

# Priority strategies for conflict resolution of traditional fishermen and mini trawl in Maros District, South Sulawesi Province, Indonesia

<sup>1</sup>Lukman Daris, <sup>1</sup>Muhammad Yusuf, <sup>2</sup>Muhammad S. S. Ali, <sup>1</sup>Wahyuti

<sup>1</sup> Fishery Department, Cokroaminoto University of Makassar, Tamalanrea, Makassar, South Sulawesi Province, Indonesia; <sup>2</sup> Faculty of Agriculture, Hasanuddin University, South Sulawesi Province, Indonesia. Corresponding author: M. Yusuf, yusufhalim2014@gmail.com

**Abstract.** The conflict of fishing resources utilization in the coastal area of Maros District due to operation of mini trawl causing a decrease in catch (yield) of traditional fishermen. The aim of this research is to determine the main priority of alternative strategies for conflict resolution of traditional fisherman's and mini trawl in Maros District, South Sulawesi Province. The study was carried out from January to October 2016 in the coastal area of Maros District, South Sulawesi Province. Data collecting method is (1) observation, (2) interview, and (3) Participatory Rapid Appraisal (PRA). The questionnaire developed was a closed questionnaire, with ordinal data types using the Saaty scale. Data analysis method was performed by approach of AHP (Analytic Hierarchy Process). The research results obtained the main priority of alternative strategies consisted of: improvement supervision (21.00%), the second priority is improvement fishing effort (12.80%), and the next priority are optimizing the roles and functions of PPNS (12.60%), technology capture development (12.50%), regulating fishing grounds (12.00%), path arrangement and fishing ground (11.00%), law enforcement (9.60%) and improvement community coaching and assistance (8.50%).

**Key Words:** capture fisheries, catch, alternative strategies coastal, traditional fishing, AHP.

**Introduction.** Coastal and marine resources development will be focus of the nation out of crisis, which is based on high potential of coastal and marine resources. 1) Indonesia has a coastline of 81,000 km which is the longest coastline in the world after Canada; 2) about 75% of Indonesia's territory are waters (about 5.8 million km<sup>2</sup> including ZEEI - Indonesian Exclusive Economic Zone); 3) Indonesia is the largest archipelagic country in the world with a number of islands around 17,508, and 4) possess massive biodiversity (Nugroho & Dahuri 2004).

The facts at the moment are that the utilization of coastal and marine resources are still in the old pattern that is not sustainable and not friendly to the ecosystem with the maritime policy based on the doctrine of common property resources with no ownership. Besides that conflicts over, both access to and use of coastal and marine resources, have become increasingly common throughout the world (Maarten 2001). This condition is also becoming evident in tropical developing countries where artisanal coastal and marine fisheries are particularly important because they provide the much needed employment and protein requirements of the coastal population (Malleret-King 1996). Therefore, the utilization of coastal and ocean resources usually follows the principle of open access that anyone can maximize the utilization of the coastal and marine resources anytime (Shofyaton et al 2010). According to Daris (2017) another consequence caused by the open access principle is that of conflict of space and natural resource use in the coastal areas is more frequent than of inland and on oceans.

The operation of mini trawl has been banned based on Presidential Decree RI No. 39 of 1980 with the reason for the emergence of social unrest resulting from physical clashes between traditional fishermen and fishermen using trawl in the waters. In addition, the use of trawl nets resulted in the destruction of coastal fish resources due to

the low selectivity of trawl nets. However, trawl is the most effective fishing tool for catching shrimp, so fishermen continue to operate trawl nets in the potential shrimp areas (Satria et al 2002). Further, Satria et al (2002), stated that the case in Maros District was caused by the traditional fisherman who conducted the activity of shrimp catching with mini trawl or in the local language known as "gadang pukat", "pattarik" or "parrenreng". The operation of mini trawl leads to conflicts of fishermen using other fishing gears, especially fishermen who use dominant fishing gear in Maros District which reached 1,626 units (Fishery and Marine Agency of Maros District 2016; Daris et al 2017).

