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# Direction of Fisheries (SUISAN) Education from a Historical Perspective in Japan

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Additional information is available at the end of the chapter

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## Abstract

Fishing, aquaculture, and food processing is collectively referred to as “SUISAN”, and the term was translated to “fisheries” in the Meiji period. Fisheries education in Japan was at its dawn. Fisheries education was necessary for improvement of local fisheries subsistence. Fisheries education was performed, centering on nurturing of mid-career engineers for deep-sea fishing after 1950s. However, when the Heisei period in the 1990s started, “participatory = citizen involvement type fisheries education” was promoted extensively. Future establishment of a Japanese version of Sea Grants is desired to promote citizen involvement in fisheries education with systematized involvement of universities, research institutions, aquaria, and local people.

**Keywords:** Matsubara Shinnosuke, fisheries (SUISAN) education, participatory fisheries education, sea grant college program, Japan

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## 1. Introduction

Japan, surrounded by the sea, has been blessed with coastal bounties from ancient times. For Japanese, familiarization with fishing and ocean matters with enhanced understanding about oceans and their utilization is important for the construction of a sustainable society. At present however, opportunities to learn about fisheries and oceans are not sufficient. In 2001, the Fisheries Basic Act was enacted. Article 23 of the act stipulates that, “Measures to enrich understanding and concern of the public about fisheries industry should be taken” [1]. Furthermore in 2007, the Basic Act on Ocean Policy was enacted. Article 28 of the act mandates “promotion of education relating to ocean” [2]. Under such circumstances, the Japanese Society of Fisheries Science opened the “Children's Fisheries College” on its homepage as one

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activity to promote understanding of fisheries and oceans. The society has been performing activities, such as “presentation of research outcome by high school students” at spring, and autumn general social assemblies [3], publication of explanatory texts of the “Verseau Books” series, which explains special areas of fisheries in an easy-to-understand format, and the enhancement of education targeted at the general public, elementary school, middle school, and high school pupils and students. This report describes “fisheries education” related to the ocean, which has been conducted continuously from the Meiji period to the present day, with a review of the history of fisheries education, and exploration of the direction of future fisheries education and its historical transition.

## 2. Dawn of fisheries (SUISAN) education in the Meiji period

In 1880, Prof. S. Matsubara (first director of Imperial Fisheries Institute) who built up the foundations of fisheries education that have stood the test of time through the present day, visited Germany as the administrative official attending the Berlin International Exhibition. After graduating from Tokyo Medical School (present Faculty of Medicine, The University of Tokyo), Prof. Matsubara was teaching biology to medical school students and also working as the General Affairs official of the Agriculture Department. He completed a list of Japanese fishes in German, “Special-Katalog für die Japanische Abtheilung der Internationalen Fischerei-Ausstellung zu Berlin”, and introduced it with scientific names in 1880 [4]. It is said that Europeans were astonished to find that as many as 600 kinds of Japanese fishes are listed, although fish species known in Germany were only 50 [5]. While staying in Europe, Prof. Matsubara probably realized that Japan is a seafaring nation surrounded by ocean and is blessed with resources of a bountiful sea. After returning, he wrote his “Observation of German Agriculture” [6] covering protection of fishery, fishery law, farming, fishery association, fishery academic surveys, and others that he experienced while staying in Germany. These observations resulted in the foundation of the Japanese Society of Fisheries, the first organization supporting the Japanese fisheries industry in 1882. At a convention held by the society in 1884, he presented his “Present and future of Japanese fisheries industry” [7], and forecasted that fishery resources, now abundant, will decrease due to fishing. He appealed for greater attention to the necessity of restrictions on fishery, improvement of aquaculture technology, and food processing technology. Prof. Matsubara wrote in his diary in 1908 that fishery, aquaculture, and food processing collectively referred to as “SUISAN”, and the term was translated to “fisheries” in 1880s. Subsequently, he wrote the “Charter for Foundation of Fisheries Training Schools” [8], fisheries training schools were established aiming to improve local fisheries industry in November 1888 at Shiba, Minato-ward, Tokyo (believed to be Tokyo Joshi Gakuen at present) [9]. At the fisheries training school, K. Okamura, K. Uchimura, C. Sasaki, and S. Matsubara, as well as M. Sekisawa (the school Headmaster), delivered lectures [4]. Thus, full-scale fisheries education started in Japan. Furthermore, in “Personal opinion on fisheries expansion policy” issued in 1890 [5], he stated that “Topographical features of Japan are suited for fishery according to the statistics of 1887, the number of fishery workers were 860,000 (1,650,000 according to the survey in 1881), whereas those of U.S. were 100,000 (1880),

