Analysing fisheries conflict with the FishCollab 'conflict mapping' toolkit: lessons from Selayar, Indonesia

A Y Abdurrahim, H Ross and D S Adhuri

1Research Center for Population, Indonesian Institute of Sciences (LIPI), Indonesia
2School of Agriculture and Food Sciences, The University of Queensland, Australia
3Research Center for Society and Culture, Indonesian Institute of Sciences (LIPI), Indonesia

*Corresponding author: aliyansyah.lipi@gmail.com; aliy002@lipi.go.id

Abstract. Fisheries conflicts often occur among coastal fishers throughout the world, especially when the condition of coastal ecosystems decreases. This paper presents a method for analysing conflicts over the utilisation of coastal resources and a route to solutions involving multiple stakeholders in achieving sustainable fisheries management. This method was developed and tested in a participatory study conducted with coastal communities and local government in 2016-2018 in the Selayar Islands, South Sulawesi, Indonesia. Within the participatory approach, data collection incorporated participant observation, in-depth interviews, and discussions. The conflict mapping tool identifies the direct and indirect parties to each conflict, their contexts, strengths, the underlying needs that manifest as positions, and their concerns with respect to the conflict issues. The analysis helps analysts or the parties themselves to look for common interests, and to identify "win-win" possibilities and opportunities to negotiate new solutions.

1. Introduction

Fisheries conflicts occur in many parts of the world, involving fishers and their communities, and other parties who are also dependent on coastal and fisheries resources. The cause of conflict is not always dominated by one factor, but maybe triggered by many problems.

Research in a variety of places has explored the variety of reasons for conflict. The scarcity of fisheries resources is said to be the main factor in the occurrence of conflicts, and it triggers conflicts through different channels [1, 2]. Often, environmental damage that causes scarcity of resources in their local waters encourages fishers to undertake a livelihood strategy of migration to catch fish in new places [3-5]. This then triggers competition and seizure of fisheries resources at their destination, often even ending in violence [1, 6].

In addition to the issue of scarcity of resources, which is often seen as an environmental (ecological) issue, social problems are also shown to be supportive of conflicts. These range from the adequacy of institutions (regulating access to fishing grounds), the characteristics and behaviour of fishermen in conjunction with their use of fishing tools and methods, perceptions of resources and other fishermen, as well as other social factors such as social status and ethnic identity [7-9]. Institutional failure is often a key factor in fisheries conflicts in various places in the world, not least in Indonesia [10]. Social psychology factors are also shown to be complementary reasons for conflict. In
the Kei Islands in Eastern Indonesia, local leadership and social ties were very strong in one fishing community: while this benefitted that village, it had potential to trigger conflicts with the fishers of other villages [7]. Fishers’ perception of the decline in resources in their coastal waters also created a dilemma. On the one hand, they were willing to work together with fishers in their village to maintain resources and return them to their original or better condition. However, their concerns led to excessive suspicion and conflict with fishers from other villages [7].

The factors mentioned above are also factors in a conflict between fishermen in two neighbouring villages on Selayar. They are small scale fishers who both catch reef fish, but with different fishing techniques and equipment. Just like elsewhere, the initial conflict was triggered by the arrival in one village’s waters of fishers from another village, who experienced scarcity of resources in their waters due to damaged coral reef ecosystems. This paper describes our analysis of fisheries conflicts between fishermen in these two villages, using the Fishcollab ‘conflict mapping’ toolkit [14]. The innovation of this research is the process of mapping and supporting the resolution of conflicts that involve the conflicting parties and a set of interested parties in different levels of government, ranging from the village, sub-district, district, and provincial governments, and including the military and police. A further innovation is the way conflict analysis is an important and inseparable part of a broader diagnostic framework, FishCollab, which integrates a number of dimensions that can lead to collaborative development of adaptive fisheries and coastal management plans.

The research was conducted under the Coral Reef Capturing and Related Ecosystem Services (CCRES) Program in 2017-2018 and continued when LIPI implemented The FishCollab Toolkit in 2018-2019. The research process was carried out qualitatively through participant observation, in-depth interviews, and community, local government and NGO discussions, especially with those who act as local ‘champions’ in fisheries management [11]. One researcher, accompanied by two assistants (local women), stayed in one of the villages to conduct participant observation for two weeks, and then moved to do observation in the other village.

