

Coastal Conflicts and Natural Resources Management in Pongso no Tao - An Institutional Aspect

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Abstract

Over the centuries the indigenous people of Pongso no Tao, or otherwise called Orchid Island have developed strong traditions, a system of values and beliefs which helped them to manage local natural resources. However, the modern regulations made by Taiwanese government, especially the ones regarding land registration and conservation, are now also a part of the institutional rearrangement in the island. During the period of the institutional changes, the conflicts in the coastal area have become complex: illegal building, tourist activity impacts and exploitative fishing are taking place. After a pilot study on the island in 2010, we presented the situation and the state of the coastal natural resources and ecological habitats in order to understand the conflicts existing in Pongso no Tao now. Lack of governmental support, enforcement and overall institutional chaos led to conflicts; self-interested behavior overcame the collective. There is a need for a stronger and immediate rearrangement in the institutional change, a need for an effectively functioning institutional body that is yet absent in the Island.

Key words: Integrated coastal resources management, conflicts, property right

1. Introduction

For the past few decades the inhabitants of a small remote island of Pongso no Tao forsaken in the Pacific Ocean in the middle of the route between the Philippine Batanes and Taiwan have been experiencing dramatic changes. Affected by a sudden exposure to the outside world, the indigenous Tao people and their culture have faced remarkable challenges, i.e. influence of Chinese culture, technology, capital economy, governmental and private stakeholders' intervention. While the island was governed by tribal rules, the state's intention to impose national policy in the island has taken its toll on the existing traditional (tribal) institutional system. The problem of institutional arrangement has become an obstacle on the way to sustainable living of the Tao tribe and rational use of natural resources which the native people heavily depend upon. Coastal resource

degradation and losses are a set of interrelated "failures" phenomena which underlie the process. One of these related "failures" can be distinguished as a governmental intervention failure (Bower and Turner, 1996). In addition, this problem is exacerbated by scientific society (e.g. implementing scientific data while ignoring traditional knowledge) and social uncertainties (e.g. crisis of ethnic identity of indigenous people). These factors lead to intersectoral policy inconsistency: one of the major problems identified in Pongso no Tao is land-use policy or, more appropriately, its non existence. This in turn, affects rights of the indigenous people of the island and makes them unable to prevent direct land reclamation that is taking place now. Meanwhile, the state's government inefficient policy, general lack of enforcement of existing tribal policy rules and regulations and institutional failure put Tao existence as a tribe on the line.

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This problem was never considered after the island was opened to the outside world in the 1960s and continued to bring conflicts and deplete the natural resources. Therefore, during the 1990s the government of Taiwan started to propose an application of a national park hoping to conserve the natural resources and aboriginal culture and customs that apparently had been impacted (Chang, 1989).

Zone management is one of important measures of integrated coastal management - a dynamic, multidisciplinary approach that covers the full cycle of information collection, planning, decision making, management and monitoring of implementation. It is commonly used at different governmental levels from small village and county to country and regional level. The ICZM structure is often designed at intersectoral level and involves many combinations and integration of sectorial policies. The management process must therefore be dynamic and adaptive in order to cope with changing circumstances, changing social tastes, increased knowledge of the behavior of coastal processes and of human behavior and "value" of coastal ecosystems, as well as, changing technology and changing governmental policies (Ehler and Bower, 1995; Turner and Bower, 1995).

One of the recognizable tools of implementation of integrated coastal zone management (ICZM) is a marine protected area, such as the Great Barrier Reef World Heritage Area in Australia (Hutchings et. al., 2008). A well designed zone management institution has functions which can be used at national level. However, a western-style national park is not really equal to a national level institutionalization of ICZM, especially in a small island that is governed by the tribes on their own. The establishment of a national park has not been made since the indigenous people of the island had many doubts on the institution. There have been many discussions and dialogues concerned about a question whether a national park is good for development of Pongso no Tao. Nonetheless, little information has been provided and limited analysis has been done to compare these two institutions (systems), the national park and the traditional - a well-established tribal resource use management system. Without an aspect of institutional change in the governance design, conflicts and abuse of the natural resources in Pongso no Tao still remain unsorted. In this study, we

examined *de facto* (a changing state, neither traditional nor national park) land-use pattern and conflicts in the island to first time reveal an institutional change in coastal management in Pongso no Tao.