the U.K. were 160,000, and France were 150,000. It should be said that Japan has the greatest number of fishery workers in the world. Germany deems fish as a new resource, even though their coastal waters are narrow, and the U.S. is struggling to expand fishery activities as if they had already used their other resources completely, even though they still have the greatest land resources in the world. Japan is in a good position to promote fisheries businesses using natural geographical features, but its slow progress is regrettable.” In 1893, rules for occupational training school [10] were enacted. After 1895, fisheries training schools were established throughout the nation for “teaching of businessmen through training schools” (fisheries expansion opinion). The first fisheries training school, founded at a higher elementary school in Miyako-cho, was run by the Kuwagasaki-ryocho Union [11]. In 1897, the fisheries training school was succeeded by the National Fisheries Training School to fulfill fisheries education. In 1899, fisheries schools were founded throughout the nation as a secondary educational institution by the Occupational School Ordinance. From 1896, fisheries training schools adopted fisheries teacher development courses to produce fisheries teachers to work actively in the nation [8].

As explained above, the Meiji period was the dawn of fisheries education. The framework of fisheries education constructed during this period continues to this day. Fisheries education aimed at “acquisition of fishing, aquaculture and food processing for the improvement of local fisheries industry” was instituted in every region of the nation. Foundations of fisheries education were established.

### **3. Fisheries education after the war**

According to the educational system reform announced after the war, fisheries education for those before entering high school was performed in “vocational courses” taught in middle school. However, “vocational courses” were replaced by “technology and homemaking” in 1958, and fisheries education in middle school disappeared gradually [8]. Professional education for developing human resources to support local fisheries industries was conducted in fisheries high schools. Fisheries education for students was possible at fisheries high schools only. The government course curriculum guidelines issued in 1953 defined the objective of fisheries education as follows: “Occupational education in the high school is quite professional in all respects, each field requires special knowledge and technology particular to fisheries industries, and one should acquire wide knowledge about fisheries industries overall. Therefore, the general aim of occupational education should be met, and students are requested to understand each subject of the fisheries industry, operating fishing boats, carrying out fishery, aquaculture, food processing. (...) In short, the target is to nurture human resources who can participate in businesses immediately after entering the workforce, serve as a driving force for fisheries industry development and eventually reach mid-career success after obtaining technology and knowledge corresponding to demands of the real world.” It seems apparent that, even after the war, objectives of fisheries education succeeded in fisheries education performed in the Meiji period, and that teaching of fisheries engineers was an important national objective.

Differences between Meiji period education and postwar education were such that prewar secondary fisheries education placed importance on “mainly teaching of mid-career engineers contributing to development of local fisheries industry”, whereas postwar education targeted “teaching of mid-career engineers for deep-sea fishing” as well as development of local fisheries industry and “fulfillment of construction of training ships and facilities and equipment” [12].

The background of placing emphasis on the teaching of mid-career engineer is such that the financial base of facilities and equipment such as training ships of fisheries high schools was strengthened after the Act on Promotion of Vocational Education was enacted in 1951. The first training ship constructed by governmental subsidies of said act was “Toyama Maru (222 GT)” of Toyama Prefecture. Because its haul was excellent, Toyama Maru was assigned as a model ship of deep-sea fishery training by the Ministry of Education, Culture, Sports, Science and Technology and many fisheries high schools participated in deep sea tuna longline fishing [13].

In 1952, the MacArthur line was abolished upon conclusion of the San Francisco Peace Treaty, and subsequent construction of fishing boats over 300 GT to be used for deep-sea fishing was promoted. The fishery course of fisheries high school immediately after the war aimed at acquisition of class B first officer qualification as one target. However, a class B first officer qualification cannot be used by captains of ships over 300 GT. Therefore, establishment of a specialist course to obtain class A second officer qualification, authorizing a person to serve as the captain of a ship over 300 GT, and upscaling of training ships were promoted nationwide. In 1952, specialist courses were established at fisheries high schools in Awa, Yaizu, and Hamada for the first time. Most students who finished this course played active roles in large fishing boats and the shipping industry. Their achievements resulted in successive establishment of specialist courses in fisheries high schools nationwide [12].

The fishing industry has been blessed greatly with innovation of science and technology and fish catches have increased accordingly. The White Paper on Science and Technology in 1962 reported that “Fish catches has been increasing by about 300,000 tons yearly thanks to progress of science and technology relating to the increased capability of fishing boats, progress of fishing technology, improvement of equipment and materials for fishing, cultivation of new fishing places, etc.” [14].

