A Brief Comparison of Fisheries Livelihoods Strategy: Countries’ Experiences of Japan and Indonesia

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Abstract Differences in socio economic status of coastal community in developed country and developing country have an impact on behavior of people in dealing with development of livelihoods strategy. The objective of this paper is to compare the strategy of fishermen to develop fisheries livelihood activities. The comparison of fishermen’s strategy in different countries includes socio-economy characteristics of fishermen at study sites, challenges and opportunities in developing coastal livelihoods, fishers’ perception and stakeholder participation in developing fisheries livelihoods. This study was conducted in Akitsu Cho (town), Higashi Hiroshima Shi (city), Hiroshima Prefecture (province) and Hinase Cho (town), Bizen Shi (city), Okayama Prefecture (province), in Japan and two coastal villages in Indonesia namely Laikang Village in South Sulawesi province and Serewe Village in West Nusa Tenggara Province by administering semi-structured and structured questionnaires. Secondary data were included from statistics, published books, scientific journals and other resources. Descriptive analysis used to interpret the data. The findings show that developing fisheries livelihood in two countries in Asia have different circumstances and different strategies. Based on the above circumstances, women of fishermen’s village can get their idea of consumer’s needs and also create their opinions. Indonesian coastal villages have more to conduct double strategy. It means, fishermen conducted two different livelihood activities by family anticipating for low fisheries season and/or off fisheries season. In Japan side, fishermen spend more time for marketing through both direct and indirect channel by women which improve their household income.

Keywords Poverty; Fisheries livelihood; Coastal community

Introduction

Poor society in almost all developing countries suffers from low quality of human resources, low income and productivity. They are unable to fully benefit from natural and economic sources. Farrington et al. (1999) argued that poverty is not only equated with inadequacy and dissatisfaction with income and consumption, but also characterized as the situation that is insecure or vulnerable, and inability in households, communities or governance systems. The Government of Indonesia (GoI) was introduced many types of coastal management projects, which aimed to reduce poverty, improve livelihoods and enhance sustainable use of coastal resources. These projects were usually consisted both environmental and socio-economic aspects (Dahuri et al., 1999; Hanson et al., 2003; Idris, 2004; White et al., 2005; Dudley and Gofar, 2005).

Over fishing affected the decreased amount of fish catch. Thus, fishermen cannot expect too much to fishing activity and they conduct marine culture fisheries as alternative income sources. In Japan, according to Schmidt (2003), fisheries as part of livelihood activity in coastal area have a story. First, fish is a important for the national diet. Second, they used coastal community based fishery management as a tool to ensure the fish-harvest in sustainable way with community plays an important role in management.

Related to household income, it needs to be taught how fisher cannot depend on the fishing activity alone and how can we empower their family to get the additional income. In Indonesia, marine culture fisheries have been done by fishermen for many years, contributing to the revitalization of the local economy. It is noteworthy that some
alternative livelihoods are important ways to raise local economy which caused by decreased production of capture fisheries. The common understanding of livelihood is still adopted to the Chamber and Conway theory that a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Chamber and Conway, 1992). Indeed, they mention that a livelihood is sustainable when fulfilling four requirements; 1) Livelihood can cope with and recover from stress and shocks, 2) maintain or enhance its capabilities and assets, 3) provide sustainable livelihood opportunities for the next generation, 4) contribute net benefits to other livelihoods at the local and global levels and the long and short term. In other situation in Japan, the main activity related with fishery household income were conducted by women until the mid-1990s, then until such activities had contributed to the region began advanced develop (Hitomi, 2009).

The concept of community based resource management is still possible to use in order to achieve sustainable use of coastal resource management that would be secure livelihoods activity. This concept has been successful in Japan as well as success story in Southeast Asia Countries. Community based resource management (CBRM) is a strategy to achieve development which centralizes in human, where the center of decision making about utilization of resource continuously in an area depends on people's organizations in that area (Charter, 1996). Peoples have responsibility to manage their resource. They define need, aim and decision-making by them self. In Indonesia, a wide variety of community based management in marine and coastal resources have developed differently from long time experiences between one region and another. Those experiences were succeeding and some another is failed. Japan has a success story of coastal community based fisheries management for practical used in a sustainable manner, and community has been as key important player for the well-being of fisheries management system.

