Knowledge and Behavior Needed to Survive in Open-Access Seas: A Case Study of Small-Scale Fishermen on Mactan Island, the Philippines

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Abstract

Although sea of the Philippines where is a target area of this presentation is a commons zone, it becomes an open access zone anyone can access due to rapid population growth, poverty, and delay of law service. Degradation of maritime resources and environment occurs there by human population pressure and illegal fishing such as blast fishing and fishing using cyanide. This paper firstly shows fishing activities and socio-economic condition of locale small-scale fishermen in Mactan Island, The Visayan region in the Philippines and investigates a livelihood of local small-scale fishermen, and their resources and environment falls into negative spiral because commons zone changes open access zone by human activity. No restriction to conserve maritime resources and environment and massive human impacts to disturb environment and to over-use of maritime resources can not stop. Secondly, it reports that policy of local administration to calm a condition of open access zone makes open access zone more severe condition (ex. no patrol, no environmental education, establishment of national park to enclose the space to run local small-scale fishermen off from the environment. The fishermen eagerly seek another fishing ground and same phenomenon on maritime resources and environment occurs). Finally, adapting strategy (division of fishing ground and method according to their specialty) based on knowledge and behavior of the locale small-scale fishermen living under open access zone is examined and pose a potential of open access zone in commons study, evaluating open access zone that situates negatively against commons zone. Philippines is a important area to study no commons zone equal to open access zone. To investigate a condition in Philippines, we can learn how commons zone is created or not, and why open access zone emerged and how to solve it. This paper also approaches these issues.

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Key word: Mactan Island, Small-Scale Fishermen, Open Access Sea, Knowledge, Behavior

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1 Purpose of this study

The Philippine Sea is basically a commons area. Anyone can use the space, and regulations to preserve maritime resources and the environment have not customarily existed; we call this *open access*. Recently, local administration policy, based on the Coastal Resource Management Project-Philippines (CRMP), has established some sanctuaries and banned small-scale fishermen from using those zones. Therefore, fishermen in these zones move to other commons and contribute to the degradation of maritime resources and the environment in those zones. Due to the poor socioeconomic conditions of the small-scale fishermen, the lack of cooperative spirit among the fishermen, and the lack of administration policy against fishing in open-access waters, efforts to resolve these issues are unable to keep up with actual conditions.

The problems mentioned above have been occurring on Mactan Island, Cebu Province, which is the focus of this paper. Mactan Island has the Mactan Economic Process Zone (MEPZ), an international airport, and many resorts, and it is one of the most developed areas in the Cebu Province. These factors have contributed to a rapid population influx to Mactan Island. Rapid population growth places high demands on maritime resources and stimulates the economic activity of small-scale fishermen. In the Philippines, fishermen are not usually full-time. Fishermen, including these potential fishermen, go to the fishing grounds at the same time, causing a depletion of maritime resources and rapid environmental destruction. Moreover, fishing activities using dynamite and cyanide are practiced, and

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maritime resources and the environment in the area are in critical condition.

The author has conducted research on the activity of small-scale fishermen in Cordova, located south of Mactan Island, for a long time (Tsuji 2007ab, in press). In Cordova, various types of fishing methods are practiced using the ecological environment, which is composed of coral reefs, grasslands, and sandy and rocky areas (Rau 1979). In particular, coastal gleaning activity using the huge tidal flats is heavily practiced. Gleaning is comparatively easy and safe for women, children, and the elderly. There is a high unemployment rate in the area, and people without jobs also engage in this activity. The rate of population growth is also high, and many people simultaneously rush to the same fishing grounds. Accordingly, there are problems with the reproduction of maritime resources and disturbances of the fishing grounds.

Considering the circumstances described above, this paper first provides an overview of the activities of small-scale fishermen in Cordova and discusses their socioeconomic conditions. Second, it discusses a case; contrary to the intention of the local administration that regulates the entry of fishermen into a part of the commons, open-access commons encroach on other areas, and the overuse of maritime resources and environmental destruction are ongoing. Finally, the paper shows that fishermen who use the open-access commons adapt to the environment and make the most of differences in knowledge and behavior about fishing methods, although most of them are contributing to the destruction of maritime resources and the ecological environment.