The above problems conduct to a conflict between local fishermen in Maros District, although fishermen have made an agreement that is a 0-3 mile zone for traditional fishermen (including fishermen using the shrimp entangling gill net) and a 3-mile outing route for fishermen using mini trawl (Achmad 2003; Daris et al 2017). However, the agreement is still violated by one of the parties, so that efforts to resolve conflicts by both local communities and the government is not optimal, not significant, and are the only temporary resolution. The objectives of this study is to found type and priority strategies for conflict resolution of traditional and trawl fishermen in Maros District South Sulawesi Province.

**Material and Method.** The realization of this work supposes the availability of a great number of repetitions of samples responding to the same known theoretical model. In practice, as the theoretical model is unknown, we use the Monte-Carlo method based on the generation of the data by computer according to a fixed theoretical model.

**Research location.** This research was carried out from January to October 2016 in the coastal area of Maros District, South Sulawesi Province, Indonesia.

**Data collecting method.** The population considered in the present research was all fisherman users of traditional catching appliance (klitik nets) and cantrang (mini trawl). Sample was determined by combining purposive sampling and snowball sampling technique. This technique was purposely determined by the researcher based on certain criteria or considerations and in accordance with the research objectives (Sugiyono 2009). Samples in this research are fisherman user of catching device of klitik nets and mini trawl involving conflicts of fishing resources utilization and key informant, consised of: traditional leader and decision makers, such as Department of Fisheries and Marine Affairs, HNSI, Parliament Maros District, Civil Servant Investigator of Fisheries (PPNS), and BPP Fisheries. Method of data collecting was done by; 1) observation, 2) interview, and 3) Participatory Rapid Appraisal (PRA). The questionnaire developed was a closed questionnaire, with ordinal data types using the Saaty scale (Saaty 2008). More details are given in Table 1.

The use of the Saaty (2008) scale was done by comparison technique, i.e. all at each level will be pairwise comparison with the scale of the assessment of 1 to 9. As a basis for the preparation of paired comparison questionnaires are structured/hierarchical/level of study conducted with Details as pairwise follows (Figure 1).

Fundamental scale of absolute numbers (Saaty 2008)

<i>Intensity of Importance</i>	<i>Definition</i>	<i>Explanation</i>
1	Equal importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgement slightly favour one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgement strongly favour one activity over another
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favoured very strongly over another; its dominance demonstrated in practice
8	Very-very strong	
9	Extreme importance	The evidence favouring one activity over another is of the highest possible order of affirmation
Reciprocals of above	If activity i has one of the above non-zero number assigned to it when compared with activity j, then j has the reciprocal value when compared with i	A reasonable assumption
1.1-1.9	If the activities are very close	May be difficult to assign the best value but when compared with other contrasting activities the size of the small numbers would not be too noticeable, yet they can still indicate the relative importance of the activities

