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Contractual solution to the tragedy of property right in coastal fisheries

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Abstract

This article aims to analyze how private property regimes can co-exist with common property regimes in a coastal area. The case study shows how the dynamics of private property and common property right holders is in creating commitment to make symbiosis in resource use. This is based on a case study in two villages in West Lombok, Indonesia, where pearl-culture as a private property resource exists in a common property regime. This is a successful story in dealing with the tragedy of property rights in the country wherein established institutional arrangement is still absent. Nevertheless, this may be site specific, and fragile if there is no institutional arrangement combining formal and informal rules and involving both formal and informal authorities. To make a robust solution, multilevel solution must be considered: national, local, and community level, with reference to Japan case.

Keywords: Property right; Pearl culture; Conflict; Institution; Coastal Fisheries; Commons; Resources management

1. Introduction

This article aims to analyze how private property regimes can co-exist with common property regimes in a coastal area. This is based on a case study in two villages, Gondang Village and Jenggala Village, in West Lombok, Indonesia (Fig. 1), where pearl-culture as a private property resource exists in a common property regime. The pearl-culture industry is capital intensive and is owned by a joint venture between foreign and domestic investors. The pearl-culture industry, one of the high-potential industries for export promotion, is economically promising for both investors and even the national and local governments. In the local autonomy era, the local government is encouraged to seriously increase local original income for its expenditure, and the pearl-culture industry is still the mainstay of the important income sources of the local original income. Therefore, the local government has encouraged the rise of pearl-culture investment in West-Lombok. The rise of pearl-culture investment, however, brings potential conflict with traditional fisheries. Charles [1] called it a type of external allocation conflict, where conflicts arise among users due to competition over the use of coastal space. Moreover, because the property right owned by the pearl-culture industry is granted by the local government, such conflict also involves the local government. Therefore, it is necessary to analyze: How is the interaction among these three actors regarding property rights in marine resources? Is there a way out to deal with the tragedy of property rights that so often inevitably occurs?

This paper is organized in four parts, starting with a theoretical review of property rights, followed by the existing condition of common property regime in the

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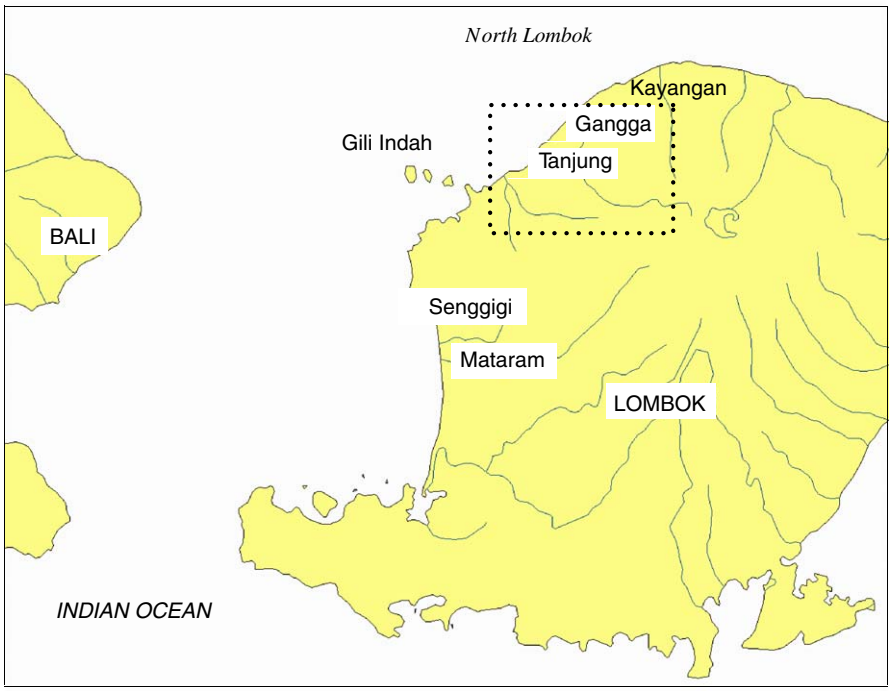

Fig. 1. Map of North Lombok, Nusa Tenggara Province, Indonesia.

case study area. It then proceeds to analyze the conflicts between the pearl-culture industry and the traditional fishers, including how their conflict resolution has been achieved. Nevertheless, this conflict resolution needs to involve the formal authorities and regulation.

2. Property right: theoretical perspective

It is important to initially understand the characteristics of property rights in fisheries. Firstly, the terms *resource*, *resource domain, property right,* and *property regime* are distinguished [2]. A *resource* is anything that is used for the needs of an organism, where a natural resource is a material that has economic or social value when extracted from its natural state [2]. Gibbs and Bromley [3] define *resources* as "those components of an ecosystem which provide goods and services useful to man", whereas Grima and Berkes [4] define it as "assets for the creation of human satisfaction or utility". *Resources domain* is defined as the fixed spatial dimension in which resources are found [2]. For example, fish stock is a resource while coastal areas or the ocean are resource domains. The term "a resource", is similar to Ostrom's term of "resource unit", while "resource domain" is similar to "resource system [5]".[2]

[2]Ostrom defined "resource system" as stock variables that are capable, under favorable conditions, or producing a maximum quantity of a flow variable without harming the stock or the resource system itself. Meanwhile, resource units are what individuals appropriate from resource systems.

