

Original paper

AN EVOLUTION OF PROPERTY RIGHT REGIME OF CORAL REEF MANAGEMENT: FROM AN OPEN ACCESS, TO STATE PROPERTY REGIME AND SUSTAINABLE LOCAL GOVERNANCE - A LESSON FROM GILI INDAH VILLAGE, WEST LOMBOK, INDONESIA

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ABSTRACT

This paper is to explain a case of evolution of property right regime of coral reef management: from an open access to state property and then to local governance, a case study of Gili Indah West Lombok, Indonesia. It demonstrates the reasons of change, the ineffectiveness of state property regime, and the emergence of local governance where conflicts are assumed as the triggering factors. The study found out that conflict of interest between two main stakeholders: tourism business operators (TBOs) and fishermen drove the change process. The conflicts initially emerged after Balai Konservasi Sumberdaya Alam (BKSDA) as the executor of the state property regimes was unable to protect the coral reef ecosystems from destructive fishing practice. It has also failed in halting Muroami application that has triggered lasting conflicts between TBOs and fishermen. The failure of the state property regime has led TBOs to take over the protection tasks through constructing local governance. So far, the local governance has been successful in protecting the coral reef resources and forced the users to use the coral reefs in a sustainable manner. However, it still shows a number of weaknesses in dealing with new challenges such as the non-involvement of several stakeholders in making social agreements and the unequal distribution of authority and responsibility among the actors and stakeholders. Therefore, attempts to find an alternative regime that could address the new challenges of the reef management are still required.

Key words: Institutional changes, open access, property right regime, coral reef ecosystems, Muroami, local governance

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INTRODUCTION

Indonesia is the largest archipelagic nation in the world comprising around 17,508

islands with a different coastal length estimate, ranging from 80,791 km (Moosa, 1995) to 204,000 km (Tomasick et al., 1997). The unity is well known as a bank of biological diversity. Coral reef

ecosystem is one of them. Tomasick et al. (1997) estimate, Indonesia has as much as 85,707 km² of coral reefs within which are living different coral fish, ornamental fish and other species. Coral fish whose a distinct market segment have become a source of traditional fishermen's livelihood. Many of fisherman families rely on the resources for their livelihood. Ornamental fish trade has entered international market, which together with coral fish have affected international fish trades (Hopley and Suharsono, 2000). In addition, coral reef beauty has been attractive matter for scuba divers. Divers are willing to spend thousand dollars to enjoy the coral reefs' beauty. In short, these ecosystems are economically very critical, ecologically also important as a robust coast barrier from wave attacks. Studies in different areas reported that coastal areas with disappeared coral reefs have been under serious threats from, for instances, coastal erosion (Bryan et al., 1998).

Recently, these ecosystems have degraded mainly due to human activities. Coral reef mining, fish bombings, fish poisonings and development activities taking place both in mainland and in coastal areas, have been the main causes. Unfortunately, no reliable action has been done to deal with these problems. Marine protected areas (MPA) expected to be able to cope with the issues are mostly only on papers. World Resource Institute's studies show that only three out of 113 MPAs in Indonesia are in good condition (Burke et al., 2002). In fact, government responsibility to the MPAs' management is unable to execute its duties for many reasons. Many parties (tourism industries, fishermen, conservationist, and so forth) concerned with the reef ecosystem are regret with the bad management performance. Thus, they have attempted to seek for an alternative measure. The

emergence of a local governance found out in some coastal villages can partly be a response to the inability of the state management regimes, as demonstrated by Gili Indah local communities in West Lombok.

The change of management pattern from open access to state property regime and finally to a local governance could be an institutional change phenomenon. This paper aims at explaining the phenomenon from the perspective of institutional change theories. It tries to explore reasons of the change, reasons of the ineffectiveness of state governance and the emergence of a local governance and its challenges.

1. Theoretical Framework

1.1. Concepts of Property Rights and Rights to Natural Resources

Different definitions on property rights can be partly found in Hallowell (1943), North (1990), Bromley (1991), Barzel (1997) and Bruce (1998). Bruce defined it as a bundle of rights and responsibility concerning a thing, often stated as rights in a thing. North called it as rights of individuals to utilize goods, services and labors they have. Following Bromley, property right is a claim to a benefit stream that some higher state bodies agree to protect it from other individuals who may interfere with the benefit streams. Thus, property rights involves right holders, others and institutions backing up the claim.

Barzel classified property rights into economic and legal property right. Economic property right is individual right to enjoy a piece of goods while legal property rights is a state assignment to a person to have an economic property rights. In other words, the last is the way of a person to have the first. From the definitions, property right is more relevant

defined as an institution than a commodity; therefore it must be enforced. One's rights will be meaningless without an authority system to enforce it, enabling people to respect other people rights. In other words, peoples have a duty to respect rights of others to which they need an enforceable rule system (Schlager and Ostrom, 1999). Property rights can be both formal based on contract or government regulations and informal according to norms, customs and culture.

The property rights as discussed above can also be used to define individual rights to natural resources. These can be de jure and de facto property rights (Schlager and Ostrom, 1999 and McKean, 2000). The former is property rights over natural resource granted legally by government. The government officially protects them according to an effective legal system, for example, a fisherman who gets a letter of permission from a fishing agency to fish within a certain fishing ground holds de jure property rights over the resource. The same matter goes to a forester or a logging company holding a concession right from forestry department over a piece of forest resources. The holders of such rights can be state agencies, private companies or individuals.

De facto property rights are rights usually created by natural resource users or community members over a piece of resources. This is usually based on social norms, customary laws and culture values inherited from their ancestors. In addition, they can also be a social agreement made by a limited group of people. Such rights are usually effective within the groups and would remain exist as long as supported by the groups and or recognized by a state authority. For example, a fisherman in the Kei Islands, Maluku, Indonesia who are engaged in a Sasi system has a harvesting right to the *Trochus* species inhabiting

coastal area of the islands (Thorburn, 2000). The rights are based on a customary law that has existed for a long period. In spite of formally lawless, the rights are quite robust due to the state authority recognition.

Property rights over natural resources are classified differently. Ostrom and Schlager (1996) classified them into rights of access, withdrawal, management, exclusion, and alienation. Right to access is the rights of entering a defined physical area and enjoying non-subtractive benefits. Someone who pays for an entry fee into a park to enjoy services produced by the park is an example of this kind of right. During in the park, they have purchased a temporary right to enter and enjoyed whatever benefits therein as long as not considered violating the prevailing constraints. Their rights are protected by rules so that other park users have a duty not to interfere with the rights of other people to enjoy the park. The similar example is the right given to fishermen residing a certain place to enter a marine protected area.

A withdrawal right is the right to obtain a resource unit or product from a resource system. The resource user who holds the rights may have authority to harvest resource unit at a certain location. Fishermen whose license of fishing within a particular fishing ground is not only authorized to enter the area but also to capture the fish. The same matter goes to a villager who holds withdrawal rights from a protected coral reef have the authority to, at a certain extent, harvest restricted fish products. They may also be authorized to take benefits only for meeting subsistence need but not for sell.

Management rights are the right to regulate internal use pattern and transform the resources by making the resource's improvement status. They include rights to modify or to transform the resources. The

rights of involvement in restricting what kind of fish can be harvested, fishing devices can be applied and size of trees can be cut off are of the examples. How, when and where resource user makes use of the resources are determined by those who hold management rights.

A right of exclusion is a right to determine who may access over resources, for example, the right to define which group of fishermen are allowed to harvest within a particular fishing ground or villagers who may enter forest areas. The last kind of right to natural resources is the right of alienation. That is, the right to transfer of part or all the management and exclusion right to another individual or group. Transferring the rights can mean selling or leasing the management and or exclusion rights. The individual who has transferred the right will no longer have the authority to the resources.