2. Materials and Methods

Pongso no Tao is located about 75 km off the southernmost tip of Taiwan being the second largest island near Taiwan and a part of volcanic Batanes Islands of the northern Philippines. The 46 square-kilometers island also lies within the route of the strong Kuroshio Current which originates from the eastern part of the Philippines passing by Taiwan all the way up to Japanese Okinawa and Kochi. Kuroshio is also a source of rich aquatic resources as well as fresh water from heavy rainfalls brought along with frequent typhoons and cyclones.

Pongso no Tao is a typical tropical island with high temperatures (23°C on average), strong winds, high humidity (about 90% annually) and heavy rainfall (2600 mm yearly). The island topography has a unique mountainous interior with tropical forest coverage on most part of the terrestrial system of Pongso no Tao. A vast network of river systems, creeks and underground water penetrates island soil with nutrients. The island overall is rich with natural resources from flat land, forest, water resources, beach vegetation, and coral reefs. Coastal zone is a subject to strong winds and tidal interactions throughout the year. The land area of coastal zone is very narrow and it includes estuaries facing six villages of Pongso no Tao. These communities often have specific resource use and diverse activities. Information regarding these aspects of the communities will be valuable resource materials for understanding indigenous natural resource use patterns when undertaking any development initiative in the coastal zone (Lin, 2006).

The marginalized location and relative isolation of Pongso no Tao till recent time has allowed the native Tao people to better maintain their traditions, language and culture than other aboriginal tribes of Taiwan mainland. The Tao migrated to Pongso no Tao about 800 years ago from the Batanes Archipelago in the northern Philippines, maintaining communication with their homeland, including of

trading pigs, goats, and millet for weapons, beads and gold until about three centuries ago. The native language spoken by Tao is one of the similarities that links them with their Austronesia descendants present in the Asia Pacific region today as well as does the cuisine and architectural forms of indigenous housing of the Ivatan people inhabiting Batanes (Madrigal, 1983).

During the rule of the Qing Dynasty Pongso no Tao was under the governance of mainland China and remained a Chinese territory till the end of the China-Japan war, when in 1985 the power over the main island of Taiwan and the small Pongso no Tao was taken by the Japanese. During the Japanese rule, the then government had assigned the island as a living anthropological museum residing researchers and officials to collect information on the indigenous communities. Under such direction, a number of anthropologists wrote several books where they documented information on various aspects of the socio-economic and cultural life of indigenous people of Pongso no Tao (Hu and Yu, 2007; Huang, 1995). Therefore, the environment of the island remained almost unchanged due to strict preservation policy of the Japanese colonial rule that dominated on the island for fifty years. However, after World War II Pongso no Tao was returned to Kuomintang regime prevailing on Taiwan mainland. Rich forestry resources of Pongso no Tao attracted attention of the KMT government which soon resulted in dramatic land use changes. In 1966 the island was open to "foreign" visitors including Taiwan government officials, soldiers, educators and even

Christian missionaries followed by massive tourist activity since 1967.

During 2010-2011, we had conducted a systematic investigation on the island's natural resources and looked for the institutional arrangement of coastal activities on the resources in the island. The researchers stayed in the island, and observations, interviews and an inventory to the fauna and flora were done during the investigation trips, in which all ecological habitats and villages were visited. Related books and publications were also collected. Interviews included seniors in the villages, high school teachers and local Taos. All data were triangulated into to see relationship between the traditional zoning and the natural resources distribution in different habitats in the island. From the observations and interviews, the study also revealed some conflicts and abuse of natural resources caused by the changing institution systems in where almost no rule could be followed and enforced. Development of small islands is a special issue such as an island's higher vulnerability on aspects of environment and socio-economics.

3. Results

1) Natural resources distribution

Environmental factors including annual temperature, rainfall and wind sculpted the tropical island from coral reef and forest. Nine ecological zones were distinguished and defined from the terrestrial/fresh water and marine ecosystems in this study (Table 1).

Table 1. The characteristics and use of the ecological zones in *Pongso no Tao*.

