

Development phases and socio-cultural contexts of the reef-based fishing economy of the Sembilan Islands community, South Sulawesi, Indonesia

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Abstract. Generally, this research aims at drafting the historical phases of the dynamic fishing economy in the Sembilan Islands, South Sulawesi (Indonesia) from the past to the present, based on the internal (local) and external (global) socio-cultural contexts. Particularly, the research aims at constructing the local patterns of fishery resources utilization practices associated with coral reef ecosystems that characterize each phase of the dynamic fishing economy. The data were collected by field research conducted in 2017 and several relevant previous types of field research in the Sembilan Islands, in which the authors had participated. These field researches used a qualitative-ethnographic method with in-depth interviews and observations as the basic data collection techniques. By focusing on dominant seafood export commodities associated with the coral reef ecosystem and the types of production technology applied, the researchers found three phases of dynamic fishing economy. They start with the sea cucumber and shellfish business (early phase: at the beginning of 1980-90s), continue with the live fish and lobster efforts (transitional phase: the end of the 1980's - early 2000), and with seaweed farming (current phase). From the constructionist perspective (in ecological anthropology), three local patterns of fishery resources utilization practices are constructed, characterizing each phase of economy development. They are the "collecting pattern" of sea cucumber and shell business, the "hunting pattern" of live fish and lobster business, and the "planting pattern" of the seaweed farming. The results of the analysis showed that the first pattern is gradually leading to overfishing practices (exploitative), the second pattern contributes to the destruction of the coral reef ecosystem (destructive), and the third pattern preserves the marine environment and supports the sustainable fishery resource utilization (protective). The development phases of the reef-based fishing economy of the Sembilan Islands fishermen have taken place in a historical series and internal-external socio-cultural contexts.

Key Words: fishermen, practice patterns, reef-based fishing.

Introduction. The Sembilan Islands fishing community from Sinjai Regency, South Sulawesi (Indonesia) are a mixture of the Bajos and Buginese ethnic groups. These groups are widely known, especially in eastern Indonesia, due to the uniqueness and complexity of their fishing economic development. The uniqueness is in the types of technologies used, fishing gear types, and the focus on fishery resources associated with coral reef ecosystems. The expansion of the fishing grounds and migration patterns, seafood export market orientation also contribute to the maritime culture of the Bajo and Bugis community. The complexity of the economic development is marked by the historical phases of the reef-based fishing efforts, the types of production technology, the marketing with the dominant seafood export commodities of each phase, followed by impacts on the marine environment and the maritime resources (Lampe et al 2005).

There are some studies treating the fishing economy in the Sembilan Islands community. Nevertheless, these studies did not provide an overview of the whole process of socio-economic development from an early phase to the current phase via transitional phases. One of the early field studies conducted in the end of 1980's focused on Bugis and Bajo sea nomadic traditions, especially on fisherman from the Sembilan Islands that were migrating seasonally to the eastern and western regions, as well as to Southern Indonesia.

They even reached the coastal water of Northern Australia, searching for sea cucumber, pearls and shells and marine plants associated to reefs as commodities for export markets, especially China (Lampe 2016).

The survey of socio-cultural, economic, and demographic aspects for the implementation of South Sulawesi COREMAP (Coral Reef Rehabilitation and Management Program) was conducted by the Team of Coral Reefs Study (2000), which focused on identifying destructive fishing practices to coral reef ecosystems at the Sembilan Islands, Taka Bonerate, and Spermonde Islands, South Sulawesi. The survey results demonstrated both the use of potassium cyanide and explosives were the most destructive fishing methods. The use of potassium cyanide, according to qualitative analysis, caused the expansion of fishing activities towards catching Napoleon fish (*Cheilinus undulatus*) and lobster since 1980-90s, as a substitute activity to the sea cucumber business. This was a response to a high export demand based in Hong Kong. For the new venture, potassium cyanide is considered by the local fishermen as the most effective fishing method, both regarding the quantity and the quality of the catch (Lampe et al 2017). Another study aimed to explain the use of potassium cyanide and explosives practically in the context of internal-external, socio-cultural, and economic influences such as export market, adoption of new fishing technology and the government policy (Lampe et al 2005; Lampe 2009).