Based on such rights, Schlager and Ostrom (1992) divided natural resource right holders to five classes: authorized entrant, authorized users, claimants, proprietor and owner. An authorized entrant is a resource user who may only access a resource system without rights to harvest a single resource unit thereof. Someone who pays an entry fee to enter marine national park has no right to harvest fish, coral and whatever resource unit except enjoying the beauty of under water view, so are they who enter forest park. They can enjoy the park without rights to harvest timber and other forest products.

Authorized users simultaneously have both authorities to access and withdraw resource units. Examples of these property right holders are commonly found out in fishery management systems. In Indonesia, most fishermen, particularly of commercial fishing, only hold rights to access and fish in a certain area. They hold fishing licenses granted by the state by

which they can employ defined fishing devices to catch fish. They do not have rights to the management, exclusion and alienation (Ruddle, 1996).

Claimants hold the two first rights plus management rights. The net fishermen of Jambudwip, India are example of claimants (Raychaudhuri, 1980 in Ostrom and Schlager, 1996). They have devised a set of withdrawal rules that enable them to coordinate their use of the fishing ground. The fishing within this area is regulated so that each crew of fishermen has authority to set its fishing net on a certain spot. When a crew has claimed a fishing spot in accordance with the rules made, other crews will respect them.

Proprietors are individual who hold an authority to participate both in management and in exclusion. Proprietors are authorized to determine who have access and how individuals may use resources. However, they are not allowed to transfer their collective-choice rights. Traditional fishermen of Trochus in Kei Island are example of proprietors. According to Sasi system, a customary law found in Maluku societies and prevailing in fishing ground, forest and reefs, a trochus fisherman has the right to manage and exclude other potential beneficiaries from that activity. The head of village, through a village council, leads determine a rule of who may be involved in the trochus fisheries, when and how the villager harvest and to whom they sell the harvested trochus (Thorburn, 2000).

Owners hold the right to access, withdrawal, management, alienation and transfer their rights. The fishermen benefiting from Ascension Bay, Quintana Roo State, Mexico are examples of this kind of property right holders. Each fisherman fishing within this area is a member of a fisherman cooperative. They hold an exclusive right to capture lobster within a determined area of 3 km². Their

rights are protected from the intrusion of non-member of fishermen's cooperative by applying monitoring system. In addition, they may also sell, lease or barter their right of management and exclusion over specific areas and when having transferred the rights they have no longer authority related to Ascension Bay fisheries (Miller, 1989).

In sum, the classification of natural resource right holders into authorized entrant, authorized users, claimant, proprietor and owner, which each of the class has different level of rights, is useful to analyze individual property rights over the natural resources. The classification is theoretically understandable, however, in fact it is difficult to place strictly resource user into one of the classes. Therefore, following Hanna et al (1996), the classification is only a model to simplify an analysis.

1.2. Property Rights and Incentives

Different bundles of property rights held by resource users, both de facto and de jure, are an assurance to be able to securely benefit from resources. The security feeling on their rights of resources is an incentive to conserve the resources. The rights make them sure that they will regain what they have invested, both present and future return. Otherwise, they will not have incentives to invest in enhancing the performance and values of natural resources (Schlager and Ostrom, 1999; Ostrom and Schlager, 1996). With that security individual will make a credible commitment to one another to develop long-term plans for investing in and harvesting from a resource in a sustainable manner.

Logically, resource users who hold a more complete property right will have stronger incentive to invest in resources. Authorized entrants will have less or no

incentive to invest in conserving resources they enter. Otherwise, proprietor whose the rights of exclusion, management, withdrawal and access will be strongly motivated to make such investment. Moreover, if they can also transfer their rights to someone else. This is so, because the right of alienation had by the owner is viewed as the essential right allowing individuals to obtain the residual of past investment (Ostrom and Schlager, 1996).

Ostrom and Schlager argue that a group of individual who holds the rights of exclusion and alienation exercise a management initiative to regulate the long-term use of common resources. According to them, commonly proprietors and owner have incentive to develop boundary rules in order to exclude noncontributor, craft authority rules to allocate withdrawal authorization and devise forms of active monitoring and graduate sanction. In short, the rights of exclusion and alienation produce strong incentive for the owner and proprietor to make current investment in resources. This is because the rights owners can decide who can and cannot enter a resource. They can harvest, for themselves, and for their offspring, the benefits from investment they undertake in a resource.

Property right systems have been applied widely on coastal resources. The inshore fisheries in the pacific basin, stretching from Fiji to Japan have applied property rights systems for a long period. They take the form of the simplest property rights, which include restriction of gear use, fishing season and fish size to the more complex ones which cover the rights of management, exclusion and alienation. Those property rights are very powerful to make the user exploit coastal and marine resources in a sustainable manner. Whereas, the rules used to enforce or to protect those property rights of traditional community are commonly

unwritten, informal or even illicit or covert (Ruddle, 1991).

Japan has been well known as a country that has applied the simple property right systems that have led to be able to prevent over-fishing, promote successful conservation, create a stable fishery and make fishermen rich. These are consistent with McGoodwin's observation which demonstrates that when fishermen hold property rights there is less tendency to over-exploit marine resources. Conversely, an evidence from Oceania, for example, shows that stocks are commonly overexploited where traditional property systems have been replaced by open access (McGoodwin, 1984). The examples reemphasize that property rights affect resource users' decision whether or not to get involved in the natural resource management.

1.3. Property Right Regime of Common-pool Resources (CPRs)

The term of property regime was firstly introduced by Daniel Bromley as a response to a misunderstanding of "common property" and "common property resources" (Bromley, 1992). The misunderstanding initially stems from the use of term "common property resource" which refers to a class of resource controlled by a group of people. He argued that there is no such thing as common property resources; there are only resources controlled and managed as common property or as state property or as private property. To reduce the confusing terminologies, he proposed to use "common property regime" referring to a management pattern by a group of people, while "common-property resources" in the sense of subtractable and non-excludable resources are replaced by "common-pool resources (CPRs)". Thus, the term of

common property resources is no longer used in the institutional discourse.

The word "regime", according to *Oxford Advanced Learner's Dictionary*, means a method or system of organizing or managing something. In regard to how people manage CPRs, Bromley proposed four kinds of regime: state property regime, private property regime, common property regime and open access regime (Bromley, 1991). Private property of a resource, called also private ownership, is ownership systems by specific individuals who control the resource use. This means that the property is managed under private property regime. The regime can be undertaken by group of individuals, organizations, corporation and partnership. They are holding rights to use, to dispose of and to exclude other from resources (Cole, 1999).

Common property regime is a collective control over a CPR by a defined set of individuals with some governance structure. Individuals being members of a group have the rights to control access and management over a resource. They can exclude other individuals who are not members of the group. State property regime is ownership and control over resource use rest in hand of the state. Individual may have access and use the natural resources only after getting permission from the state. Open access regime is an ownership system of natural resources by no one where individuals have an unrestricted access to the natural resources. There is actually no property. In other words, the natural resources under open access regime belong to nobody (Bromley, 1991).

An open access situation is well illustrated by Hardin's Tragedy of the common metaphor where each herdsman can unlimitedly add a number of cattle to graze in a limited resource. The addition of cattle will reduce the availability of food

for other animals and reduce benefits of other herdsman (Hardin, 1968). It is clear that there is no limits on the rights to graze, therefore, each herdsman takes only his benefit into account and ignores his externality effect on the others. Indeed, this situation leads to deplete the resources and it is a tragedy. What become the main lesson of the metaphor is the inadequate specification of property right to the environmental services of the pasture. The pasture becomes open to all. Therefore, it is called open access (Hanna et al., 1995; Berkes, 1996). They add that the outcome of open access is inefficient use of pasture that may lower a level of milk and meat production of each animal. In order to maintain optimal level of cattle production, it is necessary to limit the number of the animals grazing in a pasture.

Bromley (1991,1992) argued that open access could be caused by the absence, or breakdown, of a management and authority system that set norms of behavior among participants with respect to the particular natural resource. A certain resource can be under an open access regime through the failure of institution that undermines former collective, state, or individual management regime. The assertion of colonial government's rules in a number of developing nations is considered a main source of collapse of collective management of natural resources (Berkes, 1996; Ruddle, 1993). The ineffectiveness of MPAs has led them to open access regime.