Types	Ecosystem	Fauna and flora characteristics	Conserved species, number	Tao zones	Impacts
1. Seasonal rainforest	Land	diverse, rare and CR species	Plants: 31, Animals: 8	commons, wood land	low, regular, sustainable
2. Grass land	Land	Monotone	Plants: 2, Animals: 2	commons	goat grazing
3. Cliffs	Coastal	specially adapted	Plants: 3, Animals: 1	commons	goat grazing
4. Costal Vegetation	Coastal				
4.1 Reef-flat community		specially adapted	Plants: 4, Animals: 3	commons	goat grazing
4.2 Beach community		specially adapted, rare and endemic species	Plants: 3, Animals: 4	commons	goat grazing
4.3 Thrush community			Plants: 3, Animals: 4	private	pig pens
4.4 Costal		diverse, rare,	Plants: 12,	commons,	Graveyard

All villages are near coast and are located along with one or two streams, which boundary is usually in ecological zones of the freshwater, the farm land, and the coastal vegetation, while the seasonal rainforest, the intertidal zone, and sub-tidal/bay area become the most important support systems that provide most of the natural resources Tao use. The cave, cliff, and grass land zones have been almost entirely naturally maintained and are affected only by goat grazing. Parts of the coastal vegetation zone are purposely used by Tao for graveyards.

In the nine ecological zones the seasonal rainforest and the sub-tidal and bay area have higher biodiversity than the other zones. The rainforest, especially in hilly areas, is composed of diverse fauna and flora resembling those in the northern Philippines. More than 1,050 species of flowering plants were recorded in Pongso no Tao (Guo et al., 2011). Most of them are traditionally used in daily life for house-building and herbal medicine, and some are used for production, such as boat-building. Crab collecting and fishing are routinely conducted seasonally and annually. The hunting pressure was formed for a cross-generation use and had not harmed the animal populations, which were also not listed as endangered species (Table 1.). However, those commonly used plants in Pongso no Tao might be also listed as rare or critical endangered species according to the conservation regulation (Cheng and Lieu, 2000). There are conserved animals, e.g. insects, crustaceans, reptiles, birds, and mammals (Guo et al., 2011). Nevertheless, the ecological habitats that contain most natural resources traditionally used by Tao have not changed much in the last hundreds of years, (Fig. 1),

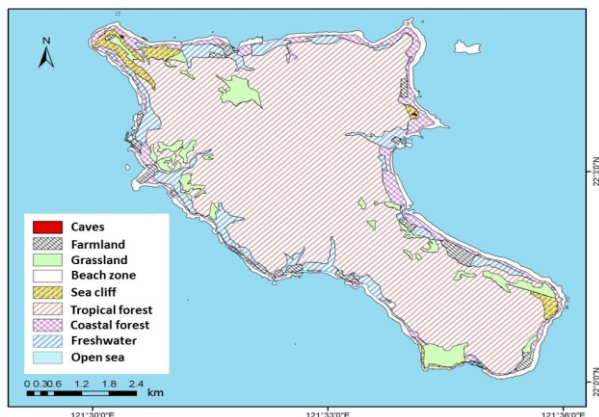


Fig. 1. The distribution of the ecological zones in Pongso no Tao.

except for the consumption of Chinese bullfrog *Hoplobatrachus rugulosa* in the past few decades. The population of the endangered and edible Chinese bullfrog has been declining since the 1960s when the island was opened for visitors and tourism. The average discovery frequency in our survey is one in three sample spots in freshwater areas (September 2011, n=15).

2) Villages' development and zoning

The first community settlements recorded on the island date back to the 17th century (de Benedek, 1978). In 1644 Pongso no Tao numbered eleven villages along its coast. However, over time, the number of the Tao tribe's settlements varied. Due to some changes in the landscape of the island caused by landslides or other natural disasters the three smallest villages were later incorporated into bigger ones. The change in number was also probably caused by extreme climatic events. Thus, towards the end of the 19th- beginning of 20th century the total number of villages was eight: I-watas consisting of only 2 houses and I-wawo of 3 had been comprised into one village. By the end of the Japanese occupation period of the island from 1895 to 1945 the Tao's population was about 3,200 people and only six villages remained on the island. Today these villages along with the original names (I-mowrod, I-ranmeylek, I-raraley, I-ratay, I-valino, Yayo), also have equivalent Chinese names.

Tao settlements consist of households that build centralized villages whose location is determined by two life-dependent factors: feasibility of farming and fishing - principal mode of food production (Huang, 1995). Therefore, Tao settle their villages in the coastal zone thus, satisfying both vital conditions - fishing ensured by the nearness of ocean and marine living resources; and farming by availability of flat land and fresh water.

Each village is located at a creek or a river mouth so that the villagers have a constant source of fresh water. A harbor however, is another necessary condition for a village to be counted as an independent settlement and is an essential component of every "ili" ("village" in the Tao language).