2. Concepts and types of fisheries conflict
As the intensity and frequency of conflicts increases in various parts of the world, scholars have developed a number of concepts and typologies of conflict related to coastal and fisheries management. Bernauer et al. [6] divide opinions about the nature of conflict into two poles, namely neo-Malthusian versus cornucopian. The neo-Malthusian group claims that environmental changes that cause resource scarcity are the cause of conflict. Homer-Dixon [2] for instance argues that decreasing access to renewable resources increases frustration, which in turn creates grievances against the state, weakens the state and civil society and increases the opportunity for instigating an insurrection. He identifies three types of environmental scarcity: (1) supply induced scarcity, i.e. reduced availability of renewable resources due to consumption and degradation that develops faster than regeneration processes; (2) demand induced scarcity, which is a consequence of population growth and/or increased consumption per capita; and (3) structural scarcity caused by an unequal distribution of access to natural resources [2].

Bernauer et al. [6] consider cornucopians an optimistic group. They contrast with the pessimistic neo-Malthusian view. They acknowledge that environmental changes may periodically put human well-being at risk, but they also claim that humans are and will continue to be able to adapt to resource scarcities either through market mechanisms, technological innovations, social institutions for resource allocation or any combination thereof.

Warner et al. [12] identify four issues that may explain the emergence of conflict: (1) Demographic change (a sharp influx of newcomers into a community); (2) Natural resource competition (increased dependence on natural resources which increases competition for space and resources); (3) Developmental pressures (as government policy switches from livelihood protection to food production); and (4) Structural injustices (changes in legislation that deny or severely restrict access to resources by dependent groups of society).
Meanwhile, Charles [13] organizes the wide range of fisheries conflicts into four interrelated categories: (1) Fishery jurisdiction (conflicts over who owns and controls access to what, the optimal form of management and the role of government in the fishing system); (2) Management mechanisms (conflicts over how policies are carried out, often short-term conflicts over harvest levels, enforcement and the consultative process); (3) Internal allocation (conflicts resulting from how different fishery stakeholders interact); and (4) External allocation (conflicts resulting from how fishery groups and ‘outside’ activities interact).

By revising the typology of Charles, Bennet et al. [10] added another type to make five, namely: (1) Who controls the fishery e.g. access issues on who among the fishers can fish; (2) How the fishery is controlled e.g. enforcement issues, quota allocation issues, co-management issues; (3) Relations between fishery users e.g. issues between different groups (linguistic, religious, ethnic) and issues between different scales of users (artisanal, semi-industrial); (4) Relations between fishers and other users of the aquatic environment e.g. issues with tourism, conservation and industrial development; and (5) Relationship between fishers and non-fishery issues e.g. issues with tourism, conservation and industrial development. Bennett et al. [10] concluded that institutional failure was a factor in fisheries conflicts. These failures included both informal institutions such as markets, communities and social capital (i.e., a set of de facto rules or norms that govern behavior and shape society) and formal institutions such as the state, the judiciary, the political system (i.e., a set of de jure rules enshrined in regulations and constitutions that govern behavior and shape society). The degree and success of conflict management are largely dictated by institutional capacity, and the ability of the formal and informal institutions to withstand and adapt to change. Ross et al. [14] meanwhile consider conflict as related to multiple types of misalignment among communities, and between communities and government.

Furthermore, Pomeroy et al. [1] identified five types of fisheries-related conflicts, with key associated drivers: (1) Violence between fishers operating at the same scale (shared, limited fishing grounds; scale-specific fishing restrictions; legal and illegal/destructive fishing techniques used in proximity; coastal crowding; human population growth; poverty; lack of participation); (2) Violence among fishers operating at different scales (overlapping fishing grounds; fishing gear conflicts; overcapacity; increasing seafood demand by consumers; globalized markets and trade; weak enforcement); (3) Maritime crime, including trafficking, smuggling, piracy, kidnapping and ransom, and illegal, unreported and unregulated (IUU) fishing (related to poverty; limited livelihood options; overfishing; food insecurity; wealth disparities; corruption); (4) Armed conflict, including civil war, inter-state conflict, insurgency, and terrorism (political marginalization; poverty; limited livelihood options; overfishing; food insecurity; wealth disparities; political instability; and (5) Civil unrest, including food insecurity; religious, racial and ethnic diversity; livelihood and economic insecurity; political instability.

3. What is the FishCollab ‘conflict mapping’ toolkit?
Before explaining the FishCollab ‘conflict mapping’ tool, we will first explain the FishCollab toolkit of which it forms part [15].