All of the preliminary field studies in the Sembilan Islands community presented above tend to ignore the development phases of the reef-based fishing economy with the complexity of the local and global socio-cultural characteristic and historical contexts of each phase. The found field studies point less to the early period in which the sea cucumber business was dominant and expanded to the contemporary seaweed cultivation through the transitional phase of fish and lobster businesses. The current phase of seaweed business brings virtues for the life of Bugis and Bajo fishing community, being the main resource of earnings, involving women in the productive economy, protecting the coral reef ecosystem from destructive fishing, etc. It was a quite surprising change because the Bajo, according to Akimichi (1996), always maintain the tradition of fishing, collecting other marine species and wild plants.

In order to explain the seaweed business development based on the historical contexts of fishing economic change, advanced research in the Sembilan Islands was conducted. In this study, the constructionist perspective (in human ecology) was applied as the main reference in drafting the development phases of the reef-based fishing economy of the Sembilan Islands community.

The constructionist perspective in ecological anthropology was developed, among others, by Descola & Palsson (1999); Palsson (1999), and Milton (1996). The assumption, according to Milton, is that the world view (culture) was built by people through their social experiences. To understand the complexity of the socio-cultural phenomena related to the humans and natural environment, the constructivists tried to recognize a small number of principal assumptions, with which a pragmatic schemata and a symbolic representation were built to arrive at the cross-cultural comparison (Osseweijer 2001). Studying human-environment relations, Palsson (1999) constructed three paradigms of explanation, orientalism, paternalism and communalism, built from many ethnographies of the fishing communities in the world, mainly from Iceland. Within the orientalism and paternalism, man is regarded as the master and the owner of nature. The difference between the 2 is that the first one "exploits" and "dominates," while the second "protects" the environment. Furthermore, communalism (traditional paradigm) is different from the first and second paradigms because it refuses differences and extreme separation between nature and society and between science and practical knowledge (Palsson 1999). Communalism represents an inter-subjective relationship, not an exploitative relationship between subject/man and object/nature.

In constructing the development phases of the reef-based fishery of the Sembilan Islands, there are three paradigms of Palsson that can be applied as the primary reference, especially in considering the local and global socio-cultural aspects and historical contexts (Palsson 1988; Palsson 1989; McCay 1978). However, various categories of ideas, beliefs, techniques, and practices that characterize the extreme paradigms of Palsson do not entirely correspond to the elements of the local-cultural patterns, as characteristics of each

phase of the fishing economy development of the Sembilan Islands community. In the case of the succession process, each paradigm of Palsson appears with its particular characteristics. For the Sembilan Islands fishing community, for example, collecting sea cucumbers as main characteristic of the early phase of business (cucumber effort) is still frequent and co-exist with live fish and lobster business, as transitional phase of business, and even with the seaweed cultivation as the last/current phase of business, even though it is not dominant or popular anymore.

The process of businesses succession of the Sembilan Islands community, in which dominant local-cultural patterns are constructed can be compared with the Model of Rice and Sugar by Gudeman (1986). Based on a metaphoric-symbolic perspective (developed in economic anthropology), Gudeman constructed three local economic models of Los Boquerones Panama farmers, namely household economy models, cash crop economics model, and wage goods economy model. In a historical series of economic model change, according to Gudeman, some features of the old model still co-exist or come up with a new model, even though they are not dominant anymore.

In referring to Palsson's paradigms and Gudeman's metaphoric-symbolic perspective, this paper aims: (1) to draft the historical development phases of the dominant reef-based fishing efforts/businesses of the Sembilan Islands community from the past to the present; and (2) to construct the local-cultural pattern functions to simplify the complexity of the fishing practices and meanings characterizing each phase of development.

Material and Method. This research was conducted in the fishery community of the Sembilan Islands, South Sulawesi, in 2017. Sembilan Islands is located at the Gulf of Bone and covers eight inhabited islands: Kambuno, Kodingare, Batanglampe, Kanalo 1 (mostly the Bajos), Burungloe, Liangliang, Kanalo 2, and Katindoang (mostly the Buginese). The distance of the Sembilan Islands from Balanipa (Sinjai Regency) is approximately 25 km, while the travel time is approximately one hour.