Due to varied ancestor origins, there has been little communication between the villages which in turn led to autonomous development of each ili. Tao organization of geopolitical relations structures single tribal communities as independent settle-

ments of households sharing the territory. Thus, the largest in number of members' community group includes only one village even though kinship relationship between communities interwoven. Notwithstanding the lack of communication between villages there is no centralized governing body that would unify all the villages and their residents. However, it is beginning to change now.



Fig. 2. Change of a village. Before (on the left) and now (on the right).

Each village has been developing through the time depending on available resources. Villages' organization and their structure deserve special attention as their unique arrangement proved to be sustainable throughout the centuries. Technically, each village is located in coastal zone, however, the environment and resources used by the people are far beyond this ecosystem. Each village is divided into zones, thereby assigning each area for a particular kind of human activity: cultivation, farming, housing and fishing are distributed in different ecological habitats, e.g. woodland, grass-

land, coastal zone and ocean. Here we'll be using a village of I-raraley as an example of a typical Tao tribe settlement divided into zones and describing different types of activities taking place in each of them.

I-raraley village is located in the Northwestern part of the island. The people originating from the Pacific region have evolved a specific housing construction that can withstand rough Pacific conditions such as heavy rainfall, strong winds, typhoons and earthquakes. Today there are only a few traditional houses in most of the villages of Pongso no Tao left in I-raraley. The rest has been replaced with modern concrete and steel structures (Fig. 2). Building modern houses makes the villages unsuitable for tropical weather conditions that the remote island is exposed to therefore, becoming more vulnerable to natural hazards and calamities. Nonetheless, all households are located in the coastal zone in accordance with unwritten indigenous laws and are usually comprised of three parts: a main house, a work room, and a terrace on stilts next to it. A village community also has a boat house set on the sea shore in front of the village and serves as a garage for fishing boats when they are not in use.

The main house is a place for a family daily living, eating and sleeping. The house is also used for storing food and other products. The veranda is usually built approximately 1.5 to 2 meters above the ground with a wooden roof but no walls so it serves as children playground and as a place for leisure activities such as singing, chatting or simply resting.

Efficient land use is a key element of survival in the rough conditions of a tropical marginalized island. Due to magmatic origin of the island its surface although lavishly green, is also rocky with a thin layer of nutrient soil which makes farming and crops growing a challenging task. Consequently, every piece of land has a significant designation and meaning.

The Tao people have developed a system of zoning following their traditional knowledge. Thus, different areas have been accustomed for different kinds of human activity (Table 2).

Table 2: Traditional use and zones of coastal resources.

Zones	Utilities
Woodland	plantations (bananas, pineapples, coconuts, pumpkins and other vine melons)
Grassland	paddy field (water taro planting) goat farming, yams/millet/sugarcane/onion planting housing material, soil for pottery
Coastal zone	house area boat house cemetery (beside the village)
Beach vegetation zone	Harbor water source
Intertidal zone	sea algae, crabs collection
Ocean	fishing ground

All households have cultivable land and all the residents of the village have access to natural resources like forest, river and sea. The major types of activities for sustaining Tao's livelihood have traditionally been farming and fishing. Farming practice includes planting of water taro in wet fields, yams, millet, sugarcane and onion in the upper grassland. Majority of the households have cultivable land and paddy cultivation is one of their main professions. Poultry, goat and pig farming is also taking place in this eco zone. Fishing is a significant part of Tao's culture; even their primitive calendar defines daily seasonal activities depending on the resident fish availability and migratory fish patterns. The Tao people are also involved in locally available resource-based occupations such as crab catching and oyster gathering. Fishing practice is specialized on offshore fish catching and is purely a men's job whereas shell and crab collection takes place in sub tidal zone where women can also participate in this activity.

Village households' members use natural resources like timber to construct their fishing boats - an essential component of a coastal community, therefore its sustainability is determined by land owning pattern and the surrounding environment. Tropical forest covers most part of the island, its upper lands, and hills and is a vital part of indigenous system of beliefs and lifestyle, such as boat construction, house building.

Territory that does not belong to any village is recognized as common property and resources are shared among all the six villages. These zones have rather precise borders and respected by other villagers even though none of them are documented or regulated by any legal law.