However, because of oil shocks in 1972 and the 200-nautical-mile issue for fishing, the size of the deep-sea fishing system started to decrease. Fish catches reached their respective peaks in the 1980s and subsequently showed a downward trend. Under such circumstances, although large-sized training ship education was maintained, the number of deep-sea fishing boats decreased. In some cases, students were unable to find a job in fishing boats even after obtaining a ship officer diploma. Consequently, students who wished to enter fisheries high schools decreased and retention of fisheries high schools was regarded pessimistically. The Kumamoto Prefectural Fisheries High School stated in their journal commemorating their 45th anniversary that the “Postwar fishing industry continued to expand, greatly influenced by education provided at this school. The number of students continued to increase year by year. In 1973, no course of the school met its admission quota, probably because of influences of the first oil



crisis. This eventuality was remarkable in fishing courses, and even at present, admissions have not yet recovered" [15]. The school has stated that severe circumstances related to the fishing industry are coupled directly with student recruitment.

#### **4. New fisheries education in the Heisei period**

The mainstream of fisheries education in fisheries high schools after the war was teaching of mid-career engineers using large training ships. However, because of social situations, changes in industrial structure, decreased employment offers for deep-sea fishing, etc., prospective students who wish to enter fisheries high schools decreased, and the continued existence of fisheries high schools became doubtful. During and after 1989, every school undertook improvement and review of fisheries education to cope with the demands of the new era. For example, Kyoto Prefectural Fisheries High School was quick to change their name to Ocean High School, and taught marine sports such as diving, boardsailing, yachting, etc. Iwate Prefectural Miyako Fisheries High School started investigation research activities in "research subjects" in which students themselves took the initiative in solving problems related to familiar themes such as aquatic marine environmental surveys and effective utilization of fisheries products. Miyazaki Prefectural Ocean High School regarded their training ship as a vessel of prefecture residents, and performed teacher training aggressively, planning experiential voyages for elementary school and middle school pupils and students to deepen their understanding about fisheries activities by residents. Ibaraki Prefectural Ocean High School constructed a large diving pool at the school geared to diving education such that they held training sessions for scuba-diving instructors. They targeted fisheries high school teachers and offered its use as the main site of an all-Japan fisheries and ocean high school diving championship. Shizuoka Prefectural Yaizu SUISAN High School streamlined learning environments, so that students can tackle fishing practical training voluntarily, such as pole-and-line fishing of tuna. During the Heisei period, fisheries high schools in the country actively promoted "research on given projects" to enhance students' independence and inquiry capability together with conventional, professional, and technical education, with originality and ingenuity of "integrated training" and regional contribution activities using their expertise to deepen citizens' understanding about fisheries. If conventional fisheries education for teaching of fisheries engineer is called "technology acquisition type fisheries education", then that education centering on enhancement of interest and concern of the learners, increased independence, and understanding of fisheries should be widely regarded as "participatory fisheries education" [16].

In parallel with such a flow of new fisheries education, according to the Life-long Learning Promotion Act enacted in 1992, career-long education [17], assigning importance to motivation and rewarding life of individuals, was regarded as the pillar instead of results-based education pursuing economic development. Furthermore, in 1998, the Act to Promote Specified Non-profit Activities (nonprofit organization law) [18] was passed, the goal of supporting general citizens' activities to contribute to society was declared. At present, approximately 40,000 groups are established, of which 750 groups are engaged in education relating to the ocean [19].

It is noteworthy that many civic activities engaged in ocean-related education share a relation with fishing experiences or fish-eating experiences [20]. Such learning activities are of independent activities rooted in traditional cuisine, culture, and climate of every region. It might be said to be “participatory fisheries education” for the enhancement of understanding about fisheries industries.

In addition, government curriculum guidelines issued in 1998 included “time for integrated study” [21] and aimed at teaching of pupils’ capabilities to solve a theme independently, in addition to improving physical and intellectual ability. Odaiba-gakuen Koyo Elementary School in Minato-ward, Tokyo is practicing observation of living things on tidal wetlands, nurturing *Zostera* beds, laver (*Pyropia yezoensis*) culture, etc. as school-wide environmental education of the sea. Mats-saki middle school in Ofunato City is pursuing enrichment of the understanding of major fisheries industries in the region through experiencing farming of wakame (*Undaria pinnatifida*) seaweed from seeding to harvest with the cooperation of the local fisheries workers' union. As described above, elementary schools and middle schools throughout the nation are promoting “participatory fisheries education” actively in cooperation with local activists and fisheries operators in “time for integrated study” [20]. Furthermore, Article 23 of the Fisheries Basic Act enacted in 2001 specifies, “Measures should be taken to deepen public understanding and concern about fisheries industries” [1]. Article 28 of the Basic Act on Ocean Policy enacted in 2007 specifies “promotion of public understanding of ocean”, [2] thereby supporting such “participatory fisheries education”.