The study was designed with the ethnographic method that used raw data collection techniques: observation and in-depth interview (Spradley 1979). Photography was used for documentation in this technique. The first technique focused on the activities of the fishermen as collectors/gatherers of sea cucumber, shellfish, pearl, wild seaweeds, as hunters of fish and lobster, and as seaweed farmers. Furthermore, an in-depth interview with the guide-interview was addressed to the selected informants from the fishermen circle, as well as to the informal and formal community leaders in Sembilan Islands. All of them retrieved past and present information on the different views, beliefs, and meanings that underlie economic activity choices in the internal/local socio-cultural context.

In order to gain the relevant external information, the progressive contextualization method of Vayda (1983) was applied for tracking informants outside the main site, such as merchants, employers or seafood exporters, seafood restaurants, clerks at fish markets/TPI, government, sea securities, and so on. The in-depth interviews used tape recorders. The data were analyzed through the stages of the data classification process, the construction of the patterns/types, and the conclusion.

Results and Discussion. Based on the tradition and the dynamics of the reef-based fishing economy of the Sembilan Islands community, the three development phases with the dominant local-cultural patterns were determined. The first/early phase consists in the efforts of sea cucumber and shellfish gathering (up to the 1980's - 90's), the second phase in the effort of fish and lobster fishing (1990's - early 2000's), and the latest phase in seaweed farming business (2000's to present). Each development phase of the reef-based fishing economy is marked by sets of distinctive cultural patterns in the internal (local), external (global), and historical contexts. The formation of the development phases is provided in Figure 1.

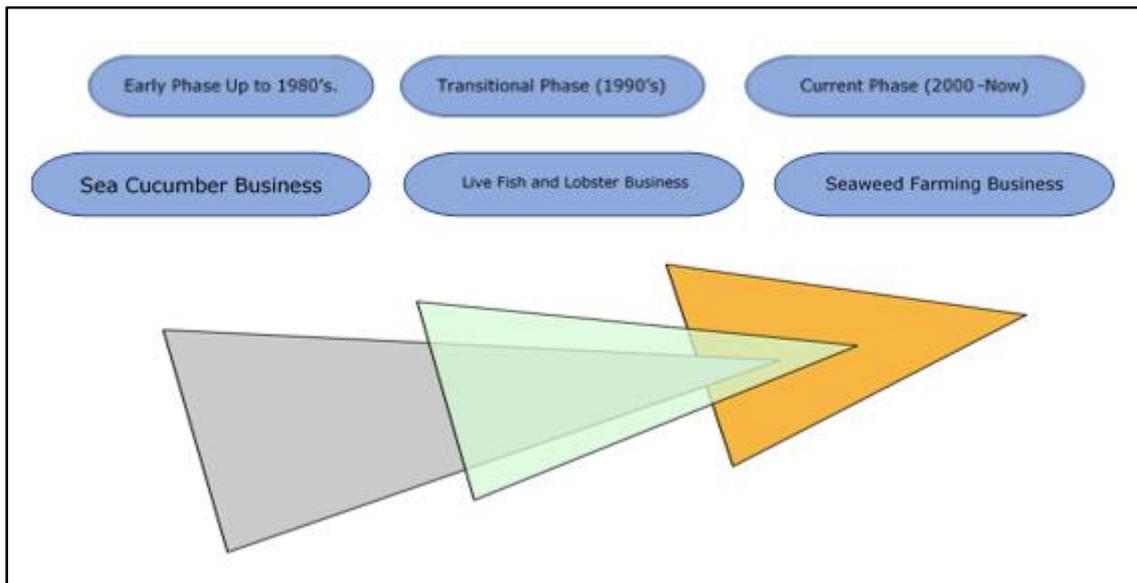


Figure 1. The formation draft of the three phases of reef-based fishing economy of the Sembilan Islands community.