Except open access, no single type of regime can be prescribed as a remedy for the natural resource degradation and overuse. Each of which may have both effective and ineffective control (Hanna et al., 1995; Berkes, 1996). Nevertheless, many scholars consider common property regime to be at a certain extent more capable of overcoming the problems (Agarwal, 2001; Ostrom, 1990; Balland

and Platteau, 1996). To deal with the limits of state, private and common property right regime on natural resources many scholars offers co-management approach (Pomeroy, 1995; 1998; Pomeroy and Berkes, 1997).

1.4. Changes in Property Right Institution

Property right is an institution therefore it follows institution behavior. It is a rule of the game requiring an enforcement, a clear monitoring system and sanction. Property rights critically affects incentives for decision making regarding resource use, economic behavior and performance (Libecap, 1989).

To better understand the changes of property rights attention must be directed to political bargaining underlying the creation and modification of property rules. The political bargaining can include private negotiations within groups to adopt or to change group rules and customs regarding the allocation and use of property, as well as lobby efforts involving private individuals, government officials, politicians, and judges to implement or alter more formal property laws. This argument is presented by Libecap who sees that property right changes are affected by economic incentive of individual involved in the institutional change process. He argues, the emergence of groups driving or opposing the changes as well as discussions that may occur in the altering property rights are determined by what they expect from the changes.

Furthermore, Libecap (1989) contends that the individual economic calculation is a function of both expected aggregate benefits and proposed resource allocation through the property rights arrangement. Besides, aggregate losses of common-pool resources also belong to this primary motivation. A share of the

expected gains from mitigating those losses encourages individuals to bargain to establish or change property rights to limit access and to control resources. They seek to get as large a share of aggregate gains as possible if they have an exclusive right (Libecap, 1989).

Libecap is a representative of institutional scholars who contends that institutional changes are determined purely by economic motives. This argument is diametrically opposed to distributional conflict theory of Jack Knight who argues that the economic interests are only initial factors triggering the emergence of conflict. To resolve the conflict, they attempt to create or change a new institution. The actors who can control power, such as information, political access and capital, tend to influence the process of the institutional change and finally win the conflict by changing or creating the rules that favor their interest. Knight emphasizes that the target of the change is to satisfy individual interest not to achieve collective interest. Although the change is motivated to win the competition, the change process itself can emerge either intentionally or merely as a consequence of the pursuit of strategic advantages (Knight, 1992).

Knight argues that the distributional conflict theory is universal theory in the sense of its capability of explaining institutional change at all institutional level and applicable to both formal and informal institutions. He argues that the change in informal rules like convention, social norms and values inherent in a community can be changed intentionally due to different interest and asymmetries power. Knight (1995) emphasizes that the change in the distribution of power gives the self-interested actor incentive to change their institutional setting which favor their interest. Even, he emphasized that the new institutional setting reflects the self-interest

of the economic actors, regardless of whether or not the change will generate a more efficient institution. It is better to explain the on going development of social institutions as by product of conflict over distribution gain than as a pareto-superior response to collective goals or benefit.

In sum, I have discussed two main theories of institutional changes. Property rights as institutions which may change overtime could be explained by these theories. The theories are relevant to explain the property right regime changes occurred in the study location.

MATERIALS AND METHODS

1. Information Background of Gili Indah Village

Gili Indah village where this study was conducted is a *desa kepulauan (archipelago village)*, consisting of three small islands situated northwest of Lombok Bay. It lies between 8°21' - 8°23'S and 116°00' - 116°23'E, and is flanked by Java Sea on the West and North, by Lombok Island on the South and by Tanjung Sira on the East (Figure 1). Administratively, it belongs to the Kecamatan (Subdistrict) of Pemenang, in the Kabupaten (District) of West Lombok, West Nusa Tenggara (NTB) province. The village covers a total area of 2,954 ha, of which approximately 665 ha is mainland.

The three island composing Gili Indah village are Gili Air, Gili Meno and Gili Trawangan. The center of village administration lies on Gili Air, situated approximately 7 km from Pemenang city, the capital of Pemenang Subdistrict, and 30 km from Mataram, the Capital of both West Lombok District and NTB province. Due to its being on an archipelago, the village is only reachable by boat from

Bangsai Port, located in the suburb of Pemenang City. Among the three, Gili Trawangan is the largest with 340 ha, and followed by Gili Air and Gili Meno, which occupy 175 ha and 150 ha respectively (Setiawan, 1999).

The three small islands are occupied by 2,818 people, of which 1,247 are in Gili Air, 487 in Gili Meno, and 1,090 in Gili Trawangan. Even though geographically the three islands belong to West Lombok, and are located close to it, their population has a different ethnic composition and culture. Gili Indah is mainly inhabited by Mandar, Bugis, and Makasar, the main tribes populating South Sulawesi province, while Lombok is dominated by Sasak and Balinese ethnic. In line with its progress, however, Gili Indah's population has been strongly affected by the external Lombok

culture. Interactions with Lombok's inhabitants have been unavoidable, with a parallel acculturation process occurring, through either marriage or other social interactions. The results of acculturation are shown, among others, by the use of daily language. Many on Gili Indah, in particular the third or the fourth generation, do not know their ancestors' language anymore. What they use as a daily language these days is a modified Sasak. That is, a hybrid language drawing on Sasak and the three tribal languages from South Sulawesi. The acculturation can also be seen in the inhabitant's calling customary laws or local institutions *awig-awig*, which previously was a common name of local institutions prevailing in Sasak and Bali (Hidayat, 2005).

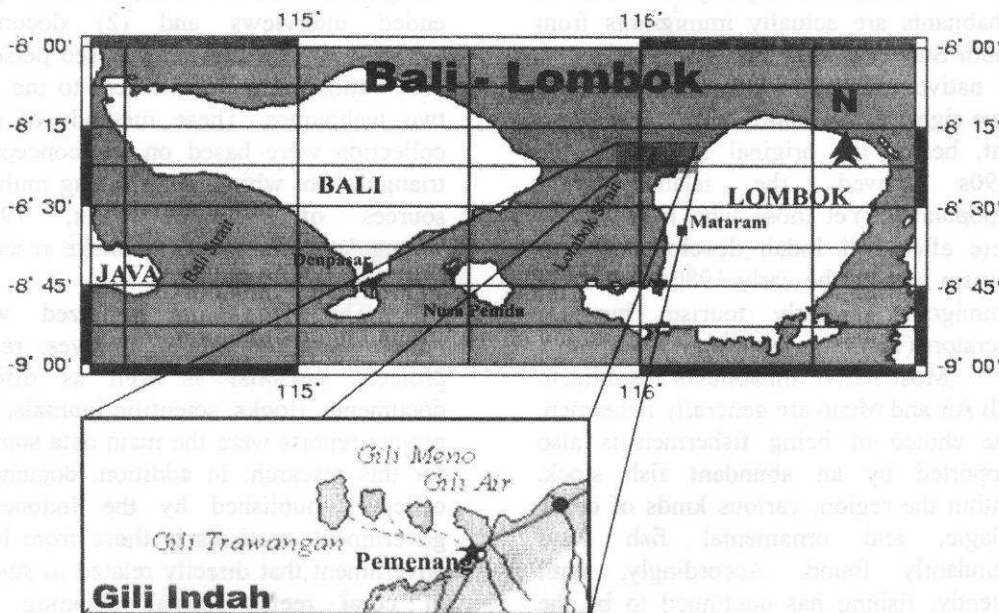


Fig. 1 Map of Study's Location
Source: Adapted from Loud (1997)

The presence of these common roots has made the feeling of a brotherhood relationship among

community members quite strong. This has raised two contrast issues. On one hand, this has enabled all conflict arising among

community members to be overcome by tradition of *musyawarah* (meetings) based on kinship ties. Those who are engaged in the conflict meet and sit together; while being mediated by either a formal or informal leader, they deliberate on how to solve the conflict based on a win-win solution principle. On the other hand, this strong kinship relationship sometimes becomes an obstacle to enforcing local institutions that have already been agreed upon. For instance, once community members have agreed to implement a penalty system against blast-fishermen, some of them feel it difficult to act when the offenders are Gili Indah inhabitants, because they would still be their relatives. This is a big challenge, and an obstacle toward implementing *awig-awig* as a local institution.

