

CHOICE OF ORGANIZATION MANAGING AND UTILIZING JAPANESE COASTAL RESOURCES USING AHP TECHNIQUE

Takumi Mitani, Fisheries Research Agency, Japan, kibou1@affrc.go.jp

ABSTRACT

In Japan, common fishery rights are granted by prefectural governor only to local fisheries cooperative associations (FCAs). Coastal resources like abalones are utilized by local fishers as members of FCAs. Fishery rights are deemed to be real rights and any person encroaching upon this right is subject to fine. Therefore, common fishery rights should be granted to proper organization under the understanding of the public citizens. I gathered replies from 800 citizens to a questionnaire via the internet and applied the analytic hierarchy process (AHP) in group-decision to select proper organization. The decision goal is to choose the most suitable organization to manage and utilize coastal resources like abalones and etc. Factors to be considered (criteria) are seafood's (1)stability in supply and quality, (2)low price, (3)brand image and (4)legality in resource utilization. Alternative organizations to be chosen are (a)administrative body, (b)cooperative association, (c)private company and (d)illegal organization. The criteria are pair-wise compared to how important they are, and points of priority are calculated as (4) is highest, followed by (1). The 4 candidates of organization are compared with respect to each above criterion. With respect to criteria (1), (2) and (3), (b) is highly regarded, and only in criterion (4), (a) is highest. According to the judgments through procedure of synthesizing, (b) is regarded as the most suitable organization followed by (a). This result shows that the Japanese public citizens have understood the situation of coastal fisheries and community based co-management on coastal resources so far.

Keywords: common fishery rights, FCAs, AHP, group-decision, Japanese coastal resources

INTRODUCTION

Fisheries Law (1949, revised in 1962) is the principal law that regulates fishery activity in Japan. The law deals with three kinds of fisheries with fishery rights, those are fixed- net, demarcated and common fishery rights. Common fishery right is a right which operates common fisheries. Common fisheries means fisheries which are operated by common use of specified waters. Coastal fishing grounds in nearshore waters should be used only by the people from local fishing communities. According to this standard, coastal waters were considered to be extensions of the land and thus a part of the feudal domain [2]. In Japan, common fishery rights are granted by prefectural governor only to local fisheries cooperative associations (FCAs). Coastal resources like abalones are utilized by local fishers as members of FCAs. Fishery rights are deemed to be real rights.

QUESTIONNAIRE SURVEY

I gathered replies from 800 citizens to a questionnaire via the internet in January 2008. Half of respondents were men and half were women, half were under the age of 40 and half more than 40. The numbers of answer were equally divided into eight regions in areas across Japan. It's reported from internet company that it got more than 800 respondents, and respondents who replied all answers were the target the company treat.

Background and Aim

Fishery rights are deemed to be real rights and any person encroaching upon this right is subject to fine. Therefore, common fishery rights should be granted to proper organization under the understanding of the public citizens. We need to choose the most suitable organization to manage and utilize Japanese coastal resources.

Condition

The respondents answered from consumers' view point, because questions were replied as if they were in the situation they purchased or ordered abalones or so.

In the first part of this survey form, I had questions regarding willingness to pay for fishers' patrol activity against poaching in the coastal area. Respondents to this survey, therefore, have known that, in Japan, coastal resources like abalones are managed and utilized by local fishers as members of FCAs to which local governor grant common fisheries right, and they release juveniles, catch with regulations to restore resources. But much abalone resource or so are poached illegally.

Questionnaire concerning characteristics

In addition to questions on which organization should manage and utilize coastal resources, respondents answered questions about the characteristics of the respondents' themselves. Those included questions how respondent evaluated multiple functions of fishing village and fishery.

THE ANALYTICAL HIERARCHY PROCESS

Hierarchies defined

The problem is decomposed into a simple hierarchy with the goal at top, the alternatives at the bottom, and the criteria in the middle (Fig.1) . The decision goal is to choose the most suitable organization to manage and utilize coastal resources like abalones and etc. Factors to be considered (criteria) are seafood's stability in supply and quality, low price, brand image and legality in resource utilization. Alternative organizations to be chosen are administrative body, cooperative association, private company and illegal organization. Illegal organization was strangely but added because I wanted to know how respondent is serious to compare importance to each side of alternatives.