Property is "an aggregate of rights which are guaranteed and protected by the government" [2], whereas Bromley [6] defines *property* as "a claim to a benefit (or income) stream, and a property right is a claim to a benefit stream that some higher body—usually the state—will agree to protect through the assignment of duty to others who may covet, or somehow interfere with, the benefit stream". Referring to Ostrom and Schlager [7], property right is "enforceable authority to undertake particular actions related to specific domain". In this context, *property regimes* are the sets of rules (laws, regulations, customs) that define property rights [2].

What is a common-pool resource (CPR)? Ostrom [5] defines CPR as "natural or man-made resource system that is sufficiently large as to make it costly to exclude potential beneficiaries from obtaining benefits from its use". Meanwhile, Buck [2] identifies CPRs as "substractable resources managed under a property regime in which a legally defined user pool cannot be efficiently excluded from the resources domain", while *commons* are resource domains in which CPRs are found [2]. Buck's definition is derived from her understanding about the attributes of resources : *exclusion* (the difficulty or feasibility of excluding others from using the resources, and *subtractability* (the degree to which one appropriator's use of the resources diminishes the amount of the resource left for another) [2]. From these attributes, the resources can be divided into four types of goods [2]: (a) *private goods* (easy to exclude with high subtractability), (b) *toll goods* (easy to exclude but low

subtractability), (c) *common pool resources* (difficult to exclude with high subtractability), and (d) *public goods* (difficult to exclude with low subtractability). Each type of good implies a different kind of property right. Further, Buck [2] describes "most private goods may be sold, but public goods cannot, and because common-pool goods are substractable, the right of access is usually limited to a legally defined user pool" [2].

In marine fisheries, there are three or four ideal forms of property regimes as ideal type [2,8–10]. The first is ***Open Access***, which is free for all, property to no one. Second, ***State Property (res publica)*** that management controls and is held by the nation state or crown; public resource to which use rights and access rights are not specified. Third, ***Private Property (res privatae)*** that is privatization of rights through the establishment of individual or company-held resources. Fourth, ***Communal Property (res communes),*** use rights for the resource are controlled by an identifiable group and are not privately owned or managed by governments. This is collective ownership. These are ideal types of property regimes because in reality it is difficult to find purely open access, state, private, or communal property. Instead, they often overlap each other [11].

Nevertheless, there are two different concepts that are represented by Western and traditional views [8] regarding *common property*. Western scientific resources management identify common property as resources which are not amenable to private appropriation, so that such resources are basically open access and freely available to anyone, such as in the United States where some resources are owned by no one and belong to every one [8]. The Western view is also represented by the "tragedy of the commons" model of Hardin, which assumes common property resources are really open access. On the contrary, according to traditional view, common property should be restricted to communally owned resources. Moreover Gibbs and Bromley [3] argue that "Common property rights are a special class of property rights that assures individuals access to resources over which they have collective claims […] common-property is created when members of an interdependent group agree to limit their individual claims on a resources in the expectation that the other members of the group will do likewise. Rules of conduct in the use of a given resource are maintained to which all members of the interdependent group subscribe".[3] However, common property regimes can provide equitable sustainable access to the resource with minimal cost—or, on the other hand, it should be **efficient, stable, resilient,** and **equitable**—by some prerequisites [3]:

(a) a minimum of disputes and limited effort necessary to maintain compliance: the regime will be efficient,
(b) a capacity to cope with progressive changes through adaptation: the regime will be stable,
(c) a capacity to accommodate surprise or sudden shocks: the regime will be resilient,
(d) a shared perception of fairness among the members with respect to inputs and outcomes: the regime will be equitable.

As Ostrom and Schlager [7] identified, for CPRs there are a bundle of rights which consist of:

(a) *access right* (the right to enter a defined physical property and enjoy nonsubtractive benefits),
(b) *withdrawal right* (the right to obtain the products of resources),
(c) *management right* (the right to devise operational-level rights of withdrawal),
(d) *exclusion right* (the right to devise operational-level rights of access), and
(e) *Alienation right* (the right to sell or lease all or part of the above collective-choice rights).

These rights may be distributed to the people that may or may not hold the full set of rights. The people who hold these rights can be categorized into five categories [5]. They are:

(a) *owner* (possess collective-choice rights to participate in management and exclusion, and also hold the right of alienation),
(b) *proprietor* (possess collective-choice rights to participate in management and exclusion),
(c) *claimant* (posses the same rights as authorized users plus the collective-choice right of management),
(d) *authorized user* (has entry and withdrawal rights), and
(e) *authorized entrant* (holds an operational-level rights of access).