Although the majority of Gili Indah inhabitants are actually immigrants from South Sulawesi, they claim themselves to be native residents of the islands. They have rights to the claim based on the fact that, before the original settlers of the 1890s arrived, the islands were unpopulated. Yet those who have settled there after Gili Indah developed into a tourism area in the early 1980s are called "immigrant", mostly tourism business operators (TBOs).

Most native inhabitants residing in Gili Air and Meno are generally fishermen. The choice of being fishermen is also supported by an abundant fish stock. Within the region, various kinds of coral, pelagic, and ornamental fish were abundantly found. Accordingly, until recently, fishing has continued to be the main livelihood for many Gili Indah inhabitants. In addition to fishing, since the early 1980s tourism-related business, such as accommodation-provision services, marine transportation services, and transportation services using *cidomo* (a buggy driven by a horse); restaurants and

cafes; diving and snorkeling services, have also become the main choices of livelihood for island resident. Beside this, other works related indirectly to tourism, such as internet and telecommunication businesses, have been developed. These businesses have been changing the dominant character of island work occupations away from fishing, which had previously been the main form of livelihood. This situation has changed Gili Indah from a fishing village to a tourism village.

2. Methods of Data Collection and Data Analysis

The data collection methods employed include two main techniques: (1) interviews with data sources from the same or different hierarchies and organizations, using structured, semi-structured and open-ended interviews and (2) document analysis. In addition, I also used personal observations as a complement to the first two techniques. These methods of data collection were based on the concept of triangulation, which means using multiple sources of evidence (Yin, 1994). Triangulation is a way to make research more valid and reliable.

The documents analyzed were books, journals, official archives, report projects, personal as well as official documents. Books, scientific journals, and project reports were the main data sources for this research. In addition, documents officially published by the Indonesian government, particularly those from local government that directly related to studies of coral reefs, coastal planning and conservation activities in Lombok, played an important role as sources of data. Other official documents, such as acts, decrees, codes of conduct, and so on, pertaining to coral reef and coastal management were also analyzed. This was done especially to analyze institutional arrangements.

The analysis of the data was done in accordance with the procedure of Miles and Huberman (1994). The data analysis began with writing up all information obtained from the interviews, field notes, comments, and documents. These were all read and studied in detail and in depth. Afterward, the data were categorized using codes, and then displayed in a matrix format that represents the relationship among categories of information, respondents and topics of interviews.

Before being written as a research report, the displayed data were reedited, complemented and cross-checked by referring to the field notes and other empirical findings, to check for irrelevancies and whether the data collected were the correct data or not and whether the interviewees gave correct information or not. Besides, the data were also examined by comparing them to relevant references and concepts. As soon as the data were grouped, the subsequent work was to examine whether the grouped data support of the research questions. This process was done to separate and discard irrelevant data, so that only useful data remained.

3. Empirical Findings

Analysis of empirical findings of this study is divided into three sections, which include each situation of coral reef management under era of open access regime, state property, and local governance. Each of these are found out below.

RESULTS AND DISCUSSION

1. Open Access Regime Era

1.1. Pre-Tourism Industry Era: How did Fishermen Treat Coral Reefs?

This section is on looking at the way fishermen treated coral reef resources and how they governed them before the arrival of tourism industry. Until recently, coral reef and fishery resources in the waters surrounding Gili Indah have been under an open access regime. Local institutions (*awig-awig*) available in the village were initially only to deal with social order and environmental problems that do not relate to marine resource management. There were no informal rules restricting access to the resources and fishing techniques. There was only an ethic that forbade people from capturing small sized fish. However, this ethic was only recognized in the past. People today no longer strictly follow it (Hidayat, 2005).

From the beginning of its being settled, the coral reef ecosystems of Gili Indah were managed under an open access regime. Fishermen from outside might fish within this region. However, because they generally fished only for self-consumption, and fish existed abundantly, fishermen did not have any incentive to maximize their short-term gains. In spite of the open access regime, fishing activities using traditional fishing tools (such as spear, hook-and-line, arrows and fishnet) did not destroy the coral reef ecosystems of Gili Indah. Coral reef problems in the locality arose after 1944, following the introduction of fish bombing by the Japanese army, and in the early 1960s, with the arrival of Muroami and artificial poisons (Hidayat, 2005).

The opening of Chinese seafood restaurants in large cities in Asia has driven fishermen to intensify their fishing

activities and move from one coral reef to another, even reaching remote reefs, in order to meet the very strong demand and receive the attractive revenues offered by those markets (Hopley and Suharsono, 2000). However, such markets do not directly affect Gili Indah fishermen. According to Hidayat (2005) no fishermen in the region specialize in catching such fish alive. They know that being in the business of live coral fish is profitable, but catching fish alive is very difficult. It needs special skills and experience. However, their non-involvement in hunting live coral fish does not mean that their coral reefs are free from such coral fish hunters. Until 2000, fishermen from Bali, Mataram, and even from Banyuwangi, Java, still came there to catch the fish. Local fishermen know that this subtracts from their fish stock; however, they have not had the power to exclude them. This was due to the absence of rules authorizing them to protect their own resource. Therefore, although the outside fishermen applied poisons to catch live fish in their region, Gili Indah fishermen could not prevent them from doing so this took place particularly prior to the era of the formalized *awig-awig* (local governance structure). Fish bombing practiced by local fishermen combined with the poison and bombs employed by the outsiders, have brought about serious degradation of the coral reefs.

To deal with fish bombers, the government of Indonesia has tried to apply Emergency Act No. 12/1951 on the ownership of firearms, sharp weapons, and explosive materials. This act can give a fish bomber a maximum 20 year jail sentence for illegally holding and using explosive materials. However, it is ineffective due to the weakness of the law enforcers and bribes offered by the arrested fish bombers. A local fisherman who had been accused of fish bombing expressed

that he was able to be released from the sentence after bribing the police (Hidayat, 2005). Act No. 23/1997 on environmental management containing a principle that any actions potentially create environmental impact can be penalized might have also been unable to protect coral reef ecosystems from destructive fishing practices. This is so because to arrest the fish bombers, the act requires evidence that the damage to the coral reef was due to the action of the accused. Technically, this is difficult to prove; therefore, the police or investigators cannot use the act to protect the ecosystems from destructive fishing practice. As a result, the coral reef quality continually decreases, which leads to further decline of the fish stock.

This difficult situation was severed by several facts as follow: First, fishermen have regarded themselves as the coral reef resources' main inheritors who have produced an ignorant attitude. Second, the coral reefs as being open to all in the sense that fish in the resources belong to nobody before they are caught, with a consequence that fishermen take free access to fisheries resources in the coral reef ecosystems for granted. Third, fishermen activities in utilizing fishery resources are also grounded on a formal legal basis, because all traditional fishermen in the locality register their fishing devices with the local fisheries agency. The open access regime's being supported on a formal basis has made fishermen feel that they have rights to access and to benefit from the resources.

1.2. Emergence of the Tourism Industry: The Beginning of Change

The rise of the tourism industry has resulted in a change in livelihood patterns for the local inhabitants. Those who previously merely recognized fishing as their main livelihood were then faced with

a new economic opportunity. A part of them took the opportunity and shifted their livelihood, while another part consistently kept to fishing as their main economy activity. Accordingly, in recent times, the villagers' livelihoods are mainly classified into recreation-associated businesses and fishing (i.e., TBOs and fishermen).

