

## **MANAGEMENT STRATEGY OF 2<sup>nd</sup> and 3<sup>rd</sup> CLASS FISH AUCTION PLACES IN PATI REGENCY**

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### **ABSTRACT**

Fisheries management policies are needed to achieve the prosperity of society in Indonesia. The auction process at fisheries in Indonesia does not run optimally; therefore, the impact of the role and function of fish auctions is not yet the best it could be in some areas. This study aimed to formulate a strategy for managing 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency. The research locations were the Puncel, Banyutowo, Alasdowo, Sambiroto, Margomulyo, and Pecangaan fish auctions in the Pati Regency. The research was conducted from January 2021 to November 2021. The research respondents, namely a sample of critical figures (key persons), were determined by purposive sampling of as many as 15 people. Data was analyzed using the Analytical Hierarchy Process and Expert Choice 11.0 software. The study results prioritize the most critical management strategies, namely fish production with a weight of 0.309 (30.9%), infrastructure with a weight of 0.295 (29.5%), institutions with a weight of 0.206 (20.6%), and human resources with a weight 0.190 (19.0%). The priority of alternative management strategies is as follows: (1) maintaining the existence of businesses run by fishermen, with a weight of 0.172 (17.2%), (2) improving facilities and infrastructure to support fish auction place operations,

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with a weight of 0.164 (16.4%), and (3) increasing the number of catches landed, with a weight 0.145 (14.5%).

Keywords: Analytical Hierarchy Process; fish auction place; strategy; management

## **1. Introduction**

All fishermen can utilize marine fisheries because they are common property (a shared resource) (Walden & McGuire, 2011). Teh and Sumaila (2011) stated that marine fishing efforts contribute to the global economy. The utilization of fisheries contributes significantly to food, nutrition, income, and traditions (Okafor-yarwood, 2019).

Fish marketing requires a sound management system so that several objectives can be achieved, namely increasing income (Oktafiani et al., 2019). In an effort to help fishermen sell their catch fish auction places have been built (Nurlinda & Saharruddin, 2013). Pati Regency Regional Government Regulation No. 19 of 2009 states that the definition of a Fish Auction Place (TPI) is a place provided explicitly by the Regional Government to conduct fish auctions. A fish auction involves the public sale of fish utilizing increased bidding. Hikmah and Nasution (2017) also mention that fishermen land their caught fish at fish landing sites and then auction them at fish auction places.

The auction mechanism has been applied to the fish market for a long time and has a long history (Marszalec, 2018). Kong et al. (2018) stated that one of the most creative ways to sell fish is by auction. Fishermen use auctions to obtain the maximum price from buyers (Fluvià et al., 2012; Sogn-grundvåg et al., 2020). Auction markets with many sellers and buyers are generally more competitive and able to obtain the maximum possible price (Sogn-grundvåg et al., 2019; Sogn-grundvåg et al., 2020).

The problem with fish auction places is that the auction process does not operate optimally or sometimes does not even run at all. The fish auction place cannot perform its functions properly because the fish landed through the fish auction place are only weighed there because the fishermen are conducting sales transactions directly with traders. Transactions are carried out directly between fishermen and traders without an auction officer (Febrianti et al., 2013). A fish auction place is one of the essential activities in a fishing port that requires optimum management because the activities that occur there affect the price of fish, which directly determines fishermen's income (Lubis & Pane, 2012).

One of the potential areas for developing small fisheries is Pati Regency in Indonesia. The capture fisheries in Pati Regency need attention due to a decline in production. In 2012, capture fisheries production was 47,576,648 kg and by 2018 it had decreased by 11.59% to 23,517,489 kg (Statistics Central Bureau of Pati Regency, 2013 and 2019). This decrease is partly due to the less than optimal role of fish auction places in holding auctions. The buying and selling activities at 2<sup>nd</sup> class fish auction places still do not running optimally. At the 3<sup>rd</sup> class fish auction place, the auction process does not exist, rather the transactions are carried out directly between fishermen and traders without intermediaries This has resulted in a less than optimal role and function of the 2<sup>nd</sup> class and 3<sup>rd</sup> class fish auction places. Damayanti (2018) mentions that one of the priority strategies for developing a small-scale/traditional fishery is the marketing trade system for fish catches through the auction process at a fish auction.

Based on this background, it is necessary to improve the management of the 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction place in Pati Regency. This study aimed to formulate a management strategy for 2<sup>nd</sup> class and 3<sup>rd</sup> class fish auction places in Pati Regency.

## **2. Background**

### **2.1. Small fishermen**

Retnowati (2011) states that small fishermen come from traditional fishermen; however, they utilize modernization program/boat motorization and fishing gear and no longer rely solely on traditional boats and conventional fishing gear. They also use diesel or motors whose range of coverage is extended or far. Traditional fishermen work to catch fish using simple (traditional) boats and fishing gear. The reach of the restricted area is only six nautical miles from the shoreline; usually, these fishermen fish to make ends meet. Small fishermen are generally the poorest in the community (the poorest of the poor). The economy relies on the weather for social and routine activities (Shaffril et al., 2017). Small fishermen have a very large dependence on their livelihoods even though the income earned is uncertain (García-lorenzo et al., 2019; Surís-regueiro and Santiago, 2014).

### **2.2. Fish Auction Place**

Pati Regency Regional Government Regulation No. 19 of 2009 states that the definition of a Fish Auction Place (TPI) is a place provided explicitly by the Regional Government to conduct fish auctions. Efforts to help market the fisherman's catch, then build a fish auction place (Nurlinda & Saharruddin, 2013) will indirectly reduce the function of mediators so that fishermen's losses are reduced, which will then affect the level of income and welfare of the fishermen. The function of a fish auction place (Dianto et al., 2015) is as follows:

- Means of coaching fishing communities on the habit of saving and insurance.
- Assist in correctly collecting data on the volume of fish, types of fish, and prices.
- Provision of materials and equipment needed by fishermen and credit payments.
- Service center for fishing communities with business and business improvement.
- Source of income for local governments

The fish auction place cannot function properly because the fish circulating through the fish auction place are only weighed there. Then, the fishermen and traders carry out the sales transaction directly without an auction officer (Febrianti et al., 2013). Kistanto (2019) stated that one of the reasons that the transactions were carried out directly with the mediators/traders was the small number of catches.