2 Fishing activity and the socioeconomic conditions of the research area

The research site, Cordova, Mactan Island, Cebu Province, is located to the south of Mactan Island (Figure 1). The 2005 population of Cordova was 45,066 with 9,541 households. The main subsistence activities are fishing-including shell gleaning and seaweed farming-stone extracting, service industry work, and ecotourism (Municipality of Cordova, Cebu Province, 2010). In Cordova, there is an abundant catch of moray eel, and the Moray

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Festival (*Bakasi Festival*) stimulates local industries and enhances the livelihoods of small-scale fishermen. Most households in Cordova are involved in fishing activity (San Carlos Publications and Office of Population Studies of San Carlos 2004). The main fishing method is the use of a basket trap made of bamboo. Basket traps are classified into three types: *bantak*, targeting moray eel (Photo 1); *teming*, targeting small crabs or cardinal fish (Photo 2); and *pangal*, targeting rabbit fish or wrasse. Hook-and-line fishing and gill nets are also popular and are identified by five types each (Tsuji, in press). Diving is also frequently conducted (Photo 3). It is classified into two types: gathering shells with spearing fish and spearing octopus. This is breath-hold diving; scuba gear is not used. Such activities are performed by men. Women, children, and old people conduct gleaning activities. A great variety of maritime resources are caught by gleaning. Stone tidal weirs are also found (Table 1). Small-scale fishermen conduct these activities, and most of them do not own motorized boats, especially in Cordova (Green et al. 2004). Consequently, their fishing activity is concentrated in the coastal areas. The coastal areas of Cordova have thus become hotly contested areas among small-scale fishermen.

Seventy-five percent of the people in Cordova have only completed elementary school, and 23% are high school graduates. The rate of population increase was 5.57% in 2000 (Municipality of Cordova, Cebu Province, 2010). Finding work can be difficult; 38% of the labor force works in the informal sector (San Carlos Publications and Office of Population Studies of San Carlos 2004). The high rate of population increase combined with low levels of education produces poverty. Under such socioeconomic circumstances, people rely on the sea. In Cordova, people sometimes say that people with no education must go to the sea. Jobless men in the prime of their lives can be found conducting gleaning activities. Anyone can use the limited coastal resources and environment, so maritime resources and the environment are under considerable strain. Some small-scale fishermen resort to using dynamite or cyanide, which causes heavy environmental damage. The commons is open access, and people do what they want. There is no cooperative organization among fishermen, and there are no clear traditional resources for

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environmental conservation. As discussed in the next section, measures enacted by the local administration are not sufficient to control the situation.

3 Regulation and reproduction of the open-access zone

To solve the problem of open access in the commons, the Philippine government received support from the United States Agency for International Development (USAID) and extended the Coastal Resource Management Project-Philippines (CRMP) into each area of the Philippines. This project provided technical support and training for coastal communities, local government units (LGUs), nongovernmental organizations (NGOs), and national government agencies (NGAs), and it lasted from 1996 to 2004 (CRMP 2004). In Cordova, three areas—Gilutongan Marine Sanctuary (1999), Nalusuan Marine Sanctuary (2002), and Day-as Marine Park (2003)—were designated as sanctuaries in this project. The project aimed to establish marine sanctuaries to prevent the entry of fishermen. Instead, the areas were made into tourist spots that aimed to collect entrance fees from visitors, such as divers, to develop the communities. At the same time, the aquatic culture of *guso* seaweed (*Eucheuma* sp.) was encouraged. The Gilutongan Marine Sanctuary generated two million pesos in revenues in 2003, which was distributed to the community and used for management of the sanctuaries (CRMP 2004). However, closing an area that local fishermen relied on for a long time to establish a marine sanctuary is equivalent to grabbing their area for subsistence activity. Only a few people must have received favors from the sanctuary, even though the revenue was used for the community and *guso* farming was encouraged. Moreover, the value of the project should be evaluated by the local people, not the donor.

The CRMP should be ideal for maintaining the commons, protecting maritime resources and the environment, and excluding open access of the commons. However, the project lacks concern for the needy local people. The CRMP does not enlighten people enough, and, furthermore, it tends to oppress the local people. For example, the Olango Island Wildlife Sanctuary (OIWS) was established in 1997 on Olango Island, Bohol Province, near Cordova. With the establishment of the

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sanctuary, subsistence activity in the commons was banned. Therefore, the small-scale fishermen of Olango Island came to fish off the coast of Cordova, which was not designated as a sanctuary. With the commons closed, small-scale fishermen sought another open-access zone. Thus, competition for maritime resources and environmental destruction continues there, and an open-access zone is reproduced. Restrictions on entering the commons are a nuisance for the small-scale fishermen who lose open-access fishing grounds; it is a threat to their daily livelihoods. A flexible and loose policy that enables the use of the commons in proportion to the needs of local small-scale fishermen is needed, not a rigid policy that focuses solely on protecting maritime resources and the environment. In addition, there needs to be a policy that will lead more people to responsibly maintain the commons for their own benefit and ensure proper use.