Capacity building in decentralization is one of the ways to develop coastal community as participation part in coastal management. Improved capacity can help coastal communities tackle adverse socio-economic pressures. Thus, the central government gives the authority to local government (provincial) and district/city to participate in coastal zone management, particularly in improving economics of small-scale fishermen. The authority of the local government is to formulate coastal zone and small islands management plan by involving the society based on norm, standard and guideline. Meanwhile, the district/ city has authority to formulate zoning plan in certain area of coastal zone and small islands.

This study will focus on investigation the strategy of fishermen in Japan and Indonesia in developing fisheries livelihood activities. Both strategies of Japanese fishermen and Indonesian fishermen will be compared and analyzed. The comparison of fishermen’s strategy in different country includes socio-economy characteristics of fishermen at study sites, challenges and opportunities in developing coastal livelihoods, and fishers’ perception in developing fisheries livelihoods.

1 Materials and Methods
1.1 Research location
Research site is divided into two countries namely Indonesia and Japan. In Indonesia, research location will select in developed coastal area and developing coastal area namely Laikang Village in South Sulawesi and Serewe Village in West Nusa Tenggara Province. Meanwhile, survey in Japan conducted Akitsu Cho (town), Hiroshima Hiroshima Shi (city), Hiroshima Prefecture (province) and Hinase Cho (town), Bizen Shi (city), Okayama Prefecture (province), where they conducting in capture fisheries and aquaculture (mariculture) activities as an income sources.

Laikang Village is one of the 12 villages in Mangarabombang Sub-District. It has an area of 19.6 km², comprising about 19.57% of Mangarabombang Sub-District (±100.14 km²). The population is approximately 4,139, or 12% of the total population of the sub-district (35,526 people) with a population density of about 211 people/km². Most of the people work in fisheries, and some work in the agricultural sector. Laikang Village has rich natural resources in fisheries, agriculture and tourism sectors which largely contribute to the economic development of the village. However, fisheries infrastructure is still poor, undeveloped telecommunication and public transportation hampered a further the economic development of the village. Lombok Island is under the administration of the Nusa
Tenggara Barat Province Province in Lombok. The island is divided into eight regencies and two cities, which total population is around 4.5 million (NTB in Figure, 2013) distributed in 8 Districts and 2 City in 20,153.15 km². Akitsu is a town located in Toyota District, Hiroshima Prefecture, Japan. The total area was 65.08 km² with an estimated population of 12,023 or a density was 184.74 persons per km². Hinase is a town having an estimated population of 8,347 and a density of 232.44 persons per km². The total area was 35.91 km². Main industry of Hinase is Oyster (kaki) farming. There are many oyster-rafts in coastal area. Oyster season is around winter (December to February) and many people come from other towns just to buy oysters from the local fish market (Figure 1).

Figure 1 Research Locations

1.2 Data collection
The investigation involves survey, direct observation and interview. Respondents consisted of fishermen, fish processors, key informants and representative of related stakeholders. Data obtained through direct interview and focus group discussion. The structured questionnaire was used for direct interview, while semi structured questionnaires were used for guide in focus group discussion. The topics of questionnaire covered socio-economic information, perception and response of respondents. Key informants will select purposively. They include the government officers and local government officers; researchers at research centers and universities, community leaders, the head of the village who well-understand about the social and economic condition of the village. Secondary data were included from statistics, published books, scientific journals and other resources.