### **2.3. Fish auction**

Peterson and Georgianna (1988) highlight that auctions are divided into the following three types: (1) closed bid auctions, where the price is the highest bid and the highest bidder is designated as the buyer, (2) auctions in the UK, buyers actively bid in ascending order of price, and (3) auctions in the Netherlands, the auctioneer starts at a very high price and decreases until the first bid, which is the winning bid. The UK type of auction includes about 75% of the world's auctions.

Fishermen use auctions to obtain the maximum price from buyers (Fluvià et al., 2012; Sogn-grundvåg et al., 2020). Auction markets with multiple sellers and buyers are generally more competitive than individual sales (Sogn-grundvåg et al., 2020; Sogn-grundvåg et al., 2019). Guillotreau and Jiménez-toribio (2011) mention the following two ways to increase and expand the fish market/TPI; first, by attracting new entrants to the local trade, and second, by allowing long-distance bidders to participate.

#### **2.4. Fish Auction Place classification**

A fish auction place is one of the facilities available at the fish landing base (Khussurur, 2014). The Fish Landing Base (PPI) is needed to support fishery activities in the management and utilization of fish resources, pre-production activities, production, processing, fish marketing, and supervision of fish resources (Solihin et al., 2016). The Department of Fisheries and Marine Affairs of Central Java Province (2005) divided fish auction places into classes based on the production value (Raman). First class has a production value of >50 billion, 2<sup>nd</sup> class has a production value of 25-50 billion, and 3<sup>rd</sup> class has a production value of 10-25 billion.

#### **2.5. Strategy**

Strategy or "strategos or strategia" comes from the Greek word which means "general or generalship" or is defined as something related to management in an organization (Suci, 2015). Taufiqurokhman (2016) defines strategy as a coordinated commitment and action to exploit these competencies and competitive advantages. The strategy has meaning as a plan, jump (ploy), pattern, taking a position, and perception. A strategy has the following characteristics: (1) is a long-term plan, (2) is general and applicable, (3) is comprehensive, involves all parts of the organization, (4) integrates, cannot see the views of the whole or organization, (5) external, considering the external environment of the company or organization, both stakeholders and the macro environment, (6) can adapt to the environment.

Research on strategic management, especially for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places using the criteria of human resources, fish production, infrastructure, and institutions has never been carried out, especially in Pati Regency. Febrianto et al. (2015) conducted previous research on strategies for improving fishing port facilities, and Sabana et al. (2016) examined the development of fish auction place strategies from service performance. Mahyudin (2016) examined the management of fishing ports in terms of facilities and activities. Lubis and Pane (2017) performed research on functional fish auction places from an institutional aspect, port management, fishermen's socio-culture, and biotechnical ports. Alfons et al. (2020) studied fishing port management strategies regarding facilities, human resources, and regulations.

### **3. Methodology**

The selection of research sites focused on the boat berth and the fish auction place where small fishermen obtain their catch, namely 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency. The research locations were Puncel fish auction, Banyutowo fish auction, Alasdowo fish auction, Sambiroto fish auction, Margomulyo fish auction, and Pecangaan fish auction. The research was conducted from January 2021 to November 2021.

As Susilowati and Kirana (2008) applied, purposive sampling was used to obtain research respondents in the field which consisted of 15 key persons including academics, business people,

government officials, and members of society. The academic is an expert in capture fisheries. There were six fish traders/mediators representing each fish auction place. The two government officials were representatives of the local government (technical department); in this case, the Department of Marine Affairs and Fisheries of Pati Regency. The community was represented by five members of the community and 1 NGO.

**Table 1**  
Research respondents for formulation of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction place management strategy

Respondent	Rule	Stakeholder	Represent
Respondent 1	key person in an interview	expert in the field of capture fisheries	Academia
Respondents 2, 3, 4, 5, 6, 7	key person in an interview	fish traders	Business
Respondents 8, 9	key person in an interview	Department of Marine Affairs and Fisheries of Pati Regency	Local government
Respondents 10, 11, 12, 13, 14	key person in an interview	community around the fish auction place	Community
Respondent 15	key person in an interview	NGO	Community

In-depth interviews were conducted with 15 key people as mentioned in Table 1. The research questions were in the form of interest comparison questions for each research aspect to determine the priority criteria and research questions in the form of comparative questions to determine the alternative priorities of each criterion. An example of a question is the comparison of interest between human resources and fish production, with a level of 1 to 9. This key person only plays a role in answering research questions to build the AHP model. The results of in-depth interviews with key figures determined aspects of policy formulation for policy recommendations. Primary data were collected by observation and documentation. Research activity was documented in photos as authentic evidence of research implementation.

Saaty (2008) stated that the results of in-depth interviews can be placed into a problem decomposition or problem hierarchy. A key principle in a hierarchical arrangement is to possess detailed knowledge. The human mind organizes complex realities into their main elements, and then into parts again, and so on hierarchically (tiered). The author conducted the research interviews.

Performance ratings and attribute weights in the AHP were generated from a series of comparative assessments at the same hierarchical level, and assigned a number from a discrete scale of 1 to 9 (Bui et al., 2017; Brandao et al., 2021).

**Table 2**  
Discrete scale of pairwise comparison weights

Scale	Degree of Importance
1	equal importance
3	moderate importance
5	high importance
7	very high importance
9	extreme importance
2,4,6,8	intermediate values

Source : (Saaty & Shang, 2011; Brandao et al., 2021)

The steps of the AHP analysis were as follows:

Step 1: Study the current situation in the 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction environment. The current conditions were used to select alternative strategies for managing the 2<sup>nd</sup> and 3<sup>rd</sup> class fish auctions in Pati Regency.

