COMMUNITY BASED FISHERY MANAGEMENT IN HYOGO PREFECTURE, SETO INLAND SEA[1]

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ABSTRACT

Seto Inland Sea plays a significant role in Japanese coastal fisheries. The successful development coastal community based fishery management contributes in sustainable fisheries. Hyogo Prefecture has a long history of coastal fisheries and has been selected as the study site. Community based fishery management in Japan reduces monitoring and enforcement cost. Fishermen comply rules and regulations settled by them, bottom up not top down. Participation from fishermen in adopting fishery management plan is the key factor. There can be transaction costs involve in adopting the Fisheries Coordination Scheme. Nevertheless this can be paid off by the long run benefit from the greater resource abundance and the optimum utilization of the available fishery resources. Fishermen can equally participate in community fishery management through being members of corresponding fishery cooperatives. They have the common goal of optimum utilization fishery resources. The fishing right granted to fishery cooperative is fairly distributed among the members, transparently. System of election at each step supports this factor of equity. Coastal fisheries in Seto Inland Sea - Hyogo Prefecture is sustainable. Fishermen collaborate in maintaining the ecological system (example is the management in Sika-no-Se Area) and sustainable fishery development. This is mainly due to the granted fishing right, equity in right sharing system, and effective coordination among stakeholders.

Keywords: community based fishery management; coastal fisheries; Seto Inland Sea

INTRODUCTION

Community based fishery management has been recommended as an effective management scheme for tropical fisheries which are often multi-species and multi-gear. Japan has been successful in adopting such scheme for coastal fishery management. It is interesting to look at the system and keys of success. For this study, the selected study site was Hyogo Prefecture, Seto Inland Sea side. Seto Inland is famous for being important Japanese fishing ground especially for coastal and small scale fisheries. Seto Inland Sea is a semi closed fishing ground being utilized by 12 prefectures along the coastlines. Hyogo Prefecture is one of the twelve. Three districts of this prefecture i.e. Kobe-Hanshin, Higashi Harima, and Hishi-Harima are located along the coastlines of Seto Inland Sea. Awaji, the largest islands in Seto Inland Sea is also located there. Two coastal communities i.e. Akashiura, in Kobe-Hanshin and Ikuha in Awaji were selected as the study sites. Akashiura was selected due to strong leadership while Ikuha was selected due to the success of collaboration among the fishermen.

FISHERIES IN HYOGO PREFECTURE – SETO INLAND SEA SIDE

Fishery establishments in Hyogo Prefecture accounted for 19% of the total in Seto Inland Sea. Most of them were small scale fisheries. 87% were individual fishery establishments while 12% were joint management and only 1% was fishery companies. 88% of the fishing vessels in Seto Inland Sea were less than 5 GT. Main fishing gears were boat seine, small trawl, purse seine, gill net, and angling. Total production in 2001 was 140,844 metric ton, 44% from marine capture and 56% from aquaculture. Except the decrease in 1997, marine production had been relatively stable. Laver production was the highest in term of volume, followed by catches from boat seine and small trawl. Important fish captures were sand

lance, white bait, fluke, scads, red sea bream, cutlass, flatfish, Spanish mackerel, and octopus. In term of value the production from capture was about the same as from culture.

There were 6,940 fishermen in Hyogo Prefecture, Seto Inland Sea side. Number of fishermen had been decreasing through the years. About one-third was 60 years old or over and other one-third was 40-59 years old. Through the development in this area, job opportunity increased. The younger generation, with access to higher study usually left fishing which was considered hard work for non-fishing jobs. Number of immigrants in fishing sector was also limited.

COASTAL FISHERY MANAGEMENT IN JAPAN

The development

Community based fishery management in Japan could be traced back more than two hundred years ago, in early 17th century during Tokugawa Period (1601-1867). To secure food supply for his troop in Edo (Tokyo nowadays), Shogun Tokukawa Ieyasu established officially recognized fishing villages around Tokyo Bay. Fishing right over fishery resources in waters adjacent[2] to the village was granted to these villages. The target was on sedentary species near shore while further from this exclusive zone fishing grounds could be shared by several communities. These fishing villages had to supply part of their catches to the Shogun's castle[3]. During 1743-1867, this fishing regime was under Ura Law[4].Under this Law, exclusive fishing right was granted by the Lords in different areas to coastal fishing communities and tax was collected in return.