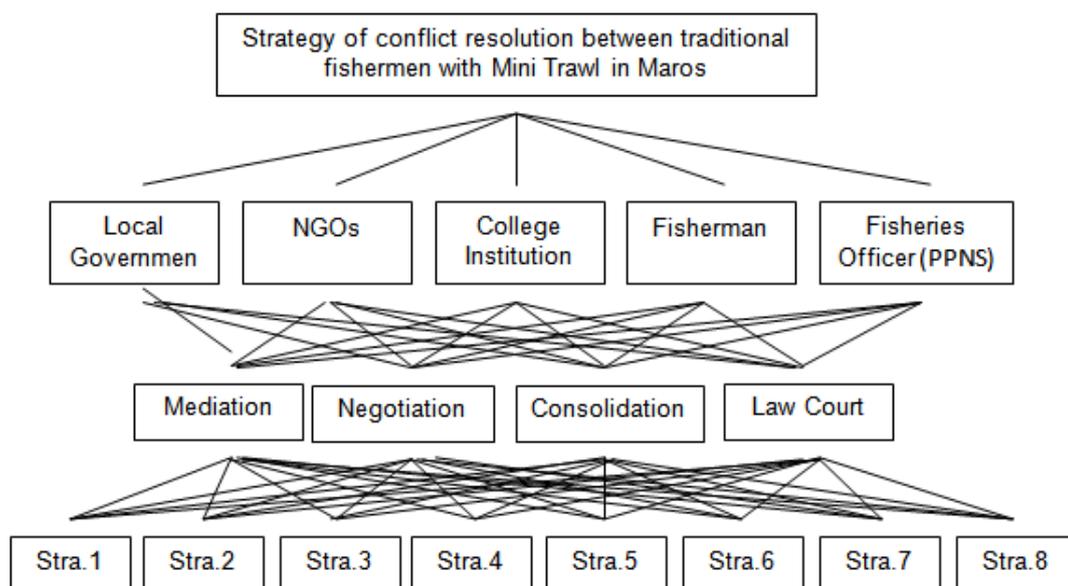


Figure 1. Hierarchy/structure of alternative strategies for conflict resolution.

Stra.1-Improvement supervision  
 Stra.2-Path arrangement and fishing ground  
 Stra.3-Optimizing the roles and functions of PPNS  
 Stra.4-Improvement fishing effort

Stra.5-Improvement community coaching and assistance  
 Stra.6-Regulating fishing grounds  
 Stra.7-Technology capture development  
 Stra.8-Law enforcement

**Data analysis method.** Methods of data analysis for alternative strategy of conflict resolution of traditional fishermen and mini trawl in Maros District, was conducted by AHP approach. AHP is a decision support model developed by Thomas L. Saaty. This decision support model will describe multi-factor or complex multi-criteria issues into a hierarchy/level. According to Saaty (2008), hierarchy is defined as a representation of a complex problem in a multi-level structure where the first level is the goal/focus, followed by the next level, i.e. criteria, sub criteria, and so on up to the last level of the alternative. It is further mentioned that AHP is a decision-making method involving a number of selected criteria and alternatives based on consideration of all related criteria in the form of hierarchy. With the hierarchy, a complex problem can be broken down into groups that are then structured in a hierarchy so that the problem will look more structured and systematic. According to Marimin (2004), AHP has many advantages in explaining the decision-making process, because it can be graphically depicted, making it easy for all parties involved in decision making. The operational phases of AHP modification are as follows (Yusuf et al 2016):

- Compile a hierarchical structure, including: actors, criteria and alternative strategies.
- Define focus/goal, i.e. alternative strategies of conflict resolution of traditional and fishermen cantrang in Maros District.
- Define criteria of actors i.e. Local Government, NGOs, College Institution, Civil Servant Investigator of Fisheries (PPNS).
- Define criteria of model i.e. mediation, negotiation, consolidation and law/court.
- Determine alternative with 8 strategies.
- Create matrix of pairwise comparisons to describe relative contribution or influence of each element against a goal or criteria that is above the level.
- Define pairwise comparisons to obtain an overall sum of valuations of  $N=nx[(n-1)/2]$ , where n is the number of elements that are compared.
- Input and run AHP software.

## Results

**Priority of actors.** Actors or stakeholders are decision makers for conflict resolution of traditional fishermen and mini trawl in Maros District, including: District Government, NGOs, College Institution, Civil Servant Investigator of Fisheries (PPNS). The five main actors are expected to synergize well. The following is the output of AHP analysis to the actors who play a role in conflict resolution of traditional fishermen and mini trawl in Maros District.

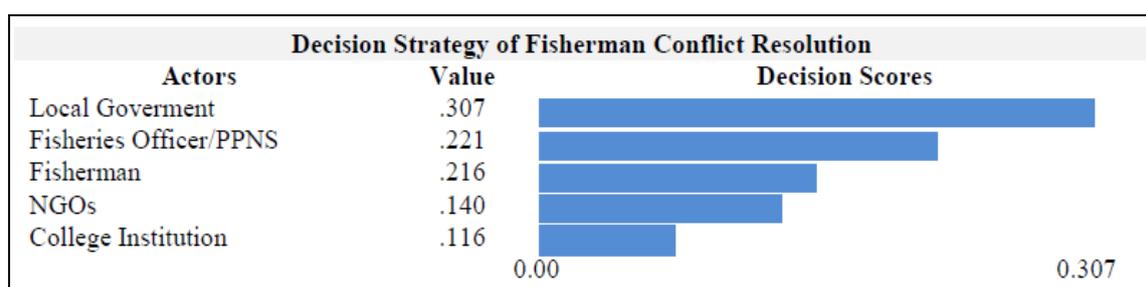


Figure 2. Actors priority oin conflict resolution.

