Blast Fishing Activity and Coping Strategies in Indonesia (South Nias and Pohuwato Regency)

Rina F. Saragih a*, Gregory Trencher b

a Civil Service Agency of Simalungun Local Government, North Sumatera, Indonesia
b Graduate School of Environmental Studies, Tohoku University, Japan

ABSTRACT

Indonesia is one such country that has not yet been successful with strategies of the government to cope with the blast fishing problem. In the existing literature, many scholars tend to study the impact of blast fishing activity from a social and ecological perspective, and few works focus on examining the governance arrangements in place to tackle blast fishing, the effectiveness of these, and how they might be improved. This research uses the case of South Nias and Pohuwato Regency in Indonesia to understand and analyses the factors affecting the outcomes of governance measures to cope with blast fishing. Findings revealed that the blast fishing situation is less improved in South Nias but significantly reduced in Pohuwato. The existing strategies in South Nias have not succeeded in eradicating the blast fishing activity of because of the lack budget and resources for implementing preventative actions. In contrast, in Pohuwato, the involvement of resource users, the co-ordination of government institutions, sharing of resources between the authorities and the community appear to be the main factors that have contributed to more effective governance measures and a decline in blast fishing activity.

Keywords: Indonesia, blast fishing, governance, coping measures, common-pool resources (CPRs), fisheries, management

INTISARI

Indonesia merupakan salah satu negara yang belum berhasil mengatasi masalah bom ikan melalui strategi-strategi yang dilakukan pemerintah. Berdasarkan literatur yang ada, banyak riset cenderung meneliti dampak dari aktivitas bom ikan dari perspektif sosial ekologis dan hanya sedikit fokus pada analisa efektivitas tata kelola pemerintah dan cara memperbaikinya. Penelitian ini mengambil contoh kasus di Kabupaten Nias Selatan dan Pohuwato untuk memahami dan menganalisa faktor-faktor yang mempengaruhi strategi pemerintah mengatasi bom ikan. Hasil penelitian menunjukkan bahwa situasi bom ikan di Nias Selatan belum banyak berubah dan sebaliknya di Pohuwato. Minim dana dan sumberdaya menjadi faktor penghambat strategi pemerintah di Nias Selatan. Sebaliknya, keterlibatan masyarakat, koordinasi beberapa instansi pemerintah, berbagi sumberdaya antar pemerintah dan masyarakat merupakan faktor utama pendukung efektivitas tata kelola penanganan bom ikan di Pohuwato.

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1. Introduction

Anthropogenic threats such as illegal hunting of elephant ivory, rhino’s horn, and other illegal or destructive harvesting of animal species is threatening the survival and diversity of natural resources (Kyando, Ikanda, & Raskraft 2017; O’Donoghue & Rutz 2016; Shimada, 2015). This activity occurs globally and mostly occurs in developing countries that have ineffective governance systems for managing natural resources (Kidgehesho, 2016; Rubio, Webb, & Inhofe, 2012). This harmful activity will happen continuously if the government does not deal with it seriously and take preventative actions. Thus, a determination to tackle root causes and effective governance efforts are needed to combat illegal harvesting for preservation and sustainability of natural resources.

Whether legal or illegal, activities pertaining to the destructive harvesting of animal species will often take place in natural eco-systems which can be conceived as Common-Pool Resources (CPRs). CPRs are natural resources with an open access (Saijo, Feng & Kobayashi, 2017) that are constantly changing and dynamically active over time (Foley & McCay, 2014). Since a great number of people share these pools to extract various resources (Rudestam, Langridge & Brown, 2015), shared use can lead to over exploitation. In CPRs, it is essential that a governance system is in place to avoid losses due to over-exploitation or illegal activities. Emphasizing the link between human and natural systems, Ostrom (1990) developed a framework (i.e. the so-called social-ecological (SES) framework) based on various empirical studies to identify the principles and variables of effective resource governance. This framework has helped many scholars to evaluate from a social-ecological perspective various governance system in fisheries management (Aguilera 2018; Cole, Epstein & Mcginnis, 2019) forest governance (Lopez & Moran, 2016) poaching problems (Nulti & Muchaponsdwa, 2018; Obour et al., 2018) and sustainable natural resources management.

One of the illegal activities that are still faced globally is blast fishing. Poverty (Munyi, 2009) is cited as one of the main reasons why some people did blast fishing. Blast fishing is a destructive fish harvesting by using bomb/ explosion material to get more fish, more rapidly, and with lesser efforts than regular fishing methods (Chan & Hodgson, 2017; England, 2014). Bombs are usually made with readily available materials such as fertilizer (ammonium or potassium nitrate) mixed with fuel (Chan & Hodgson 2017), phosphor, urea (Sitorus & Tarigan, 2009) and drinking bottles. Although illegal around the world, this activity continues because of a lack of effective coping strategies from the government (Slade & Kalangae, 2015). Blast fishing practices are particularly common in tropical areas in developing countries. Fishers here will often target schooling reef fish living in the high diversity of coral species in countries (Chan & Hodgson, 2017; England 2014; Munyi, 2009) which cannot enforce fishing legislation effectively (Katikiro & Mahenge, 2016).