Sea cucumber business (the 1980's). Hunting for sea cucumber had a great importance to the Sembilan Islands fishermen. It is because the sea cucumber is the oldest and high-value business that has a long history and a vast export market network. Fishermen communities in the Sembilan Islands (Sinjai) are descended from Bajo and Bugis people from Bajoe Village (Bone), who once travelled to the East, West, and South of the Indonesian archipelago. They even traveled up to the coastal waters of Northern Australia and the South Coast of Papua New Guinea since the 17th century to find seafood export commodities (Lampe 2016).

It is interesting to note that when the Sembilan Islands community talks about the effort to get sea cucumbers, they frequently mention two local terms: "mengumpulkan" (collecting) and "pencari" (seekers). "Mengumpulkan" means the act of collecting the sea cucumber. This activity is conducted in the sea bottom, collecting the sea cucumbers and pearls with traditional or modern techniques. "Pencari" refers to the fishermen who often struggle to find a sea cucumber that usually hides in the sand and tricks the fishermen by resembling a small coral boulder. The term also refers to the migration patterns from one fishing ground to the other of the seasonal fishermen, which takes weeks or even months. Based on the local terms, the "collecting pattern" was constructed summing up the complexity of the fishing practices that characterize the dominant sea venture in the first phase of the economic development in the Sembilan Islands.

For the fishermen community in the Sembilan Islands, sea cucumber is crucially important as an export commodity, and not as food for consumption. They believe so, since they know that sea cucumber is a sought food by Chinese people who import it. Moreover, because of the high export demand and high and stable price of the sea cucumber in the market, they look for sea cucumbers even beyond the borders of the Sembilan Islands territory, which is rich in fishery resources (Lampe et al 2005; Lampe 2016).

In the context of marketing, fishermen in the Sembilan Islands perceive themselves as a part of the global market society, especially China. The market relations determined the adoption of new knowledge regarding sea cucumber species and price levels, followed by new capture tools in the form of modern diving techniques. In the past, Chinese merchants from Beijing sorted sea cucumber species according to quality and price levels. Sea cucumber was categorized along with shells, shark fins, fish eggs, bird/swift nest, gelatin, and sea rattan as "old seafood export commodities" (Sutherland 2000). To fulfill the market demand, some Chinese merchants introduced and taught the modern diving techniques to the Sembilan Islands fishermen. The adoption of new diving equipment (gas tank devices, frogs, shoes, and masks) took place in the 1970's, followed by compressors

(where engine pumps air in the mask attached to the diver's mouth) in the beginning of 1990 (Lampe et al 2005; Lampe 2016).

Through the inheritance of knowledge from the previous generations, the Sembilan Islands fishermen firstly perceived Indonesia's Coral Sea waters (except the territory of Sasi in the Moluccas - Maluku) as free areas of searching and extensive wanderings, with an abundance of different species of sea cucumbers and shellfish. They could freely enter and exploit the area. Sea cucumber and shellfish populations in the reef areas around the Sembilan Islands gradually declined since the beginning of 1970's until 1980's due to the ever-increasing number of catch. This pushed the divers to expand the old search regions to other new reef areas. Initially, they entered the atoll in Taka Bonerate and Spermonde Islands (South Sulawesi), and then Mamuju waters (West Sulawesi). For the same reason, divers in the work-groups ("Ponggawa-Sawi") increased in number to follow the footsteps of the previous generations of divers in travelling seasonally to the eastern part (Maluku and Papua), the western part (South Kalimantan, North and West Sumatra), and the southern part (the territory of Nusa Tenggara Timur and Nusa Tenggara Barat) of the Indonesia archipelago to find fertile areas. This took place even until early 1978's and 1990's, with incursions in the territorial waters of Australia's North Coast, rich in species of sea cucumber, shellfish, and pearls. However, due to the international law enforcement on marine boundaries between the two countries, legalized in 1997, illegal visits to Northern Australia waters rarely resume (Lampe et al 2005; Lampe 2016).