The Japanese Society of Fisheries Science opened the “Children's Fisheries University” on its homepage. In 2000, started publication of the familiarization and enlightenment book “Verseau Books” jointly with Seizando Publishing Co., Ltd. which explains fisheries industries in a comprehensive and comprehensible way for the general public and for high school students. In addition, from 2007, the society has been helping with “presentation of research by high school students” [3]. From 2009, the fisheries education field has been newly added as a research field for academic papers presented at the spring and autumn general assembly of the Japanese Society of Fisheries Science.

## 5. Direction of future fisheries education

Since the dawn of fisheries education in Japan during the Meiji period, the mainstream of fisheries education in the country has been teaching professionals and fisheries engineers. Fisheries education starting from the Heisei period used, in addition to the above, “participatory fisheries education”, which enhances independence of learners and deepens understanding of fisheries, rooted in the tradition of the region and food culture. “Participatory fisheries education” is a new activity that blossomed during the Heisei period. Throughout the nation, these activities have been enhancing the understanding of fisheries industries and the ocean. Certainly, “participatory fisheries education” emphasizes processes until an outcome is obtained, and does not result directly in technological development and increased income. Nevertheless, with this type of education, all local residents consider and discuss fisheries

industries and the ocean, understand fisheries industries comprehensively, and make decisions and take action from a broad perspective. Thereby, independence and human power are strengthened, the region is activated, and a new field is created [22].

Such “participatory fisheries education” is a new trend that has been adopted long after the Heisei period. However, although every activity of this education is excellent as a subjective activity of individuals (points), organizational activities forming linear and planar relations have not been forthcoming. For further promotion of such approaches, development of concrete legal systems should be conducted such that, instead of mere technological development education, the upwelling of “participatory fisheries education” can be ranked definitely as a national project. Moreover, an organizational framework should be established to convert individual activities to a more solid linear and planar arrangement. Some ideas include institutionalization of fisheries, ocean-related universities, high schools, institutions, and social education facilities such as aquaria throughout the nation.

Here, the author would like to introduce a national project in the U.S. that has been promoting participatory ocean education among citizens. The U.S. has a Sea Grant College program (SGCP) [23] proposed by Dr. Spilhaus at the American Fisheries Society in the 1960s. SGCP, assisted primarily by the Sea Grant Office (SGO) of the federal government, assigned the Sea Grant College Office (SGCO) in universities in 33 states (coastal area across the U.S. and around Great Lakes including universities in Puerto Rico) and a Sea Grant College Extension (SGE) in each county to realize organized system at the federal government level, state government level, and local level. Furthermore, SGE is working together with citizens’ groups such as NPO, aquaria, museums, schools, and research institutions in every region.

At present, 400 SGE staff members are actively working as agents, communicators, educators, and the like throughout the U.S. The SGE staff members are promoting participatory ocean education to enhance ocean literacy using research outcomes from universities, networks linking universities, and regional networks using workshops, research meetings, videos, webpage design, radio shows, etc.

For instance, at the Florida Sea Grant College, a management office (SGCO) has been established within University of Florida. The SGE office is provided in 29 of 36 counties as a subordinate institution, and professional staffs are stationed in each SGE office. In Escambia county, located in western Florida, Mr. Andrew Diller is stationed as the SGE program specialist providing workshops on oceanic environmental education, coastal organisms, and marine turtle education for adults and children. Such quiet dedication in every region brings remarkable fruit to regional development [22]. The author would like to propose establishment of a “Japanese version Sea Grant” to promote “participatory fisheries education” actively in every region.

In areas stricken by the Great East Japan Earthquake on March 11, 2011 disaster, such momentum is being fostered that understanding of our bountiful ocean should be enhanced through experiential activities instead of emphasizing the horrors of the sea and distancing children from oceans [24]. To support reconstruction of the Sanriku coastal region, Iwate University, working together with Kitasato University, and fisheries universities such as the



Tokyo University of Marine Science and Technology, established the Kamaishi satellite, the headquarters of Sanriku reconstruction promotion, and extension centers in each coastal city [25]. It is expected that such Kamaishi satellite and extension centers in each coastal area will become a precursor of a “Japanese version Sea Grant”, contributing to the development of “participatory fisheries education” and acting as the nucleus of Sanriku reconstruction supported primarily by local residents.

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