3.1. The FishCollab toolkit
The FishCollab toolkit is a participatory diagnostic tool designed to assist governments, communities and non-government organizations (NGOs) in identifying opportunities, challenges, and management options to achieve sustainable coastal management and sustainable livelihoods. By using the toolkit, various parties who are interdependent with each other can collaborate to achieve coastal governance and management.

The use of the term 'participatory diagnosis' is certainly not new, there have been many previous studies that have used it, especially in development studies that use variants of participatory rural appraisal. Besides being used in the context of agriculture, veterinary work and epidemiology, this term has been used in studies related to inland fisheries in Niger [16], Nigeria and Mali [17], and in
Indonesia, the Solomon Islands, Tanzania, and the Philippines [18]. Building on previous approaches, we innovated by combining the participatory processes focused on community discussion with participant observation methods to get complete information and stronger verification. We also added a number of components that did not exist in previous versions of participatory diagnosis, including conflict analysis.

The FishCollab Toolkit uses the image of a fish. It consists of three main parts, namely (1) the head: representing the direction, a collaborative and adaptive management plan; (2) the tail: representing driving and steering from an adaptive coastal (fisheries) governance and management perspective; (3) the backbone: the participatory diagnosis procedures of meetings, participant observation, and learning activities; and (4) the fish bones: components that contribute to the participatory diagnosis (see Figure 1). Section four, the 'bones' of the fish present several components which are available for use as part of the participatory diagnosis procedure, as required. Users may adapt and combine these as they wish, and add others. Some are essential or recommended, others are optional. Following the objectives, this paper focuses on explaining the use of the conflict analysis ‘bone’.

Figure 1. Fishbone representation of participatory diagnosis tool [15].

3.2. The FishCollab ‘conflict mapping’ toolkit
The FishCollab ‘conflict mapping’ toolkit is based on the conflict mapping framework developed by Australia’s Conflict Resolution Network [19]. The idea of the original conflict mapping tool is to identify the needs and concerns of each stakeholder concerning an issue, then to gather information on common interests and points of possible negotiation. It relates to principles of negotiation [20] which recommend looking at conflict in new ways.

1. First, all parties must respect each other. They should focus on maintaining a positive mutual relationship and consider themselves as joint problem solvers rather than antagonists [20]. The assumption is that all parties feel uncomfortable with the conflict, and they want resolution.

2. While the parties to a conflict may state conflicting ‘positions’, it is important to explore the needs underlying those positions. They may open up common ground. Similarly, it is important to explore each party’s concerns: what do they fear happening?
3. After identifying the basic needs and concerns behind the conflict, the parties can try to identify new options that (ideally) present mutual benefits while also meeting the basic needs of all parties so far as possible.

4. If at this stage there is still no solution, all parties can agree to seek and abide by advice from independent experts. They need to agree on the types of evidence and advice they would be willing to accept. For example, they can agree on fishing rules, which could include types of fish caught, fishing gear, and times for fishing, or on asking for scientific supervision.

5. If, all parties still find no agreement, each party can assess their best alternative to a negotiated solution. They need to think about the negative effects they will feel if the conflict continues. Is it better to continue efforts to resolve the conflict or withdraw and continue to live with the conflict situation? They will often decide based on their basic needs, such as to ensure the sustainability of livelihood, territorial integrity, and/or maintaining their traditions.

Figure 2. The FishCollab mapping toolkit [15].
When the conflict between the two villages had reached an impasse, and two levels of government had failed to facilitate or adjudicate the conflict, our team was invited to analyse the conflict to try to help the parties to find ways forward. We created a conflict mapping tool, based on the five stages above [19] and the foundations laid by the Conflict Resolution Network [18]. It is represented by a circular diagram in which the central circle delineates the main issue (see Figure 2). There are segments for each of the parties, those directly in conflict and those who can affect or be affected by it. This includes regulatory authorities. For each party, we identified their differences in context, their strengths (an idea influenced by strengths-based psychology and resilience), their needs and concerns. The intention is that comparing all these parts can enlighten mutual understanding and respect, and help to find ‘win-win’ opportunities for new solutions. The steps are:

- Write down the central issue of the conflict as clearly and concisely as possible. Lack of clarity or error in describing the main issue can shift the identification of stakeholders that must be involved.
- Identify all stakeholders or parties related to the issue, not only those directly involved in the conflict, but also the rules/policymakers, neighbours, and anyone who can influence or be affected by the conflict. Write the name of each on one segment of the diagram. The number of segments can be increased according to the number of parties involved.
- Consider each of the parties’ contexts, their strengths, their underlying needs, and their concerns or fears. Concerns and needs may represent the same, or different things.