The population of high-quality sea cucumbers has been declining in most of the territorial waters of Indonesia. However, according to the story of divers that entered some sacred reef areas ("taka-taka") in the Sembilan Islands waters, such as Taka Lampoge, Taka Pasi' Loangnge, and Taka Tinting, as well as other places, several high-quality species of sea cucumber such as "Teripang Koro" (*Holothurian fuscogilva*), "Teripang Nanas" (*Thelenota ananas*), "Teripang Hitam" (*Holothuria whitmaei*) and even several sea pearls are still present. According to fishermen, entering these sacred places should be preceded by several rituals, like prayers, and permission requests from sentient-beings. Furthermore, folkloric stories regarding sacred "takas", were told by Taka Bonerate fishermen (Lampe 2017) and Spermonde Islands fishermen (Lampe et al 2017). This strengthens the belief of fishermen, especially collectors of sea cucumbers and shellfish, that the catch is in good or bad condition depending on the will of supernatural forces. These belief and ceremony practices are one of the communalism characteristics (of Palsson), being also a characteristic of the reef-based fishing economy of the Sembilan Islands.

At the end of the 1990's, the divers experienced the reduced catches in most fishing grounds in Indonesia. This altered the perception of the fishermen about maritime commodities, from abundance to scarcity, especially in regards to sea cucumbers and pearls. That is why most fishermen began leaving the sea cucumber business and shifted to live fish and lobsters businesses that experienced a growth in the 1990's.

Live fish and lobster business (1990's - early 2000). In the Sembilan Islands, despite the fact that capturing wild fish and other biota is as old as collecting sea cucumbers, shellfish, and pearls, the first-mentioned economic activity became popular and dominant when live fish and lobsters started selling well in the export market centers in Hong Kong, from the 1990's to the early 2000's. The fish and lobster businesses focused on catching species of grouper. Some species and their local names are "Sunu" (*Plectropomus leopardus*), "Kerapu" (Epinephelinae), "Laccukang/Langkoe" - Napoleon (*Cheilinus undulatus*), and lobster (Nephropidae). Lampe et al (2005) classified these seafood commodities as "new seafood export commodities", replacing the "old seafood export commodities", terms used by Sutherland (2000). It is possible to run the live fish and lobster businesses as they promise an increase in household income. Therefore, most of the fishermen who used to catch other types of maritime resources with various kinds of traditional tools, including collecting sea cucumbers and blast fishing turned to the new fishing business.

Live lobster and fish business, as a transitional development phase, contained complex characteristics of the exploitation technology, local and global socio-cultural and

historical background, the problems of environmental damage, and social conflict. For understanding the complex characteristics of the fishing activity and the collecting techniques the establishment of a "hunting pattern" is needed. The forming of the pattern is based on the Indonesian language phrase of "memburu ikan liar di laut" (hunting for wild fish in the sea), which is always heard from senior fishermen at Batanglampe (a part of the Sembilan Islands cluster). On the aspect of hunting techniques, the term functions to simplify the complexity of engineering devices ranging from the eco-friendly traditional forms (variety of trapping tools and fishing rods) to the traditional destructive tools (explosive/blast fishing) and to the new form of destructive fishing techniques, such as spraying anesthetic and breaking rocks (to find lobsters) with the iron hammers (Lampe et al 2005; Lampe et al 2017).

In this phase of the live fish and lobster effort, fishing communities in the Sembilan Islands prefer the sale value of the catch than its subsistence value for side dishes. More than 90% of the total catches are for sale in order to earn money for the fulfillment of the basic household needs that focus on clothing, food, and housing. For the fishermen, "hunting for fish in the sea" means "hunting buyers in the market" to earn money.

In the context of marketing, fishermen in the Sembilan Islands perceive themselves as a part of and dependent on the international export market in China and Hong Kong. Like for sea cucumber and shellfish, fish and lobster market relations also involve the adoption of knowledge about species, the level of prices, and the capture techniques. Merchants from Hong Kong developed collaborative trades with some traders of Chinese descent in Makassar (Indonesia), and selected several kinds of valuable grouper and Napoleon fish, and lobster species for the market. The catch species of live fish were classified according to their weight ranging from Baby (under 1 kg), Super Class (1 kg), to "Buangan" (more than 1 kg), with different prices levels (Lampe et al 2005). In order to respond to the export market demands that were not met by traditional captures solely, operators of Tionghoa taught the fishermen to use potassium cyanide (an ancient technique) that is prohibited by the government because it belongs to the most destructive fishing techniques. In catching lobster, local fishermen combined anesthesia techniques with the use of iron hammers to break the rocks in which lobsters hide (Lampe 2009; Lampe 2016).