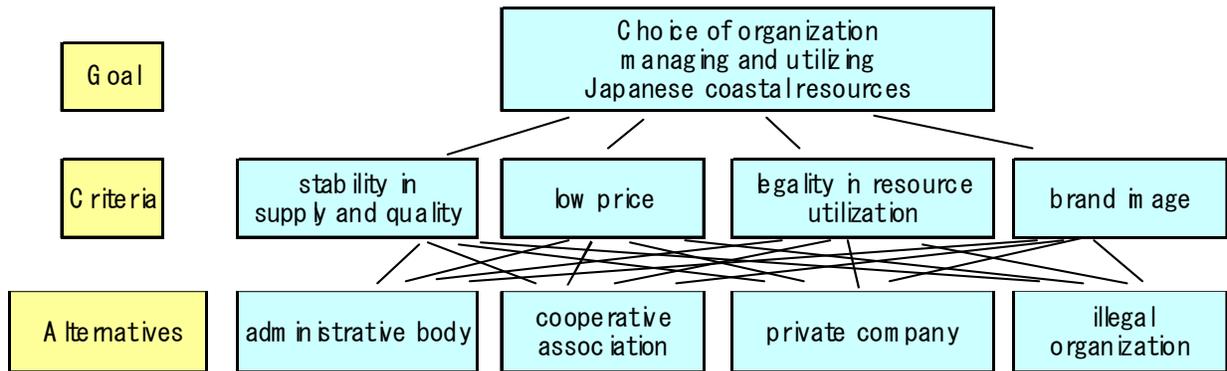


Fig. 1: AHP hierarchy for proper organization selecting respondent group-decision

Pairwise comparison

The criteria are pair-wise compared to how important they are, when respondents purchase or order abalones etc (Fig.2) .

In the fundamental scales for pairwise comparisons, 1 intensity is given for ‘equal importance’, 3 for ‘moderate importance’, 5 for ‘importance’, and 7 for ‘extreme importance’.

	A. stability:	to be stable in supply and quality						
	B. low price:	to be cheap or reasonable in price						
	C. brand image:	to be branded						
	D. legality:	to be legal in resource utilization						
		extreme importance	importance	moderate importance	equal importance	moderate importance	importance	extreme importance
1.	A. stability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	A. stability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	A. stability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	B. low price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	B. low price	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	C. legality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fig. 2: Question: You can choose organization managing and utilizing Japanese coastal resources among alternative. Which and how degree is more important than other side? when you purchase or order abalones etc.

The 4 candidates of organization are compared with respect to each above criterion (Fig.3) .

A. adm in istrative body:	local public entity	governability, publicness, may be inefficiency)							
B. cooperative association:	FCA s	(cooperativity, regionality, may be non-govern ing)							
C. private com pany:	private sector	efficiency, marketability, may be non-cooperative)							
D. illegal organization:	Japanese mafia or so								
		extreme importance	importance	moderate importance	equal importance	moderate importance	importance	extreme importance	
1.	A. adm in istrative body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	B. cooperative association
2.	A. adm in istrative body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	C. private com pany
3.	A. adm in istrative body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	D. illegal organization
4.	B. cooperative associat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	C. private com pany
5.	B. cooperative associat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	D. illegal organization
6.	C. private com pany	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	D. illegal organization

Fig. 3: Question: Which and how degree is more important than other from stability, low price, legality, and brand image, view point, respectively ?

Group-decision

There are some methods of applying AHP to support a group decision making process. How do they reach their combined judgments? The approach I use is to achieve consensus mathematically. Each respondent has provided his own judgment for each pairwise comparison and the results must be averaged. The geometric mean is the unique device to combine group judgments[3]. Pairwise matrix of the group (800 citizens) is outcome from geometry mean.

RESULTS

All replies include into calculate priorities as a procedure of group decision making, that means that I don't reject individual pairwise matrix of large consistency index, CI.

Priority of criteria

Points of priority are calculated as legality is highest, followed by stability (Fig 4).