In terms of environmental impacts, blast fishing activity is a severe problem. A shock wave from a detonated bomb can potentially damage many square meters of coral reef (Nurdin et al., 2016; Slade & Kalangae, 2015). This is problematic because coral organisms grow so slow and it can often take up to roughly 50 years for restoration (Bowden-Kerby, 2003). The damaged reefs will no longer provide its functions as a feeding ground and shelter for the organisms and it will also lose its protective role for the coastal area (Chan & Hodgson, 2017). In addition to environmental harm, this destructive practice also causes socio-economic damage (Brooke & Ross, 2014; Munyi 2009; Pet-Soede, Cesar & Pet, 1999). The damaged coral will reduce the future fish catches which limit the income for next generations and thus exacerbates poverty (and in some cases reduces access to cheap protein). Thus, while blast fishing brings an instant financial reward for the perpetrators, this is once-off only. Conversely, blast fishing will leave long-term environmental, economic, and social losses.

Indonesia, as a developing country has been experiencing blast fishing activity until now. This destructive fishing has been known since the 1900s (Pet-Soede et al., 1999) and is widespread in many coastal areas. This fishing practice is illegal as several regulations prohibit the ownership of the explosive material for fishing. The government in many coastal regions has made coping strategies to tackle this problem. Despite this, these government measures, on the whole, are not successful yet curtailing the blast fishing problem. In addition, many governments are not taking any action to tackle this problem. As a result, blast fishing is an unresolved problem in Indonesia. Briggs (2006) argues that blast fishing practices are threatening more than half the coral reefs in Indonesia and resulting in economic loss of around 170 million US dollars per year.

What actions have to be taken in preventing such illegal activities? Not only the government, the local people—as the resource users—have to contribute to preventing widespread destruction of ecosystems. The involvement of many stakeholders (i.e. multi-actor governance) is needed for effective resource governance (Raycraft, 2018; Williams et al., 2019). Coordination and collaboration between the government, private sector, and resource users in resource governance are required in governing the natural resources effectively (York & Schoon 2011). The engagement of stakeholders and coordination of different actors is required to increase the synergy of all governance actors and make blast fishing coping strategies more effective. Institutions play a role in regulating and controlling individual behaviour in
society or organizations (Nursidah et al., 2012). Thus, the collaborations of institutions and resource users determine the success of overcoming a problem particularly in natural resources management.

There is some limited scholarship on blast fishing. In global, blast fishing is a challenge for many researchers and government to stop it out. Combatting these destructive activities are crucial for sustainable marine services (Raycraft, 2018). Understanding what factors are hampering coping measures for blast fishing is critical for policymaking in governing the natural resources and preventing the continuing blast fishing activity.

In many of blast fishing study works of literature, social-economics, law implementation, and environmental aspects are common to be researched. The impact of this destructive fishing gets more to the attention of scholars. For example, in social-economic aspects some literature study the importance of determining the causes and effects (Munyi, 2009), costs and benefits (Pet-Soede et al., 1999) of these illegal activities to the society. Further, other literatures focus on in environmental damaged that affects the social system (Briggs, 2006; England, 2014; Fox & Caldwell, 2006; Russell & Fabinyi, 2012; Sawall et al., 2013; Williams et al., 2019) and the idea of providing the alternative governance strategies (Chan & Hodgson, 2017; Raycraft, 2018). However, little is known about what factors are causing the ineffectiveness of existing governance strategies to form an effective solution against blast fishing problems. So, there has not been a significant change to the current approach being worked out by governance actors to overcome the problem. Thus, it is essential to analyse the inhibiting factors of the existing strategies so that governance is effective.

To fill this gap in knowledge, this study uses the case of two marine regions in Indonesia to understand the factors affecting the outcomes of governance measures to cope with blast fishing. Research questions are (a) who are the resource governance members and what coping measures are in place to tackle blast fishing activity?; (b) what are the positive and negative factors affecting these existing coping measures? What should be done to improve them?

The overall research design is a twin and comparative case study of South Nias and Pohuwato. This study utilized a qualitative research method and obtained data from interviewing key informants in both cases as well as from document analysis. The results of both cases are compared with an analytical framework to identify the factors that are hampering the governance measures in both cases.