Step 2: Create a hierarchy of criteria and selected alternatives that are considered to implement AHP. The hierarchical structure of the problem can be seen in Figure 1.

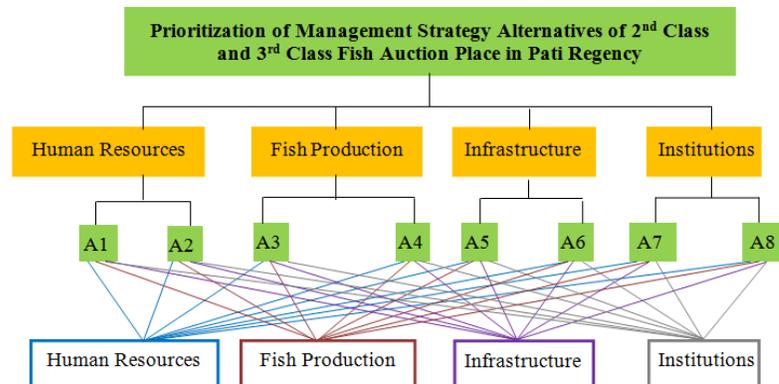


Figure 1 Problem hierarchy framework by data analysis (2021)

Key:

- A1: Quality of fish auction place officers
- A2: Quantity of fish auction place officers
- A3: Existence of businesses run by fishermen
- A4: Catch landed at the fish auction place
- A5: Fish auction place operational support facilities and infrastructure
- A6: Access to fish auction place either by land or sea
- A7: Participation of fish auction place officers/existence of fish auction place
- A8: Participation/existence of the community, traders/intermediaries, and local government

Step 3: Describe the criteria and alternatives chosen to develop the problem hierarchy. The management aspects of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auctions place in Pati Regency are the AHP criteria formulated based on the management model's indicators (Widayati, 2008; Dianto et al., 2015; Solihin et al. al., 2016).

Table 3  
Description of criteria in the problem hierarchy

Criteria	Description
Human resources aspect	The capacity of a second and third person in Pati Regency. The human resources aspect consists of 2 alternative criteria, namely, the quality of fish auction place officers and the quantity of fish auction place officers
Fish production aspect	The number of fish managed and the involvement of fishermen in these activities in 2 <sup>nd</sup> and 3 <sup>rd</sup> class fish auctions places in Pati Regency. The aspect of fish resources consists of 2 alternative criteria, namely, the business run by fishermen and the catches that are distributed at the fish auction place
Infrastructure aspect	The availability of facilities and infrastructure. This aspect consists of 2 alternatives, namely, facilities and infrastructure supporting fish auction place operations, as well as fish auction place access both by land and sea
Institutions aspect	The role of institutions interested in the existence of fish auctions places. The institutional aspect consists of 2 alternatives, namely, the participation of fish auction place officers and the participation/existence of the community, traders, and local governments.

Table 4  
Description of alternatives in the hierarchy problem

Alternatives	Description	Criteria	Reference
Quality of fish auction place officers	Fulfillment of job responsibilities, the quality of work results	Human resources	Yuniar (2016) Suherman et al. (2020)
Quantity of fish auction place officers	Description of the fish auction place personnel, the level of productivity achieved, the quantity of work, and effectiveness at work	Human resources	Pramitasari et al. (2006) Yuniar (2016) Suherman et al. (2020)
Existence of businesses run by fishermen	The number of fishermen and traders	Fish production	Pramitasari et al. (2006) Widayati (2008)
Catch landed at the fish auction place	The number of ships	Fish production	Pramitasari et al. (2006) Widayati (2008)
Fish auction place operational support facilities and infrastructure	The auction floor area, the number of baskets, and the number of scales	Infrastructure	Pramitasari et al. (2006) Widayati (2008)
Access to fish auction places either by land/sea	The length of the pier	Infrastructure	Pramitasari et al. (2006) Widayati (2008)
Participation of fish auction place officers/the existence of fish auction place	Weighing activities, auction continuity, retribution, and fish auction place institutions	Institutions	Perda Kabupaten Pati No. 22/2009 Dianto et al. (2015)
Participation/existence of the community, the traders/intermediaries, and the local government	Description of the fishermen's group, trader's group, implementation of regulations, and supervision of activities at the fish auction place	Institutions	Dianto et al. (2015) Idajati et al. (2016) Solihin et al. (2016) Raodah (2017)

Table 5  
Contribution of criteria and alternatives to the management strategy of the 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency

Criteria	Alternatives	Contribution to the management strategy of the 2 <sup>nd</sup> and 3 <sup>rd</sup> class fish auctions
Human resources	Quality of fish auction place officers	Human resources (fish auction place officers) can improve the performance of fish auction place management by carrying out their duties according to the instructions and procedures that are given.
	Quantity of fish auction place officers	Human resources (quantity or number of fish auction place officers) can speed up the implementation of auctions at the fish auction place.
Fish production	Existence of businesses run by fishermen	Fish production (existence of fishing business, number of fishermen and traders) determines the running of management activities at the fish auction place.
	Catch landed at the fish auction place.	Fish production (landed catch) is the main commodity in the auction process.
Infrastructure	Fish auction place operational support facilities and infrastructure	Infrastructure (availability of fish auction place facilities and infrastructure) can guarantee and be a supporting factor for the ongoing auction process
	Access to fish auction places either by land or sea	Infrastructure (access to a fish auction place either by land or by sea) is a supporting factor and can attract fishermen and traders to make transactions at the fish auction place
Institution	Participation of fish auction place officers/the existence of fish auction place	Institution of fish auction place officers who play a role and actively participate in implementing activities at fish auction places can support the smooth management of a fish auction place.
	Participation/existence of the community, the traders/intermediaries, and the local government	The community, traders, and local governments must actively participate in monitoring the continuity of activities at the fish auction place

Step 4: After compiling the hierarchy problem, the next step is to give weighting by doing pairwise comparisons on each element. Next, evaluate the level of relevance and compare pairs between criteria and alternatives, following a weight scale consisting of three people. The first party is the Diponegoro University fishery academics. The second party is a researcher in public policy, which the government of Pati Regency owns. The third party is the fish auction section of the Department of Marine Affairs and Fisheries of Pati Regency. We explained the concepts that were applied in Tables 3 and 4 and emphasized evaluating the importance of the criteria and alternatives for managing 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency. The weighting results were then processed using the AHP and Expert Choice 11.0 as a tool to help determine strategic priorities. Marsono (2020) explained that the expected consistency must be close to

perfect in order to produce a decision that is valid. The consistency ratio should be less than or equal to 10%. The data assessment must be corrected if the value is more than 10% or 0.1.

