

Original article

Visualizing characteristics of knowledge and experiences for fishery management activities in Japan

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Introduction

Japan is one of the world's largest fish-eating countries with a long history, but recently stable supply of marine products and sustainable development of fishing villages are urgent issues due to various changes in both natural environment and society [1]. In order to solve these problems, a lot of good practices for fisheries resource management have been accumulated throughout Japan. In developing fishery management in Japan, it is important to learn from good practices and to utilize them for policy and next activities.

The aim of this study is to develop a methodology to visualizing knowledge and experience from good practices using Natural Language Processes. Finally, we discuss the characteristics of Japanese fishery management from viewpoints of climatic zones, target species, and fishing gears.

Materials and methods

A text database of communities' fisheries management activities was constructed from documents (total 1087 documents), which provided by National Federation of Fisheries Co-operative Associations in Japan [2]. Then, semantic network analysis [3] was conducted for this text database. In this study, we visualize and compare semantic networks in different climatic zones (Hokkaido and Kagoshima pref.), biological characteristics of fish species (pelagic fish and demersal fish), and fishing gears (purse seine, gillnet, set net, etc.).

Results and discussion

Figure 1 shows semantic networks in different climatic zones. Concept group of “fish species” are extracted in Hokkaido. This concept group includes concepts such as “sea cucumber”, “salmon”, “scallop”, “kombu”, and “sea urchin”. On the other hand, concept group of “fishing gear and methods” are extracted in Kagoshima prefecture. This concept group includes concepts such

as “set net fishery”, “pole and line fishery”, and “gill net fishery”, “small trawl net fishery”). These results show characteristics of fisheries management between two regions.

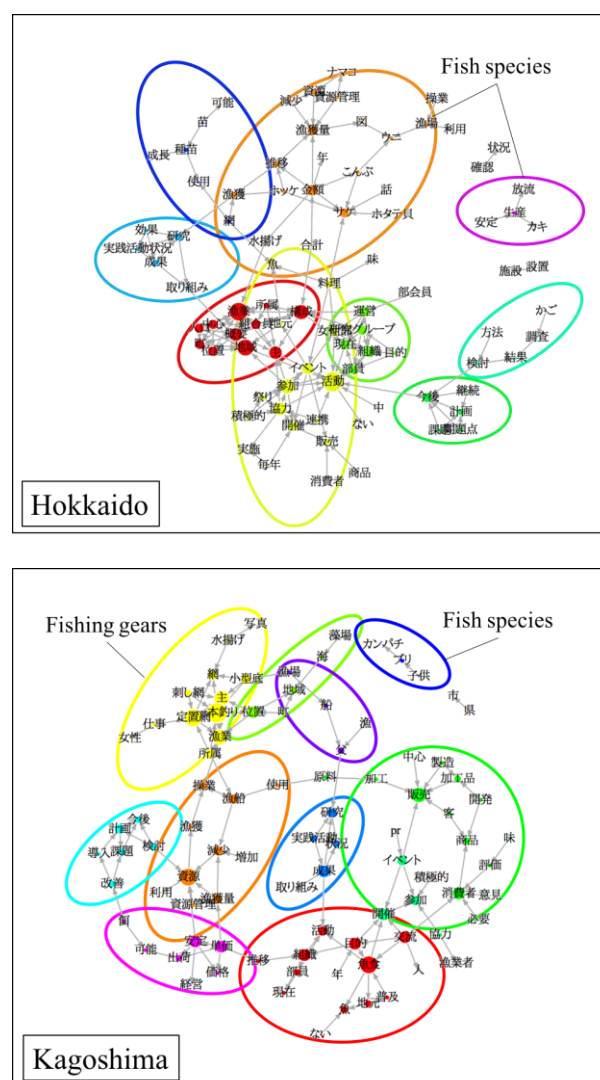


Fig. 1. Semantic networks in different climatic zones.