These rights may originate from the government which grants rights to fishers (*de jure* right), and also may originate from fishers (*de facto* rights) which are not usually recognized by the government [7]. However, the system of property rights and rules originated from fishers—that are locally devised or defined, implemented, monitored and enforced by fishers themselves—are likely to perform better than the system set and enforced by external authorities. The rules that fishers devise are well matched to the physical, social, and cultural environment of the fishers community.

[3]Gibbs and Bromley [3] also defined common property regimes as forms of management grounded in a set of accepted social norms and rules for the sustainable and interdependent use of collective goods.

3. Fishing communities and their communal property rights

In Indonesia, territorial use right, as part of common property rights, was initially legally recognized by *Statbald 1916: 157*, which was a legal product of Dutch Colonization. By this law article 2, stated that local people have full right over the marine-coastal area with less than 9 m depth, and this right is not transferable. Furthermore, *Kustvisserij Ordonantie 1927:144* (the Coastal Fisheries Law) article 6, explicitly stated that those who want to engage in coastal fishing were required to recognize the traditional fishery right of the local people based on their customary law. This implicitly means that customary law in coastal fisheries was legally recognized. Customary law usually contains both use right and management right. Nevertheless, it is not clear enough yet that management right of the local fishers over the coastal area was legally acknowledged. However, by recognition to the customary law, it might be meant as devolution of the fisheries management to the local people. Unfortunately, these content of *Staatbald 1916: 157* and *Kustvisserij Ordonantie: 1927:144* were dropped by the establishment of Fisheries Law No 9/1985, which is more centralistic and modern, and does not recognize the common property right owned by the traditional fishers [12]. The modernity in resources management is characterized by the state dominance in the process of management and dominance of the top-down approach [13]. During the New Order in which the Fisheries Law No 9/1985 was applicable, the fisheries management was held by the central government with the top-down approach [12]. Nevertheless, in 2004, Indonesia revised the fisheries law, called Fisheries Law No 31/2004, in which marine customary law is more highly recognized, but this law is not as strong as *Staatbald 116: 157* and *Kustvisserij Ordonantie 1927:144* in supporting the common property right of the traditional fishers. This new fisheries law just calls for considering the role of marine customary law in any fisheries management and development.

Both in Gondang and Jenggala Village, the fishers do not have *de jure* property rights, but they bear a set of *de facto* property rights. How do they engage in fishing with their property right? In Gondang Village, the traditional fishers have been using motor boats since 1990 by their own innovation. In 1996, the central government developed a fisheries modernization program by which the traditional fishers in Gondang Village got inboard motor boats 8.5 HP. Unfortunately, only one of them can be utilized, while another was broken and then sold for Rp 4.5 million. This money was used as capital for the fisheries cooperative. In 2000, there was another motorization program, belonging to the local government, that provided soft loans for traditional fishers to buy 6.5 HP motor boats which cost approximately Rp 2.3 million. However, the fishers still fish in their traditional way and are subsistent.

Table 1
Fishing gears and season, in Gondang and Jenggala, 2004

Fishing gears	Targeted species	Season
1. Drift gillnet		
(a) 1 in	Fringscale sardinella	a. All the years
(b) 1.5 in	Flying fish	b. July–August
(c) 2 in	Seads	c. December–February
(d) 3 in	Eastern little tuna	d. July–August
2. Hand-line	Groupers and other demersal species	April–June
3. Bulu-Bulu (squid jiggers)	Squid	July–October
4. Troll line	Yellow tail, eastern little tuna	January–March
5. Seine-net	Anchovy	April–November

Table 1 presents the types of fishing gear, targeted species and seasons with regard to the fishing pattern. Table 1 also depicts how the fishers have their own knowledge about fish species, fish behavior and the ecosystem, which is termed traditional ecological knowledge (TEK).[4] For example, prior to catching yellow tail and tuna, the fishers usually watch the flying birds above the sea surface. The flying birds can indicate how abundant the fish are beneath the water. In addition, dark clouds above the mountain are used as a signal for westerly winds, which indicate the start of the off-fishing season. However, TEK is important as a cognitive pillar in the institution of the commons.

Meanwhile, the regulative pillar of the institution is depicted by a set of rules established by the local fishers. Beside the cognitive aspect, there is a regulative aspect of common property resources. The local fishers established unwritten local rules in 1997 that contained prohibition of beach seine and mini purse seine along the coast of Gondang. Before 1997, these fishing gears were allowed to operate in this area. Nevertheless, due to the operation of such fishing gear, conflicts among fishers often occurred, so the rule of prohibition was made. Another rule also restricts the use of purse seine less than 1 km from coastline. These rules are aimed at protecting small fishers who are highly dependent on the coastal area. Those who violate such rules will get a particular fine, such as confiscation of the fish caught. Moreover, the fishers also established a rule for the prohibition of destructive fishing practices, such as blast

[4] "The knowledge acquired through living in contact with the natural resources of a particular area over many generations" [14]. Moreover, Kay and Alder [15] and Ruddle [16], for example, broadly divided components of traditional knowledge and practice into knowledge of the biophysical and biological resources characteristics.