Furthermore, through discussion, the author and the three parties describe the activities that can be applied as policy implications for each of the resulting alternative strategies. The policy implications create a formula to make it easier to execute the resulting alternative strategies so that policymakers, namely the Pati Regency government, can help them be carried out through related agencies.

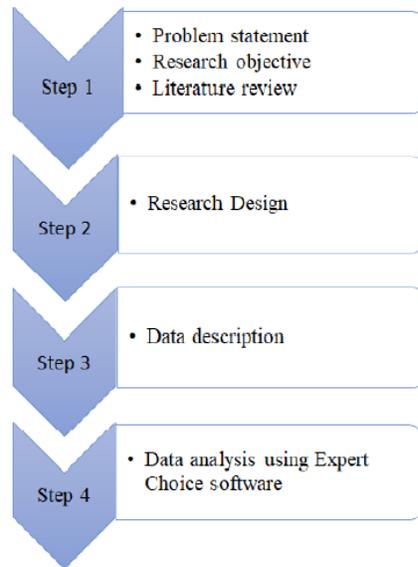


Figure 2 Research analysis process (Brandao et al., 2021; Periaiah et al.,2021)

Table 6  
Interpretation of the relationship between criteria and alternatives

Criteria	Alternatives	Scope			
		Human resources	Fish production	Infrastructure	Institution
Human resources	Quality of fish auction place officers	Improve the performance of fish auction place management	Knowledge of fisheries management and business	Ability to utilize facilities/ infrastructure according to their function	Carry out activities according to duties and functions
	Quantity of fish auction place officers	Speed up the implementation of auctions at the fish auction place	Improve services at the fish auction place	Increase utilization of facilities and infrastructure	Carry out activities according to duties and functions
Fish production	Existence of businesses run by fishermen	Knowledge about fisheries business management	Determine the running of management activities in the	Ensure the smooth running of the fishery business	Ensure the existence and conveying of aspirations to

Criteria	Alternatives	Scope			
		Human resources	Fish production	Infrastructure	Institution
Infrastructure	Catch landed at the fish auction place	Knowledge about fisheries business management	fish auction place Main commodity in the auction process	Ensure the continuity of auction activities at the fish auction place	the government Ensure the performance of fish auction place for management institutions
	Fish auction place operational support facilities/ infrastructure	Availability of facilities to manage fish auction place	Ensure the continuity of auction activities at the fish auction place	Guarantee and be a supporting factor for the ongoing auction process	Ensure the performance of fish auction place for management institutions
	Access to fish auction places either by land or sea	Smooth access in and out of the fish auction place	Organize auction activities at the fish auction place	Supporting factor and can attract fishermen and traders to make transactions at the fish auction place	Support the smooth management of the fish auction place
	Participation of fish auction place officers/the existence of fish auction place	Professionalism of officers in fish auction placemanagement	Auction organizer at the fish auction place	Supporting factors for organizers to conduct auctions at the fish auction place	Support the smooth management of fish auction place
Institution	Participation/existence of the community, the traders/intermediaries, and the local government	Supervision following the knowledge possessed	Supervision of the auction process at the fish auction place	Supervision of the availability of the fish auction place facilities and infrastructure	Monitor the continuity of activities at the fish auction place

#### 4. Results and discussions

Puncel fish auction place and Banyutowo fish auction place are 2<sup>nd</sup> class fish auctions and hold regular auctions, while Alasdowo fish auction place, Sambiroto fish auction place, Margomulyo fish auction place, and Pecangaan fish auction place are 3<sup>rd</sup> class and do not hold auctions. Buying and selling transactions occur at 3<sup>rd</sup> class fish auction places directly between traders and fishermen without intermediaries. Ships that dock at 2<sup>nd</sup> class fish auction places are Danish seine ships under 30 GT, and ships arriving at 3<sup>rd</sup> class fish auction places are gill net ships below 10

GT, with an average of 10 ships per day. One problem faced at the 2<sup>nd</sup> class fish auction places is the inadequate floor area which becomes overloaded when the number of fish is abundant (peak season). The main problems of the 3<sup>rd</sup> class fish auction places are the inadequate number of personnel and minimal facilities.

#### **4.1. Management strategy of 2<sup>nd</sup> class and 3<sup>rd</sup> class fish auction place in Pati Regency**

The results of the AHP consideration of the criteria for the 2<sup>nd</sup> and 3<sup>rd</sup> class auction places are shown in Figure 3. The inconsistency ratio value of  $0.01 < 0.1$  means the analysis results are acceptable. The fish production aspect has the highest priority in management of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places, with a weight of 0.309 (30.9%). Fish is the primary commodity and the principal object available at the fish auction. Without the availability of fish, there would be no transactions since one of the main functions of the fish auction place is to organize the marketing and auctioning of fish caught by fishermen (Dianto et al., 2015). The second priority is the infrastructure aspect, with a weight of 0.295 (29.5%). The fish auction place infrastructure or facilities play a role in supporting the smooth running of activities or transactions at the fish auction place. Inadequate facilities, infrastructure, and access disrupt organizing auction activities at the fish auction place. Siburian et al. (2018) stated that the existing infrastructure or facilities and equipment of the fish auction place is critical to support all auction activities. The third priority is the institutional aspect, with a weight of 0.206 (20.6%). Institutional aspects at fish auction places or structure functions regulate the roles and functions of management personnel so that there is no overlap in the implementation of activities. Solihin et al. (2016) stated that the fish auction place institution creates price certainty and stability due to the auction process. If there is an institutional failure by a fish auction place, it will result in fishermen's poverty due to market price injustice and a failure of fishery management due to the weakness of the fish landing data. The fourth priority is the aspect of human resources, with a weight of 0.190 (19.0%). The fish auction place management of human resources becomes the fourth priority because findings in the field show that auctioneers at fish auction places expect management personnel to be qualified people. In several fish auction places, especially 3<sup>rd</sup> class fish auction places, personnel have a minor role in transactions carried out by fishermen and traders. If fish auction place personnel played a greater role in activities at the fish auction place, satisfaction with services would increase; therefore, increasing the opportunity to maintain the loyalty of bidders and attract new bidders (Dewi & Kholil, 2019). An auction process that is carried out professionally and transparently will guarantee that the auction participants get a fair result which then fosters trust in the auction organizer (fish auction place officers) and will lead to the auction participants (fishermen and traders) carrying out their buying and selling transactions through auctions at the fish auction place.