3) Institutional changes and conflicts

The first land-use institution was deployed at a national level in 1966. It was a revised version of the Regulation on Traditional Territory (set in 1948). However, the Taiwanese government had started a colonial farming plan since 1958, which reclaimed 83 plots (240.19 hectares) of farmland throughout Pongso no Tao by the Vocational Assistance Commission for Retired Servicemen (now called the Veterans Affairs Commission). Eleven farms and clones deployed covered all the territory of the six Tao villages (Fig. 3.). The most reclaimed lands were dry fields since the wet fields were more of private use than the dry fields. However, the colonial plan was not successful and never formed a market. Many Tao people now took over the farming and transferred the land into orchards with assistance of the church. In this case, it shows very importantly the institutional characteristics of the Tao's tradition. Tao are usually against deployment of policy from the outside world, but they allow tribal-implemented policy enforcement. The CPRs (common property resources)-based management seems becoming an adaptive strategy

de facto, nonetheless, there are some adaptive privatization of land use along the coastal areas. Small stores and coffee shops have been built on the coasts; they are mainly managed by Tao youths with permission of the tribe' elders and are recognized by them.

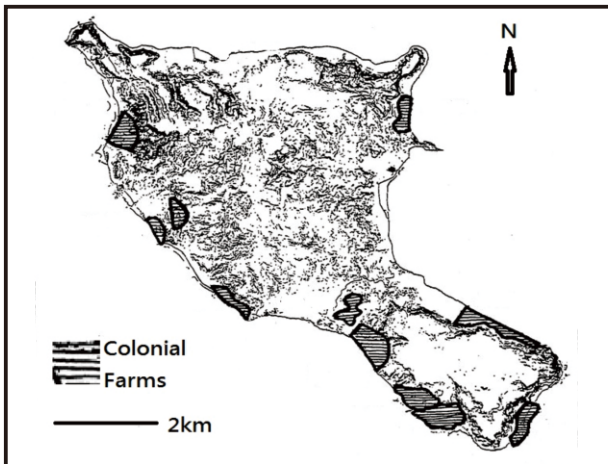


Fig. 3. The distribution of colonial farms during 1960s (modified from Huang 1995).

Table 2 and Table 3 show that this kind of natural resource-based management usually functions within two sets of institutions. There are more conflicts in the terrestrial system than in the aquatic system - only one eco - zone without regulation-related conflicts in the terrestrial system and two in the aquatic. Ecological conservation seems to be the major issue in the conflicts. However, more impacts have been caused to the aquatic system -

two large-scale impacts affected the eco-zones of sub-tidal and bay area - that is due to high utility of motorized fishing activities.

4. Discussion

The aboriginal Tao people live in and ethnically belong to an environment that can be called 'coastal'. Therefore, they should be given priority over others in policy formulation, even though all of them are in need of urgent support. It signifies the need for more comprehensive research in the future. Land being the principal resource and as it is being grabbed at an alarming rate, a responding commission may be formed for rapid action on the issue. The tradition of weaving and pottery should also be patronized, while steps should be taken to foster education among Tao, particularly higher education. Most important of all, access to natural resources, which are currently denied by law, must be ensured for the indigenous communities. Protection from the state, both constitutionally and administratively, is urgently required.

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Table 3. Two institutional arrangements on terrestrial resources (TAO – Tao's, GOV–Taiwanese government) and its conflict impacts.

Eco-zone	Affected range	Human activities	Impacts	Regulations
Tropical forest	large	conservation, invasive species, development	Little	woodland (TAO) conservation (GOV)
Coastal forest	medium	agriculture, afforesting	bio-diversity decreasing	property (TAO) development (GOV)
Grassland	small	conservation, tourism	Little	tourism (GOV)
Farmland	medium	agriculture, farming, development, invasive species	bio-diversity decreasing, pollution	property (TAO) development (GOV) tourism (GOV)
Beach vegetation	medium	farming, development, tourism, conservation	bio-diversity decreasing, pollution	property (TAO, GOV)

Table 4. Two institutional arrangements on aquatic resources (TAO – Tao's, GOV – Taiwanese government) and their conflict impacts.

Eco-zone	Affected range	Human activities	Impacts	Regulations
Freshwater	medium	agriculture, invasive species, development	bio-diversity decreasing, flooding	irrigations, property (TAO) flooding (GOV)
Intertidal	medium	fishing, tourism, development	bio-diversity decreasing, landscape disappearing, pollution	common property (TAO) conservation (GOV)
Sub-tidal	large	fishing, conservation, tourism	bio-diversity decreasing, pollution	common property (TAO) conservation (GOV)
Bay area	large	fishing, tourism	Little	common property (TAO)
Ocean	small	fishing, transportation	bio-diversity decreasing , pollution	common property (TAO)

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