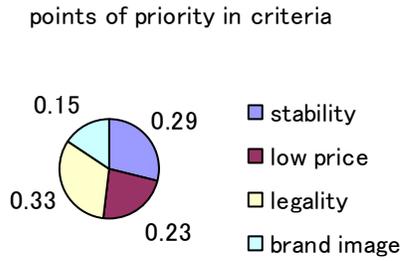


Fig. 4: Calculated point in priority of criteria

Priority of alternatives from each view point

The 4 candidates of organization are compared with respect to each criterion. With respect to criteria of stability, low price and bland image, cooperative association is highly regarded, and only in criterion legality, administrative body is highest (Fig.5).

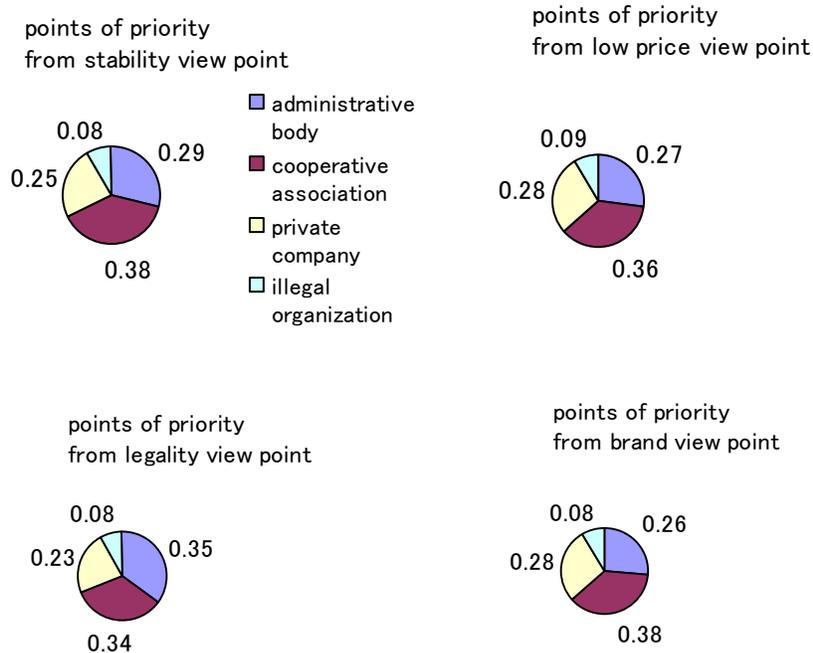


Fig. 5: Calculated point in priority of alternatives from each view point
 top, left: from 'stability' view point, top, right: from 'low price' view point,
 down, left: from 'legality' view point, down, right: from 'brand image' view point,

Final priority

According to the judgments through procedure of synthesizing, cooperative association is regarded as the most suitable organization followed by administrative body. And third candidate is private company. Illegal organization is, off course, negligible. Final conclusion is illustrated in Fig.6.

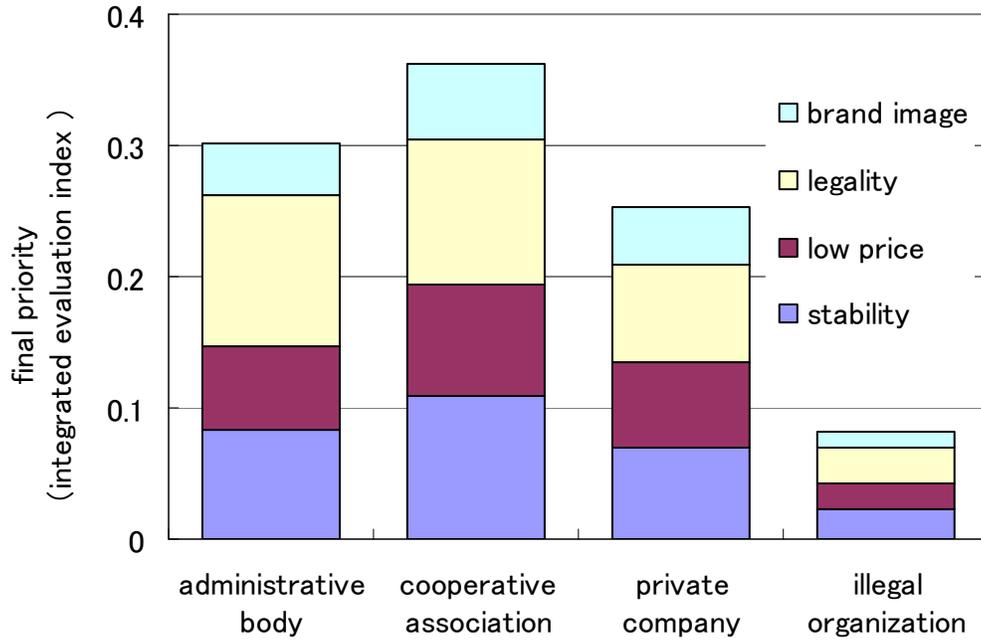


Fig. 6: Final priority of alternatives (organizations)