In relation to coral reef ecosystems, fishermen make use of their resource units while TBOs merely utilize the resource system (i.e., the ecosystems' beauty). This condition has driven TBOs to set an absolute requirement. In order to make use of the coral reef systems, they must be kept in good condition, and all activities of resource utilization that potentially impact negatively on the ecosystem must be avoided. As we have seen, these requirements contradict the habits of local fishermen who have commonly applied destructive fishing methods. From the viewpoint of TBOs, the fishermen's activities damage their economic interest. In contrast, efforts to prevent the fishermen's destructive practices by TBOs are viewed as a disturbance, even a serious threat by the fishermen.

The above situation could be explained by distributional conflict theory, saying that the conflicting groups may need a new institution to deal with the conflict (Knight, 1992). The process of institutional change is driven by economic interests. Theoretically, only groups that have power may potentially affect the process. In the case of conflicts between TBOs and local fishermen, at the moment when they arose, the TBOs' position was less powerful than that of the fishermen, because the former did not have a legal basis for taking any measures. At the same time, fishermen, claiming themselves to be the coral reefs' true beneficiaries, also claimed to have the right of making use of the ecosystems according to their own fishing methods. The claim as "the true

beneficiaries" could have been a power resource for sustaining the status quo.

2. State Property Regime Era

2.1. Role of the Natural Resource Conservation Agency

Gili Indah marine water was determined as a marine recreational park in 1993 based on a Forestry Ministerial Decrees Number 85/1993. The status as a marine recreational park has made the resources under control of the Natural resources Conservation Agency (BKSDA). Referring to Forestry Ministerial Decree No. 6187/2002, the role of the Natural Resource Conservation Agency (BKSDA) is the technical executor of natural resource and ecosystem conservation, under the Directorate General of Forest Protection and Natural Resources Conservation (PKA), and is responsible to the Forestry Minister through the director of the PKA. With respect to its function, BKSDA has a mandate to undertake conservation tasks regarding every natural resource, from forests to the ocean. It is a representative of the central government (PKA), running a centralized natural resource conservation system. The link between the PKA and BKSDA is hierarchical and based on command. As a representative of the central government, BKSDA has an office in every provincial capital and is responsible for conservation of resources existing in the provincial regions. The BKSDA existing in Mataram, Lombok, belongs to the NTB province, whose authority covers conservation areas on the Islands of Lombok, Sumbawa and the surrounding areas. Management of Gili Indah Marine Tourism Park belongs to its responsibility.

2.2. Reasons for the State Property Rights Regime

Officially, the motive behind establishing Gili Indah's waters as a conservation area was to protect the marine biodiversity of its coral reef ecosystems. The Act No. 5/1990 on biological natural resource conservation authorizes the government to do this if it sees the natural resources as being important to improve the quality of human existence, social welfare, and/or science. Referring to the current characteristics of coral reefs reveals that these ecosystems meet the requirements for being protected. In addition to that, the government may have another reason, i.e., an economic motive. This runs parallel to the tourism industry becoming the fastest growing sector of the global economy, with ecotourism occupying a high rank and well-managed coral reef ecosystems being a major draw for scuba divers, snorkelers and recreational fishermen (Hopley and Suharsono, 2000). According to Hopley and Suharsono (2000), the tourism industry in West Lombok has made up, on average, 16 percent of the district's GNP.

Given the possibility of attractive economic returns, the Indonesian government has been driven to create protected areas in the form of national parks, forest parks, marine national parks, or marine recreational parks. These parks can generate incomes. The officials of BKSDA also agreed with the economic motive behind the policy, though the agency itself has not yet received any revenue from the Gili Indah coral reefs, which so far has gone to the local government. Therefore, BKSDA initiated the proposal to make new regulations on the way of allocating collected money from the conservation areas among stakeholders. Because of the strong economic motive, as the economic theory of property rights predicts (Barzel, 1997),

it is understandable that the government has invested great effort toward enforcing its property rights over natural resources that have increased in value.

2.3. The Structure of the State Property Regime

2.3.1. Property Rights and Rules

The BKSDA, acting as a property rights holder, has principally all five of the possible rights over the coral reef ecosystems under its control: rights of access, withdrawal, management, exclusion and alienation. The rights are principally based on Government Regulations (PP) Nos. 59/1998 on Tariffs on Sorts of Non-tax State Income and 872/1992 on Tariff of Entrance Fees to the Recreational Forests, National Parks and Marine Tourism Parks. According to these PP, BKSDA holds the rights to define authorization and access to enter the defined territory. Tourists who want to enjoy the resources, fishermen who intend to capture fish, and researchers who want to conduct observation and collect information must first obtain a permission letter from the agency. Villagers of Gili Indah are exempted from having to possess this permission letter.

Following these PP, those who want to enter the region legally must pay conservation fees. Unfortunately, due to some technical difficulties, collection of the fees has not yet worked because some agreements between Local Tourism, Art, and Culture Agency (DISPARSENBUD), as a representative of local government, and BKSDA are still needed. Since DISPARSENBUD is responsible for developing the tourism industry within the district, it claims that it has the right to the fees for entering tourism areas. Therefore, it has initiated the making of a policy on the mechanism of the fee collections and

their allocation among the stakeholders (Hidayat, 2005).

In addition to access restrictions, BKSDA limits harvesting of resource units as well. Even though principally all Gili Indah fishermen have access to the resource systems, their fishing rights are restricted according to fishing locations and fishing devices based on an operational rule established by BKSDA. In managing this conservation area, BKSDA applies a zoning system that divides the area into protected zones (core zones) and utilization zones. Within the utilization zones, fishermen are allowed to capture fish; however, they may not apply fishing devices considered damaging to coral reef ecosystems. Muroami and Mogong belong to the prohibited devices, even though both are registered with Local Marine and Fisheries Agency (DISLUTKAN).

2.3.2. Authority and Boundary Rules

As a property right holder, BKSDA is authorized to manage the Gili Indah coral reef ecosystems. It may exclude other potential beneficiaries or restrict their utilization and access rights. The division of the areas into protected and utilization zones is a way of restricting the rights of access and withdrawal. BKSDA forms its own management plans concerning of the coral reef ecosystems based on standard guidelines that it has. It does not consult with either local communities or agencies of local government. An official of BKSDA revealed that there is no program made collectively with local government, that is, with both DISLUTKAN and DISPARSENBUD (Hidayat, 2005). He has never intentionally discussed how to manage coral reef ecosystems with other local agencies. This is so because the BKSDA must follow guidelines that clearly define what it must do.

Although BKSDA claims that the Gili Indah conservation area covers about 2,954 ha, until recently it had no set of physical borders (mooring buoys) that could easily be recognized. The claim was only based on coordinate points determined on the conservation map. Instead of physical borders, BKSDA has installed four signal lights on each side of the islands, which serve as reference points to define the border line. In addition, BKSDA does not have borders separating the protected zones from utilization zones. Clearly, these are serious obstacles in the way of BKSDA's ability to enforce its authority and property rights.

2.3.3. Law Enforcement and Monitoring System

In enforcing its rights, BKSDA uses a standard mechanism. It has marine guards who patrol the conserved area. To facilitate the patrol, there is a field station located in Gili Trawangan from which the officers can take turns monitoring the situation. One officer is required to be on duty there for eight hours. Unfortunately, the officers are not equipped with speedboats, so that they cannot immediately take any necessary action when witnessing or finding any indication of violations. What they can do is to contact SATGAS officers, together with whom the patrol officers pursue suspected violators.

Apart from possessing marine guards, the agency also has internal civil investigation officers. They are responsible for investigating captured violators suspected of damaging the region's marine environment. They are intentionally provided to deal with environmental criminals who cannot be dealt with by the police (regular investigators). The investigation results will then be handed over to the district attorney. In order to

have the necessary skills the officers obtain special training as investigators.