As a result, this study was able to identify the factors that explain the differing effectiveness of the blast fishing coping strategies in the two case studies. Based on these, it makes a series of policy recommendations that could improve the effectiveness of governance strategies in the two case study areas (South Nias and Pohuwato) as well as elsewhere in Indonesia or the world. This knowledge would help improve the sustainable management of marine resources, particularly in developing countries that have ineffective fisheries governance.

2. Theory

The marine ecosystem can be conceived as a Common Pool of Resources (CPRs) or a public good, which is utilized together by everyone. Since CPRs are used collectively, they are vulnerable to over-exploitation. According to McKean in Nursidah et al., (2012) there are two different opinions on how to manage CPRs in order to avoid over-exploitation and destruction of the common resources. The first one is privatization under the supervision of government control. Privatization is giving authority to the private sector (non-government) to manage resources. This authority remains overseen by the government to reduce conflicts between users. (Foley & McCay, 2014). The second is managing the resources by involving the community resource users. This is commonly stated as self-governance (Van Laerhoven & Barnes, 2014).

In governing the CPRs, Ostrom (1990) criticized Hardin’s theory (Lopez & Moran, 2016) about the “Tragedy of the Commons” (Hardin, 1968). She claimed that unmanaged resources could be dealt with appropriate governance. Ostrom proposed a framework called Common Based Natural Resources Management with eight design principles to successfully manage CPRs. These principles are based on empirical studies of various local-scale CPRs with management systems in place. The principles are used to examine the governance performance indicators based on social-ecological point of view in the goal of providing a framework to show the necessary ingredients for sustainable resource governance. Those principles are (a) clearly defined boundaries; (b) congruence between appropriation and provision rules and local condition; (c) collective-choice arrangements; (d) monitoring; (e) graduated sanctions; (f) conflict-resolution mechanisms; (g) minimal recognition of rights to organize; (8) nested enterprises.

Ostrom’s framework has assisted many scholars in various disciplinary backgrounds to analyse self-organized systems of resource governance such as forest governance (Oberlack & Schmerbeck, 2013) water management (Milupi, Somers, & Ferguson, 2017) fisheries/marine governance (Aguilera, 2018), poaching in wildlife conservation (Ntuli & Muchapondwa, 2018) and another governance strategies for managing CPRs. But, in if applying this framework to the case of blast fishing in a country like Indonesia, Ostrom’s framework has many limitations. First, some of the eight design principles do not have relevance from the perspective of
marine CPRs in developing countries. For example, in the principle of “clearly defined boundaries”, the marine ecosystem is an open resource. No limitation can or cannot subtract the benefit of resources. Furthermore, for the category of “collective-choice arrangements”, in Indonesia’s case the government authorities are entirely in charge of providing or modifying the operational rules and do not involve the resource users. Those principles are suited to examine a privatization resource governance in charge of providing or modifying the operational rules and are not suitable for developing countries, which have limited human resources and funding for managing natural resources, especially in the case of blast fishing problems in Indonesia.

Table 1 Analytical framework of Principles for Effective Governance

| Principles & Indicators | Key studies |
|-------------------------|-------------|
| 1. Level of awareness/willingness | Steg & Vlek (1997) |
| a. Do the governance actors have a deep understanding of the current state of conditions and problems in the fishing resources and are they motivated to improve this situation? | Iizuka (2000) |
| b. Are there any actions (programs, activities, policies) from the governance actors to overcome the situation and are these frequently implemented? | O’Donoghue and Rutz (2016) |
| 2. Depth of measures | Nelms (2007) |
| a. Do the various government authorities possess knowledge on the root causes such as the main actors involved and the bomb material supply chain? | Halperin et al. (2019) |
| b. Have the government authorities taken actions to tackle these factors? | Pomeroy and Berkes (1997) |
| 3. Involvement of community users | Watson (2013) |
| a. Are the government authorities collaborating with the local resource users, and are there actions programs in place to drive this? | Arsyad and Sodiq (2014) |
| 4. Co-ordination of government institutions | Berkes (2007) |
| a. Is the government collaborating with other vertical (national, local) and horizontal (across the same level) institutions and are there actions programs in place to drive this? | Ansel & Gash (2008) |
| 5. Clarification of roles and responsibilities | Teck et al. (2014) |
| a. Do each of the governance actors involved have a clearly defined role and responsibility? | Mackenie, Vad and Macpherson (2018) |
| b. | Heucher (2019) |