4. Mapping and resolving fisheries conflict in Selayar, Indonesia

Following the instructions above (as can be seen in Figure 2), the first step taken was to write ‘conflict over fishing gear and locations’ as the problem, then to list the parties to the conflict. Some of those we identified are (1) 'Our case village', (2) the fishers of the neighbouring village (who were directly in the dispute), (3) the non-fishers of the neighbouring village (who did not necessarily support the practices of their fishers), (3) other communities and villages nearby, (4) the subdistrict administration, (5) the district fisheries office, (6) the Bupati (head of district government, equivalent to a mayor), (7) the provincial fisheries office (now responsible for fisheries in Indonesia’s inshore waters), and (8) the police and (9) the military (these share the responsibility for coastal surveillance of inshore waters in Indonesia).

Our full indicative analysis of one fisheries conflict case in Selayar, Indonesia can be seen in Figure 3. Please note that the analysis was conducted by researchers based on our field research: this process was not participatory, but could have been made so. We were in a position to offer detailed analysis for two of the segments: the case village and the fishers of the neighbouring village based on all of our data. Other segments were filled out according to information arising from our study of the conflict, but is not necessarily complete. Some examples of important points in the analysis are described below.

**Contexts**

- **Case village:** has a strong village government, strong local traditions/wisdom, long east and west coastlines which enable fishing in both monsoon seasons, economic diversification: micro-enterprises, and a marine surveillance system but with limited capacity.
- **Neighbouring village (fishers):** has a short coastline on the west coast only, which limits fishing to one season. The desire to exploit resources is stronger here, it was once a destructive fishing centre.
- **Neighbouring village (non-fishers):** has strong ties between fishers and others in the community. Most are farmers with limited land, and the few fishers provide access to fish, through sharing traditions, sales, and barter for farm goods. This village is connected to the case village community through intermarriage, giving an incentive to restore good relationships.
**Strengths**

- Case village: local wisdom supported by the village government, a strong desire for conservation, willing to coordinate and collaborate with the other village provided their fishery resources were not threatened.
- Neighbouring village (fishers): innovative (adopting alternative fishing gears)
- Neighbouring village (non-fishers): close relationship between the villages.

**Needs**

- Case village: ecosystem protection, livelihood sustainability, to maintain local wisdom.
- Neighbouring village (fishers): access to other villages’ waters.
- Neighbouring village (non-fishers): sustainable livelihoods, food security.

**Concerns**

- Case village: loss control over management, ethics and justice, maintaining relationships with neighbouring villagers, the pressure to adopt managing fishing gear.
- Neighbouring village (fishers): limited knowledge of sustainable fishing practices, legal protection, maintaining relationship with other villagers.
- Neighbouring village (non-fishers): fish ability, maintaining relationships with other villages, limited land resources.

In addition to the two villages in direct conflict, other parties also wanted this conflict resolved because of its impact on them. Governments at the higher levels become involved in finding solutions. First, the head of the sub-district (Camat), assisted by the police chief (Kapolsek) and the military chief at the sub-district level (Danramil), tried to adjudicate. They ruled in favour of the case village, but the other village was not satisfied with this ‘win-lose’ solution and sought to have the decision overturned. The head of district (Bupati) and district offices were then invited to become involved. The district fisheries office was in a very difficult position because on the one hand, it wanted to encourage sustainable fisheries, but on the other hand had to recommend a decision based on the law (as they saw it), that conflicted with the goal of sustainability. The police and military, as the fisheries enforcement organisations, are in a position to uphold official state laws and regulations. Other villages also observed the development of the conflict. They also experienced incursions from the fishers of the neighbouring and other villages, and wanted to protect their waters and fishing resources from outside fishing groups that do not fish in an environmentally friendly way. What happened was in accordance with Cornelius and Faire [20] who suggest recognizing a conflict early so as to address it before it escalates.
Figure 3. The full analysis of the FishCollab mapping toolkit [15].