**Priority of models.** Commonly used conflict resolution model of fishery and marine resources utilization is efforts to resolve conflicts or disputes non litigation, such as; negotiation, mediation, consolidation and arbitration. However, if the approach is deemed to be unsuccessful then the litigation route becomes a viable option for conflict resolution. The output of AHP analysis at the criterion level is model of conflict resolution of traditional fishermen with mini trawl in Maros District as shown in Figure 3.

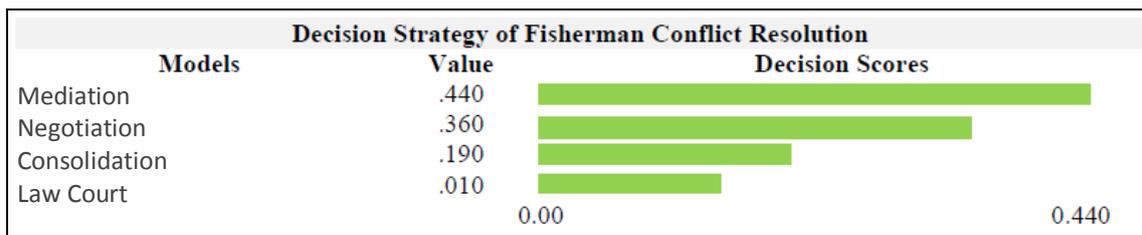


Figure 3. Models of priority in conflict resolution.

**Priority of alternatif strategy.** An alternative strategy for conflict resolution of traditional fishermen with mini trawl in Maros District is an implementation strategy for conflict resolution. Output of AHP analysis for alternative priorities for conflict resolution strategies of traditional fishermen with mini trawl in Maros District, a detailed representation is shown in Figure 4.

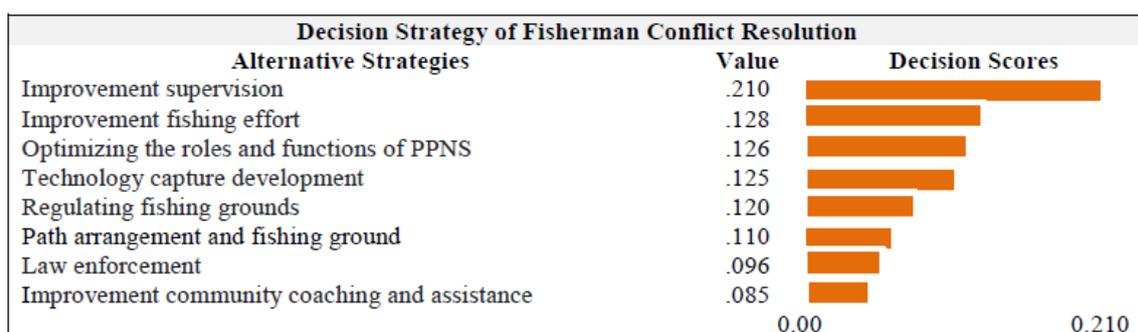


Figure 4. Priority of alternative strategies.