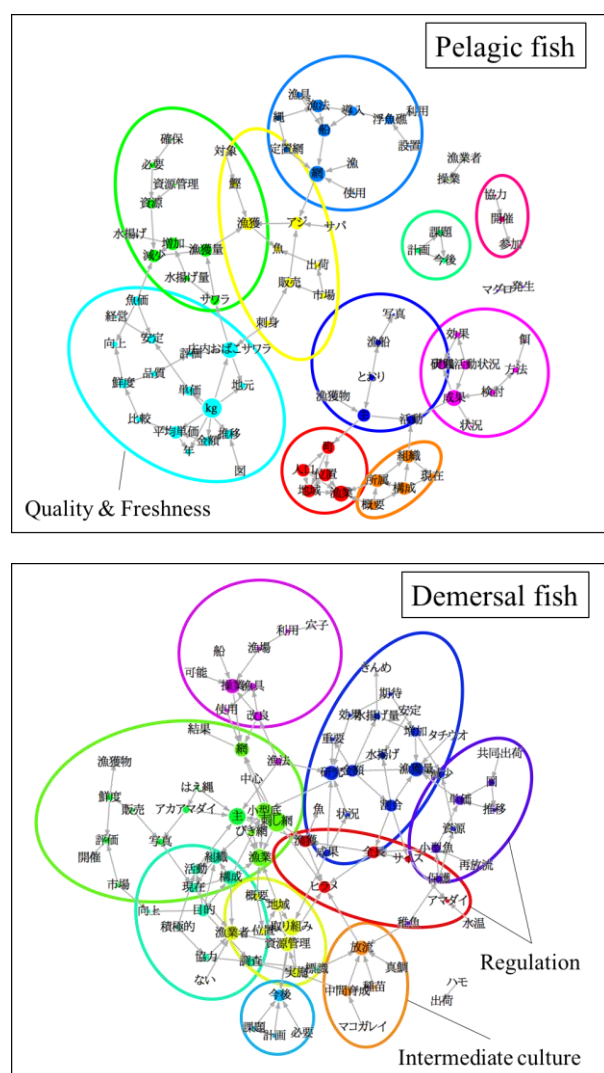


Fig. 2. Semantic networks in different biological characteristics of target species.

Figure 2 shows semantic networks between different biological characteristics of fish species. Concept group of “quality and freshness” are extracted in pelagic fish. This concept group includes concepts such as “fish price”, “quality”, and “freshness”. On the other hand, two concept groups are extracted in demersal fish; 1) concept group of “Intermediate culture” includes concepts such as “seed” and “release”, 2) concept group of “regulation” includes concepts such as “small fish”, “conservation”, and “re-release”.

Figure 3 shows semantic networks of fishing gears. Four concept groups are extracted in purse seine fishery; 1) concept group of “Business improvement” includes concepts such as “business”, “improvement” and “stable”, 2) concept group of “Fresh fish” includes concepts such as “fresh fish” and “rate”, 3) concept group of “Add-values” includes concepts such as “increase added value” and “activities”, 4) concept group of “New buyer” includes concepts such as “bait fish”, “profit” and “increase”.

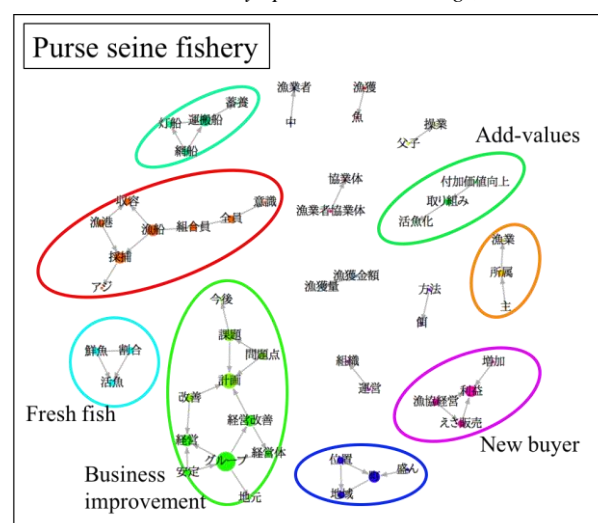


Fig. 3. Semantic network of fishing gears and method.

Conclusions

Our results indicated differences of fisheries management knowledge among the climatic zones, biological characteristics of fish species, and fishing gears. Also, our results showed that semantic network analysis allows us to visualize characteristics of knowledge and experiences for fishery management activities in Japan. Further research is needed to learn fisheries management knowledge of good practices to utilize them for policy and next activities.

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