</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>2,325</td>
<td>11,449</td>
<td>14,923</td>
<td>14,207</td>
<td>557</td>
<td>43,461</td>
</tr>
<tr>
<td>2019</td>
<td>2,115</td>
<td>10,241</td>
<td>14,636</td>
<td>13,457</td>
<td>484</td>
<td>40,933</td>
</tr>
<tr>
<td>2020</td>
<td>981</td>
<td>9,721</td>
<td>12,551</td>
<td>12,236</td>
<td>557</td>
<td>36,046</td>
</tr>
<tr>
<td>2021</td>
<td>973</td>
<td>8,302</td>
<td>10,319</td>
<td>10,236</td>
<td>421</td>
<td>30,251</td>
</tr>
<tr>
<td>2022</td>
<td>773</td>
<td>6,052</td>
<td>9,373</td>
<td>10,131</td>
<td>357</td>
<td>26,686</td>
</tr>
<tr>
<td></td>
<td>7,167</td>
<td>45,765</td>
<td>61,802</td>
<td>60,267</td>
<td>2,376</td>
<td>177,377</td>
</tr>
</tbody>
</table>

### Tab. 2 Operational cost calculation (Developed by the authors)

<table>
<thead>
<tr>
<th>A</th>
<th>Fixed Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment 2.5% x Rp17,300,000</td>
<td>432,500</td>
<td></td>
</tr>
<tr>
<td>Depreciation per year</td>
<td>2,565,000</td>
<td></td>
</tr>
<tr>
<td>Employee wages 2 x Rp1,200,000 x 12</td>
<td>28,800,000</td>
<td></td>
</tr>
<tr>
<td>Insurance cost 1% x Rp17,300,000</td>
<td>173,000</td>
<td></td>
</tr>
<tr>
<td>Amount A</td>
<td>31,970,500</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Variable Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying Napoleon angelfish (5,132 @ 35,000)</td>
<td>179,620,000</td>
<td></td>
</tr>
<tr>
<td>Yellow drug</td>
<td>750,000</td>
<td></td>
</tr>
<tr>
<td>Daily wages 2 x 26 days x 25,000 x 12</td>
<td>15,600,000</td>
<td></td>
</tr>
<tr>
<td>Other costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Transport</td>
<td>1,200,000</td>
<td></td>
</tr>
<tr>
<td>2. ATK</td>
<td>1,200,000</td>
<td></td>
</tr>
<tr>
<td>3. Telecommunications</td>
<td>1,800,000</td>
<td></td>
</tr>
<tr>
<td>4. BBM (2 x 24 x @ 900,000)</td>
<td>43,200,000</td>
<td></td>
</tr>
<tr>
<td>5. Print fees</td>
<td>600,000</td>
<td></td>
</tr>
<tr>
<td>6. Consumption (2 x 24 x @ .750,000)</td>
<td>36,000,000</td>
<td></td>
</tr>
<tr>
<td>Amount B</td>
<td>279,970,000</td>
<td></td>
</tr>
</tbody>
</table>
The total cost required for the ornamental fish operations is $311,940,500. This cost includes fixed and variable expenses. The costs of these operations are essential for starting a business in captive breeding and marketing of ornamental fish [14,16].

3.1 SWOT Analysis

SWOT analysis is a strategic planning tool used to identify and evaluate the strengths, weaknesses, opportunities, and threats facing a company. By systematically analyzing these factors, businesses can maximize their strengths and opportunities while minimizing their weaknesses and threats. This analysis helps in formulating appropriate strategies for the company's growth and success [29].

<table>
<thead>
<tr>
<th>Categories</th>
<th>Description</th>
</tr>
</thead>
</table>
| Strengths (S) | 1. Adequate production facilities and infrastructure  
2. Consumers comprise individuals from the middle class and up.  
3. Captivity license/permit obtained from the Natural Resource Conservation Subhall |
| Weaknesses (W) | 1. Poor water quality hindering growth  
2. High operational cost because feed originates from an outside company  
3. Technology is still simple. |
| Opportunities (O) | 1. Market demand always increases.  
2. There are exhibitions from government and private parties.  
3. Promising marketing, especially in an outside country |
| Threats (T) | 1. Competitors producing products with similar appearances |

The evaluation of components in a customized fish hatchery business is influenced by various factors [18,22,26]. This evaluation is based on logical thinking and information provided by the company. Each component of the SWOT analysis is assessed and connected to existing alternative strategies. These components are then ranked based on their respective weights. The ranking for each alternative strategy can be found in the table below.

3.2 Priority Strategy for Ornamental Fish Sale

To develop an alternative strategy that will prioritize the business of breeding Arowana fish, it is essential to consider both internal (strengths and weaknesses) and external (opportunities and threats) factors. This evaluation is commonly referred to as SWOT analysis. Its results can be found in the table below.
Based on the weighting of marks assigned to alternative strategies, a priority strategy can be determined for the sale of ornamental fish.  

1) Operational cost optimization through the implementation of efficient feed cultivation methods;  
2) Expanding the share market by expanding network marketing;  
3) Following exhibitions to stimulate the buying power of local or domestic consumers.

4 Conclusions
Ornamental fish captivity is to maintain rare fish species, which are highly favored by the public and help preserve the richness of nature. Research results indicate that in 2022, 26,826 ornamental fish were exported.