2.3.4. Challenges of Fishermen to the State Property Rights and the Failure of State Governance

As a property right holder, BKSDA is also authorized to control access and to transfer it to other parties. For example, it only gives local fishermen rights to access. Fishermen may access the resources without rights to take any benefits from them, particularly from the protected (core) zones where fish abundantly exist. BKSDA has provided the local fishermen with use zones where they may fish. However, fishermen do not like the zones, because these are too deep for catching fish with the fishing tools they have (Hidayat, 2005). They want to fish within the protected core zones, whose coral reefs are still in relatively good condition and in shallow waters. In addition, even within these use zones, there exists a number of restrictions, i.e., fishermen may not operate fishing devices that have the potential to harm the coral reef ecosystem, like Muroami. In short, BKSDA may treat fishermen as authorized entrants, who only hold rights to enter the areas without rights to harvest any kind of benefit from them, or as squatters who possess no right at any level related to the coral reef ecosystems.

However, the fishermen challenge their status as authorized entrants and squatters. They also reject the conservation status of the coral reefs, and do not accept any kind of restrictions imposed on them. They do not recognize the BKSDA's claim on the protected areas and challenge the division of areas that BKSDA has established. Some fishermen expressed that they would not respect any decisions made by the agency. According to Hidayat (2005), these rejections which caused the state property regime are unenforceable.

Based on Hidayat's investigation fishermen continue to fish within the areas claimed as both core-protected and utilization areas, except within areas prohibited according to village institutions (see Section 4.3.). They also continually apply the forbidden blast-fishing method and other harmful fishing devices. From the legal point of view, there is no doubt that BKSDA has the exclusive right to enforce its legal rights within the conservation area. However, it has disregarded the fact that fishermen also have the rights over the resources and, therefore, demonstrate massive resistance to the policy. The distributional theory of Libecap (1989) seems to be in line with this phenomenon. Libecap argued that when a property right change causes massive distributional inequality, the disadvantaged parties will oppose the new arrangements entailed by it.

The failure of BKSDA in upholding the state property regime could be looked at from two sides: that of BKSDA and that of the fisherman. From the former's side, the state property failure could be caused by high transaction costs, the distant location of BKSDA personnel from the conserved coral reef ecosystems, and the centralized policy of conservation.

Local fishermen have also contributed to the ruin of the state property regime. *De facto* and *de jure* property rights of fishermen over coral reef fishery resources, as well as power over the resources are assumed to be part of their self-justification for doing so. *De facto* property rights of fishermen into coral reef in this region is related to the historical fact. Historically, fishermen have been fishing in the region for generations. They claim that they have the rights over the resources, even claiming themselves to be the main beneficiaries and *de facto* property right holders. The village's population recognizes this status. The

following fishermen's statements can be seen as evidence of this: "BKSDA has no authority to exclude us from fishing in this area. We have been fishermen, fishing here for generations. We have the rights over Gili Indah waters, coral reefs and the creatures that exist there. They are our life and we cannot live without them. Nobody can take the resources away from us..." (Hidayat, 2005)

Therefore, the policy of protecting (conserving) the coral reef ecosystems, which prevents fishermen from benefiting from them is very unpopular because this is in contradiction with their understanding of the situation. To the artisanal fishermen, who usually fish within inshore fishing grounds such as coral reef ecosystems, the fishing prohibition really damages their basic rights and interests. Therefore, they reject the decisions of BKSDA and disobey the prohibition assigned to them. In short, excluding the rights of the local community over the resources has prompted the community to reject the policy *en masse*.

In addition to *de facto* property rights, the local fishermen also have a formal legal basis to claim that they have the rights over the resources (*de jure* property rights). This comes from Local Government Regulation (PERDA) No. 14/2001 on Fishery Enterprises, which requires fishermen in West Lombok to register (license) their fishing devices and fishing activities with the district government of West Lombok, through DISLUTKAN, without which they may not fish within West Lombok waters. In addition, some fishermen also obtain a fishing license from the provincial government of West Nusa Tenggara. Therefore, the fishermen of West Lombok, including those who are in Gili Indah, are registered fishermen.

Following the PERDA, local government has the primary authority to

issue fishing licenses, take registration fees, and enforce rules. Section 3, article 7, point 1 of the regulation states that every fishing company operating within West Lombok waters must have a fishing license which clearly defines the fishing areas, number and size of vessels, and fishing devices to be used. They hold the fishing license for one year, and must re-register every year. These fishing licenses are necessary for commercial (industrial) fishing. Excepted from some of these regulations are artisanal fishermen employing non-motorized boats, outboard-motor boats, or inboard-motor boats of less than five gross tons and/or with motors of less than 15 horse power.

These fishermen must only register their fishing activities and fishing devices with DISLUTKAN and pay registration fees. According to the local government regulation, the fees range from Rp1,500 to Rp100,000 (\$0.20 to \$12.5) per annum. Muroami, as the controversial fishing device, is charged Rp100,000 per unit and a hook is charged Rp1,500 per unit. Hidayat investigation revealed that these collected monies are used partly to fund infrastructure developments in the region (Hidayat, 2005).

The obligatory fishing license and fees have made fishermen authorized users of the whole territory existing within the West Lombok district, including within the conserved area of Gili Indah's coral reefs. The licensed fishermen may fish within West Lombok waters without any exception as long as they are using legal and licensed fishing devices. Muroami, which BKSDA regards to be a very destructive fishing device, is also a registered fishing device whose owners have the right to use it everywhere. Therefore, even though BKSDA claims that the fishing device may destroy coral reefs, its operation cannot be stopped.

This situation has made it more difficult for BKSDA to protect the conserved areas. Muroami users are actually authorized users, although BKSDA considers them to be squatters or merely authorized entrants. Therefore, BKSDA faces two challenges, illegal blast-fishermen and registered Muroami users. The described situation has prevented BKSDA from enforcing the state property regime. From 1993 up to recently, BKSDA has never been able to stop either blast-fishermen or Muroami users. The state property regime governing the coral reefs of Gili Indah has actually been ruined. TBOs and some fishermen who need the coral reefs to always be in the best quality cannot rely upon the BKSDA. The ruin of the state property regime was also accelerated (worsened) by the powerlessness of BKSDA in dealing with the massive resistance of local fishermen. It is too costly to enforce a rule if it is challenged by a large number of violators. The Hobbesian perspective on law says: When most people obey the law, enforcement agencies can do their job at low cost. However, when most people challenge the law, law enforcement costs become prohibitively high.

3. Local Governance Era

Today's emerging local governance structure is mainly driven by TBOs. From the perspective of BKSDA, the TBOs are authorized users. They have the right of access to and benefit from the ecosystems. This formal status is much better than that of fishermen, who are only eligible to be authorized entrants. The status as authorized users is held due to a letter of recommendation the TBOs must obtain prior to opening a tourism-associated business. They will not be able to run the business without a recommendation from BKSDA. Those who hold this

recommendation are considered to have the right to access and benefit from the resources. One point that BKSDA must take into account in issuing the letter is that the recreational activities planned or recreational facilities to be built will not impact negatively on the coastal and marine environment in general, and coral reef ecosystems in particular. TBOs that have obtained a letter and invested their capital feel that they have the right to a certain return on their investment. Therefore, they indirectly demand that BKSDA protect the resources, by enforcing the rules, to assure that they will obtain revenues from the invested capital. This shows that there is an economic motive behind the emergence of local governance.

3.1. The Structure of Local Governance

To assure that the governance structure work effectively, it has two local institutions (*awig-awig*) acting as rule-in-use in coral reef management. One is for preventing destructive fishing practices, the other one deals with conflict resolution.

3.1.1. First Rule-in-Use: *Awig-awig* on anti-blast fishing

This *awig-awig* that came into force on 19 March 2000 is very simple. It merely consisted of three stipulations regarding blast fishing, as follows: (a) Fishermen who capture fish using bombs or potassium or other poisonous substances will be arrested. In front of the fishermen's society, SATGAS, and village officials, the arrested violator will be questioned with respect to their activities. They will then be requested to sign an agreement on not repeating the violation, and must pay a fine of up to Rp10,000,000 (\$1,250). If they cannot afford to pay the penalty, they will be sent to the police to be processed

according to formal law. (b) If the violators are rearrested and proven to have repeated the same violation, the fishermen's society will destroy the fishing equipment used during the violation. Additionally, the violator must also repeat the first sanction. (c) If a third time offender is caught, he will be traditionally punished by enduring a severe "beating".