Shogun regime was overthrown in 1867. Meiji era began but it was not until 1901 that the Meiji Fisheries Law was enacted. Under this Law fishery right would be granted to fisherman societies upon their request. Fishermen had to establish their organization to apply for the right. These fisherman societies later on were developed to be fishery cooperative associations, which was key institution in responsible for fishery management in Japan.

In 1910 trawl fishery was developed and led to conflicts with coastal fisheries. To control number of trawlers, licensing system was adopted. In later half on 1920s most of the fishing vessels were mechanized, finally resulted in over-fishing, thus more conflicts among fishermen. Before the end of Meiji era fishing right was mostly under control of large scale and selective fishermen. There was a need for fishing right redistribution.

In 1935 Mr. Kanichi Nomura, Chief of Coastal Fisheries Division[5], on the attempt to reduce the conflicts, proposed the Program on Fishery Coordination.. The objective was to achieve fishery management plan for optimum resource utilization with harmony among stakeholders. Fisheries Law 1949 was enacted upon his proposal. Fishery Coordination Committee was established. There was also fishery reform. Central government bought back all fishing right in order to make resources available for harmonious optimum utilization.

Type of current fishery management in Japan

Currently, fisheries in Japan were classified by type of management into three categories: fishing right fisheries, licensed/authorized fisheries, and free fisheries.

Fishing right fisheries, focused on coastal fisheries, were further classified into three groups: common fisheries, demarcated fisheries, and fixed net fisheries. Common fishery fishing right would be granted to Fishermen's Cooperative Associations (FCA). Grant period was 10 years and could be renewal upon

application and performance of the FCA. Covering in this common fishery fishing right were 5 fishery groups: 1) submerging fixed net/gear, gill net and small set net, 2) beach seine, hand trawl, baiting angling, and shelter fishery, 3) winter mullet fishery, boat red sea bream and sand lance fishery and 5) inland fishery. The emphasis was on coastal fisheries. Demarcated fishery fishing right was aimed at aquaculture in specified area with grant period of 5-10 years. Fixed net fishery fishing right was focused on those fixed gear in over 27 m depth or at the deepest point of the area. Nevertheless small set-net in Seto Inland Sea was an exception, being under common fishing right.

Licensed/authorized fisheries were divided into two groups: those granted by Minister and those granted by Prefecture Governor. The Minister would issue licenses for mobile gears and off-shore fisheries, usually large scale, which had to be uniformly regulated to lessen the conflicts and maintain sustainability. Fisheries Coordination Committees were established under Fisheries Law and Fisheries Resource Conservation Law for supportive decision information upon harmonization among stakeholders. The Governor, took the recommendation from his Sea Fisheries Coordination Committee, would issue licenses to 17 types of fisheries, mainly small trawls and other coastal mobile gears. Nevertheless Ministry of Agriculture, Forestry and Fisheries took responsibility in determining limits of fishing effort (in term of number of fishing vessels, tonnage and horsepower) which the licenses issued by the Governor could not exceed these limits. Boat seine and medium salmon drift net in Seto Inland Sea were included in this group.

Free fisheries include those not being covered in the aforementioned categories, mainly pole-and-line and long-line fisheries. Nevertheless free fisheries would not be allowed in the area of common fishing right for shelter fishery, octopus pole and line, and sedentary species gathering. Tuna long-line of over 5 GT required Ministry of Agriculture, Forestry and Fisheries (MAFF) permit. (Figure 1)

