



Management of marine resources through a local governance perspective: Re-implementation of traditions for marine resource recovery on Easter Island



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ABSTRACT

Easter Island (Rapa Nui) is one of the most isolated places in the world. The local Rapanui people have noticed an extreme decline in marine resources, which is due to the exploitation of these resources. Top-down regulations (e.g. fisherman and boat registrations and restrictions on catch-length and fishing season and location) implemented by the central fishery authorities located ~4000 km from the island do not represent the cultural heritage and interests of the Rapanui people. According to the local people, one of the traditional ways to protect marine resources was the taboo (or tapu in Rapa Nui) that regulated the fish harvest. Key informants were interviewed to assess what they knew about the tapu in fisheries and so that the feasibility of its implementation could be assessed based on current local conditions. The tapu that had the greatest potential impact on regulating open water resources, especially tuna, was the traditional belief that consumption of open-water fish during winter months would cause asthma. According to the interviewees, the real reason for this tapu was to protect the fish during its reproductive period, and the asthma threat was only a way to enforce the restriction. At present, tapu is not respected because of the high economic activity related to the tourism that demands fish like tuna all year. Even though many Rapanui people agree that tapu re-implementation would be the best alternative to recover marine resources, people also think it is difficult to implement under modern conditions. We propose to promote a participatory process for development of a local governance structure that will use local traditions and beliefs, including tapu, to support the local decision-making process for reverting the decline of marine resources.

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1. Introduction

Research on traditional or local ecological knowledge (TEK or LEK), particularly research on customary practices, marine tenures and taboos, is growing in interest among scientists, managers and communities (Cinner and Aswani, 2007; Foale et al., 2011), especially in the Pacific Islands, where rapid population growth has resulted in increasing pressures on limited natural resources (Govan, 2009). On Easter Island, or Rapa Nui (in the local language,

Rapa Nui refers to the island and Rapanui refers to the indigenous people and the language), the situation is not different. The local community is struggling with marine resource degradation and looking for alternatives by recognizing, in its traditional practice, solutions for reversing declining catch trends (Gaymer et al., 2013).

1.1. Setting the scenario; the historical Rapa Nui

Rapa Nui is famous for many reasons: for being the most remote place in the world, for its giant stone statues or moais, for the social crisis and ecological disaster that occurred on the island (Diamond, 2007) and for its extraordinary cultural and environmental history (Hunt and Lipo, 2008). The initial colonization of

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Rapa Nui is still under debate. While some authors proposed colonization occurred about 400 AD, others proposed that colonization occurred about 1200 AD (Mulrooney et al., 2009), by a Polynesian population, possibly from the Mangareva-Pitcairn-Henderson area or the Tuamotu Islands (Martinsson-Wallin and Crockford, 2002). The archeological aspects of the island have been extensively studied; however, the fishery and the relationship between the Rapa Nui and marine resources have received less attention, despite the fact that these resources were exploited since the first immigrants arrived to the island (Ayres, 1979; Hough, 1889).

The first Polynesians that arrived on Rapa Nui developed an exceptional culture in extremely isolated conditions; however, after the splendor came the inevitable crisis (Ramirez, 2008). When the first Polynesians arrived at Rapa Nui, approximately 70% of the island was covered with dense woodland, where palm dominated (Mieth and Bork, 2010). Rapa Nui suffered an ecological catastrophe due to the overexploitation of its forestry resources (Diamond, 2007; Hunt and Lipo, 2009). As a result, the island was largely deforested when the first Europeans arrived in 1722 (Diamond, 2007; Hunt, 2006; Hunt and Lipo, 2009), thus wood became scarce, affecting the canoes and/or boats construction. In 1722, Roggeveen described canoes as being of 'poor and flimsy construction' and about ten feet long (de Haedo and Roggeveen, 1908). Similarly, Cook (1784) described that he observed no more than three or four canoes on the whole island, which were small, no more than eighteen or twenty feet long, and narrow and not capable for any distant navigation. In 1852, Palmer (1870) described the existing canoes as made of small pieces of wood sewn together. This author also described seeing few large hooks (called rou), but they were not in use at this time. In contrast, nets were used for small coastal fish. After the deforestation of Rapa Nui, seaworthy canoes were impossible to build, which probably caused the loss of navigation and open water fishing.

1.2. The fishery in Rapa Nui

Recent reconstruction of artisanal landings in Rapa Nui for the main fishery resources showed a sharp increase in landings after 1977; however, a general decrease in landings has been observed since 2000 (Zylicz et al., 2014). Also, in a series of participatory workshops with the local community, Rapanui people identified the lack of resources from both coastal and open water fishing areas as the main marine problem (Gaymer et al., 2013). There is a perception of a dramatic reduction in the most important marine resources on the island. According to local people, lobster (ura), tuna (kahi) and coastal fish are declining in abundance over time and notably so during the last three decades (Gaymer et al., 2013).