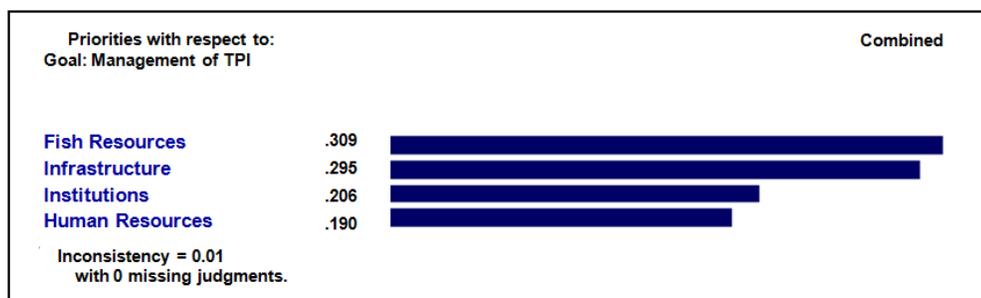


Figure 3 Priority criteria for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency

The overall priority scale analysis results of the alternative criteria for managing 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places are shown in Figure 4. The resulting alternative priorities indicate that the existence of businesses run by fishermen is the priority with the greatest weight of 0.172 (17.2%). The catch landed in the fish auction place becomes the second priority with a weight of 0.164 (16.4%). The fish auction place operational support facilities and infrastructure is the third priority with a weight of 0.145 (14.5%). If viewed in more detail, the alternative priorities of these criteria are following the priority criteria that place the human resources and infrastructure aspects as the first and second priorities. The inconsistency ratio value of  $0.01 < 0.1$  means that the analysis results are acceptable.



Figure 4 Alternative priority criteria for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency

#### 4.2. Management strategy of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction place in Pati Regency based on the human resources aspect

The management of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places based on the HR aspect includes improving the quality and increasing the quantity of fish auction place officers. The results of the alternative analysis of the HR aspect criteria can be seen in Figure 5. The inconsistency ratio value of  $0.00 < 0.1$  means the analysis is acceptable.

Alternative criteria A1, namely improving the quality of fish auction place officers, received a weight of 0.611 (61.1%); while A2, which is the addition of the quantity of fish auction place officers has a weight of 0.389 (38.9%). The quality of officers is prioritized over the quantity of fish auction place officers. Based on the results of observations and in-depth interviews, we obtained information that the participants of activities in fish auction places, namely fishermen and traders, prefer the presence of qualified officers compared to a large number of officers. If fish auction place officers are qualified and understand their duties, transactions will be faster and easier. However, if the number of fish auction place officers is sufficient, it will help smooth transactions at fish auction places because it avoids overlapping work. Bayyinah et al. (2016) mention that fish auction place officers who can carry out their duties well will affect the quality of service at fish auction places, therefore having an impact on the level of satisfaction of fishermen who use the services. Thus, qualified fish auction place officers should be able to carry out their duties properly so that services at fish auction places run well. Bayyinah et al. (2016) also mention that if the number of officers is adequate, they will be able to handle transaction services at fish auction places.

If the two alternatives in the human resources aspect are able to be fulfilled, then it can be followed up by making standard operational procedures (SOPs) at the fish auction place. The SOPs' impact on the services provided will follow the promised time. Services can be carried out quickly and following procedures so that transactions that occur at fish auction places run well and smoothly.

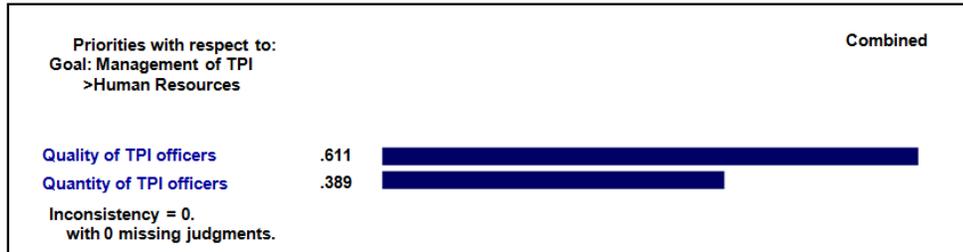


Figure 5 Alternative priority criteria for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on thr HR aspect

The current condition of the 2<sup>nd</sup> class fish auction place in Pati Regency as seen from the HR aspect shows that auction activities and fish auction place officers carry out their functions and duties well. However, the 2<sup>nd</sup> class fish auction place in Pati Regency has not been able to accommodate all the fishermen's catches, so it often exceeds capacity. The current condition gave rise to the idea of adding more auction activities. Additional fish auction places will be required if additional auction activities, namely auction officers, weighing, and recording notes are included. The management strategy of 2<sup>nd</sup> class fish auction place in Pati Regency based on the recommended HR aspect is shown in Table 5.