In term of the fishing grounds, the fishermen of the Sembilan Islands initially perceived the coral cluster in and around the islands as very rich in fishery resources, including grouper, Napoleon and lobsters due to the high value of the export commodity. Many fishermen believe and compare the fish abundance in the sea with the abundance of leaves on land, thinking that resources will never run out. According to the fishermen, the use of bombs or anesthesia is normal because that will not damage the corals, but merely reduce the fish population.

Although the reef areas in and around the Sembilan Islands are rich in fishery resources, for the fishermen, the catch has always perceived as gift or granting from divinity. There are quite a lot of reef locations banned because they are believed to be sacred places. Before entering such places, fishermen should first pray for protection or for permission from sentient guards. There are also fishermen that use spells to repel sentient beings guarding the places. The functioning beliefs and ceremonial practices of the Sembilan Islands fishermen can be compared with the inter-subjective relation between fishermen and the Sea Guards of the sacred places in Taka Bonerate, Selayar Regency (Lampe 2017).

The damage of coral reef ecosystems emerged in the early 1990's. It reduced the catch of grouper, Napoleon, and lobsters in the Sembilan Islands, Taka Bonerate, and coral reef areas of Spermonde Islands (South Sulawesi). The principal causes of the damage to the main sea ecosystems, according to the COREMAP Survey, was the use of explosives and toxic gasses (potassium cyanide). The issue was revealed by the results of scientific research, the news media, and even the talk of fishing communities. The empirical facts changed again the perceptions of fishermen from "abundance" to "scarcity" of resources, which, in turn, encouraged some fishermen to go back to the old economic strategy of diversification, including looking for sea cucumber and catching fish by explosives. Others tried marine culture, especially seaweed farming. Shifting to aquaculture was inspired by

the smart idea of Mrs. Nursiah, a Bajo woman who became the Head of Batanglampe Village until the 1990's. She stated that, in the future, the Sembilan Islands community ought to shift the economic pattern from hunting for fish, collecting sea cucumber and shellfish, gathering wild sea plants to planting the seeds and harvesting the yield from the coral reef areas (Lampe et al 2005). This kind of new economic pattern, according to Mrs. Nursiah, would positively bring a more promising and beneficial future than that brought by bombing and using anesthetic substances that cause damage to coral breeding places and to all species from the fishery.

Seaweed farming (2000's to present): planting pattern. As mentioned above, the seaweed cultivation in the Sembilan Islands was firstly practiced by Mrs. Nursiah (a Bajo woman) and Ruskimin (Nursiah's son-in-law) who used the gelatin that grows wildly in some reef areas of the Sembilan Islands in the end of 1990's. In the beginning of the 2000's, the Marine and Fisheries Agency of Sinjai regency conducted a socialization of seaweed farming techniques, following with the dissemination of seaweed seeds to 68 cultivation groups spread in four villages of the Sembilan Islands: village Padaelo' (36 Groups), Village Pengharapan (17 groups), Village Persatuan (13 Groups), and Village Buhungpitue (2 groups). Each group consisted of 10 to 15 people. This phenomenon can be compared with the shifting of old fishing activity to new productive seaweed farming in most of South-Western Korean Islands communities (Kim 2013).

To understand the complexity of reef resources utilization practices and the local meaning that characterizes the phase of seaweed business, the "planting pattern" was constructed. The construction was inspired by the good idea and positive attitude of Mrs. Nursiah, with a commitment to shift from the collecting and hunting pattern to the planting pattern in the reef area followed by harvest. By this current local-cultural pattern, farming seaweeds in the reefs is represented by planting seeds or seedlings in paddy fields or gardens as the initial phase, followed by maintenance and harvest. The planting pattern of seaweed cultivation simplifies the complex characteristics of the seaweed farming phase: (1) the manufacture of a hide in the reef location; (2) the installation of two rope carriers serving as a foundation; (3) mounting the ropes binding the seaweed seed designated areas; (4) the use of floats from plastic bottles; (5) installation of flags as signs of ownership of the site; (6) maintenance and control; and (7) after the harvest lasts 1.5-2 months.