SWOT analysis identified three priority strategies for the companies. First, to reduce high production costs, especially for feed, the companies should establish partnerships with suppliers to ensure consistent feed supplies. Second, the companies should expand their network marketing to increase sales. For the local market, participating in exhibitions organized by the government or private parties can help promote the company’s products. Finally, the companies should implement the strategies arranged to achieve their marketing goals.

The academic contribution of this work lies in its exploration of the ornamental fish industry, particularly in the context of sustainability and marketing strategies. By studying ornamental fish production and marketing practices, this research provides insights into how companies can improve their operations to reduce costs and increase sales.

The limitation of this research is that the solutions offered are limited to business analysis and strategies that can be used to optimize the sales of fish farming products. Therefore, for further research, the authors suggest conducting a broader study on how to optimize fisheries cultivation, especially of seawater ornamental fish, in other contexts, such as the use of environmentally friendly technology or sustainable cultivation.

References

Management, 2015, 104, 136–149.


[37] SETIYOWATI H, NUGROHO M, HALIK A. Strategy for implementing the blue economy concept in neon tetra ornamental fish cultivation groups; model analytical hierarchy process. Journal of Survey in Fisheries Sciences, 2023, 10(3S), 482–497.


[1] AGOES E R. 推动通过粮农组织港口国预防、制止和消除非法、不报告和不管制捕捞措施协定。印度尼西亚国际法杂志，2011，8(2)，10。

[2] BANJARANI D R. 非法捕鱼达拉姆·卡吉安·胡库姆国家党和国际法：与跨国犯罪的关系。《克萨·帕特里卡杂志》，2020年，42(2)，150–162。


[5] CRESWELL W。教育研究：规划、实施和评估定量和定性研究。第四版。马萨诸塞州波士顿：皮尔逊，2012年。

[6] CRESWELL W。研究设计：定性、定量和混合方法。第四版。加利福尼亚州圣荷市：智者，2014年。

等。潘耶勒萨安·桑克塔非法捕鱼迪维拉亚·劳特·纳图纳·安塔拉印度尼西亚登安中国。《改革杂志》，2018，1(2)，51–58。


[9] GARCÍA I A. 西班牙：打击违反国际渔业法律制度行为的先驱国家。海洋政策，2022，144，105230。


[12] GIACOMARRA M、CRESCIMANNO M、VRONTIS D 等。鱼类生态标签促进可持续意识转变的能力。海洋政策，2021, 123, 104292。

[13] WOOD E M. 水族馆珊瑚礁鱼的收集：全球贸易、保护问题和管理策略。瓦伊河畔罗斯：海洋保护协会，2001年。

[14] GLAESER B，FERSE S，GORRIS P。印度尼西亚渔业在生计与环境退化之间：苏拉威西佩蒙德群岛的应对策略。见：GUILL OTREAU P、BUNDY A、PERRY R I. (编) 海洋系统的全球变化：社会与治理反应。伦敦：劳特利奇，2017：67-82。


[17] GUMILAR H R。印度尼西亚的非法捕鱼以及国际海事法对非法捕鱼活动的作用。印度尼西亚环境法与可持续发展杂志，2022年，1(1)，29–46。

[18] HARYATNO H、ISANAWIKRAMA I、WIMPERTIWI D 等。阅读从爱好中赚钱的机会水族景观。《彭加布迪安和凯维劳萨汉杂志》，2018，2(2)，117–125。

[19] HIKMAH M。从国家法和国际法角度看印度尼西亚的非法捕鱼。印度尼西亚国际法杂志，2013年，11(1)，60–88。

[20] JOB S。整合海洋保护和可持续发展：以社区为基础的海水观赏鱼水产养殖。活珊瑚礁鱼信息公报，2005年，13，24-29。


[31] RAMACHANDRAN A. 有效渔业管理的生态标签和绿色认证——分析, 2010年。http://conference.cusat.ac.in/xmlui/handle/purl/4127


等。（编辑）东南亚的资源增强和可持续水产养殖实践：水生物种负责任生产的挑战：2014年
东南亚资源增强和可持续水产养殖实践国际研讨会（瑞萨）的会议记录。蒂格巴万，伊洛伊洛

[37] SETIYOWATI H，NUGROHO M，HALIK A.
在霓虹灯四观赏鱼养殖群体中实施蓝色经济概念的战略；模型分析层次过程。渔业科学调查杂
志，2023年，10(3S)，482–497。

[38] SIRAJUDHEEN TK，SALIM SS，BIJUKUMAR A．
等人。印度喀拉拉邦海洋观赏鱼贸易的问题与前景。渔业经济与发展杂志，2014，15（1），1
4-30。

[39] 西班牙国际法年鉴。国际私法和公法及相关事项领域的西班牙文献，2005年。西班牙国际法
年鉴在线，2005年，11(1)，397-453。

[40] THONEY DA，WARMOLTS DI，ANDREWS C．
为动物学收藏获取鱼类和水生无脊椎动物。有未来吗？动物园生物学，2003，22（6），519–527。

[41] TISSOT B N，BEST B A，BORNE MAN E H．
等。美国海洋政策和市场力量如何改革珊瑚礁野生动物贸易。海洋政策，2010，34(6)，1385–1388。

[42] TLUSTY M F，RHYNE A L，KAUFMAN L．
等。公共水族馆有机会提高水生动物贸易的可持续性。动物园生物学，2013，32（1），1-12。

[43] WILLIAMS S L，JANETS KIN N，ABBOTT J．
等人。珊瑚三角区的观赏海洋物种养殖：印度尼西亚苏拉威西斯佩蒙德群岛的海马示范项目。
环境管理，2014年，54，1342–1355。