and poison fishing. This latter rule was actually established by the Fishers Council of Northern Lombok, of which Gondang and Jenggala fishers are members; therefore, this rule is applicable along the Northern Lombok coast [17]. The penalties for destructive fishing practices are as follow:

(a) Those who are found and proven to be practicing bombing and fishing with potassium cyanide and other poison materials will be caught and taken to the official authority to sign a statement of cured and pay a fine of Rp 10 million.
(b) If they are not undaunted with practicing such fishing methods, their fishing gear and boat will be burnt by the local fishers.
(c) After the first and second sanctions have been imposed, and they are still found practicing destructive fishing methods, they will get physical sanctions from the local people, without resulting death.

Those rules are effectively enforced. The rules controlling ecological destruction can be established if the appropriators can agree on norms, monitor each other, and sanction noncompliance with agreement [7]. This enforceability is also caused by the support and recognition from the local government. Actually, the government also has a legal instrument to prevent such destructive fishing. Nevertheless, as stated by Ostrom and Schlager [7], control of natural resources by state authorities is frequently less effective and efficient. The regulative process by the local fishers exemplifies the fishers as a "proprietor" that have a set of withdrawal rights, management rights, and exclusion rights. Using Scott's criteria of institution [18], Table 2 presents institutional performance of common property right system in the study area.

Table 2
Institutional performance of common property management in Gondang and Jenggala village

Indicators	Performance
1. Normative	
Orientation	Subsistence oriented
Objective	Protecting small traditional fishers Keeping marine resources sustainability
2. Cognitive	
Type	Traditional ecological knowledge
Transfer of knowledge	Intergenerational transfer, inter-community transfer
Application	Based on experience
3. Regulative	
Territorial boundary	Clear, less than 1 km from coast line
Operational rules	Prohibition of destructive fishing practices Zoning for beach seine, purse seine, and seret
Authority	Fishers Group and Fishers Council of Northern Lombok
Monitoring	Self-monitoring
Sanctions	Fine, physical sanction, court process
Enforceability of rules	High

4. When private property regimes come to the commons

4.1. Formal regulation of pearl-culture

Pearls are high-value goods, therefore since the Dutch colonization era, diving for pearls in the bottom of the sea for harvest has been under formal regulation. *Statbald* no 157/1916 allowed the local fishers to dive harvesting pearl-snails and pearl-oysters. Meanwhile, pearl-culture has been carried out since 1958 by the marine fisheries research station. As a modern industry, pearl-culture has been developed since 1968 when Foreign Investment Law and Domestic Investment Law were established [19]. This is because the rise of the pearl-culture industry is not apart from the rush of foreign capital flow into Indonesia.

Furthermore, the regulation of the pearl-culture industry refers to Government Regulation of Fisheries Enterprise No 54/2002 that delegates the provincial and the municipal government to issue Fisheries Enterprise Certificates to companies that develop aquaculture and marine-culture in their administrative territory. The certificate also contains the location of pearl-culture which is determined by the local government. In Addition, to generate income for the municipal development as a consequence of the local autonomy, the West-Lombok Government has released Municipal Regulation (*Perda*) No 14 and 15/2001 that manage a retribution fee for the pearl-culture industry of Rp 100,000/site and a resources management fee of around 1% of the harvesting value.

4.2. Pearl-culture industry and private property rights in two villages

In Gondang Village, the pearl-culture industry has developed since 1994. There was only one company, called "Company A". Pearl-culture was operated by using floated rafts, equipped with wire netting for pockets and ten long-lines. The pearl-culture area was located at the fishing area. The establishment of all the equipment for pearl-culture in the fishing area was done without any consultation with the local fishers who always fish there. The company just referred to the site determined by the government. The government had the authority to determine where the pearl-culture site would be located. At that time, there was no regulation

calling for the company to get approval from the local fishers. This is because in 1994, a centralistic approach was still dominant, and the only type of fisheries management was government-based management.

Nevertheless, the local fishers attempted to react against the establishment of the pearl-culture industry, because the pearl-culture site hampered the local fishers in fishing activities. *First,* the site was located at the edge where traditional local fishers engaged in fishing. *Second,* the fishers' nets usually drifted and ended up caught on the long-line of pearl-culture. *Third,* Company A prohibited the fishers to hang on to the long-line during fishing. Accordingly, this led to the conflict between Company A and the local fishers. In 1996, the local fishers made a demonstration to protest the operation of Company A, and demanded that the site must be relocated 150 m away from coastline. In addition, the local fishers also demanded that the local people must be employed.

The conflict was resolved by a mediation process initiated by the Sub-District Authority and representing the local fishers, Company A and the Village Authority. Some points of agreement were made. *Firstly,* the Company A had to pay a compensation fee to the local fishers amounting to Rp 250,000/month/group. There were five fisher groups, and each group comprised around 40 fishers. *Secondly,* Company A had to distribute 5 kg of rice and 1 kg of sugar to 200 fishers one week before *Idul Fitri* (feast celebrating the end of fasting period). *Thirdly,* the fishers were allowed to hang on to the long-line of pearl-culture equipment during fishing. Furthermore, Company A demanded the fishers to help the company in security matters.