In addition to sea cucumber and shellfish (old seafood export commodities) and live fish and lobster (new seafood export commodities), seaweeds are also appropriate to be categorized in "the current/latest seafood export commodities". Yet, the difference is that both sea cucumbers and seaweeds have only market value, while fish and lobsters have both market value and subsistence value for the community. Consequently, for its export market value, the cultivators interpret themselves as a part of and dependent on the international market of the seaweed industry.

With the planting pattern, the coral reef cluster of the Sembilan Islands is perceived as a vast cultivation area. It can be owned and utilized without significant capital. In the Sembilan Islands, there were 38 groups (816 people) in 2017 who had plots for seaweed cultivation. These groups function as administrative units, asking for help and proposing a budget to the government. They have replaced "Ponggawa-Sawi" (traditional work-groups of fishermen) who survived for hundreds of years (Lampe 2015). From the gender perspective, the new seaweed effort optimistically brings about the positive social change of the women role, especially in their involvement in seed processing, drying harvested seaweed, and marketing. Meanwhile, men actively play a role in planting, controlling, and transportation. The change can be compared with several Bajo communities of South Sulawesi that have shifted from fishing at sea to gardening on land (Lampe 2011).

Although seaweed farming is frequently hampered by the problem of plant disease and fluctuating price, which are difficult to overcome, this new effort becomes a significant source of income. It can be compared with seaweed farming in Takalar and Jennepono (the other two regencies in the South Sulawesi Province) studied by Zamroni et al (2011). Some people on the island connect the plant disease to the influence of anesthesia, which is still used by the fish and lobster fishermen. In this case, there is the striking positive

change of the cultivators from destructive fishing to friendly and sustainable marine resource utilization. The interesting phenomenon in the seaweed cultivation period is that catching fish, including groupers and lobster and even looking for sea cucumbers is still a source of extra income. Similarly, to the fishermen efforts in catching live fish and sea cucumbers, the extra income gained from seaweed farming has always been considered as a "fortune" or "awarding" from divinity, brought by hard work and prayers.

The construction of the three development phases of the reef-based fishing economy of the Sembilan Islands community is interesting to discuss in relation with the environment paradigms of Iceland fishermen (Palsson) and the local economic model of Panama farmers (Gudeman). The world market network of seafood export commodities is one of the main characteristics of orientalism from Palsson; equally, this characteristic is assumed for the three development phases of reef-based fishing economy in the Sembilan Islands. Migration patterns and the modernization of the diving techniques and means of production embraced in the collecting pattern, as well as the adoption of anesthesia (potassium cyanide) as a new form of capture and traditional blast fishing embraced in the hunting pattern resemble the characteristics of the orientalism paradigm (Palsson).

Why were the cucumber business and live fish and lobster business in the Sembilan Islands separated in the historical phases of the economic development, even though both have the same characteristics of orientalism? Because between these two businesses there are several fundamental differences in terms of fishing grounds, characteristics of maritime insight from the long experience of fishermen, the impact of the environment and fisheries resources. In the sea cucumber business phase, fishermen interpret coral reef areas of Indonesia as exciting and very wide search areas. Whereas, in the hunting pattern (live fish and lobster business), fishermen initiated the fishing grounds only to the point of a reef cluster of the Sembilan Islands and the surrounding narrow reef areas. The fishing grounds fishermen visit determine vast maritime geo-socio-cultural insights (for sea cucumber searchers) and narrow insights (for fish and lobster hunters). There is a distinction between both patterns of marine resource utilization, the collecting pattern being characterized by extensive over-exploited large fishing grounds of East Indonesia, and the hunting pattern by the intensive destruction of the coral-reef areas inside the Sembilan Islands water. These negative impacts of collecting sea cucumber in the Sembilan Island can be compared with the impacts seen in the case of both Oelaba traditional divers and Oesapa modern divers from West Timor, Nusa Tenggara Timur, Indonesia (Adhuri 2013). Both of the practice patterns correspond to the characteristics of the orientalism paradigm (Palsson 1999).