**Table5**  
Management strategy of 2<sup>nd</sup> class fish auction place in Pati Regency based on the HR aspect

Alternative Strategies	Policy Implications	Actors
- Improve the quality of fish auction place officers	- The type of training adapts to each task, for example, auction procedures	Department of Marine Affairs and Fisheries of Pati Regency
- Increase the quantity of fish auction place officers	Recruitment/acceptance of new competent personnel through open and transparent selection	Department of Marine Affairs and Fisheries of Pati Regency

The current condition of the 3<sup>rd</sup> class fish auction places in Pati Regency from the HR aspect shows that no auction activities are occurring, the fish auction places are not operating and fish auction place officers only make retribution withdrawals. Fish buying and selling transactions are carried out without an auction process directly by fishermen and traders without involving fish auction place officers. In addition, transactions are conducted outside the fish auction place area. The current conditions gave rise to to the strategy of enforcing the established rules that all fish buying and selling transactions must be carried out at the fish auction place. In addition, it is necessary for the fish auction place manager to start pioneering the implementation of auctions, especially during the peak fishing season. Fish auctions can reduce the occurrence of direct transactions between fishermen and traders/middlemen because all fish buying and selling activities will be carried out through an auction process and are held directly by the fish auction place. In this scenario, the traders/middlemen only function as buyers through the auction process at the fish auction place. The management strategy of the 3<sup>rd</sup> class fish auction place in Pati Regency based on the recommended HR aspectis shown in Table 6.

**Table 6**  
Management strategy of 3<sup>rd</sup> class fish auction place in Pati Regency based on the HR Aspect

Alternative Strategies	Policy Implications	Actors
- Improve the quality of fish auction place officers	- Training on auction procedures	Department of Marine Affairs and Fisheries of Pati Regency
	- Recruitment/acceptance of new competent personnel to fill positions at the fish auction place institutional/organizational structure	Department of Marine Affairs and Fisheries of Pati Regency
- Increase the quantity of fish auction place officers	- Make SOPs for auction procedures and non-auction transactions within the fish auction place	Department of Marine Affairs and Fisheries of Pati Regency, fish auction placeofficer

**4.3. Management strategy of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction place in Pati Regency based on the fish production aspect**

The management of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on the fish production aspect includes maintaining the existence of businesses run by fishermen and increasing the number of catches landed at fish auction places. The results of the alternative analysis of the fish production aspect criteria can be seen in Figure 6. The inconsistency ratio value of  $0.00 < 0.1$  means the analysis is acceptable.

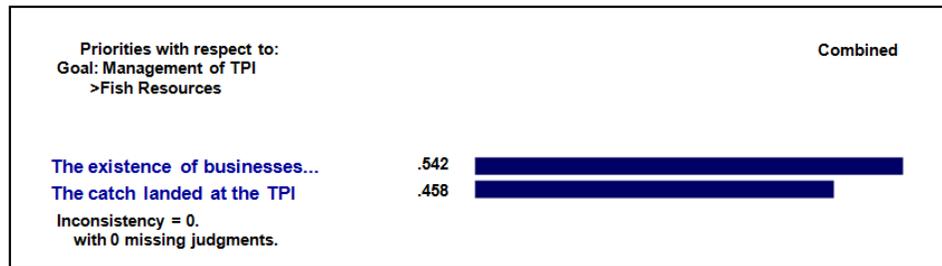


Figure 6 Alternative priority criteria for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on the fish production aspect

Alternative criteria A3, which maintains the existence of fishermen-run businesses has a weight of 0.542 (54.2%), while A4, which increases the number of catches landed at the fish auction place has a weight of 0.458 (45.8%). Maintaining the existence of fishermen-run businesses has a higher priority than increasing the catch that lands at the fish auction place. Currently, fish auction place management prioritizes that the fishermen’s catch landed at the fish auction place will continue to run smoothly; however, there must be a balance in efforts to increase the number of landed catches with the provision of infrastructure for mooring ships, which is a greater investment of time and resources. Damayanti (2017) states that the fishing business of fishermen is closely related to their income. Furthermore, Damayanti (2018) states that one way to maintain the existence of fishing businesses of small/traditional fishermen is to increase the productivity of these businesses by using modern fishing gear. An increase in the number of catches landed at the fish auction place is closely related to the number of ships that landed at the fish auction place pier, which is in accord with Nurhayati and Atika (2018) who state that the number of fish landed at the fish auction place increases with the increase in the number of ship visits. In contrast, the number of fish landed at the fish auction decreases when ship visits decrease.

The current condition of 2<sup>nd</sup> class fish auction places seen from the fish production aspect shows that fishermen land their catch at the fish auction place, and auctions are carried out there every day. However, this has not been the same with the inadequate number of traders in Pati Regency based on the recommended fish production aspect presented in Table 7.

Table 7  
Management strategy of 2<sup>nd</sup> class fish auction place in Pati Regency based on the fish production aspect

Alternative Strategies	Policy Implications	Actors
- Maintain the existence of businesses run by fishermen	- Efforts to bring new traders to the fish auction place - Maintain the continuity of auctions at fish auction places regularly and consistently by increasing the number of ships that land at fish auction places by increasing the length of the pier	Department of Marine Affairs and Fisheries of Pati Regency Department of Marine Affairs and Fisheries of Pati Regency, fish auction place officer, fisherman
- Increase the number of catches landed in the fish auction place		Department of Marine Affairs and Fisheries of Pati Regency, Department of Public Works and Spatial Planning of Pati Regency

The current condition of the 3<sup>rd</sup> class fish auction places as seen from the fish production aspect shows that the fish auction place is not operating and transactions occur directly between fishermen and traders. The 3<sup>rd</sup> class fish auction place in Pati Regency does not hold auctions, and fishermen operating in the vicinity of the fish auction place have a contract with traders that causes them to sell their catch to the trader at a price that the trader has determined. The current conditions must receive attention and intervention from the local government, especially the implementation of transactions between fishermen and traders and determination of the selling price of fish in Pati Regency based on the recommended fish production aspect shown in Table 8.