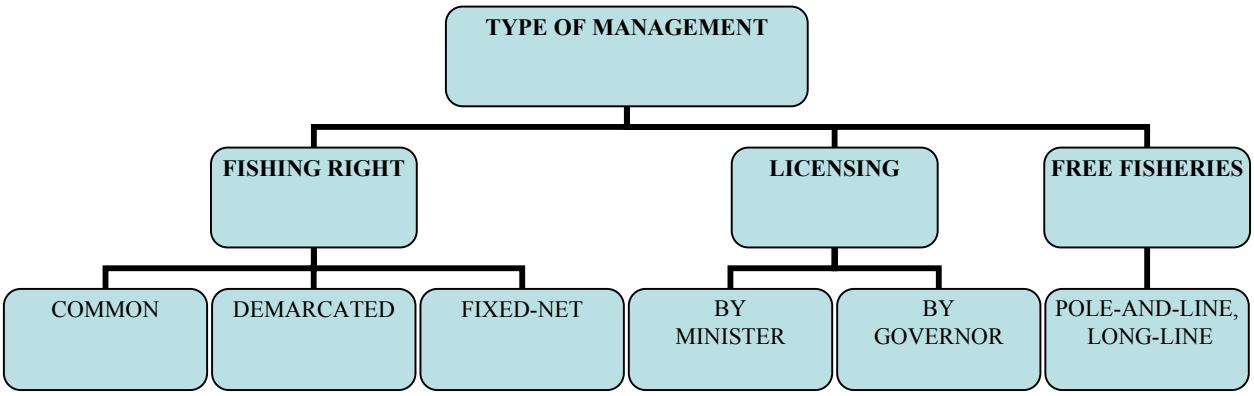

Figure 1 Type of Fishery Management in Japan

Management organization

At national level there was “Fisheries Agency Bureau” in which “Central Fishery Coordination Council” took role in drafting overall management plan, harmoniously taking into account requests from relevant stakeholders. Fishery Agency Bureau carefully gathered information from fishing community up to

prefecture and regional level, bottom up not top down, and acted as secretariat in central planning for fishery management in Japan.

At regional level there were 3 "Regional Fisheries Coordination Committees" and 5 subcommittees to provide consultation and coordination within and beyond the region (for migratory species), with the emphasis on coastal and offshore fisheries. Seto Inland Regional Fisheries Coordination Committee was one of the committees. Harmonization among stakeholders was the top priority. Committee members consisted of elected representatives from Prefecture Coordination Committees acting for coastal fishermen, appointed representatives from offshore fishermen, and appointed experts. Office of Seto Inland Sea Fisheries Coordination[6] served as secretariat for Seto Inland Regional Fisheries Coordination Committee. The Office was under Fishery Agency Bureau. There were 17 committee members: 11 elected from Prefecture Sea Area Fisheries Coordination Committees[7] and 6 experts appointed by MAFF. The Committee investigated the problems and recommended the solutions, aiming at optimum utilization of fishery resources in Seto Inland Sea.

At prefecture level there was "Sea Area Fisheries Coordination Committee". In Hyogo Prefecture there were two such committees i.e. "Seto Inland Sea Adjustment Committee" and "Tajima Sea Area Fisheries Adjustment Committee". Hyogo Prefecture Office of Seto Inland Sea Fisheries Coordination served as the secretariat to the Seto Inland Sea Adjustment Committee. There were 15 members in this Committee: 9 elected by fishermen and their employees and 6 appointed by the Governor. From the 6 appointed, 4 were experts and 2 were those with concern on Seto Inland Sea. The Committee gave instruction on fisheries coordination and decision on common fishing right as well as fishery license.

Prefecture Governor granted fishing right to coastal fisheries and issued licenses for small trawls and17 types of fisheries (e.g. medium surrounding net, sea bream surrounding net, Danish seine, diving apparatus, gill net, and octopus pot)[8] and Seto Inland Sea boat seine and medium salmon drift net. Number of licenses could not be beyond the limit set by MAFF.