Due to these reasons, this study has created an its own analytical framework by incorporating a wider body of literature (Table 1). This new framework called “Principles for Effective Governance” aims to provide a structured way to understand and compare the characteristics of governance measures for coping with blast fishing (and destructive or illegal fishing activities) as well as identifying strengths and weaknesses in these. This framework is designed for blast fishing cases but could be used for examining governance strategies for tackling other kinds of illegal activities in CPRs. It is based on literature in fisheries governance (Aguiler, 2018; Arsyad & Sodiq, 2014; Chan & Hodgson, 2017; Pet-Soede et al., 1999); illegal harvesting—especially in poaching (Challender & MacMillan, 2014; Critchlow et al., 2017; Kahler, Roloff, & Gore, 2013; Ntuli & Muchapondwa, 2018) and blast fishing (England 2014; Katikiro & Mahenge, 2016; Slade & Kalangahe, 2015; Williams et al., 2019) and self-organized or co-management program in managing the CPRs (Heber Dunning, 2015; Van Laerhoven & Barnes, 2014; Al Mamun, Brook, & Dyck, 2016). The Principles for Effective Governance framework consists of both principles and indicators. Principles are broad factors or pre-conditions that are needed in governing marine resources problems (especially blast fishing). Indicators consist of specific questions that evaluate whether these
principles actually exist in the examined governance system.

3. Research Method

3.1 Study Design and Approach

This study used twin (comparative) cases to understand and explain how the governance actors’ actions are influencing the effectiveness of the governance measures in place to cope with blast fishing activity. To evaluate the differing governance systems in each case study, I developed an analytical framework from a broad review of literature based on CPRs management (fisheries, forest and water), illegal activities in wildlife (poaching, smuggling) and governance systems (co-management, self-organizing). These various works of literature were examined to identify the principles and indicators that demonstrate the presence of attributes that positively effect successful outcomes in fisheries governance, particularly in terms of coping with illegal and destructive blast fishing.

3.2 Case Study Selection

Two coastal regencies were chosen as case study locations: a) South Nias (in North Sumatera Province in Sumatera Island) and b) Pohuwato (in Gorontalo Province in Sulawesi Island) in Indonesia. Both regions are island and coastal areas where blast fishing activities are continuing. However, the coping measures in each case study are different, and so are the effectiveness of these. Pohuwato was chosen as an example of a case with relatively effective measures in place to cope with blast fishing. This governance measures in this case study are widely regarded as effective. For example, they were appraised by a national newspaper in 2018 (Azhar, 2018) for its success in coping illegal fishing in Gorontalo Province. In contrast to Pohuwato, South Nias was chosen as an example of less effective governance measures. This combination of case studies allows the easy identification of the particular factors affecting the effectiveness of coping strategies in each location. In addition, as an archipelagic country with so many islands, South Nias and Pohuwato are appropriate for representing the poor and good centralized fisheries governance system Indonesia.

3.3 Data collection and analysis

Data was collected via (i) site visits, (ii) document analysis, and (iii) interviews with key informants. Regarding site visits, in total four weeks were spent in the field locations to collect data using a qualitative, descriptive method. As for document analysis, data was collected in the form of documents such as the annual reports of fishing catches as obtained from officials in government authorities during site visits. Data was also collected and assessed from a publicly available database relating fishing industry such as statistical agency, provincial and national fisheries websites. To supplement this secondary data, primary data was obtained from interviews. Informants were selected because they were active in or associated with either fishing activities or management strategies for these. A total of 48 informants were interviewed. They include full-time fishers, non-fisher, and government officials (district office, local/provincial fisheries department, navy, and water police). They were selected to provide a variety of perspectives regarding the blast fishing situation. The participants were interviewed using semi-structured interviews in both case studies. During interviews, the statements of informants were recorded on a mobile phone. In addition, interviews were also conducted over the phone and text messages. All interview recordings were transcribed into written form to closer analysis.

Data from interviews was analysed using an Excel sheet. This was divided into categories (e.g. fisher, non-fisher etc.) into which statements from interviews were inserted that corresponded with the research questions and analytical framework. When citing interview statements in the findings, the informants are coded based on their region and professions.

4. Results and Discussion

4.1 Part 1: Analysis of actors and roles in governance measures

4.1.1 Case One: Governance measures in South Nias and evaluation of outcomes

The principle governance actors in South Nias are the government authorities such as the navy, water police, and local/provincial fisheries department. Importantly, the local resource users are not involved in the formal measures to cope with the blast fishing problems. Overall, there appears to be a lack of concrete measures to tackle blast fishing as government authorities were observed to be carrying out only two key roles (i) monitoring and (ii) educating the local fishers.

In general, navy and water police have a routine patrol to supervise the marine territory to ensure safety at sea. They do patrol the duty to make sure no illegal activities such as smuggling of narcotics, human trafficking, and destructive fishing practices. Meanwhile, the local and provincial fisheries department focus on managerial of the fishing industry. Aside from organizing the fisheries management and educate the fishers about IUU Fishing, the institution that in charge to do monitoring is the provincial fisheries department.