The agreement was implemented from 1997 to 1999. The compensation fee gained from the company was utilized in various ways. For example, the *Sumber Laut* fishing group used the compensation fee for capital for a savings and loans institution, as the embryo of fisheries cooperative. Company A also distributed Rp 1.5 million for each fishing group as a present from the initial harvest. Moreover, a social charity program was held by the company to take care of 70 orphan children in fishing communities. Those social programs initiated by the Company made the fishers feel relieved. Nevertheless, these programs ended in 1999, because the Company was closed due to bankruptcy.

In 2004, Company A revived its business after getting foreign capital from Japan, with equity sharing its 20:80. The sites of pearl-culture are similar to the previous sites (Fig. 2). The company plans to export 90% of the harvest, with the value being approximately US$ 750,000. Based on the certificate issued by the Provincial Government, the period of the company's operation is 30 years. In the approval letter issued by the Provincial

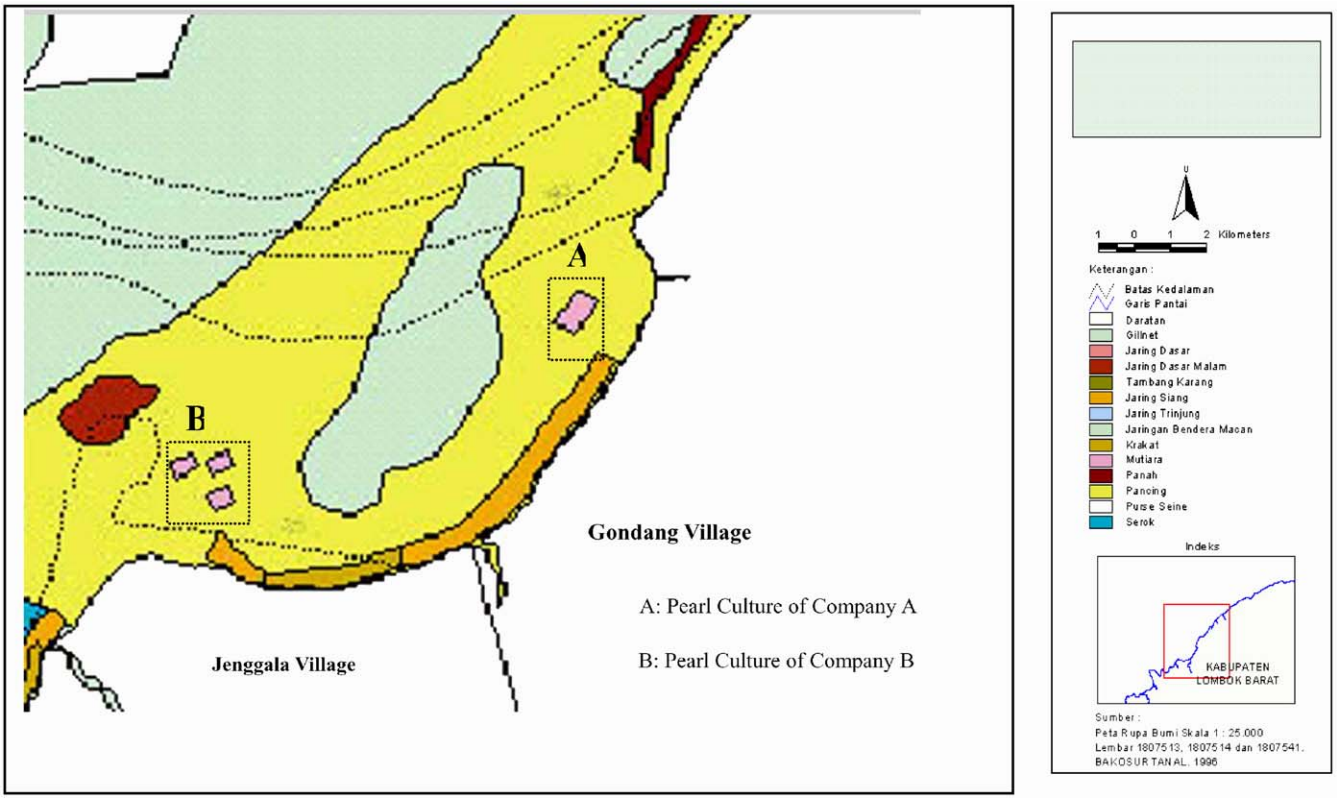

Fig. 2. Map of pearl-culture area.