3.1.2. Second Rule-in-Use: *Awig-awig* on conflict resolution

Another *awig-awig* effective in Gili Indah is one concerning the resolution of conflicts between fishermen and TBOs. It is called the *awig-awig* on Coastal Zoning of Gili Indah Islands. This was the first *awig-awig* formalized by the village administration, issued on 28 September 1998 and the revised edition was then launched on 1 September 2001.

The revised *awig-awig* consists of 10 sections and 33 articles. Important parts of the *awig-awig* are on zoning of the coastal areas of Gili Indah. Of the articles regulating zoning, there is an article that firmly establishes several locations specially intended for diving activities, where other types of activities, particularly catching fish using Muroami, are not allowed. Additionally, there are also articles on sanctions, prohibition of fishing using bombs and potassium, prohibition of the mining of coral stones and collection of large shellfish and turtles, neither for commercial nor personal purposes. Violation of the stipulations determined within this *awig-awig* is monetarily sanctioned.

3.2. The Local Organizations Involved

At the village level, there have been three local organizations involved in the governance structure: SATGAS, Ecotrust, APGA, the Fishermen's Association,

LMNLU, and the village administration that each has specific authority and responsibilities. In the current governance structure, SATGAS deals with a crucial problem of local governance, playing an important role as a monitor and law enforcer. They patrol marine waters surrounding Gili Indah and monitor any kind of rule infraction. For running these tasks, it gets a financial support from APGA and Ecotrust. In addition to that role, SATGAS also plays an important role in making village-level institutions. The emergence of rules prohibiting destructive fishing practices and the changes in the existing village institutions on coastal zoning came mainly from its members' idea.

Association of Gili Air Entrepreneurs (APGA) constitutes an organization of TBOs from Gili Air. It was formed in April 2001, mainly to facilitate collection of conservation fees. So far, APGA has successfully collected some Rp2,500,000 (\$294) per month.

Unlike APGA, which became a shelter for all Gili Air entrepreneurs, Ecotrust restricts its members to diving companies of Gili Trawangan only. Its main task is to collect conservation fees from recreational divers. Each diver must pay a conservation fee amounting to Rp20,000 (\$2.35) for their entire visit with a diving company. This means that a visitor of, for instance, the Indonesian Dive, only needs to pay Rp20,000 regardless how often he dives with the company.

The role of village administration basically is to service the public interest, to build the village's economy, to maintain community harmony, and to reconcile conflict that occurs among community members. In addition to these functions, related to coral reef governance, Gili Indah village also serves as a facilitator in making or changing village rules,

upholding social contracts (agreements), legislating and guaranteeing community decisions, implementing village policies, and mediating conflict.

As a property rights holder and an authorized agency over the region, Natural Resources Conservation Agency (BKSDA)'s involvement in governance mechanisms at the village level is inevitable, because the emergence of the governance structure itself could not be separated from its roles (Hidayat, 2005). The agency serves as SATGAS's partner in conducting marine security patrols. Additionally, its involvement is a form of political support and a symbol of government recognition of the existence of the local governance structure.

Despite being considered as important actors in coral reef management, Hidayat's investigation does not find out what a real role of Gili Indah fishermen in constructing the governance structure actually is. Organizationally, they do not participate actively in coral reef management, neither in implementation nor in the decision-making process. To the contrary, Hidayat find out that they occupy the position of a party that must be controlled and monitored. An investigation of Hidayat (2005) revealed that once fishermen get involved in meetings and propose some changes in the rules, they merely struggle for their own interest to receive compensation for not being able to fish within certain areas. They will fight to change rules considered to damage their interests.

Convention Board of North Lombok Fisherman Society (LMNLU) is an organization of fishermen residing in villages along the coastal region of North Lombok. It emerged in 2000 in response to massive destructive fishing practices and applications of some improper fishing devices by environmentally unaware fishermen as well as to the ineffectiveness

of state governance in dealing with such crucial problems. With respect to the working areas covering the northern region of Lombok, Gili Indah fishermen belong to its radius. LMNLU has played a critical role in building the governance structure. It, along with other local organizations, operates at the constitutional-choice level, where the main task is to make rules with respect to the prohibition of destructive fishing methods.

3.3. Monitoring and Systems of Graduated Sanctions

The success of local governance structure is identified by clear work allocation among SATGAS, Ecotrust and APGA. The first serves as a reef safeguard and the last two are responsible for making money so as to fund the first's activities. As a monitor and rule enforcer, SATGAS plays an important role because monitoring and enforcing activities are essential components of village control aimed at preventing free riding (Baland and Platteau, 1996).

So far, there are two kinds of patrol activities carried out, namely land-based monitoring and marine-based patrol (Hidayat, 2005). Land monitoring is conducted from the mainland with the help of telescopes installed on the beach. The aim is to watch for suspicious activities of fishermen or other potential violators; this can be regarded as an early detection system. If some suspected violators are spotted, those on patrol immediately go to the sea and pursue them. The second type of monitoring is marine patrol, where the guard officers patrol using motor boats around the waters, watching out for any violations. In addition, this governance structure is also supported by a clear sanction system considered to be a main determinant of success in CPR governance. There will not be a CPR with effective

governance without a clear sanction system (Balland and Platteau, 1996).

CONCLUSIONS

From the long discussion on the problems of coral reef management, particularly in Gili Indah, Indonesia, we can draw a conclusion that the processes of change from open access to a state property regime and local governance structure were mainly driven by economic motives. The fishermen's strong efforts to restrain an open access regime, their tough resistance toward the status of state property rights, the willingness of the government to run a state property regime, and the endeavour of TBOs to build a local governance structure are actually driven by economic motives. Fishermen have been worried about losing revenues, as they no longer have access to the resources. The state as well as TBOs are motivated to receive income from the resources through conservation fees and the selling of environmental services. These economic interests have resulted in a lasting conflict involving fishermen, TBOs and BKSDA. The conflict has driven institutional change, that is, a transformation of property rights from open access to a state property regime and local governance.

In addition, the discussion also shows that property rights need an effective governance structure for their enforcement. To a certain extent, this local governance works effectively due to its ability to construct a governance structure whose an effective monitoring pattern played by SATGAS, with financial support from Ecotrust and APGA. This effective governance structure could finally distribute the rights over the coral reef ecosystems between fishermen and TBOs. Beside that, it has also been able to resolve

the chronic conflicts between fishermen and TBOs. In contrast, the failure of the state governance structure concerning coral reef ecosystems in Gili Indah was caused by the incapability of BKSDA—as a rule enforcer that could barely enforce the rules in conducting effective monitoring.

REFERENCES

- Agrawal, A. 2001. "Common Property Institutions and Sustainable Governance of Resources." *World Development* 29, (10) : 1649-1672.
- Balland, J.M and J. P. Platteau. 1996. *Halting Degradation of Natural resources. Is there a Role of Rural Community?* Food and Agriculture Organization of the United Nation and Clarendon Press, Oxford.
- Barzel, Y. 1997. *Economic Analysis of Property Rights*. 2nd Edition. Cambridge University Press. Cambridge.
- Berkes, F. 1986. "Local Level Management and the Common Problem: A Comparative Study of Turkish Coastal Fisheries." *Marine Policy* 10, 215-229.
- Berkes, F. 1996. "Social Systems, Ecological Systems and Property Rights." In S. Hanna, C. Folke, K. G. Mäler and A. Jansson (Eds.). 1996. *Rights to Nature: Ecological, Economic, Cultural and Political Principles of Institutions for the Environment*. Island Press. Washington, D. C; Covelo, California.