Despite these limited roles, the government authorities are experiencing many problems in doing their tasks well. SN-O7 (interviewed July 6th 2018), as the provincial department officer, stated it was difficult to
implement monitoring when there are large areas to control, especially in South Nias. The role of the provincial government is minimal, considering that South Nias is an archipelago located far from the centre of the provincial government. Even though there is a provincial branch office representative in South Nias, coordination is lacking due to limited transportation access and communication systems (network access) limitations. SN-O5 (Interviewed April 10th 2019) added the limited operational budget hampers not only the monitoring program but also the education program. They combined the educating program with another occasion like socializing IUU Fishing when they distribute the certificate of fisher. This certificate as the identity of a profession as fishers that guarantee them to fish legally.

The difficulties in implementing their role in supervising marine resources also faced by navy and water police. Several officers (SN-O2, SN-O3, SN-O4; Interviewed April 12th 2019) argued the lack of operational budget, human resources, and boat are the problems hinder them from doing more in reducing blast fishing activity. In blast fishing problems, the authorities have got complete evidence to arrest the perpetrators on the spot. The authorities cannot arrest the blasting fishers only by reports without authentic pieces of evidence (i.e. a blast fisher must be seen to be committing blast fishing on the sea). This situation became worse when the perpetrators were good on tricking the authorities and have a faster boat than officials have.

The strategies from the authorities not yet succeed in eliminating blast fishing in South Nias. This said, the government officials feel that blast fishing activity has declined in South Nias. For example, SN-O9 argued that the peak of this activity was in the 2000s. He stated:

"but since there are navy and the water police since 4 or 5 years ago here, the situation has changed a bit" (Friday, April 12th 2019: 10.05 AM, source by author’s transcript database).

He mentioned that since the 1990s until 2012, there is no monitoring system in that time. That is why the dynamiters were able to freely carry out blast fishing. Although blast fishing appears to be reduced slightly in the patrolled areas, it simply appears to have also spread to other areas in South Nias. SN-O2 as navy officer confirmed that the spread of fish bombs in South Nias could occur because of the patrolled area small in terms of the overall size of South Nias. The authority to oversee this region consists of several guard posts. Unfortunately, the lack of facilities and human resources are remaining the same. Mostly, blast fishing is committed by fishers from nearby districts. SN-O8 and SN-O9 (Interviewed April 12th 2019) as the bureaucrat in district office explained that although blast fishing no longer exists in the patrolled areas, but it does not mean that it did not happen in other districts in South Nias.

Even though the local fishers are not officially involved in the governance arrangement headed by the government authorities, they have tried taking action. For example, they detained one blast fisher boat and brought them to the coastal area. Then they released the perpetrators and burned the boat. This happened because the officials do not do anything when a report is made about an observed blast fishing activity, so explained SN-NF6 (Interviewed April 10th 2019) an ex-dynamiter. However, actions from the local fishers are also ineffective. When they try to confront the dynamiters, they almost threaten to hurl explosives on the local fishers. SN-NF5 (Interviewed April 10th 2019) that was working as fish distributor stated that he prefers to stay away from the dynamiters. SN-F15 (Interviewed April 14th 2019) added that the dynamiters are like terrorists that are ready to die in doing their task. They even dared to attack officers who had weapons. SN-O5 also explained that family ties also discourage the local fishers from reporting the blast fishers.

4.1.2 Case Two: Governance Measures in Pohuwato and Evaluation of Outcomes

In Pohuwato, more actors are involved. Besides the authorities, local fishers are engaged in the monitoring program for supervising the marine territory. This community-based surveillance is called Pokmaswas. It made the blast fishing improved because there is a broader range of coping strategies in place. Dissimilar with South Nias, Pohuwato region is not an archipelagic area. Coordination between local and provincial fisheries department is not challenging to do. P-O2 (Interviewed April 18th 2019), as provincial fisheries department officer, stated there is synergy between local and provincial fisheries department regarding the program they made. It is specifically about the community empowered program in supervising the marine area. She mentioned that the role of the local community started in 2009 organized by the local fisheries department. In that period, the local government in charge of monitoring the marine area. Since the Law No. 23 of 2014 about local government was established, the responsibility of supervising marine resources mandated to the provincial fisheries department in Indonesia.

Regarding Pokmaswas, 5 to 10 of the local fishers formed in a group in different districts. The groups were approved and supported by the provincial fisheries department. They are given money, fuel, boat, and mobile phone to report the blast fishers in planned or unplanned monitoring. In case they see the blast fishing activity, they will record or film the perpetrators then send it to the water police or provincial fisheries department to be handled.