Final priority and respondents' characteristics

Table 1 shows the result of effect ratio analysis where I list up items (characteristics) which influence on final priority of alternative (organization). I'm afraid that some are not significant but noise.

Table. 1: Candidate of respondents' characteristics which effect in selecting organization , listed by effect ratio analysis using NEUROSIM/L[1], [4]

<p>Point in final priority (Integrated evaluation value)</p> <p>of administrative body is influenced by</p> <ul style="list-style-type: none"> + Culture and landscape of fishing villages are worth to maintain - How to use tax is need to fully examine + Living in southwestern Japan + Married - living with spouse + Living with family - many children <p>of cooperative association is influenced by</p> <ul style="list-style-type: none"> + to often eat abalone, etc at home + Culture and landscape of fishing villages are worth to maintain + Elderly - Married + Living with spouse + Living with grand-father/mother <p>of private company is influenced by</p> <ul style="list-style-type: none"> - Culture and landscape of fishing villages is worth to maintain + How to use tax is need to fully examine <p>(over 0.75 in Effect Ratio are listed)</p>
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Selecting the appropriate organization to manage and utilized Japanese coastal resources is considered to be partially dependent on the characteristics of respondents. There was no correlation between income and point of final priority.

CONCLUSION AND FUTURE STUDY

In this survey I target the general public Japanese citizen, they seemed to be understand the status of community based coastal fishery co-management, because cooperative association like FCAs is regarded as the most suitable organization, and followed by administrative body like local government. This survey is for selecting proper alternative from view point of consumer. View point of industry, of resource and environment are also necessary to make policy after considering citizens' decision. AHP hierarchy with 2 or more criteria and sub-criteria for the choice group decision(for example, Fig.7),

- • • that is my future study.

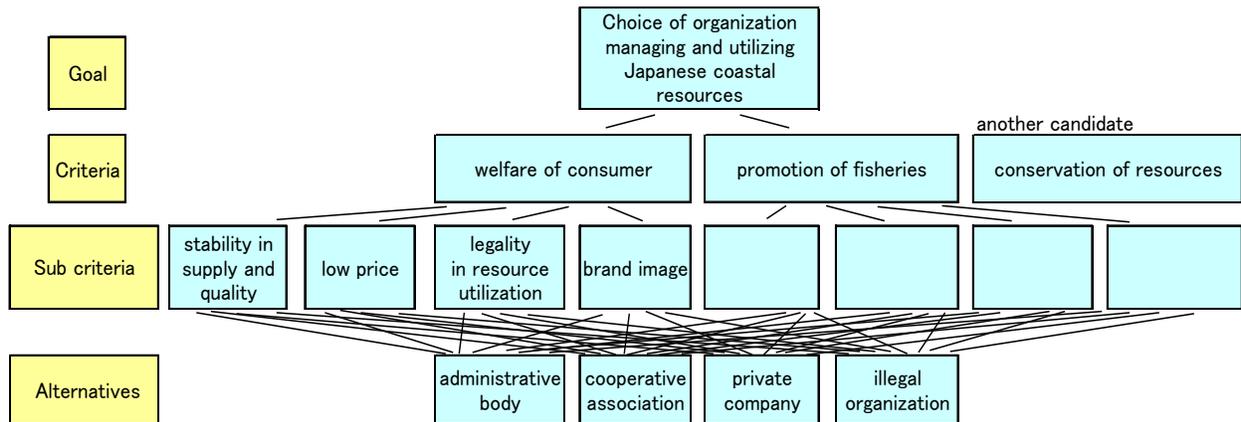


Fig. 7: AHP hierarchy with 2 or more criteria and sub-criteria (left is same as this time) for future study

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