Government, there are some obligations. For example, the company has to involve, educate, and train 90% of the local employees, and the employees have to be paid based on the regional minimum wages regulated by the local government. Furthermore, the municipal government has particular rules for the company as a prerequisite of recommendation. This recommendation is one of the documents required by the provincial government to issue the certificate. The rule is that the pearl-culture area has to be approved by the local fishers. Unfortunately, this rule is unwritten and just an effort made by the municipal government to harmonize pearl-culture and traditional fisheries. Nevertheless, this request is ignored by the company because the company feels that its recent status is a continuation of which was applicable in the previous period (1994–1999). The company does not consult with the local fishers regarding the site location of pearl-culture, because in 1996 the company had an agreement with the local fishers. However, the company does not consider that during this time-lag of 5 years (1999–2004), some changes are likely to occur, such as an increased number of fishers. As a result, in 2004, when the company set the equipment of the pearl-culture, the fishers' felt unrest, because their fishing area is getting narrower. Therefore, this leads to the new conflict.

To resolve the conflict, there is a new agreement between the local fishers and the company. *Firstly*, the company has to pay a compensation fee to the local fishers amounting to Rp 250,000/month/group. There are ten affected fishing groups. *Secondly,* the coconut plant available in the company office area must be harvested for social charity purposes, especially for fatherless children. *Thirdly,* the fishers are allowed to hang on to the long-line of pearl-culture equipment during fishing. *Fourthly,* if the fishers' nets are drifted and caught on the long-line, it is compulsory for both fishers and the company to lift them together. If due to drifting, the nets are broken, the company has to compensate the fishers. This agreement seems harsher than the previous agreement and biased to the local fishers' side. Accordingly, the fishers feel relieved due to gaining good luck with such an agreement. The fishers even treat the sites of pearl-culture as a new ''fish aggregative device''. Many more species of fish are easily found surrounding this area.

Meanwhile, in Jenggala Village, there is also another company, say Company B, that develops pearl-culture as a kind of hatchery to supply seed for other companies. Company B occupies an unutilized site owned by Company A. Company A actually is authorized to three sites (Fig. 2), but uses only one. This shows that the pearl-culture industry has a transferable right that the local fishers with their common property right do not have. The transferability is informal without any written agreement, and Company B is not demanded to pay a ''rental fee''. This is because Company B is recognized as a boat industry where Company A is a customer of Company B, purchasing boats. Company B is now trying to diversify its business, since 2004, after getting a new partner from Australia equity sharing is 50:50. The owners of company B are local people, while Company A is an outsider. Company B's status as local people makes it easier to develop agreements with the local fishers without any proceeding conflicts. The points of agreement seem similar with ''Company A's'' case. *Firstly*, the company will pay a compensation fee to the local fishers amounting to Rp 250,000/month/group. There are three affected fishing groups. *Secondly,* there is profit sharing, around 10% of the harvest goes to the fishers. *Thirdly,* the fishers are allowed to hang on to the long-line of pearl-culture equipment during fishing at daytime. Meanwhile, at night, the fishers are prohibited to hang on because this can disturb the culture activities. *Fourthly,* the fishers are obliged to keep guard and monitor the security of the pearl-culture site.

This agreement, especially the profit sharing system, attracts the fishers to increase their sense of belonging over the pearl-culture industry. The fishers here are happy getting a ''share'' of the harvest to increase their income. Moreover, most employees stem from the local people. Like in the previous case in Gondang Village, the fishers consider the pearl-culture site as a new ''fish aggregating device''. A set of benefits gained from the pearl-culture industry does not make the neighbor villagers jealous. Conversely, there is one village that refuses proposal from some companies to develop a pearl-culture industry there. One reason is that traditional fishers will be disturbed by the industry due to geographical factors. This village has a small bay. If the pearl-culture is developed in the mouth of the bay, there will be no entry and exit access for the fishers anymore.

In sum, Fig. 3 describes interaction among Company A, Company B, local fishers, and the Regency Government.

5. Discussion

Referring to Ostrom, the pearl-culture industry can be categorized as an ''owner'' who has all of types of property rights, from withdrawal right to alienation right. The alienation right is the key characteristic of ownership, the idea being that you are not an owner unless you have the right to sell off all your rights [7]. In this case, the ''owner'' is identical to the actor who holds private property right by which private property resources are managed. This private property right is granted by the Provincial Government, to whom the pearl-culture industry has to pay a retribution fee. Meanwhile, the local fishers can be identified as

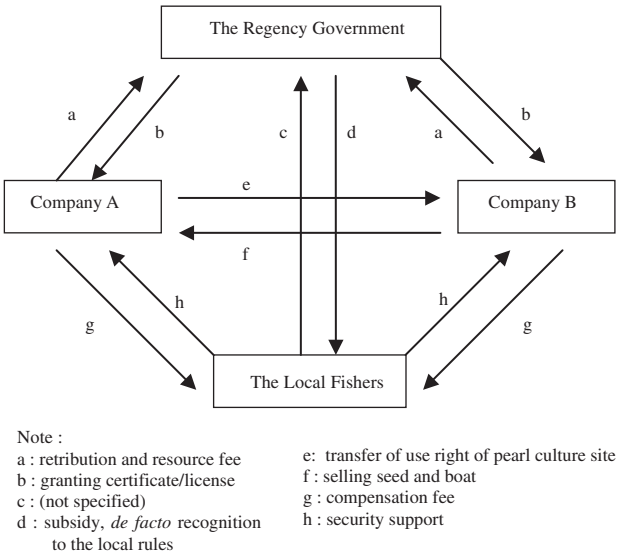

Fig. 3. Interaction among Company A, Company B, local fishers, and the regency government.