In granting fishing right and license, the Governor would form fishery management plan on types and fishing grounds, in consultation with government officers. He would take into account the recommendation from his Prefecture Sea Area Fisheries Adjustment Committee/s. After the Governor completed his plans, the Committee would hold a public hearing on the plan. Thereafter the Committee made recommendation upon the results to the Governor. The governor, taking the recommendation, made decision on the plan and gave public notice thereof. Then, the fisherman, through Prefecture Bulletin, could file his application for fishing right (usually by FCA) or license. The Governor shall accept the application and listened to the opinion from the Committee/s. grant eligibility and priority was established in Article 10 and 14 of Fisheries Law. The Committee/s made recommendation on grant priority. The Governor would take the recommendation in granting fishing right and licenses. He would have the grant registered and recorded at the Fisheries Section in Prefecture Office (Figure 2).

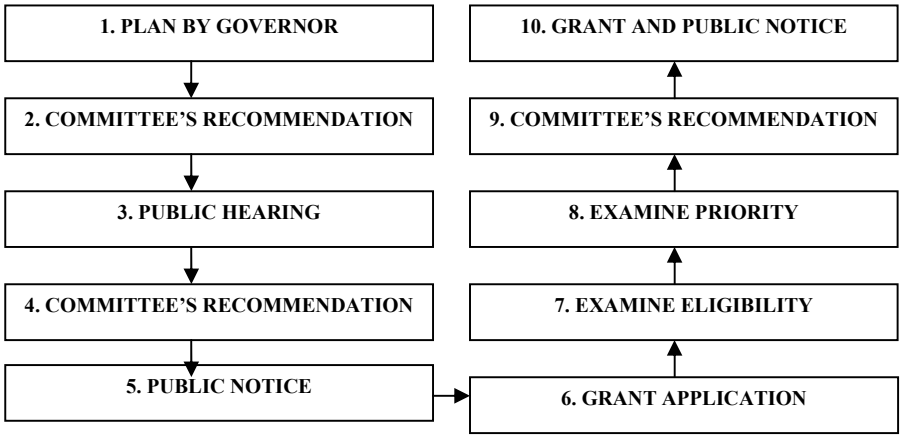

Figure 2 System of Granting Fishing Right/License at Prefecture Level

At community level, there were "Fishery Cooperatives". From 102 Fishery Cooperatives in Hyogo Prefecture two were selected for this study i.e. Akashiura in Akashi and Ikuha on Awaji Islands.

THE TWO SELECTED FISHERY COOPERATIVES

Akashiura Fishery Cooperative

Akashiura Fishery Cooperative was located in Akashi, about 20 minutes from Kobe by train. In 2002 there were 358 members, an 18% decrease from 1990. Recently number of fishermen had been decreasing. The young generation, with higher education, could be employed in non-fishery sector which was considered better working condition. All members were full time fishermen. Akashi had been rapidly urbanized. 43% of Akashiuara Fishery Cooperative members used small trawls, 35% used long line, 15% used trolling line, 5% used boat seine and 2% used other gears including gill net and octopus pot. Main fishing grounds were Harima Sea and Osaka Bay. For aquaculture, about one kilometer from shoreline had been allocated for seaweed culture. Seaweed production from Akashiura was the largest in Hyogo. Total annual catches as reported in March 2003 was 1,686,745 ton accounting for 1,608 million JPY.

Fishermen from various coastal fishing villages around Seto Inland Sea fished in Osaka Bay. There used to be conflict in fishery resource utilization. The conflict was less via the fisherman agreement "Osaka Bay Fisheries Coordination Agreement". The Agreement was made among the fishermen on fishing periods, amount of catches, fishing gears, and certain regulation on conservation purpose. Presidents of concerning Fishery Cooperatives took role in settling the agreement.

Between Akashi and Awaji, there was a shallow water area called "Sika-no-Se" where had been spawning and nursery ground for aquatic livings as well as important fishing ground. Sika-no-Se was utilized by 8 fishery cooperatives which collaborated for sustainable fisheries as well as conservation of spawning and nursery areas.

Akashiura Fishery Cooperative was established before World War II, started from being "Fishermen Association" and later was developed to be cooperative. The administration was undertaken by 14 executive committee members of whom 9 were elected. The president had been in the position for a long time after his being personnel in this Cooperative. 2 were permanent members of the committee and other 2 were accountant and clerk. Total number of employees in this Cooperative was 23.