Interestingly, several institutions have a collaboration in the task force team initiated by the
provincial fisheries department. The partnership consists of navy, water police, judicial and provincial fisheries department and legalized by Gorontalo Provincial government in 2018. This teamwork emulates the central government strategy against IUU Fishing. When the research was conducted, P-O3 (Interviewed April 23rd 2019) confirmed Gorontalo Province was the only in Indonesia to have formed this teamwork at the provincial level. By far, this teamwork has undertaken the education program to the local fishers together. P-O1 (Interviewed February 27th 2019) added they held eight times of education program in socializing IUU Fishing in Gorontalo Province in 2018. Meanwhile, the patrol was conducted by each institution based on its budget. However, the handling of blast fishing cases is still jointly responsible. For example, when the water police and the provincial government get blast fishing reports from the fisher community, they coordinate with each other to have a patrol together. P-O5 Victor (Interviewed May 29th 2019), as a water police officer, confirmed this coordination.

The role and strategies of these governance actors appear to have contributed to a significant decline in the number of blast fishing activities in the past three years. P-O1 stated the number of blast fishing since 2016 is only 2 to 3 cases. It is large drop compare to several decades ago. The recent blast fishing happened 17th April 2019 in Marisa when the officials being busy to succeed national election in Indonesia, added P-O3. They stated:

“it continues, but our strategies in doing monitoring system succeed in declining blast fishing over the years” (Tuesday, April 23rd 2019: 11.16 AM, source by author’s transcript database).

Although the blast fishing decreased in Pohuwato, it doesn’t mean there are no problems hampered their role and strategies in tackling blast fishing. In a collaboration among government institutions, the teamwork seemingly yet has specific goals and mission program, especially in monitoring program together. As P-O5 and P-O6 suggested (Interviewed May 29th 2019), the cooperation might have to clarify the scheduled time or other information regarding the routine patrol of each institution to avoid the overlapped role of authorities.

4.2 Part 2: Comparison of cases via analytical framework of Principles for Effective Governance

4.2.1 Level of Awareness/Willingness

In South Nias, both the resource users and authorities (the latter is the main governance actors) are aware of the seriousness of blast fishing impact. Mostly stated that the impact of this blast fishing is undesirable for their future generation. Some fishers said about their awareness of blast fishing problem mainly because of the fish stocks declining over the years. SN-F11 (Interviewed April 14th 2019) argued, “there was time for us to speak up about this problem (blast fishing). Some fishers agreed to cope with the perpetrators together, but then it did not take long. Fishers here have not been well united to tackle this situation.” Additionally, the authorities have the same concern about this blast fishing situation. The water police (SN-O4) for example stated that they are motivated to tackle the problem. But their ability to take an action is hampered by a lack of facilities such as the incapacity of the boat to catch the blast fishers and so it is not that easy to arrest the dynamiters. To stop them, it needs some evidence on-spot.

In contrast to South Nias, the governance actors in Pohuwato are aware and more motivated to tackle the blast fishing problem. P-F6 (Interviewed April 20th 2019), a fisher in Torosiaje stated the decreased of blast fishing practices in his village not only because there is the increasing of supervising strategies to tackle blast fishing in Pohuwato but also the local users have recognized the negative impact of this destructive fishing for their generation. The similar things acknowledged by authorities in Pohuwato. Their willingness to reduce this blast fishing practice is implemented by supporting the local fishers in supervising the marine territory. Furthermore, P-O3, as the official of the provincial fisheries department said that their initiative formed the collaboration among government institutions, proves the motivation of the authorities in eliminating the blast fishing practices. The result is the governance actor strategies became broader and competent to tackle blast fishing problems.

4.2.2 Depth of Measures

Regarding the continuing blast fishing activity, the local resource users and the authorities in both case locations knew who the main actors support the bomb material supply chain. In South Nias, SN-O5 as an official in fisheries department said the material came from other districts. He argued that it is impossible for the local fishers made the home-made bomb without importing it.

"This exactly made us confused, how come the bomb material got to this area. Whereas in Sibolga (one of the big ports in North Sumatera) the inspection for the boat is a requirement” (Wednesday, April 10th 2019: 10.19 AM, source by author’s transcript database).