On the religious aspect, only the characteristics of communalism (Palsson 1999) function to preserve the balance of the human population and fishery resources. This is in contrast with all phases of the fishing economy of the Sembilan Islands community, in which religious beliefs and ceremonies are the characteristics of the three development phases. The religious uniqueness that characterizes both phases of the sea cucumber business and the live fish and lobster business is in the religious elements. Hence, it co-exists with the value orientation of market capitalism, export market, and modernization of means of production that could have positive or negative impacts on the condition of the environment and fisheries resources. Positive impacts occur when the religious elements function to limit the space motion and production practice of fishermen. Vice versa, the impacts are negative when religious practices motivate aggressive efforts as intended to resist and repel the guards or the power of the supernatural to maximize income. This is in contrast to the phase of seaweed farming business, in which religious and ceremonial practices function as prayer efforts for economic success and for the protection of seaweeds from diseases and pests, including the influence of anesthesia and bombs.

The seaweed business with the planting pattern of the Sembilan Islands community has similarities with the paradigm of paternalism (Palsson 1999) regarding essential homeostasis ideology (in preserving the balance of fishery resources). However, the difference is that paternalism with the recovery programs of sea resources always arises from and is portrayed by the government, which relies on expert scientists and consultants in the implementation of the top-down development programs, while the fishermen (local people) are not considered for the role because they were considered passive and ignorant

(Palsson 1999). On the contrary, in the seaweed business phase with the planting pattern, the local people are regarded as smart and playing an active role with the support and assistance of the government. As for various academics, practitioners, NGOs, they are regarded as development facilitators.

Regarding the succession model (Gudeman 1986), the development phases of the fishing economy of the Sembilan Islands community show resemblances with the Panama farmer's model. Yet, the difference is that in the Sembilan Islands, household economy characterizes all phases of the economic development, while in Panama, according to Gudeman (1986), the household economy model was only portrayed in the first phase of the economic dynamic. On the third phase of economic development of the Sembilan Islands community, the seaweed effort, household economy and wage system of earnings emerge as main characteristics. On the contrary, both the sea cucumber (first phase) and the live fish and lobster efforts (second phase) of the Sembilan Island community applied a sharing system of earnings that existed since hundreds of years ago.

Conclusions. Based on historical facts, the reef-based fishing economy of the Sembilan Islands community has gone through three development phases: sea cucumber and shellfish business (up to the first half of the decade of 1980s); live fish and lobster business (the second part of the 1980's-early 2000s); seaweed farming (current phase). The first development phase of the reef-based fishing economy with the collecting pattern tends to exploit the marine resources and the second development phase with the hunting pattern destroys the coral reef ecosystems. Both of the local-cultural patterns characterize the first and the second phase of the reef-based fishing from Sembilan Islands and correspond to the orientalism paradigm (Palsson 1988). In contrast, the planting pattern characterizes the third development phase of the reef-based economy of the Sembilan Islands. In particular, protecting the environment and preserving the sustainable utilization of marine resources correspond to the communalism paradigm (Palsson 1988).

The phases of economic developments and local patterns of human-environment relations are constructed in the local-global socio-cultural and historical contexts. Through the market relations of the three categories of seafood export commodities, the Sembilan Islands fishermen regard themselves as a part of and depend on the global market. They have relations with China through the sea cucumber and shells (old seafood export commodity), with Hong Kong through live fish and lobsters (new seafood export commodity), and with many countries, especially China and Japan through the seaweed product (the latest seafood export commodity). The market relations involve the adoption of knowledge about the kinds and the quality of the catches, the commodity price levels, the adoption of new production technology in the forms of modern submarine means (gas tanks, compressors, diving devices), controlling the chemical potassium cyanide for raising the fish and lobster business, and the techniques for seaweed cultivation.

The shift from the collecting pattern (exploitative) and the hunting pattern (destructive) to the planting pattern (protective, productive, sustainable) is distinctively a directional process of maritime civilization revolution. It is significantly important for the improvement of the well-being of the people's economic and environmental sustainability into the future. Therefore, the marine culture, in particular the cultivation of seaweeds, needs to be developed with the management models in favor of the interests of the people and the preservation of the environment, such as integrative management, co-management, or community-based management. Consequently, it is needed to conduct the collaborative action in research, which involves many relevant parties from related disciplines.

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