Main function of the Cooperative included input procurement, marketing, insurance and extension services. Success in market development by Akashiura Fishery Cooperative was well known. Members landed their catches at Cooperative for the auction there. Fish auctions were twice daily; at 00:30 for wholesale market and 11:30 for restaurant as well as large central fish markets (including Tokyo and further west). The Cooperative charged 3% auction fee from their members. Recently supermarkets and department stores bought from this market in preference for live fish and freshness. Contact had been established with consumer cooperatives and hotels. Akashiura Fishery Cooperative also took role developing value-added processing products. Seto Inland Sea Coordination Committee supported plant construction and the implementation on price support program for sand lance and octopus processing. Before processing, about 10 ton of sand lance catch was sold for fishmeal. After processing had been developed, only 2 ton was sold for fishmeal.

Fishermen were divided into 6 groups by their fishing gears (small trawl, boat seine, gill net, trolling line, long line, and octopus pot). They shared the fishing right, mainly common fishing right, granted to the Cooperative. Fishing entry was limited to the members. Fishermen participated in their fishery group to take roles in developing fishery management plan. Fishing group leaders represented their group members in drafting the plan at the Cooperative Level. Rule and regulation could be adopted in addition to those required by Hyogo Prefecture. The Cooperative applied for fishing right to the Governor. Once the right was granted, right distribution was based on historical record. Violation socially discredited the non-compliance. Social sanction was regarded a severe penalty among the fishermen, thus compliance was considerably high.

Annual gross revenue per fisherman was about 10 million JPY while net revenue was about 6 million JPY. Amount of sales from Akashiura Fishery Cooperative was decreasing due to impact from earthquake in 1995, Akashi-Kaikyo Bridge construction, and extension of Kansai Airport[9] as well as decreasing demand in economic depression. Nevertheless this revenue was still above the average (0.9 billion JPY/cooperative). Total annual catches in 2003 was 1.69 million ton or 1.6 billion JPY in 2003. Including the returns from processing and marketing the annual Cooperative revenue was about 3.1 billion JPY.

Granting fishing right to the Cooperative together with limited entry established property right over fishery resources, thus effective sustainable management scheme. Akashiura fishermen believed in fish for the people and collaborated in maintaining fish abundance. One of the key for success of Akashiura Fishery Cooperative was the efficient leadership which brought about high income for the members and their cooperation as well as successful negotiation and collaboration with relevant bodies, including other cooperatives, their product buyers as well as the government.

Ikuha Fishery Cooperative

Ikuha was located on the northwest of Awaji Islands. Transportation to Awaji was convenient via Akshi-Kaikyo Bridge and several ferries. Recently this area had been developed for tourism. There were 26 Fishery Cooperatives in Awaji. Ikuha was one of them. These Fishery Cooperatives agreed on dividing Awaji fishing communities into three groups from the north to the south. Presidents from 26 Cooperatives represented their members in Awaji Coordination Committee. From 26, 3 would be elected as executive committee with one top President. The top President took roles in fishery management in collaboration with the outsiders and other management agencies in the upper levels. Through this organization fishery management planning was bottom up from the members to their Presidents, then the top Presidents who communicated with the Governor, Sea Area Fisheries Coordination Committee, and Seto Inland Sea Fisheries Coordination Committee.

Main fishing gear in Ikuha was boat seine of 3-5 GT. There was no clear fishing group in Ikuha Fishery Cooperative since most of the members used same gear. Laver culture was also run by the Cooperative. Similar to Akashiura, main fishing grounds for Ikuha were Harima Sea and Osaka Bay, with more emphasis on northern Harima Sea. Northern Harima Sea had a long history in fisheries. It was the fishing ground for fishermen from Okayama, Kagawa as well as Hyogo. The area once was overfishing, with conflicts in fishery resource utilization. After the Fishery Cooperatives, the fishermen collaborated in establishing their consortium "Koyogikai". Agreement was made upon sustainable fisheries. Fishing zone was established with limited entry. Fishing ground was divided into three zones. Presidents of Fishery Cooperatives represented their fishermen in this consortium. Among these Presidents, 3 would be elected as representatives from each zone while there would be one top President of the consortium in charge of communication with the Governors upon conditions of granting fishing right and coordination among fishermen. Top president term was 2 years. The consortium organized annual conference for fishermen and relevant agencies to exchange ideas for better fishery management.