Problems related to the decrease in marine resources include coastal resources, such as the Pacific rudderfish, nanue (*Kyphosus sandwicensis*), mollusks (e.g., pure, *Cypraea caputdraconis*), and crustaceans (e.g., ura, *Panulirus pascuensis*, and rarape, slipper lobster, *Scyllarides roggeveeni*), as well as large open-water fish, such as kahi (tuna, *Thunnus albacares*, *Thunnus alalunga*, *Thunnus obesus*), kana-kana (wahoo, *Acanthocybium solandri*), and toremo (amberjack, *Seriola lalandi*) (Gaymer et al., 2013). The scarcity of tuna and other large pelagic fish for the artisanal fishery has pushed fishermen to concentrate their extractions on coastal waters, using gillnets and causing a dramatic decrease in the abundance of coastal fish (Gaymer et al., 2013). Similar problems, related to decline in landings, have been described for the small scale fishery in other Pacific Island such as Guam, Commonwealth of the Northern Mariana Islands (CNMI) and American Samoa (Zeller et al., 2007).

1.3. Local ecological knowledge and taboos in fishery

In contrast to Rapa Nui, fisheries in many Pacific Islands have been sustainable for many years and are regulated by traditional management practices, which have been developed by the local fishing communities (Jennings and Polunin, 1996; Johannes, 2002) and are based on local ecological knowledge (LEK). In Fiji, the Locally Managed Marine Area (LMMA) network is based upon traditional local knowledge and practices and the customary laws of the indigenous population, and it achieves positive outcomes (Techera, 2008).

Several taboos for the conservation of marine resources have been described for Oceania. These taboos, including the closing of fishing areas, closed seasons during spawning periods, allowing a portion of the catch to escape, banning the catch of small individuals and a marine tenure system, among others, were enforced by the chief of the community (Johannes, 1978; Techera, 2008). In Rapa Nui, one of the solutions proposed by local people for recovering the degraded marine resources is re-implementation of traditional restriction or prohibition called tapu (Gaymer et al., 2013), which is similar to taboos in other places in Polynesia. Tapu implementation is seen as an alternative given its low cost. Additionally, as tapu was an important tradition in the past, some people believe that it could be easy to recover this tradition (related to fisheries) and it could also be easy to enforce it.

In the past, tapu was enforced by the king (Ariki) of Rapa Nui and controlled by the chief in other places in Polynesia (Johannes, 1978). The main tapu related to fisheries was the closure of fishing season for tuna and other pelagic or open-water fish during the winter months because these fish (especially tuna) were considered poisonous (Englert, 1948; Métraux, 1971). During the tapu, only the royal canoe or vaka vaero, decorated with rooster feathers (Métraux, 1937), with expert fishermen or tangata rava ika ma'a and boat handlers (tangata tere vaka) were allowed to fish (Ayres, 1979; Métraux, 1971). Tuna captured during tapu were for the Ariki and the eldest tangata honoui (important men) (Métraux, 1937, 1971). According to Palmer (1870), tapu was fully applied when he visited the island in 1868.

Given the importance of the tapu in the past and given that Rapanui perceive tapu implementation as a solution for marine resource recovery, we collaborated with locals to assess the current importance of tapu in fisheries and evaluated the feasibility of tapu re-implementation based on current local conditions.

2. Methods

2.1. Study site

The study was conducted on Rapa Nui (Easter Island), a small island (171 km²) located in the South Pacific Ocean and the easternmost corner of the Polynesian triangle (Fig. 1A). Rapa Nui (27° 07' S, 109° 22' W) is the most isolated island in the world, located 3700 km from the Chilean coast and 2030 km from the nearest oceanic island group (Pitcairn). In contrast to other islands in Polynesia, corals do not usually form true reefs, except in two places (Hubbard and Garcia 2003), and marine productivity is extremely limited (Friedlander et al., 2013).

Since 1888, Rapa Nui is under Chilean administration; however, Rapanui only have been considered Chilean citizens since 1966, under the Law N° 16441. According to the 2002 census, about 60% of the island populations are of Rapa Nui ethnicity. Regarding the social organization of the island, the Rapanui consider Chilean people who inhabit the island as immigrants. The Government, accepting the requirements of the Rapanui community, pushed an amendment to the Constitution of the Republic to allow, through an

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