Table 3
Bundles of rights associated with positions

Type of rights	Pearl industry	Local fishers	Outsider fishers
Access	X	X	X
Withdrawal	X	X	X
Management	X	X	
Exclusion	X	X	
Alienation	X		

"*proprietors*" who possess collective-choice rights to participate in management and exclusion, except alienation, whereas the outsider or migrant fishers who operate in Gondang and Jenggala village as "authorized users" have access right and withdrawal right only (Table 3). Even though, the local fishers are actually not apart from the private property right, because they own fishing gear, boats and caught fish (Table 4).

Concerning the power relation among those actors, the pearl-culture industry is stronger than both the local fishers and migrant fishers. Although, the local fishers have tried to strengthen their bargaining power. The strong position of this industry is due to the recognition of the legal system and private property rights. Moreover, the governments have an interest in supporting such industries as a source of government income. Meanwhile, the local fishers assuming the coastal area is their own, are still weak, because legal recognition to their common property right is not clear enough. Among formal legislation products, there is no explicit recognition to the common property right belonging to the local fishers, except *Staatbald 157/1916* that since 1985 was invalid. In short, private property rights can

Table 4
Property system of both pearl-culture and capture fishing

Property	Pearl-culture	Capture fishing
Water area	Culture site (*quasi-private property*)	Fishing ground (*common property*)
Resources	Pearl, pearl oyster, pearl snail (*private property*)	Fishes (*common property*)
Equipment	Long-line, raft, pocket, etc. (*private property*)	Gear, boat, caught fish (*private property*)

exist in the common property right arena because of the power of the government and the law.

Nevertheless, in this case of complex property rights comes potential conflict. *First,* there is the conflict between two authorities: the government and the local people. The government holds the authority with reference to the formal laws, while the local people claim their authority to grant common property right to the local fishers under local rules basis. The different references or regulative sources of them in granting property right is actually an essential problem. Even though they have never been in conflict yet, the conflict between them will potentially occur.

Second is conflict between right holders, called external allocation conflict, while Satria et al. [20] identified it as class conflict involving two actors representing different class. This type of conflict occurred many times in the case study area, especially in Gondang Village. This occurs because those involved act independently due to lack of communication or incapacity to make credible commitments [7]. Although, in Gondang Village the commitment between them is eventually made. Meanwhile, in Jenggala Village, the conflict can be prevented because the company has the capacity to communicate and make credible commitments to the local fishers. The harmonious social relation among them is led by their similar cultural background because the company owner is also a native person.

The complexity of the fisheries property right system can be summarized by Fig. 4. Between the common property right and the private property right system there are different process: one is informal, while another is formal. According to these two case studies, they can co-exist because the pearl-culture industry and local fishers successfully create commitments to make symbiosis, even though this is preceded by the conflict.

These cases are different from the Japanese fisheries system. In Japan, marine culture and capture fisheries can co-exist under the established institutional arrangement. This is because both fisheries are managed by the Fisheries Cooperative Association (FCA) with reference to the Fisheries Law. The Fisheries Law explicitly recognizes fishery rights. Fishery rights are rights that

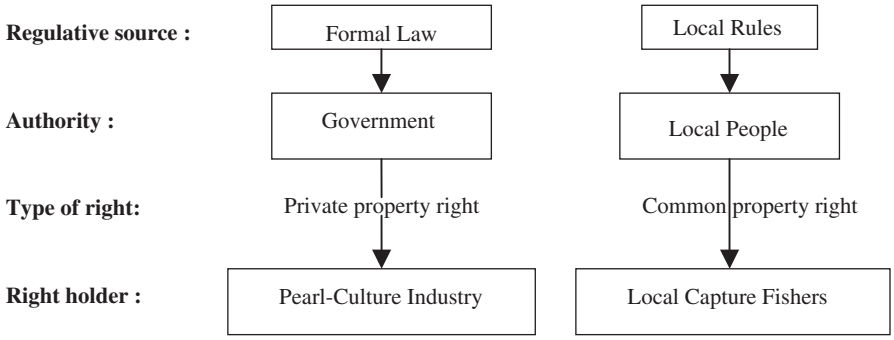

Fig. 4. Process to get property right in Lombok.