SN-O2 added if the local people did not make the orders of bomb materials, there was no chance for it (bomb materials) to get into the area. Several local fishers and non-fishers (SN-F11, SN-F12, SN-NF; interviewed July 7th 2018) argued the involvement of some officials influence the government actors to solve this problem. Regarding this information, the government has not taking an action yet to cut off the supply chain.
In Pohuwato, the authorities are also aware of the root causes of blast fishing and the supply chain for bomb material. The bomb materials came from other districts such as Makassar and South Sulawesi. P-O1 and P-O2 as the official in different institution said the local fishe

rs made the bomb by themselves by using Pupuk Matahari (fertilizer). If someone or communities want to have that fertilizer, they required a legal document because it is not free to be traded. The water police have taken some limited actions to avoid misuse of this fertilizer. P-O5 stated there is other division of water police that responsible for undertaking the inspection inland. The provincial government also did an inspection of the smuggled fertilizer in the border area. Preventing this fertilizer get into Pohuwato is impossible to carry out because apart from fishers there are farmers who need the fertilizer for the crop. Aside from this, there is no specific effort from the government to tackle the misuse of the fertilizer and also tracing the consumers of the fertilizer who made the home-made bomb.

4.2.3 Involvement of Community Users

In terms of the involvement of community users, there are significant differences between South Nias and Pohuwato. In South Nias, local resource users are not involved in the governance system. There is no initiative of the local government to hire them in actions to solve the blast fishing problems. SN-F1 (Interviewed April 13th 2019) mentioned there was a community of local fishers. But the goal of the community was not to tackle the blast fishing problem. Unfortunately, the government did not make use of this community as an action to help protect the coastal area. Finally, the community no longer exist because of the lack of unity and trust between members.

Meanwhile, in Pohuwato, the government engaged the local fishers in supervising the marine area. They are involved via a group community (Pokmaswas) since 2009. This group carries out on-spot reporting regarding blast fishing activity. They record the perpetrators and send this information to the authorities. Several fishers (P-F1, P-F2, P-F6; interviewed April 20th 2019) stated they appreciate the initiative of the government who need their ability to involve in governing the resources. The government needs the local people to report the blast fishing actors as evidence to arrest them. In this principle, Pohuwato is observed to have successfully satisfied these indicators.

4.2.4 Co-ordination of Government Institutions

In South Nias, the authorities who responded to cope with the blast fishing problems did not take co-ordination yet. SN-O1, (Interviewed July 10th 2018) a navy officer, admitted that they need a collaboration program such as joint patrol with the fisheries department to solve the blast fishing problem. The water police, fisheries department, and navy have never carried out some actions together in place to tackle the situation.

Otherwise, in Pohuwato, following the high degree of willingness of the authorities to solve this situation, significant coordination is occurring between institutions. The provincial fisheries department is collaborating with horizontal linkage institutions such as the navy, water police and judicial in a task force team Satgas 83 to combat the illegal activities in the marine area. This collaboration officially formed in 2018 and initiated by the fisheries department. They were making a coordination and shared the information of possible blast fishing activity. Based on P-O5 statement as water police, they often carry out patrols together with provincial fisheries department after they receive some reports about blast fishing occurrences from the local fishers. P-O3, as the official in the fisheries department, said that the involvement of various government institutions in this collaboration reflects a widely shared concern to tackle the continuing blast fishing activity.

4.2.5 Clarification of Roles and Responsibilities

The governance actors in South Nias do not have a clear role and responsibility in coping blast fishing problems. Each of the government agencies does not have a clear coordination regarding their strategies in reducing blast fishing practices. Each of institutions just doing their program based on their own agenda. Because there is no coordination between them, it is difficult to clarify whether there is any unnecessary overlap between their roles and responsibilities. The statement of SN-O1 about the importance to have coordination among other institutions make it clear that there are no clearly defined role and responsibilities between governance actors in South Nias.

Conditions are much different in Pohuwato. The coordination between governance actors, especially the authorities required a clearness of roles and responsibilities. P-O5 and P-O6 as the officials who did routine patrol stated that all the authorities have to clarify their task, especially for monitoring. Usually if they want to do patrol, they have to pretend acting like the regular fishers. They used the small boat and did not wear their officer uniform to fool the blast fishers. The navy officers make use of this trick as well.

“When we want to do patrol, sometimes it is better for us doing it by ourselves. Because if other institutions are also doing the same patrol, it is difficult for us to recognize who are friends or the perpetrators. We need to be cleared who do patrol, when and where,” said P-O5. (Wednesday, May 29th 2019: 13.45 PM, source by author’s transcript database).
P-O4 (Interviewed May 3rd 2018), as the navy officer, stated they always try to make coordination with the relevant institution (water police) in obtaining the effectiveness of routine patrol. That is why they enforce the clearness of each governance actor roles and responsibilities if they decided to run a joint program, added P-O6.

4.2.6 Sharing of Governance Resources

In terms of sharing resources between governance actors, the situation is very different in South Nias and Pohuwato. In South Nias, this principle was not observed because there was no collaboration between authorities and local resource users in coping blast fishing problems. In Pohuwato, however, the local fishers got money, fuel, boat, and mobile phone from the fisheries department. P-F4 (Interviewed April 20th 2018), as the member of community group Pokmaswas, stated the local fisheries department started the assistance since 2009. The local fisheries department gave monthly incentives for operation. He added they use the money buying foods, and the fuel assists their needs to catch further.