1.3 Data analysis
Data collected is analyzed by using simple statistic, such as descriptive statistic to analyze percentage, arithmetic mean, number and standard deviation. A Likert-type scale was used, when the respondents was asked to point out their perceptions. Descriptive statistics essentially aimed to provide a better understanding of how frequent the data value is, and of how much variability there is around a typical value in the data (Fernandes, 2009). The results obtained from field observation, key informants opinions, and informal investigations were used to support the analysis. Likert scales are a non-comparative scaling technique and are one-dimensional (only measure a single trait) in nature. Respondents are asked to indicate their level of agreement with a given statement by way of an ordinal scale. A Likert type scale analysis is used to analyze perception of respondents on strategy of livelihood activity. Comparative analysis is also used to compare the strategy of coastal communities to adapt changes in livelihood activities.

2 Results
2.1 Livelihoods activity in two coastal communities in Indonesia
Ellis (2000) define a livelihood comprises the assets (natural, physical, human, financial and social capital), the
activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household. As the result of survey and analysis of the above two coastal villages in Indonesia shows that fishermen have various livelihood activities such as capture fisheries, seaweed farming, and seaweed farming combined with capture fisheries activity, seaweed farming combined with some other works. There are some fishermen who work for seaweed farming as a single activity (35%), combined seaweed farming and fishing activities (56%) and another multiple activity (9%). Therefore 65% of fishermen have called double strategy or double works on livelihoods development. It means, fishermen together with family should do both fisheries activity and alternative jobs beside fisheries.

Almost all seaweed farmers (97.5%) agree that the benefit of seaweed farming is better than catching the fish. There are many reasons of fishermen who doing seaweed farming as income source; 1) the Indonesian government introduced and supported seaweed farming technology that aimed to improve the economy of coastal communities. 2) seaweed farming can manage with relatively small operational costs. 3) seaweed farming is easy to maintain or monitor daily and/or weekly. In case of seaweed farming, the process of planting, maintenance and harvesting are conducted by the husband, while wife and daughter support for seedling. Seaweed farming is crucial to the implementation of a system of sustainable ecosystem management (Alder, 1994). This is confirmed by Salayo et al. (2012) that mariculture qualifies as an economic enterprise and livelihood option for diversifying income sources in the context of sustainable livelihood approach (SLA) to fisheries management. Zamroni and Yamao (2011) support previous opinion that the development of seaweed farming in Indonesia has led altering in the socio-economic structure, particularly in the livelihood economic activities of traditional coastal communities.

A lack of capital was not always regarded as a main obstacle to affect the sustainability of livelihood activities, according to the survey results in two selected villages. It was another constraint for altering livelihood is a lack of market information. In the survey, respondents expected that their present business was profitable enough to continue it; however, those respondents who anticipated a good prospect of their present business for development. In fisheries sector, fisheries entrepreneurs are regarded as a high risk group. Risks were usually related to the seasonal factor and to the fact that fish is a highly perishable material. Mismanagement of funds intended for the sustainability of livelihood activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household. As the result of survey and analysis of the above two coastal villages in Indonesia shows that fishermen have various livelihood activities such as capture fisheries, seaweed farming, and seaweed farming combined with capture fisheries activity, seaweed farming combined with some other works. There are some fishermen who work for seaweed farming as a single activity (35%), combined seaweed farming and fishing activities (56%) and another multiple activity (9%). Therefore 65% of fishermen have called double strategy or double works on livelihoods development. It means, fishermen together with family should do both fisheries activity and alternative jobs beside fisheries.

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2.2 Livelihoods activity in coastal community in Akitsu, Hiroshima Prefecture

Fishermen’s livelihood in Hiroshima, Japan is different. They optimize the role of Fisheries Cooperative Association (FCAs) and role of women of fishermen’s village on marketing of fisheries. FCAs are established in almost all along the coastal areas and/or fishing communities of Japan, and at least one FCA exists in each municipality (city, town and village level). They have three structure levels; 1) FCAs at local level, 2) prefectural federations of FCAs at prefectural (province) level, and 3) national federation of FCAs at national level, which referred to as “FCA network structure”. FCAs have contribution for fishing community in many activities, namely; credit, supply, marketing, and processing businesses as well as a guidance or non-economic activities. In term of fish marketing, marketing of fishes in Hiroshima has been involve as well as empowered the women, particularly for both direct and indirect marketing activities. Direct marketing give benefits for the participants (fishermen and consumer) and local community as well as their environment. Direct fish market advocates self-sufficiency/independency and prevents over utilization of resources in an attempt to meet customer’s demand. Participation of women of fishermen’s village in direct fish market creates good sense of belongings especially through group activities. It also changes the subordinate view of women by their spouse. Marketing activities of women improved the level of living by the support of their spouse and family.