**Table 8**  
Management strategy of 3<sup>rd</sup> class fish auction place in Pati Regency based on the fish production aspect

Alternative Strategies	Policy Implications	Actors
- Maintain the existence of businesses run by fishermen	- Efforts to maintain the stability of the selling price of fish by making price agreements with traders or determining the lowest selling price for fish  - Promote and empower the village unit cooperative (KUD) of fishermen, specifically for savings and loans (capitalization)	Pati Regency local government, Department of Marine Affairs and Fisheries of Pati Regency, traders, fishermen
- Increase the number of catches landed in the fish auction place	- Implementation of strict regulations and sanctions so that ships land and unload at fish auction place docks	Department of Marine Affairs and Fisheries of Pati Regency; Department of cooperatives, micro, small and medium enterprises of Pati Regency Pati Regency local government, Department of Marine Affairs and Fisheries of Pati Regency, fish auction place officers

**4.4. Management strategy of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on the infrastructure aspect**

The management of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places based on the infrastructure includes increasing the facilities and infrastructure supporting fish auction place operations and increasing access to fish auction places either by land or sea. The alternative analysis of the infrastructure aspect criteria results can be seen in Figure 6. The inconsistency ratio value of  $0.00 < 0.1$  means the analysis is acceptable.

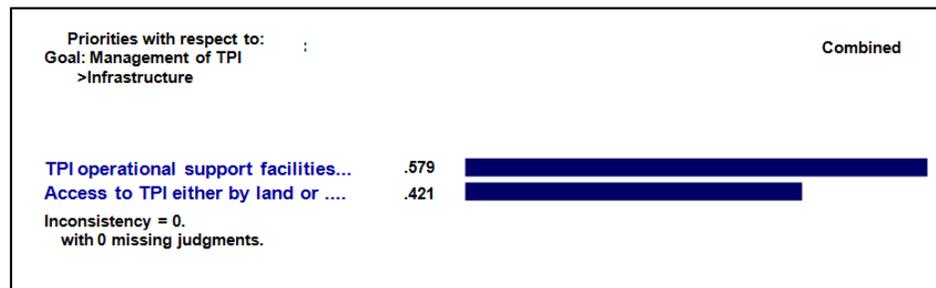


Figure 7 Alternative priority criteria for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on the infrastructure aspect

Alternative criteria A5, namely improving the facilities and infrastructure supporting fish auction place operations, received a weight of 0.579 (57.9%); while A6, namely increasing access to the fish auction place both by land and sea, weighs 0.421 (42.1%). The supporting facilities and infrastructure for fish auction place operations need to be improved because they are insufficient, especially for 3<sup>rd</sup> class fish auction places. In 2<sup>nd</sup> class fish auction places, facilities and infrastructure need to be added because they are not sufficient, causing the auction process to be divided into several sessions which hinders the smooth running of the auction and risks the fish starting to rot. For 3<sup>rd</sup> class fish auction places, facilities and infrastructure are still minimal and unavailable because the fish auction place is not operating. Febrianto et al. (2015) stated that one of the strategies for improving the performance and governance of fisheries development is to pay attention to the facilities around the fish auction place. In addition to improving facilities and infrastructure, the access to fish auction places either by land or sea needs attention. Access from land appears to be quite good. The obstacle that fishermen often face is access from the sea because the pier area is often shallow. The occurrence of siltation certainly hampers the process of docking ships, making it difficult for fish to land in the fish auction place. Siry (2011) states that the silting of the port-channel makes it difficult for ships to get in and out and increases operational and maintenance costs.

The current condition of the 2<sup>nd</sup> class fish auction place as seen from the infrastructure aspect shows that the facilities and infrastructure are already available but not adequate, especially when the number of fish is abundant. Facilities that require improvement are the length of the pier, the area of the auction floor, the number of baskets, and the number of scales in Pati Regency based on the recommendations of the infrastructure aspects shown in Table 9.

**Table 9**  
Management strategy of 2<sup>nd</sup> class fish auction place in Pati Regency based on the infrastructure aspect

Alternative Strategies	Policy Implications	Actors
- Improve fish auction place supporting facilities and infrastructure	- Efforts to increase the length of the dock - Efforts to expand the auction floor - Efforts to add facilities and infrastructure to support auction activities	Department of Marine Affairs and Fisheries of Pati Regency
- Increase access to fish auction places both by land and sea	- Pier groove dredging - Repair and maintenance of roads to the fish auction place	Department of Marine Affairs and Fisheries of Pati Regency

The current condition of 3<sup>rd</sup> class fish auction places as seen from the infrastructure aspect shows that facilities and infrastructure are still minimal and unavailable. The length of the pier is not sufficient, the auction floor is not spacious and requires repairs, and baskets and scales that are not yet available require special attention because the facilities and infrastructure are very minimal. Therefore, it will be able to operate properly again if the fish auction place is equipped with the infrastructure aspects recommended in Table 10.

**Table 10**  
Management strategy of 3<sup>rd</sup> class fish auction places in Pati Regency based on the infrastructure aspect

Alternative Strategies	Policy Implications	Actors
- Improve fish auction place supporting facilities and infrastructure	- Efforts to increase the length of the dock and expand the auction floor - Efforts to add facilities and infrastructure to support auction activities such as basket and scales	Department of Marine Affairs and Fisheries of Pati Regency
- Increase access to fish auction places both by land and sea	- Dredging of grooves and around moorings - Repair and maintenance of roads to the fish auction place	Department of Public Works and Spatial Planning of Pati Regency

**4.5. Management strategy of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on the institutional aspect**

The management of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auctions places based on the institutional aspect includes increasing the participation of fish auction place officials/fish auction place existence and

increasing the participation/existence of the community, traders, and local government. The results of the alternative analysis of institutional aspect criteria can be seen in Figure 7. The inconsistency ratio value of  $0.00 < 0.1$  means the analysis is acceptable.