**Discussion.** The results of the analysis resulted that priority of the actors is the main priority in solving the conflicts of traditional fishermen and min trawl with a value of 0.307 of the total weight of existing actors (Figure 2). Subsequently the second priority of the second actor to the fifth priority is Civil Servant Investigator of Fisheries (PPNS) with 0.221, Fishermen Society with 0.216, NGOs with 0.140 and College Institution with 0.116 value. The percentage indicates that the main actors for conflict resolution of traditional fishermen with mini trawl is the District Government. It is based on the authority of marine area management, especially 4 miles with various types of fishing gear that operates under the Local Government. Beside that, the level of conflict is quite high, where horizontal conflict is generally communal and in groups. According to Kusnadi (2006), conflict management in stages is when conflicts among fishermen within a district can be resolved by the relevant district governments and conflicts between traditional fishermen at the district level can be resolved by the province authorities. Further, the role of local government becomes very important in conflict resolution. According to Luluk et al (2009) weak law enforcement in fisheries sector and slowly local governments to complaints respond of fishermen be the cause of widespread conflict. Another factor causing conflict in fishing resource utilization is poverty (Retnowati 2011). Furthermore, according to Sudarso (2007) that poverty in fishermen is dominated by structural poverty. Structural poverty is poverty caused by the inability to work, lack of access and other factors that occur structurally. While Tunje (2016) in order to minimize fisheries resource use conflicts, and promote harmony amongst resource users and achieve sustainable use and management of fisheries resource, suggests education, awareness and sensitization programmes targeting the local artisanal fishers, zonation of fishing grounds and assigning them appropriate gear use, as well as providing exclusive fishing rights to a first comer to a fishing ground.

The criteria of mediation models are the main priority in solving conflicts between traditional fishermen with mini trawl is 0.440. While the negotiation model is a second alternative is 0.360. Then, consolidation model value is 0.190 and the last priority or law court had a value of 0.010. The most commonly chosen models of fishing communities in the event of a conflict are mediation and negotiation. Both models are generally selected

fishing communities in conflict resolution, because it can provide better certainty of settlement (win-win solution).

The alternative strategies is main priority for conflict resolution of traditional fishermen with mini trawl in Maros District is improvement supervision (0.210), the second priority is improvement fishing effort (0.128), and the next priority are optimizing the roles and functions of PPNS (0.126), technology capture development (0.125), regulating fishing grounds (0.120), path arrangement and fishing ground (0.110), law enforcement (0.96) and improvement community coaching and assistance (0.085). Increased supervision is a preventive effort in preventing conflicts between fishing communities, where conflicts can occur due to fishing and other factors. According to Agunggunanto (2011) some of the main factors causing conflict are individual differences, cultural differences, differences of interests, and social change. Further Daris (2017) stated that one source of conflict in coastal and marine areas is the increased intensity of resource exploitation. Improvement supervision will increase awareness of potential conflicts that may occur, so it can be prevented earlier (Luluk et al 2009).

**Conclusions.** The present study concluded that the main priority in resolving conflicts between traditional fishermen and mini trawl in Maros District, from the actor side can be the local government involvement. While the form of conflict resolution is mediation, and the main strategy that must be applied is increased supervision upon fishermen.

## References

- Achmad S., 2003 [Problems and conflicts that occur between mini trawl fishermen and traditional fishermen in Maros Regency]. Paper presented by FKPPS South Sulawesi Province, State Department of Agriculture, Maros Regency, Indonesia. [In Indonesian].
- Agunggunanto E. Y., 2011 [Poverty analysis and income of fishermen families in the Wedung sub-districts, Demak District, Central Java, Indonesia]. *Jurnal Dinamika Ekonomi Pembangunan* 1(1):50-58. [In Indonesian].
- Daris L., Aslinda A., Rapi N. L., 2017 Forms and strategies of conflict resolution in fishing resources utilization in the coastal area of Maros District, South Sulawesi Province. *AACL Bioflux* 10(6):1540-1545.
- Daris L., 2017 [Social dynamics of coastal communities]. *LeutikaPrio*, Yogyakarta, 202 p. [In Indonesian].
- Kusnadi, 2006 [Fishermen social conflict, poverty and the struggle for natural resources]. LkiS, Yogyakarta, Indonesia, 345 p. [In Indonesian].
- Luluk A., Staria A., Rilus A. K., 2009 [Fisherman conflict in East Java. Case study of changes in agrarian structure and differentiation of welfare of planter communities in Lebak District, Banten]. *Jurnal Sodality* 3(1):113-124. [In Indonesian].
- Marimin, 2004 [Techniques and applications for decision making for multiple criteria]. Gramedia, Jakarta, 197 p. [In Indonesian].
- Maarten B., 2001 Marine resource management. Conflict and regulation in the fisheries of the Coromandel Coast. Sage Publications, New Delhi, 394 p.
- Malleret-King D., 1996 The food security of the coastal communities and the establishment of marine protected areas. PhD Thesis, University of Warwick, UK.
- Nugroho I., Dahuri R., 2004 [Regional development: Economic, social and environmental perspective]. Pustaka LP3ES, Jakarta, 381 p. [In Indonesian].
- Retnowati E., 2011 [Indonesian fisherman in the structural poverty vortex (social, economic and legal)]. *Jurnal Perspektif* 16(3):149-159. [In Indonesian].
- Saaty T. L., 2008 Decision making with the Analytic Hierarchy Process. *International Journal of Services Sciences* 1(1):83-98.
- Satria A., Umbari A., Fauzi A., Purbayanto A., Sutarto E., Muchsin I., Muflikhati I., Karim M., Saad S., Oktariza W., Imran Z., 2002 [Towards marine decentralization]. PT. Pustaka Cidesindo, Jakarta, 147 p. [In Indonesian].
- Shofyatun A. R., Widyastuti Ya'la Z. R., Sulistiawati D., 2010 [Management of coastal socio-ecological systems of small islands to increase community income: Case study