4 Adaptive strategies of small-scale fishermen in open-access zones

Many people, including small-scale fishermen, rush to the coastal areas in Cordova to seek their daily food. As a result, there is a disturbance of the fishing grounds and overuse of maritime resources. No measures are taken against the people who thoughtlessly overuse resources. If so, open access is a negative reason; it is never so. The problem has to do with exploiting maritime resources, fishing with dynamite or cyanide, or using fishing grounds without any restrictions. Such attitudes are found among people who do not deeply relate to the sea. On the other hand, people who relate deeply to the sea are more harmonious with maritime resources and the environment. This is displayed in the knowledge and behavior among small-scale fishermen regarding fishing methods and the use of fishing grounds.

As mentioned earlier, various fishing methods are practiced using various maritime environments. Why do people divide their fishing grounds or fishing methods? It is most likely a result of adaptations based on knowledge and behavior for obtaining the maritime resources that people need. These people's adaptations may minimize damage to and overuse of maritime resources and the environment. For example, people who glean peanut worms (*Sipunculus robustus*) (Photo 4), wedge sea hares (*Dolabella auricularia*) (Photo

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5), and sea cucumbers have special techniques. These techniques seem simple, but they are backed up by deep knowledge of resources and the environment. They immediately see opportunities with the targeted animals that other local people cannot identify. These techniques are ingrained in them from childhood as a result of relating to the sea. It is not easy to learn their techniques (Tsuji 2007a, in press) (Photo 6).

These examples are also found in other fishing methods, such as the use of bamboo-made baskets. There are big differences in the harvest between veterans and novices (Tsuji 2007b). Consequently, fishing activities guided by knowledge are less likely to lead to environmental devastation and overuse of maritime resources, even in open-access fishing grounds. Ecological knowledge and behavior are invaluable for maintaining the commons. However, due to heavy stress in open-access fishing grounds, these fishing methods and resource-utilization techniques suffer from disturbances of the fishing grounds. For example, a newly introduced gleaning activity for catching a specific shell (*Atys cilyndricum*) with high economic value heavily disturbs the fishing ground (Photo 7). The vulnerabilities and problems related to that activity stem from a lack of ecological knowledge and behavior.

5 Summary and conclusion

We have discussed the impact of small-scale fishermen on the commons, administration measures regarding open-access commons, the response of the small-scale fishermen, and the potential of ecological knowledge and behavior to reduce the degradation of the commons using as an example the coastal areas of Cordova, Mactan Island, Cebu Province, the Philippines. Increasingly, poor small-scale fishermen have no choice but to use the commons fishing grounds for subsistence. For cultural reasons, it is difficult to establish organizations—such as a fishermen's cooperative union—to patrol open-access areas. The administration launched the CRMP project to conserve the commons zone, but it seemed to be ineffective. It is doubtful that the project was welcomed by the local population in the first place. The use of dynamite and cyanide are also ongoing. Such administration measures are considered to relate to the bilateral social structures found in

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the Philippines. That is, it is probable that the side to patrol and side to be patrolled are in kinship. Although the CRMP project can be evaluated in terms of regulating entry to the commons to decrease open-access zones to a certain degree, substantially, it aimed to exclude small-scale fishermen to conserve maritime resources and the environment. As a result, a case can be found where small-scale fishermen simply moved to other areas that were not regulated by the CRMP project and renewed the exploitation of maritime resources.

It is doubtful that the maritime environment and the resources in coastal areas of Cordova can absorb the increasing population. Poverty, a lack of knowledge, and a growing population complicate efforts toward making sustainable use of the maritime environment. Eder (1997), who researched differences in shifting cultivation between indigenous people and migrants on Palawan Island, the Philippines, evaluated the indigenous peoples' extensive and sustainable ways against the ignored recovery of the ecological environment by the migrants. There are small-scale fishermen who practiced their fishing activities based on ecological knowledge and behavior, and they are harmonious with the commons. However, up to now, their knowledge and behavior were almost out of the problems.