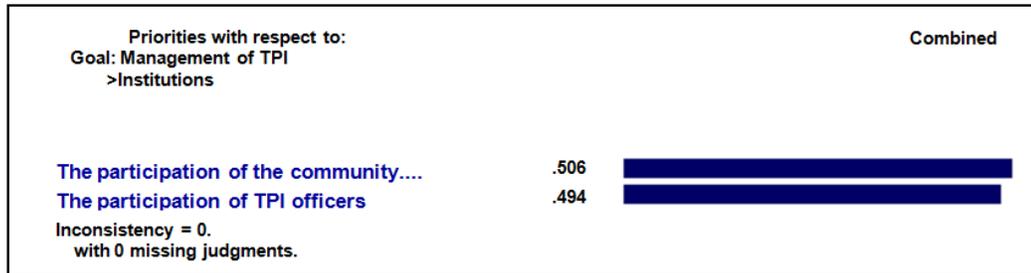


Figure 8 Alternative priority criteria for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency based on the institutional aspect

Alternative criteria A7, namely increasing the participation of fish auction place officers/existence of fish auction places, received a weight of 0.494 (49.4%). In contrast, A8, which is increasing the participation/existence of the community, the traders/intermediaries, and local governments received a weight of 0.506 (50.6%). The participation of the community, traders, and local governments is prioritized, especially as supervisors of activities at fish auction places. Based on observations in the field, auction activities at 2<sup>nd</sup> class fish auction places can run well because the community and village government supervise auction activities. The village government issues a rule that fish auctions must be at the fish auction place. This is different from 3<sup>rd</sup> class fish auction places, where the community and village government tend to be passive so that the buying and selling of fish occurs without supervision. Rianto (2017) stated that the village government plays an essential role in conveying fish auction places. In addition, people who obey the regulations affect the sustainability of auction activities at fish auction places. The role of fish auction place officers is to be the organizer of auction activities. Auction activities at fish auction places are entirely the responsibility and primary task of fish auction place officers. Maulidya et al. (2014) stated that the work effectiveness of fish auction place employees/officers dramatically influences the performance of fish auction places. The effectiveness of the work of fish auction place officers is significant because it affects the trust of users of fish auction place services, namely fishermen and traders.

The current condition of 2<sup>nd</sup> class fish auction place as seen from the institutional aspect shows that the fish auction place and fishermen's institutions are running well based on the regular holding of auctions. The institution that does not yet exist is a trader institution. The existence of a trader institution is essential as a connector for the aspirations of the traders; it would be easier if there was an institution that housed the traders rather than to having to deal with the traders directly. The recommended institutional aspect for the 2<sup>nd</sup> class fish auction place in Table 11.

Table 11  
Management strategy of 2<sup>nd</sup> class fish auction place in Pati Regency based on the institutional aspect

Alternative Strategies	Policy Implications	Actors
- Increase the participation of fish auction place officers/fish auction place existence	- Efforts to improve the performance of fish auction place officers, especially in auctions, reporting, and documentation of activities at the fish auction place	Department of Marine Affairs and Fisheries of Pati Regency, fish auction place officer
- Increasing the participation/existence of the community, traders, and local government.	- Efforts to increase the participation of the community, traders, and local governments in supervising activities at fish auctions place through establishing a supervisor forum.	Department of Marine Affairs and Fisheries of Pati Regency, fishers, traders, community, village government

The current condition of the 3<sup>rd</sup> class fish auction places as seen from the institutional aspect shows that the institution is not functioning because the fish auction places are not operating. Some fishermen are not proactive in fish auction activities, but there is no trader group. Thus, local governments need to start pioneering and revitalizing activities at fish auction places in Pati Regency based on the recommended institutional aspects presented in Table 12.

Table 12  
Management strategy of 3<sup>rd</sup> class fish auction place in Pati Regency based on the institutional aspect

Alternative Strategies	Policy Implications	Actors
- Increase the participation of fish auction place officers/fish auction place existence	- Efforts to hold auctions at fish auction places during peak season - Intervention of fish auction place officers in the sale and purchase of fishers and traders	Department of Marine Affairs and Fisheries of Pati Regency, fish auction place officer
- Increase the participation/existence of the community, traders, and local government.	- Efforts to establish a supervisor forum	Department of Marine Affairs and Fisheries of Pati Regency, fishers, traders, community, village government

## **5. Conclusion**

This study concludes that the management strategy of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency consists of the following four aspects: human resources, fish production, infrastructure, and institutions. The order of priority for the management strategies of 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency from highest to lowest are fish production, infrastructure, institutions, and human resources. The priority of alternative management strategies for 2<sup>nd</sup> and 3<sup>rd</sup> class fish auction places in Pati Regency from highest to lowest is (1) maintaining the existence of businesses run by fishermen. Existing fishing businesses can sustain ongoing transactions and auctions at fish auction places. (2) Improving facilities and infrastructure to support fish auction place operations. Fish auction place facilities and infrastructure support the ongoing auction process at the fish auction place. (3) Increasing the number of catches landed at fish auction places. Ensure the continuity of auction activities because fish are the main commodity in the fish auction. (4) Increasing access to fish auction places by land and sea. Access to a fish auction place is a supporting factor and can attract fishermen and baskets to make transactions at a fish auction place. (5) Increasing the participation of the community, traders/intermediaries, and local governments. Communities, traders/middlemen, and local governments supervise the continuity of activities at fish auction places. (6) Increasing the participation of fish auction place officers. The role of fish auction place officers is a supporting factor for holding auctions at fish auction places. (7) Improving the quality of fish auction place officers and qualified fish auction place officers who can carry out activities according to their duties and functions. (8) Increasing the number of officers. A sufficient number of fish auction place officers can improve services at fish auction places.

## **6. Policy recommendations**

Policy recommendations include government efforts through activities or programs based on the researched and reviewed priority aspects, namely fish production, infrastructure, institutions, and human resources. The aspects of fish production include supporting fishermen's buying and selling activities through professional and transparent auctions at the fish auction place. The infrastructure aspect includes sufficient facilities and infrastructure used to manage and implement auctions at the fish auction place. The institutional aspects include increasing the role and function of fish auction place institutions, fishermen, traders, and the community in implementing and supervising the fish auction place management. The aspects of human resources include improving the quality and quantity of fish auction place officers to work professionally according to their respective functions.

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