Beside capture fisheries in the pass, fishermen in Akitsu Cho conducting oyster farming in coastal area within 10 meter in-depth. Oyster farmers are usually get 20 tons/crop in average of each farmer with the pricing 1,100/Kg. In Akitsu, there are nine oyster farmers that divided into two categories; 1) two of them are farmer and as a trader. 2) The rest are only doing as a farmer. This farmer has production value is about ¥80 Million to 100 M per year of each farmer. Some old oyster farmers sold the product to collector (Figure 2), through internet and direct market (only 5%). However, young managers of oyster farm were usually contacted to wholesalers for selling their
product. Wholesalers exist because they are able to provide the most effective and efficient distribution process than all other channel participants (Torii and Nariu, 2004; Rosenbloom, 2007). Accessibility and risks of the product-market chain depended on market structure, size, expected demand levels and the nature of competition (Roberts and Stekoll, 1993).

In Okayama Prefecture, fishermen selling fishes to wholesalers was preceded with auction which managed by Japan Fisheries (JF) of Hinase. Moreover, fishermen were also distributed the fishes to local market (direct market) and processing for souvenier or cafetaria (Figure 3). The traders or collector and farmers are doing mutual cooperation unlike the pass period (i.e. exploitation). Since consignment fish-sales between fisheries cooperative association (FCA) got a good result, financial status of FCA was stabilized, and mutual trust and support among fishermen were improved, cooperation between fishermen and traders were also improved (Yamamoto, 1995).

Figure 3 above have a similarity with fish distribution from fishermen to consumers in Indonesia. In Bali-Indonesia, fishes distribute from fishermen through action and then delivered to fish processing company (boiled and canned). In other way, the fish from fish auction distribute to fish trader or middlemen, then deliver to boiled fish-processing (home industry), cold storage and fish market (Zamroni, 2015).

There are three main fisheries products in Okayama, namely seaweed (nori), Fish (Spanish Mackarell) and Oyster. The fishermen are using set net and beach seine to catch the fishes. However, the problem in capture fisheries in Okayama Prefecture is decreasing the number of fishing units. In fisheries management area of Hinase, the number of fishing boat decreased from 13 units in 1985 to 6 units in 2016. It is due to the number of fishermen are decreased as well as altering livelihood activity to oyster farming. It was emphasized by Schmidt (2003) that 42% of Japanese fishermen in 1998 were over 60 years old, and it was predicted that the elder fishermen leave fishing industry but they are not replaced by younger age groups. Changes on livelihood activity of fishermen are also occured in some fishing community of Indonesia. Such as Zamroni and Yamao (2014) mentioned that some
fishing communities have been change their activity from fishing to seaweed farming due to higher contribution of seaweed farming to household income. It is a different reason with Japanese fishermen that had changed their fishing activity into oyster farming due to decrease the number of young fishermen. For instant, the number of fishermen by gradually decreased during 1988 – 2013, particularly on age group 15 – 59 years old, but they were increased on age group 60 to over 60 years old (Figure 4). In average, the group 15-24 years have decreased 0.2%, 25 – 39 years old have decreased 0.1%, and 40-59 years old have also decreased 0.1% in almost three decades. However, the number of fishermen who are 60 to over 60 years old were slowly increased about 0.05%. Clearly, it is difficult to develop fishing activity in Japan by decreasing the number of young fishermen.

