



Comparative job satisfaction of fishers in northeast Hokkaido, Japan for coastal fisheries management and aquaculture development



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ABSTRACT

To foster future research directions and propose feasible adaptive management strategies, the factors affecting job satisfaction were examined in Akkeshi and Erimo, two local fishing communities in northeast Hokkaido, Japan, using historical fisheries data and semi-structured questionnaires. Fishers in Akkeshi practice mixed fisheries (capture and aquaculture), whereas in Erimo fishers specialize in capture fisheries. The target species for fisheries and aquaculture are kelp (*Laminaria angustata*), chum salmon (*Oncorhynchus keta*) and oysters (*Crassostrea gigas*) in Akkeshi, and kelp and chum salmon in Erimo. The fishers in both areas were moderately satisfied with their jobs, but fishers in Erimo were more satisfied than those in Akkeshi. Satisfaction was directly associated with household size in Akkeshi and Erimo, and was high for fishers practicing oyster aquaculture in Akkeshi. Most fishers (79% in Akkeshi and 84% in Erimo) were unaware of any future target species if the current species declined or went extinct. About 14% of the respondents in Akkeshi mentioned oyster farming as their best alternative in the future. Differences in job satisfaction between the two areas may be attributed to disparities in socio-economic factors and fishery types among fishers. Further comprehensive studies that include allocation of fishing effort among different species, and impacts of climate variability and anthropogenic factors on the resources are required.

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1. Introduction

Fisheries are complex social-ecological systems that are managed by addressing problems related not only to the resources themselves but to the people targeting them (Hilborn, 2007). Fishing has contributed to the collapse of several fish stocks (Karpov et al., 2000; Myers et al., 1997), reduced biological diversity (Akpulu and Bitew, 2011; Rochet and Benoit, 2012; Smith et al., 1991; Tudela, 2004), and led to the loss of ways of life based on history and culture (Mills et al., 2011; Urquhart et al., 2013). Fisheries resources have been successfully managed by sharing responsibilities between governmental institutions and groups of resource users, i.e., fisheries co-management (Makino et al., 2009;

Persoon et al., 2005). The rationales behind the management include improved management and utilization of resources through the use of local knowledge, and collective participation by owners in decision-making.

In Japan, young people seem to prefer jobs in fields other than fisheries. A recent study by Kunimitsu (2014) reported that job opportunities and gross regional production influenced the satisfaction of residents in Japan. Other studies also have associated satisfaction with individual attributes including age (Blanchflower and Oswald, 2004), gender (Mroczek and Kolarz, 1998), and occupation (Tsutsui, 2010). Pollnac et al. (2001) showed that fishing is connected to traditions, and pleasurable aspects of the occupation, including the beauty of the sea and being one's own boss, are key factors that attribute to fishing satisfaction.

Because of limited alternative occupations, fishers tend to be unwilling to change occupations (Pollnac and Poggie, 2006, 1988) and they are likely to recommend fishing to the next generation (Pollnac et al., 2001) regardless of their fishing satisfaction level. On the other hand, limited fisheries resources can encourage the

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sustainable management of the resources (Duarte, 2000; Gaspare et al., 2015; Matsuda et al., 2009) and maximize job satisfaction among fishers. Differences in satisfaction between types of fisheries may imply disparities in management (Pollnac et al., 2014) and outputs common with many multi-species fisheries (Béné and Tewfik, 2001; Gourguet et al., 2014; Hilborn and Ovando, 2014). Thus, low job satisfaction among fishers can be a key indicator of production constraints in fisheries and call attention to the poor prospects for the future wellbeing of the fishers and of the community as whole. To protect and enhance the resources and services they provide to the local communities – which include food, cultural aspects and tourism – the challenges faced by fishers need to be holistically tackled in a timely manner. Therefore, understanding the levels of job satisfaction among fishers and the reasons for dissatisfaction will assist institutions in advocating future studies, reviewing the management strategies in place and formulating feasible adaptive management policies for the resources (Pollnac and Poggie, 1988).

Despite the substantial contributions that the fishing industry makes to the local economies, food security and culture of many communities around Japan, job satisfaction of fishers has not been well studied. The purpose of this study was to examine fishing satisfaction among traditional fishers. To achieve this goal we first assessed the historical variations in species catch and income, and explored preconceived factors attributing to fishing satisfaction or dissatisfaction. To compare and contrast the results, we used two local fishing communities, namely Akkeshi and Erimo, where fishers practice mixed fisheries (capture and aquaculture) in the former and capture fisheries in the latter. The paper also examines the current sources of fishing capital and the reasons certain species are targeted ahead of others. Finally, with an assumption that species catch compositions are subject to change, as exemplified by substantial falls in catches of several species, Pacific herring (*Clupea pallasii*) for instance, the paper presents future potential target species and examines fishers' willingness to look for other occupations during periods of catch and income instability.