- Bromley, D. W. 1991. *Environment and Economy: Property Rights and Public Policy*. Blackwell. Cambridge, USA.
- Bromley, D. W. 1992. "The Common, Common Property and Environmental Policy." *Environ. Res. Econom.*, 2:1-17.
- Bruce, J. W. 1998. *Review of Tenure Terminology. Tenure Brief. No 1*. Land Tenure Center, University of Wisconsin, Madison
- Bryan, D., L. Burke, J. McManus and M. Spalding. 1998. *Reefs at Risk*. World Resources Institute (WRI), International Center for Living Aquatic Resources Management (ICLARM), World Conservation Monitoring Center (WCMC) and United Nations Environment Programme (UNEP)
- Burke, L., L. Selig and M. Spalding, 2002. *Reefs at Risk in Southeast Asia*. World Resources Institute.
- Cole, D. H. 1999. New Forms of Privatization: Property Rights in Environmental Goods. In B. Bouckaert and G. D. Geest (Eds.). *Encyclopedia Law and Economics*. 1999. Edward Elgar and the University of Ghent.
- Hardin. G. 1968. "The Tragedy of the Commons." *Sciences* 162.
- Hanna, S. and M. Munasinghe. 1995. *An Introduction to Property Rights and the Environment*, in S. Hanna and M. Munasinghe (Eds.). 1995. *Property Rights and the Environment: Social and Ecological Issues*. The Beijer International Institute of Ecological Economics, the World Bank.
- Hanna, S. C. Folke and K.G. Mäler. 1995. "Property Rights and Environmental Resources." In S. Hanna and M. Munasinghe (Eds.). 1995. *Property Rights and the Environment: Social and Ecological Issues*. The Beijer International Institute of Ecological Economics, the World Bank.
- Hallowell, A. I. 1943. The Nature and Function of Property Rights as a Social Institution. *J. Legal. Pol. Socio.* 1:115-38.
- Hidayat, A. 2005. *Institutional Analysis of Coral Reef management. A case Study of Gili Indah Village West Lombok, Indonesia*. Shaker Verlag, Aachen, Germany.
- Hopley, D and Suharsono. (Eds.). 2000. *The Status of Coral Reefs in Eastern Indonesia*. Global Reefs Monitoring. Townsville, Australia
- Knight, J. 1992. *Institution and Social Conflict*. Cambridge University Press.
- Knight, J. 1995. "Model, Interpretation and Theories: Constructing Explanation of Institutional Emergence and Change." in J. Knight and I. Sened (Eds.). 1995. *Explaining Social Institutions*. University of Michigan. Ann Arbor.

- Libecap, G. 1989. "Distributional Issues in Contracting for Property Rights." *J. Inst. Theor. Econom.* Vol. 145.
- Loud, P. (1997). "Maps of Indonesia." Milton Keynes. Woodley Headland, UK. Download: <http://users.powernet.co.uk/mkmarina/indonesia>
- McGoodwin, J.R. 1984. *Fish Report 289. Food and Agricultural Organization.*
- McKean, M. A. 2000. "Common Property. What is It, What is Good for and What Makes It Work?" In C. C. Gibson, M. A. McKean and E. Ostrom (Eds.). 2000. *People and Forest: Communities, Institutions and Governance.* The MIT Press, Cambridge, Massachusetts.
- Miles, M. B. and A. M. Huberman, 1994. *Qualitative Data Analysis.* Sage: Thousand Oaks, London and New Delhi.
- Miller, D. 1989. "The Evolution of Mexico's Spiny Lobster," in F. Berkes (Ed.). 1989. *Common Property Resources: Ecology and Community-Based Sustainable Development.* Belhaven Press, London.
- Mossa, K. M., I.S. Suweno, M. Hutomo, R. Dahuri and S. Salim. 1995. *Indonesia Country Study on Integrated Coastal and Marine Biodiversity Management.* Ministry of State for Environment, Republic of Indonesia in Cooperation with Directorate for Nature Management, Kingdom of Norway.
- North, D. C. 1990. *Institutions, Institutional Change and Economics Performance.* Cambridge University Press
- Ostrom, E. (1990). *Governing of the common. The Evolution of Institutions for Collective Action.* Cambridge University Press.
- Ostrom, E and E. Schlager. 1996. "The Formation of Property Rights." in S. Hanna, C. Folke, K. G. Mäler and A. Jansson (Eds.). 1996. *Rights to Nature: Ecological, Economic, Cultural and Political Principles of Institutions for the Environment.* Island Press. Washington, D. C; Covelo, California.
- Pomeroy, R.S. 1995. "Community Based and Co-management Institutions for Sustainable Coastal Fisheries Management in Southeast Asia." *Ocean. Coast. Man.* 27 (3) 143-162
- Pomeroy, R.S. 1998. "A Process for Community-based Fisheries Co-management." *AFSSR News Section. ICLARM Contribution No. 1448*
- Pomeroy, R.S and F. Berkes. 1997. "Two to Tango: the Role of Government in Fisheries co-management," *Marine Policy* 25 (5) 465-480
- Raychaudhuri, B. 1980. *The Moon and the Net: Study of a Transient Community of Fishermen at Jambudwip.* Government of India Press, Anthropological Survey of India, Calcutta.

- Ruddle, K. 1991. "A Research Framework for the Comparative Analysis of Traditional Sole Property Rights Fisheries Management System in the Pacific Basin." *Res. Man. Optim.* 8 : 3-4.
- Ruddle, K. 1993. "External Forces and Change in Traditional Community-Based Fisheries Management System in the Asia-Pacific Region." *Mar. Anthropol. Studies.* 6 : 1-3.
- Ruddle, K. 1996. "Formulating Policies for Existing Community-Based Fisheries Management Systems." *The Journal of Policy Studies*, No. 1. Kwansai Gakuin University Policy Studies Association. Gakuen, Sanda 669-13, Japan
- Salafsky, N and E. Wollenberg. 2000. "Linking Livelihood and Conservation: A Conceptual Framework and Scale for Assessing the Integration of Human Needs and Biodiversity." *World Dev.* 28 (8):1421-1438.
- Schlager, E and E. Ostrom. 1992. "Property Right Regime and Natural Resources: A Conceptual Analysis." *Land Econom.*, 68. 249-265.
- Schlager, E and E. Ostrom. 1999. Property Rights Regime and Coastal Fisheries: An Empirical Analysis. In M.D. McGinnis (Ed.). 1999. *Polycentric Governance and Development*. Reading from the Workshop in Political Theory and Policy Analysis. The University of Michigan Press.
- Setiawan, B. 1999. *Potensi dan Kendala dalam Pengelolaan Terumbu Karang: Pedoman untuk Intervensi Pengelolaan Berbasis Masyarakat. Desa Gili Indah, Kabupaten Lombok Barat* (The Potency and Challenge in Managing Coral Reef Ecosystems: A Guide for Intervention of Community-based Resource Management, Gili Indah Village, West Lombok). Proyek Rehabilitasi dan Pengelolaan Terumbu Karang (COREMAP) and Lembaga Ilmu Pengetahuan Indonesia (LIPI), Jakarta.
- Thomascik, T., A.J. Mah, A. Nontji and M.K. Moosa. 1997. "The Ecology of the Indonesian Seas: Part Two." *The Ecology of Indonesia Series*. Volume VIII. Periplus Editions (HK) Ltd., Hong Kong
- Thorburn, C. C. 2000. Changing Customary Marine Resource Management Practice and Institutions: The Case of Sasi Lola in the Kei Islands, Indonesia. *World Dev.* 28 (8) 1461-1479.
- Tisdell, C. 1977. "Local Communities, Conservation and Sustainability. Institutional Change, Altered Governance and Kant's Social Philosophy." *International J. Soc. Econom.* 24 (12) 1361-1375.
- Yin, R. K. (1994). *Case Study Research: Design and Methods*, 2nd Edition. Thousand Oaks, CA. Sage.