Ikuha was one of the 8 Fishery Cooperatives in collaboration for fishery management in Sika-no-Se. Out of the 8, 4 were from Awaji. The Sika-no-Se Committee made agreement in rules and regulation for sustainable fishing in this important spawning and nursery area.

Fishing right was granted for 150 fishermen in Ikuha while the members were 200. Practically there could be more than one fishing household jointly own fishing vessel. For each fishing right, there could be 5-6 persons working together. The right could not be inherited and was non-transferable.

Ikuha Fishery Cooperative members elected 8 executive member committees to run their Cooperative. The term was 2 years. Each member paid 80,000 JPY member fee and 4% charge upon landing. It was require that Fishery Cooperative members land their catch at the port of respective cooperative. Ikuha Fishery Cooperative provided landing port in protection of storm, supplied ice, fuel and other necessary fishing equipment. Storage room and processing plants were available at the port. Fish traders came for auction at the port.

Ikuha Fishery Cooperative put the emphasis on collaboration among fishermen. The President took role in representing their fishermen in collaboration with others upon harmonious and sustainable fishery management.

LESSON LEARNED FROM SETO INLAND SEA COASTAL FISHERY MANAGEMENT

Seto Inland Sea had been important fishing ground for coastal fisheries, being source of high quality fish protein, source of income for coastal dwellers, and important spawning and nursery sanctuary for fishery resource. Japanese Government in realizing the importance of this fishing ground had given priority for sustainable fishery management there. In this section the institutional framework, physical condition, and socio-economic condition were considered as the keys of success for Seto Inland Sea fishery management

Institutional Framework

Development of fishery laws and regulation, fishing right system, and Fishery Cooperative allowed s foundation for coastal community based fishery management regime in Japan.

Community based fishery management in Japan can be traced back as far as 17th century when the Lords gave fishing right to coastal fishing community in exchange for tax and fish supply. In 1949 Fisheries Law was enacted. This law put the emphasis on people participation in fishery management, bottom up. The target was for "harmony" in fishing for "optimum" utilization of fishery resources. The establishment

of "Fisheries Coordination Scheme" was one of the key of success. Under this Scheme, Fisheries Coordination Committees were established at each level, national, regional and prefectures. The aim was to allow harmonious participation in fishery management plan taking into account the needs of various stakeholders, such that management would be acceptable thus received better compliance among the fishermen. At the community level, Fishery Cooperatives took care of the needs among their members and communicated with the prefectures. There were representatives from each fisherman group participating in higher decision level. Cooperative Law 1948 supported and strengthened capacity of community organization in form of Fishery Cooperative. Fishery Resources Conservation Law 1951 was important framework for renewal fishery resource abundance, providing better source of fishing income.

Fishing right granted in coastal fisheries in Seto Inland sea included common fishing right granted by the Governor to Fishery Cooperative, demarcated fishing right which was applicable for Fishery cooperative, and licensed fishery granted by the Governor. Fishing right system secured property right over fishery resources in coastal community fishing grounds. Together with the limited entry adopted by Fishery Cooperative, the fishermen could be secured in their access to fishery resource, thus better incentive for participation in sustainable fishery management plan.

Fishery Cooperative allowed fisherman participation in fishery management, a bottom up approach. Their needs could be reflected in fisherman group then to their Fishery Cooperative which communicates to the upper levels. Fishery Cooperatives also collaborate with each others in management on joint fishing grounds e.g. Sika-no-Se, northern Harima Sea, and Osaka Bay. Presidents of Fishery Cooperatives also worked with the Prefecture and Regional Coordination Committees. Fishery management plan was drafted upon consent among fishermen while the government provided coordination for harmonized optimum utilization of fishery resources. Fishery Cooperative also performed functions on procurement, insurance, marketing and processing with the emphasis on uplifting the income as well as living condition of the fishermen. The capability of Fishery Cooperative had been one important factor fot the success in Japanese coastal fishery management.