2. Methods

2.1. Description of the study areas

Akkeshi and Erimo are in northeast Hokkaido, Japan, at 43°03' N 144°51' E and 42°04' N 143°09' E, respectively (Fig. 1). Fishers in these areas engage in a variety of fisheries and target a wide range of species. Akkeshi is known for oyster (*Crassostrea gigas*) farming (Kasim and Mukai, 2009), whereas Erimo is renowned for producing one of the more expensive kelp species (*Laminaria angustata*). In 2015, the numbers of fishers in Akkeshi and Erimo were 517 and 748 constituting about 10% and 14% of the total population, respectively. For the past 20 years (1990–2010) the human population and numbers of fishers have declined by about 24% and 38% in Akkeshi, and 23% and 22% in Erimo, respectively. During this period, the 0–19-year-old and 20–59-year-old age classes in Akkeshi declined steadily by 52% and 33%, respectively, and the 60 and above-year-old age class increased dramatically by 47%. Similarly, the 0–15-year-old and 15–64-year-old age classes fell by 50% and 26%, respectively, the 65 and above-year-old increased by 32% in Erimo. The age of the respondents ranged between 20 and 90 years. The household sizes in Akkeshi and Erimo ranged from 1 to 6 and 1–7 people, respectively.

2.2. Sampling of data

This study used two data sources: historical fisheries data and questionnaires. Detailed descriptions of the sampling methods are

provided below.

2.2.1. Fisheries cooperative associations (FCAs)

During June 2013 data on catch size (tonnage) and income (Japanese yen, JYN) were collected from the local Fisheries Cooperative Associations (FCAs) at Akkeshi (1960–2010) and at Erimo (from 1967 to 2010). The data were extracted from the cities' accumulated fisheries data logs and sorted by year and species. To adjust the effect of inflation on the income, we standardized the data using a consumer price index (CPI) (OECD, 2014) with year 2010 being the base year in the calculation. Thus, CPI was used to measure change in the annual price of consumer goods and services over time. The standardized income data were then converted to US\$, where 1 US\$ was equivalent to 105 JPY according to 2014 exchange rates.

2.2.2. Questionnaires

Surveys were conducted using semi-structured questionnaires that facilitated the collection of additional information such as comments from respondents. The questions were in Japanese. To test the clarity of the questionnaires, we conducted pilot surveys of 20 people (10 from each study area) with various occupations including fishers, FCAs and city halls' workers, and other locals during March 2014. The pilot questionnaires had 62 questions categorized into four sections, namely fisheries operation history, occupation and income, alternative economic activities to fisheries, and sustainability. Information on respondents' age, gender, and family size were not included in the 62 pre-mentioned questions.

The final questionnaires were restructured, and the number of questions was reduced to 40. Additionally, for multiple-response questions, we asked respondents to indicate main and minor options. The answers to job satisfaction and likelihood to look for other occupations questions ranged on a 1-to-5 scale from 'extremely dissatisfied' to 'extremely satisfied' and 'extremely unlikely' to 'extremely likely', respectively.

Surveys were randomly performed at fish markets where respondents brought their landings for sale, landing sites (returning from fishing or repairing fishing gear) and at residences during April 2014 to April 2015. To be consistent and ensure quality of information, only one trained and experienced researcher was involved throughout the survey.

In Akkeshi, 100 people including non-fishers were surveyed. In Erimo, 100 questionnaires were sent to local fisheries cooperative associations (FCAs) who then distributed them to fishers. A total of 34 completed questionnaires were returned in Erimo. In addition, we conducted another 58 surveys to make a total of 92 completed questionnaires. The reasons for the low return rate of the questionnaires from Erimo were thought to include respondents not being willing to participate in the survey (Lück, 2015), insufficient follow-up by the FCA staff, and inclusion of too many questions in the questionnaires.

2.3. Analysis

The data were sorted and analyzed using the IBM Statistical Package for Social Sciences (SPSS), version 20. Descriptive analyses including crosstabs and multivariate responses were carried out to calculate and compare mean job satisfaction using demographic variables, particularly gender, age, target species and sources of fishing capital among fishers. The percentage and frequency distributions of the demographic factors: fishers' gender, household size, age and years of fishing experience were calculated. The same procedure was performed for the sources of fishing capital, reasons for targeting various species, fishers' pride in their occupation, reasons for dissatisfaction and the potential future target species.

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