Now is the time to evaluate the local knowledge-such as the division of the utilization of fishing grounds, fishing methods, and resource utilizations-that has succeeded for a long time among the small-scale fishermen. Future possibilities should be considered beyond evaluating the ecological environment and the resources of small-scale fishermen. Balanced new measures that improve people's lives are needed, not inclining to conservation of environment and resources.

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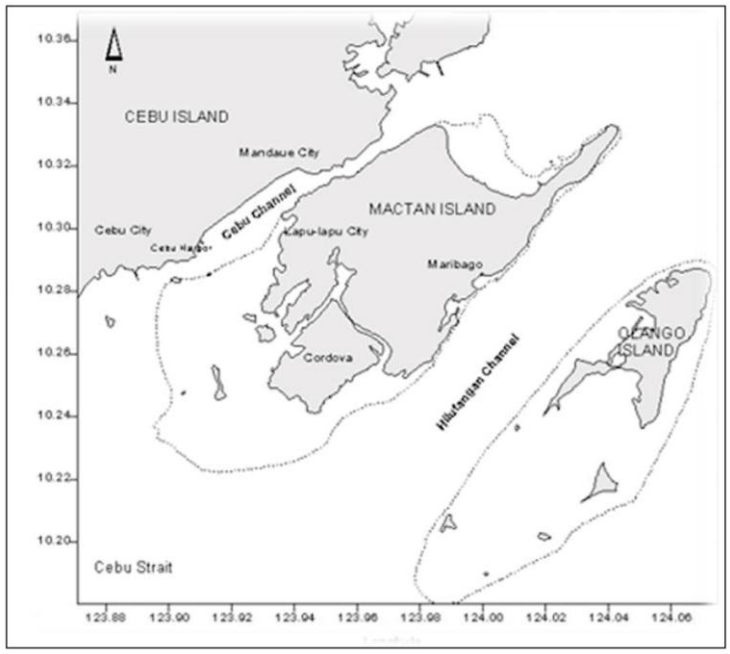
Figure 1. Location of the research site



Source) Municipality of Cordova, Cebu Province (2010)

Table 1. Fishing methods used at the research site

Fishing method	*Varieties of fish captured*
Hook and line	①piscator rig (mamasol), ②patao (catch bonito with live bait), ③pamanuit (catch parrot fish with hermit crab), ④kasag-kasag (catch octopus or giant cuttle fish with lure), ⑤nokos (catch cuttle fish with lure)
Fish cage	①moray fishing (mamantak), ②manimin (catch wrasse, cardinal fish, *Thalamita* sp.), ③pangal (catch rabbit fish or wrasse)
Net	①sabay (round net ; eel tail catfish, etc.), ②drift net (sensoro), ③gill net (lambat, mamaling, manukut), ④scooping net (mano ; scoop sleeping fishes at night using lantern), ⑤drag net (mango-ot ; catch mainly *Thalamita* sp.)
Diving	①manaon (catch conches and spear banded blenny, etc.), ②manama (catch octopus)
Gleaning	①panginhas (general gleaning), ②mangiyo-os (glean *Atys cylindricus*), ③manama (glean octopus at night)
Stone tidal weir	gango

Source) Tsuji (in press)

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Photo 1. Moray eel fishing

Photo 2. Fish cage fishing (*teming*)

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Photo 3. Diving

Photo 4. Peanut worm (*Sipunculus robustus*)

Photo 5. Wedge sea hares (*Dolabella auricularia*)

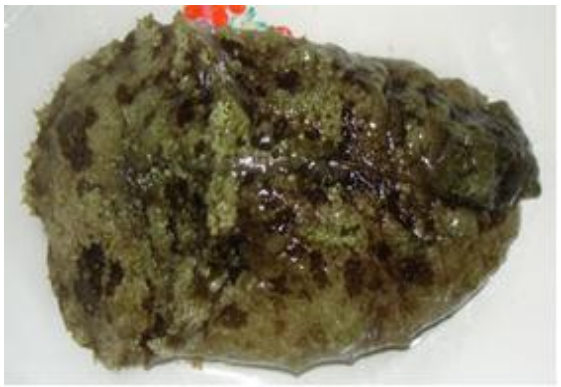

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Photo 6. Woman catching peanut worm

Photo 7. People gathering *Atys cylindricus*

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