![The number of Fishermen by Ages over last 3 Decades](image)

**Figure 4** The number of Fishermen in Japan during over last 3 decades

Note: Fishery census, Ministry of Agriculture, Forestry and Fisheries

In Japan, fishery right system have devided into 3 systems, namely; 1) common fishery right, 2) demarcated fishery right and 3) set net fishery right. In term of the right to catch the fish, prefecture government give a mandate to local fishermen cooperative association (FCA) for responsible management of fishing activity with exclusively for FCAs members (Figure 5).

![Fisheries management Area](image)

**Figure 5** Fisheries management Area in Higashi-Hiroshima, Hiroshima Prefecture

Women in fishing communities are engaged in various types of works. In some areas, they are engaged in fishing activities themselves together with their family members. In many other areas, women are engaged in sorting of fish by species and by size, after landing, and prepare for shipping the products by putting ice in the fish box to keep freshness. They are sensitive to the changes of the environment such as caused by pollution, and are actively engaged in the do-not-use-synthetic-detergents movement, clean the environment campaign such as by beach cleaning activities, and movement of planting trees on the mountain and so forth. Women sold the fishes through peddling prior to fisheries industry in Japan. They were developed the way to selling the fishes by opened the
shops. In case of large distribution, fishes-caught have sold to large-scale distributors (Hitomi, 2009). Women are also stayed on important contribution in regional revitalization for food supply. They involved in the most important on “conversion” step from the fish-caught into the income or money. In Japan, housewives are traditionally the manager of family’s finance. FCA women’s group members keep their books, and on the basis of this give advice on fishing business management matters, and thus play an important role in helping improve management of fishing households, particularly in small scale coastal fisheries sector. Further, women’s group members have long been doing savings promotion campaign, and through this movement, contributed much to the progress of FCA’s credit business development. In addition, they have been also actively engaged in insurance subscription campaigns such as for fishing vessel insurance, fishery insurance, life insurance, and in other activities, contributing to enhance FCA movement across the country.

Indirect marketing is taking the most part of fish marketing in Hiroshima Prefecture, which is operated by Fisheries Cooperative Association (FCA). In Japan, the FCAs also provide additional services for fishermen and the community, which is include input supplies, credit facilities, training, and other social services to support various activities such as processing, handling and marketing (Schmidt, 2003). It may comprehensive approach that has been done by FCA to minimize the conflict of interest among stakeholders in fisheries. In Akitsu, FCA have been donated the land to Higashihiroshima City to constructed the building for direct market sales.

Up to present, indirect market is still fisheries main channels in rural area of Hiroshima Prefecture. Direct or indirect marketing channel is selected by the type of fish and their products. Based on the above circumstances, women of fisher men’s village can get their idea of consumer’s needs and also create their opinions.

2.3 Livelihood strategy of coastal community in two countries: Indonesia and Japan

Livelihood strategies are composed of various activities undertaken by households to generate livelihood, generally adaptive over time, responding to opportunities and changing constraints (DFID, 1999). Developing fisheries livelihood in two countries in Asia have different circumstances and different strategies. Based on the above circumstances, women of fisherman’s village can get their idea of consumer’s needs and also create their opinions. Indonesian coastal villages have more to conduct double strategy. It means fishermen conducted two different livelihood activities by family anticipating for low fisheries season and/or off fisheries season. In Hiroshima, fishermen spend more time for marketing through both direct and indirect channel by women which improve their household income (Table 1). Allison and Ellis (2001) emphasized that diversification gave some benefits, such as 1) reduces the risks of livelihood failure by spreading it across more than one income, 2) overcome the uneven use of assets caused by seasonality, 3) reduce vulnerability, and 4) generate financial resources in the absence of markets. In fact, alternative livelihoods, which are introduced to poor or small-scale fishers, should bring more economic benefit by making their products more marketable. Livelihood diversification might be combined with other resources (Siavaneen et al., 2005).