What happened next

After taking into account the opinions of various parties, and his staff’s interpretation of the legislation, the Bupati (i.e. mayor) of the district government issued a decision that could not only apply to the two conflicting villages, but for the sake of consistency had to apply to all coastal villages in the Selayar islands. This was to permit the types of destructive fishing gear used by the ‘neighbouring’ village, everywhere. With the Bupati’s decision, the case village’s opportunities for further appeal or protest were exhausted. They looked for other possibilities and opportunities that remained within their control. With the help of another ‘bone’ of FishCollab, policy analysis, they diagnosed that they had lost because of official government rules that did not support them in their efforts and customary law towards sustainable fishing. Next, they considered that the best way to continue to prohibit the use of devices deemed destructive in their territory was to formalizing these local wisdom rules into a village regulation - an official rule compiled by the village representative body and authorized by the village government. As a result, on 28 December 2017, the case village government and village representative body endorsed Village Regulation No 4/2017 on Coastal Resources Management in Bungaiya Village, which among other matters regulates a ban on the use of
fishing gear that is not environmentally friendly.

Although the conflict has not been completely resolved, a number of important new initiatives have resulted, especially the issuance of the village regulation. With this regulation in place, the neighbouring village fishermen are more concerned and cautious when fishing in the waters of the case village. Other villages also became inspired to make village regulations that could protect their fisheries and other coastal resources. In fact, to support this spirit, the Bupati issued a new circular in mid-2018 suggesting that all coastal village governments make similar village regulations to maintain the sustainability of coastal resources and livelihoods while avoiding conflict over fisheries.

5. Discussion and conclusions

Referring to various kinds of literature, The fisheries conflicts that occurred between the fishers in two different villages on Selayar have similarities with concepts and the types of conflicts that have been formulated identified by other scholars. In terms of the issues that generate the conflict, at least there are similarities with Warner's concept [12] recognition of: (1) demographic change and (2) natural resources competition. Judging from Following Charles's concept analysis, the conflict is the result of a combination of four things: (1) fishery jurisdiction, (2) management mechanisms, (3) internal allocation, and (4) external allocation. In more detail, the conflicts that occur fall into Bannet's conflict type 2 (how the fishery is controlled) and type 3 (relations between fishery users). It is also consistent with Pomeroy's observation about the conflict between fishers operating at the same scale.

From an institutional standpoint, the conflict also supports Bennet's [10] argument that institutional issues, both formal and informal, are important keys to conflict. In terms of formal institutions, for example, inconsistencies in the rule of law, governance, and management of fisheries/coastal resources, and program implementation in Indonesia, contributed to the conflict. The conflict occurred and escalated across a time when the national government was in the process of shifting the authority for managing coastal resources from District to Provincial Governments. The legislation to do so had been passed, but the implementation and staff had not yet begun. This shift in authority seriously disrupted longstanding formal institutions, and created complexities such as that while provincial government was given authority over marine resources, district government retained responsibility to work with and develop the villages where the fishers live. The provincial government was assigned by law to carry out coastal management, but has not been able to do so owing to capacity and implementation gaps. As a result, at that time, it could be said that the formal institutions of the state in coastal management were paralyzed, other than the continuing possibility of village regulations issued by each village government. Moreover, Law No. 6 of 2014 about Village Government further strengthens the autonomy of village resource management, at least in principle.

The main problem with the level of village autonomy is that some village regulations are made with strong biases towards the interests of their villages, without sufficient consideration of the interests of other villages. In the conflict analysed here, it could be said that this was one of the main triggers. The case village assumed that the diminishing fisheries resources in its waters are caused by over-fishing and destructive fishing by the fishers of the neighbouring village. This agrees with the findings of Yamazakia [7], who said that scarcity of resources would strengthen social ties among fishers in one village to maintain its sustainability, including restricting access by fishers from outside the village. This certainly can increase conflict with the fishers from other villages.

Our experience of using the FishCollab 'conflict mapping' tool shows the comprehensive process of mapping and seeking solutions to the conflict. Starting with the five principles that must be fulfilled in this process, the conflict mapping tool is equipped with diagrams that help all parties in mapping conflict, starting from identifying the main issues, then identifying all parties and stakeholders concerned, including their contexts, strengths, needs, and concerns. When this information is successfully mapped, the opportunity to find 'win-win' solutions for all parties is increased.

Conflict analysis is very meaningful for making collaborative and adaptive management plans and their implementation, both in Selayar and in other areas, especially those that have similar conditions and needs. Conflict analysis (or analysis of potential friction that has not yet erupted in conflict),
together with policy alignment, and comparison and integration of forms of knowledge, are three areas that are useful for seeking strong alignments between communities and the various levels of government, and across communities [14]. In the Selayar context, integration of conflict analysis with the seven other 'bone' components in the FishCollab toolkit resulted in an idea of creating marine protected areas crossing village waters and involving fishers in both village and other neighbouring villages, and all stakeholders who have an interest in achieving sustainable livelihoods.

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