Physical Condition

Three factors were considered, i.e. the fishing ground boundary, fishing gear, and fishery resources.

Seto Inland Sea is semi-closed area, thus the sea could be considered exclusive to the fishermen in coastal communities around the Sea. The boundary was geographically clear. Within the area, the Cooperatives collaborated in settle agreement on their fisheries. System of boundary lines and sea marks were agreed among these coastal fishermen. Being semi-closed and given clear boundary line resulted in convenient regulation enforcement and monitoring and less fishing conflict.

Most of the fishing gears were small scale. In Fishery Cooperatives with diversified fishing gears there would be various fishery groups classified by the gear. Fishermen could collaborate in finding the solution for the common optimum fishery resource utilization through their group leaders in the Cooperative.

As most of the catches were sedentary species, management was less difficult. The requirement on landing at Cooperative port allowed record keeping. Together with the limited entry, total allowable catch (TAC) and total allowable effort (TAE) had been introduced in an attempt on renewal resource abundance for certain species.

Socio-economic Condition

Key factors were community culture, market and income.

Community culture had an important role in these coastal fishing communities. Fishery households were closely related. They collaborated in helping each other in time of trouble. Social sanction was considered a severe penalty. Such culture resulted in high compliance among fishermen. Most of the fishermen in same fishing villages were homogeneous, at a level. Their backgrounds, religious, traditions, customs, and living condition were similar. Such homogeneity contributed in common understanding and collaboration in fishery management.

Establishment of Fishery Cooperative decreased reliance on fish traders. Fishermen were not credit-tied to the traders. They could fish as they wanted, with the objective on sustainable responsible fisheries. The landing, the auction, and other market services provided by Fishery Cooperative allowed reasonable prices for their catches.

Coastal fisheries in Seto Inland Sea were profitable. Family members also earned income from non-fishing sector. Their incomes were a little above the average of Japanese households. They were able to earn enough for savings. Fishing was considered a hard work but still gave high return. With the success in fishery management, resources would be more abundant. The limited entry would allowed better income, thus better living condition among these coastal fishermen.

CONCLUSION

Coastal community based fishery management around Seto Inland Sea could be considered efficient. Fishermen collaborated in fishery management plan as well as establishing rules and regulation with satisfied level of compliance, thus reduced the cost of monitoring and enforcement. Participation from fishermen was the key of success. Adopting Fisheries Coordination Scheme might take time and costs but it could be paid off by long run benefit from sustainable responsible fisheries.

In term of equity, fishermen equally participated in their fishery management being members of Fishery Cooperative. Fishing right was distributed transparently, based on fishing record. System of election at each level supported this equity.

Coastal community based fishery management around Seto Inland Sea-Hyogo prefecture could be sustainable. Fishermen were willing to collaborate in maintaining ecological system and sustainable fishery development. Effective coordination for harmonization in optimum fishery resource utilization was the key of success.

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ENDNOTES

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[2] Usually fishermen estimated the zone by lining about 3 km from shoreline, or at a distance that they could swim to.

[3] Short (1992) and Morisawa, Short and Yamamoto (1992).

[4] "Ura" is Japanese word for coastal (mainly fishing) community.

[5] By that time Coastal Fisheries division was responsible for fishing right, fishery cooperative, infrastructure and sea ranching (with emphasis on stock release to enhance natural fish abundance).

[6] In this Office there were 4 Division i.e. Administration, Coordination, Resources, and Guidance. There were also 4 officers under the Director of this Office i.e. Fishery Enforcement, Resource Management and Planning, Resource Conservation Management, and Fishing Vessel Inspection.

[7] There were 11 Prefectures around Seto Inland Sea.

[8] Details were in Article 7 of Regulation of Fishery Adjustment.

[9] Government paid a 15 million JPY compensation per fisherman upon Airport construction. Nevertheless fishermen preference was still on keeping their fishing ground abundance.