After here was the new law number 23 of 2014 in Indonesia, the provincial fisheries department were continuing the program until now. The provincial gave one boat and mobile phone to the community for fishing and reporting the dynamiters. The mobile phone mainly used to record the dynamiters on-spot then send it to the provincial officer or water police to be followed-up. Several local fishers acknowledged this sharing of resources benefit them not only to support them doing fishing but also an honour for them involved as part of governance actors. P-O5 stated the water police also distributed some nets to avoid the local fishers using destructive tools. As a collaboration between governments institutions, the provincial fisheries government, navy and water police did the socialization program to the local fishers. Every institution shared their knowledge and information to the fishers regarding the restriction to use destructive tools for fishing.

4.2.7 Monitoring

In general, in Indonesia, the task of monitoring the marine resources is the responsibility of navy, water police, and provincial fisheries department. Both the navy and water police mainly have the same function in providing security at the ocean. And they work together with the provincial fisheries department in monitoring the illegal fishing activities such as the inspection to the unowned fishing licenses boat and to check the suitability of the boat with the fishing tools. Unfortunately, none of these institutions yet have focused on measuring the damaged coral reef caused by blast fishing activities.

However, in carrying out their basic monitoring tasks, although the government authorities in South Nias claimed they did the routine patrol, they do not possess any report evaluation (information regarding their monitoring program). All of the institutions (fisheries department, navy and water police) did not have a specific report, particularly the information of blast fishing activity. Either, the data of fishing catches in South Nias are only available in 2017. The head of the local fisheries department confirmed that fact. Regarding the report of coral and blast fishing activity, all the authorities did not have the data to prove the information.

Several officers (SN-O2, SN-O3, SN-O4) stated they did routine patrol every day except bad weather. They argued the rotation officials in the bureaucracy system is one of the factors resulting in the unavailable information. SN-O2 claimed he was just assigned for seven months and only heard one report of blast fishing activity which is outside of his monitoring authority. This situation inevitably affects the way of government making progress improving blast fishing problems.

The monitoring system is running better in Pohuwato. P-O2, as the officer in the provincial fisheries department, provided some documents regarding monitoring program annually. The provincial fisheries department did more intense monitoring which got fully support by the provincial government. The main difference in monitoring system between both cases is the involvement of other institutions and local fishers in doing the monitoring. The strategy involving the community is useful to solve blast fishing problems, stated P-O5 as a water police officer. The reports from the fisher community help the authorities providing information about recent blast fishing activity and as the resource for them taking actions. However, in the monitoring system, the obstacles faced by the authorities are the lack of operational costs in conducting routine patrols, the lack of human resources and facilities for monitoring large areas and the small capacity of boat engines to pursue blast fishers.

4.2.8 Sanctions

Based on fisheries regulations number 31 of 2004 and number 45 of 2009 in Indonesia, there are clear sanctions regarding illegal fishing (e.g., using cyanide or dynamite). Anyone who carries out such destructive activities will be sanctioned at most for five years in jail and must pay a fine of two billion IDR. However, the implementation of these regulations is weak in both case studies. In South Nias, several fishers (SN-F5, SN-F10; Interviewed April 15th 2019) stated that the execution of sanctions is not well done because the perpetrators can bribe the officials. “The dynamiters are arrested, but they bribe and come back,” said SN-F15. That is why the perpetrators are not afraid of being caught committing dynamite fishing because the regulations are not enforced effectively.
5. Conclusion

This study compares two marine resources with blast fishing problems and finds there are significant differences between how the authorities and the resource users have coped with the situations. This study had two objectives: a) identify and analyse the governance measures and their coping measures to tackle blast fishing activity, b) observe and describe the positive and negative factors affecting the existing strategies and identify what strategies should be done to improve them. It filled the gap in the literature regarding the limitless of research of existing strategies by governance actors in reducing illegal activities in marine resources, particularly with blast fishing problems.

In terms of overall findings, although quantitative evidence lacked because of the limitation of supporting data documents, interviews with government officials and fishers revealed that blast fishing activity is mostly unchanged in South Nias but significantly reduced in Pohuwato. It appears that differing governance strategies explain this difference. In South Nias, there is no coordination among government institutions and the community has not been integrated into the measures to improve the blast fishing problems. In addition, governance measures are hampered by a lack of budget and facilities in running the supervising program of marine territory. In contrast, in Pohuwato, governance measures are characterized by the involvement of resource users, collaboration between governance actors and the sharing of the resources among them.

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