Alternative livelihoods, which are introduced to poor or small-scale fishers, should bring more economic benefit by making their products more marketable. In fact, however, in cases where a newly introduced livelihood is considerably capital-intensive, the small-scale fishers could hardly start without any support. These businesses can be developed through joint ventures between fishermen. They cooperate with other fishermen to solve problems on limited financial capital.

Fishermen cannot depend on the fishing activity alone. They need additional income to fulfill the household needs. Such as the case studies, referring to the study of the other researchers, seaweed potential in Laikang Bay can be an alternative way to do double strategy. Family members also involved on fishery activities such as preparing seaweed seed or making salted fish. In this study, seaweed culture is still interesting for people to increase their income. Thus, seaweed culture has become main income source besides products from capture fisheries. The result of analysis between several fisheries activities shows that seaweed culture is realistic choice for fishermen to preserve their livelihoods. In term of livelihood strategies above mentioned, it was income from catching cannot stand alone. Thus, fishermen need to ensure that marine product can be secure livelihood and resources by shifting the pattern from catch to cultivation (Hitomi, 2009).
Table 1  The Differences of Livelihood Strategy on Coastal Community between Japan and Indonesia

| No | Factors                              | Japan                          | Indonesia                      |
|----|--------------------------------------|-------------------------------|--------------------------------|
| 1  | Type of livelihood activity          | Fisheries and Agriculture     | Fisheries, agriculture and services |
| 2  | Management of business               | Semi-professional             | Traditional                    |
| 3  | Distribution of the products         | FCA, Direct Market             | Middlemen                      |
| 4  | Adaptation to environmental changes  | Diversification of the products | Combined fishing, aquaculture and product processing |
| 5  | Type of products                     | Fresh and Processed products   | Raw material and processed products (traditional) |
| 6  | Financial capital                    | Middle - Strong               | Low                            |
| 7  | Financial management                 | Good                          | Poor                           |
| 8  | Scale of activity                    | Small-scale                   | Small-scale                    |

Note: Primary Data Processed, 2016

Despite above constraints, fishermen have the capacity to improve their livelihood activities. This study shows that the factors that can strengthen and further develop those activities include decreasing the amount of fish harvested, promoting and benefiting from seaweed cultivation as an alternative source of livelihood, tapping support from local governments and taking advantage of opportunities in the market. These factors are basic of interest to fishermen who engage in seaweed farming as an alternative means of livelihood. There is a lesson learned from both countries’ experiences that the networks, work experiences, education, and access to the assets are as critical factors in the process of developing livelihoods particularly in fisheries activity.

3 Conclusion

Two coastal villages in Indonesia have been use seaweed culture as a tool of livelihood strategy. It could be as a multiple strategy for fishermen’s income sources to sustaining their livelihoods. This is also as an alternative strategy to response for decreased fish production. Livelihood diversification through seaweed farming succeeded to enhancing household economy. However, this tool could not generalize to apply in all type of fisheries. In order to develop seaweed as a livelihood strategy’s tool, there are several problems faced by seaweed farmers; 1) management of production and post-harvest, 2) pricing and marketing, 3) business management, and 4) physical environment.

In coastal village of Hiroshima, the community have been optimizing the role of Fisheries Cooperative Associations (FCAs) and the women and/or housewife in production and marketing. Overall, marketing of fisheries in Akitsu Cho (Hiroshima) and Hinase Cho (Okayama) has been empowered by women, particularly for both of direct and indirect marketing activities. Oyster farming is one of strategy of fishermen to adapt the decreased the number of young fishermen. Oyster farming give more opportunity to women participation. In term of comparison pattern in livelihood strategy, Japan and Indonesia have similarities in altering livelihood activity from fishing to aquaculture (mariculture) activity. Meaning that mariculture activity by using sustainable manner can be keep sustained and secured for fishermen livelihoods.

Authors’ contributions
AZ designed and conducted research, collected primary and secondary data and analyzed. AZ is also arranged all things to completed this paper. Co-authors are contributed in data collection in Japan, data analysis and academic discussions.

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