- of the Batudaka Islands Tojo Una-Una District]. *Jurnal Geografi* 13(2):47-56. [In Indonesian].
- Sudarso, 2007 [Structural poverty pressures of povorty of traditional fisherman in urban areas]. *Jurnal Masyarakat Kebudayaan dan Politik* 20(2):13-28. [In Indonesian].
- Sugiyono, 2009 [Statistics for research]. Alfabeta, Jakarta, 390 p. [In Indonesian].
- Tunje J. G., Tole M. P., Hoorweg J. C., Shauri H. S., Munga C. N., 2016 Conflicts in fisheries resource use along the Vipingo-Mida Creek stretch of the Kenyan coast: Causes and implications for fisheries management. *International Journal of Fisheries and Aquatic Studies* 4(5):156-161.
- Yusuf M., Fahrudin A., Kusmana C., Kamal M. M., 2016 Driven factors analysis on sustainable management of Tallo watershed estuaries. *Jurnal Analisis Kebijakan Kehutanan* 13(1):41-51.
- \*\*\* Fishery and Marine Agency of Maros District, 2016 [Annual Report]. Maros District, 231 p. [In Indonesian].
- \*\*\* Presidential Decree of the Republic of Indonesia Number 39 of 1980 Concerning Deletion of Trawl Network. Jakarta, Indonesia.

Received: 24 June 2019. Accepted: 24 February 2020. Published online: 05 March 2020.

Authors:

Lukman Daris, Cokroaminoto University of Makassar, Fishery Department, Agribusiness Study Program, Indonesia, South Sulawesi Province, 90245, Makassar, Tamalanrea, Jl. Perintis Kemerdekaan Km. 11, e-mail: daris.lukman70@gmail.com;

Muhammad Yusuf, Cokroaminoto University of Makassar, Fishery Department, Agribusiness Study Program, Indonesia, South Sulawesi Province, 90245, Makassar, Tamalanrea, Jl. Perintis Kemerdekaan Km. 11, e-mail: yusufhalim2014@gmail.com;

Muhammad Saleh Syekh Ali, Hasanuddin University, Faculty of Agriculture, Indonesia, South Sulawesi Province, 90245, Makassar, Tamalanrea, Jl. Perintis Kemerdekaan Km. 10, e-mail: saleh.assofie@gmail.com;

Wahyuti, Cokroaminoto University of Makassar, Fishery Department, Agribusiness Study Program, Indonesia, South Sulawesi Province, 90245, Makassar, Tamalanrea, Jl. Perintis Kemerdekaan Km. 11, e-mail: wahyuti.asaf@yahoo.com;

This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

How to cite this article:

Daris L., Yusuf M., Ali M. S. S., Wahyuti, 2020 Priority strategies for conflict resolution of traditional fishermen and mini trawl in Maros District, South Sulawesi Province, Indonesia. *AAFL Bioflux* 13(2):496-502.