Table 5
Type of fishery right

Type of fishery right	Definition	Species
1. Joint/common fishery right	A right to operate a common fishery.	Non-migratory fish, shellfish, and seaweed.
(a) Type 1 (for littoral resources)	A right to harvest aquatic animals and plants attached to the sea bottom.	Littoral resources which do not migrate to other sea areas.
(b) Type 2 (stationary gear like small net and gill net set)	A right to fish using stationary fishing gear at a depth of less than 27 m. The net can be set any place within a sea area specified by the right.	Mainly migratory pelagic resources and partly demersal resources.
(c) Type 3 (for beach seine)	A right to fish using beach seine in sea area specified by right.	
(d) Type 4 (inland fisheries)	A right to operate inland water fisheries fit for propagation of aquatic animals and plants.	
2. Set-net fishing right	A right to fish using a barrier-type set net at depth more than 27 m. Permitted fishing area is specified by the right.	Migratory pelagic resources such as salmon, yellowtails, etc.
3. Demarcated fishing right	A right to develop mariculture in coastal area.	Seaweed, oysters, pearls, etc.

guarantee the business operations of fisheries, which require exclusive use of the surface of the water through the installation of artificial structures (fixed fisheries, aquaculture), or fisheries that are prone to encroachment upon business by other parties because of the ease of taking catches (selfish, seaweed harvesting business). Based on the fisheries law 1984, in general the Fishery Right System (FRS) can be catogorized into three types, as follow : (1) joint/common fishery right, (2) set-net fishery right, and (3) demarcated fishery right (Table 5). Common fishery refers to fisheries operated in specified waters that are used in common [21]. As mentioned in the fisheries law, the fishery rights are granted to the FCA by the prefectural governor. Fishery right is a kind of use right. However, fishers as fishery right holders are members of the FCA, and the FCA has collective-choice rights (management right and exclusion right), so the fishers can be categorized as "proprietors" rather than "authorized users".

In Japan, pearl-culture is not a private property right like in Indonesia, because the transferability of the resources use right is not recognized. There is no alienation right in the fishery right system. Concerning regulative source, both refer to the same Fisheries Law. Moreover, all fishers who are members of the FCA stem from where the FCA exists. Nevertheless, pearl-culture which has been developed since a hundred years ago, is still "illegal" against the Fisheries Law. Pearl-culture is generally capital intensive and belongs to the company instead of common fishers. Meanwhile, by the Fisheries Law it is clear that the eligible member of the FCA is a fisher who engages in fisheries for at least 90 days a year. Therefore, the company should not be identified as a member of the FCA. However, the complexity of the property right system can be more easily dealt with because of the arrangement by the legitimate FCA. The owners of the pearl-culture eventually can become the members of the FCA. This is a key point of the success for Japan in resources management by which many varied fisheries activities are in mutual symbiosis (Fig. 5).

6. Concluding remarks

The case study shows how the dynamics of private property and common property right holders is creating commitment to make symbiosis in resource use. This is a

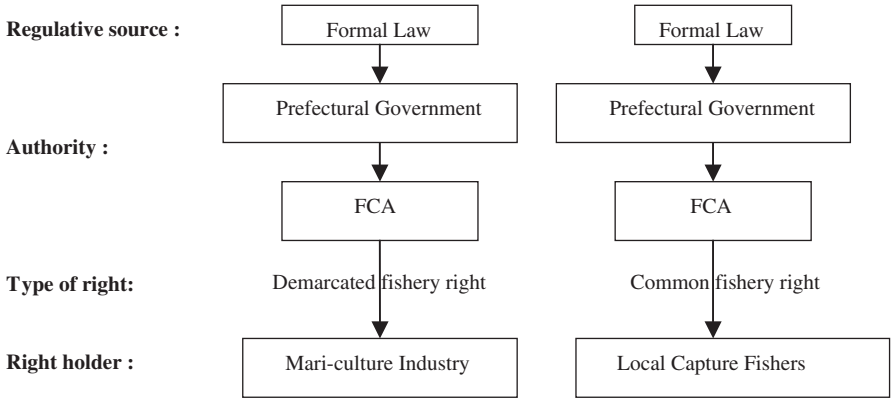

Fig. 5. Process to get fishery right in Japan.

successful story in dealing with the tragedy of property rights in the country wherein established institutional arrangement is still absent. Nevertheless, this may be site specific, and fragile if there is no institutional arrangement combining formal and informal rules and involving both formal and informal authorities. Therefore, there are three options for the third way to deal with the complexity of property right system in fisheries. *First,* national level, at which legal reform attempts to recognize the local people as resource managers with particular territoriality takes place. With such legal reform, property right systems in marine fisheries can be clearly defined. *Second,* at local or regional level. Due to decentralization policy, the local government gains a set of new authorities in coastal and marine resources management. With new authorities, the local government may delegate or devolve management authority of marine resources to the local people in particular territories. Furthermore, harmonization between government regulation and the local rules concerning property rights can be arranged. *Third,* is at community level, wherein agreement between the local fishers and the pearl-culture industry to create a win–win solution, like in the case of Gondang and Jenggala, takes place. However, the case study depicts that the solution to the complexity of property rights in coastal and marine areas is held at the community level only. This is a minimum solution regarding the tragedy of property rights. Meanwhile, to make a robust solution the first and the second options can be considered.

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