Fisheries in the *Shiretoko* World Natural Heritage, Japan

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Today’s talk

1. Introduction to the fisheries in Japan
2. Coastal fisheries management in the Shiretoko WNH area
3. New activities after the inscription to the UNESCO Heritage List
4. Future perspectives
1. Introduction to the Fisheries in Japan

Abarone + Halfbeak + Plum flower + Poetry

UKIYOE of abalone and halfbeak by UTAGAWA HIROSHIGE (late 19th Century)
- Consists of 6852 islands
- Wide types of marine ecosystems, from tropical to sub-arctic.
- GDP: US$ 6.4 trilli. (2007), Fisheries 0.3%.
Fisheries Production (2007)

- 5.7 million tons, US$ 20.4 billion.
- 204 thousand fishers, with about 200 thousand fishing vessels (>98% small scale).
## Profile of Fisheries Industry; comparison

<table>
<thead>
<tr>
<th>Country</th>
<th># fisher</th>
<th># vessel</th>
<th>SSF ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iceland</td>
<td>6,300</td>
<td>826</td>
<td>0.63</td>
</tr>
<tr>
<td>Norway</td>
<td>22,916</td>
<td>8,664</td>
<td>0.89</td>
</tr>
<tr>
<td>Denmark</td>
<td>4,792</td>
<td>4,285</td>
<td>0.86</td>
</tr>
<tr>
<td>UK</td>
<td>19,044</td>
<td>9,562</td>
<td>0.82</td>
</tr>
<tr>
<td>France</td>
<td>26,113</td>
<td>6,586</td>
<td>0.78</td>
</tr>
<tr>
<td>Canada</td>
<td>84,775</td>
<td>18,280</td>
<td>0.74</td>
</tr>
<tr>
<td>NZ</td>
<td>2,227</td>
<td>1,375</td>
<td>0.74</td>
</tr>
<tr>
<td>Spain</td>
<td>75,434</td>
<td>15,243</td>
<td>0.76</td>
</tr>
<tr>
<td>USA</td>
<td>C.A. 290,000</td>
<td>27,200</td>
<td>0.53</td>
</tr>
<tr>
<td>Korea</td>
<td>180,649</td>
<td>50,398</td>
<td>0.90</td>
</tr>
<tr>
<td>Japan</td>
<td>278,200</td>
<td>219,466</td>
<td>0.98</td>
</tr>
<tr>
<td>AU</td>
<td>13,500</td>
<td>C.A. 5,000</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

SSF < ISCFV 25 (the International Statistic Classification of fishery Vessels)
Coastal fisheries co-management in Japan

- Organization of coastal fishers, **Fisheries Cooperative Associations (FCAs)**, have **Fishing Rights** based on Fisheries Law of 1949.

- Only the members of FCAs can operate coastal fisheries specified by the Fishing Rights (exclusion of outsiders). Offshore fisheries are managed by licenses.

- Govt provides broad and simple regulations. On top of that, each FCAs make detailed and fine tuned rules and regulations in autonomous basis according to the social and ecological conditions.

Local fishers are one of the main stewards of fisheries resources
Examples of local fishers’ autonomous activities

Local legend says
“Forests are the roots of coastal fish”
(http://www.jf-net.ne.jp/amhiraingyokyo/)

Forestation activities by local fishers’ wife
(http://www.jf-net.ne.jp/hkyubetsu/sigen.htm)
Promotion of environmentally-friendly detergent produced by the Federation of FCAs.
(http://www.jf-net.ne.jp/fsgyoren/work1.html)

Cleanup activities by FCA members’ family
Fish scale produced by local FCA
(http://www.jf-net.ne.jp/cbgyoren/sigen.html)

Autonomous resource assessment or setting
Individual catch Quota for some species
Meetings and discussions at FCA

http://www.pref.aomori.jp

http://www.pref.mie.jp

http://www.pref.iwate.jp
Seafood consumption

- Seafood is consumed everyday in Japan.
- The 2\textsuperscript{nd} largest source of total protein intakes, the largest source of animal protein intakes.
- Positive correlation btw rice consumption volume.

My son (18 months old)

Dried sardine juvenile on rice

Seaweed soup

Boiled mackerel

Pumpkin

Dried bonito on boiled spinach
Fisheries products are more important as food than other areas (Food Security).
Wider range of species are utilized (biodiversity + food culture).

Fig. 19.2 Diversity of fish taxa caught, with diversity calculated using the Shannon function $H'$, for OECD countries arranged by latitude of their capital city (Source: FAO FISHSTAT).

Makino & Matsuda (2011)
2. Coastal fisheries management in the *Shiretoko WNH* area

- Spring festival for the God of Water
- TAIRYO (big fish) flags celebrating the festival
The Shiretoko WNH area

- Southernmost limit of seasonal ice floes
- Main industries: Fisheries & Tourism
- There are 3 FCAs, with 851 members.
- About 20% of local people works for fisheries industry.
Autonomous MPAs to protect Walleye Pollack SSB

Since 1995

Spawning ground

Since 2005

(Bottom trawlings are legally prohibited at the coastal area)
Some other autonomous measures for Walleye pollock

- Rules on fishing season, operation time, \#nets, etc.
- Enlargement of gillnet mesh size based on the results of academic research (Ueda, 1992)
- Vessel buyback program. Compensation costs, US$13.5 milli, are paid by residual fishers and FCA.
- Collecting biological data (e.g. maturity)
- (TAC is set by the govt.)
- Local fishers are engaged not only in fishery operations, but also in resource mgmt and a part of EBFM.

- The core fishers are attending 15-20 meetings per month for their autonomous management (a part of fisheries operation).

- The next task is scientific assessment on these autonomous activities.
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How this fisheries co-management regime was expanded to EBM
1. New coordinating org.s for multi-sector

FCA people don’t speak a lot

Shiretoko World Natural Heritage Site Regional Liaison Committee (2003)
- Role: exchange information, and coordinate interests/policies amongst administrative sectors.
- Participants: Central/local governments, Sightseeing Guide Associations, NGOs, and FCAs.

Shiretoko World Natural Heritage Site Scientific Council (2004)
- Role: Provide Scientific Advices on management, research, and monitoring activities
- Participants: Scientists, Central/local government, FCAs, and NGOs.

Shiretoko National Park Committee for the Review of Proper Use (2001)
- Role: Build use rules for tourists to reduce negative impacts on environment
- Participants: Scientists, Central/local government, NGOs.

Marine WG
River Construction WG
Yezo Deer WG
2. WNH marine management plan (WNH MP)

- **Objective**: to satisfy both conservation of the ecosystem and sustainable use of resources.

- WNH MP defines adaptive management and **monitoring of coastal ecosystem**.

- WNH MP officially incorporated autonomous measures by local fishers as a part of EBM.
Coastal Food web at Shiretoko WNH area
(WNH Scientific Council, 2005)
The objective matters

- unless the **objective** of the EBM in *Shiretoko* WNH is set to go back to the original “**wilderness**” of centuries ago, utilizing wide ranging species in sustainable manner is very close to the conservation of ecosystem structure and functions in this area.

- Coastal fishery is a keystone species
Fisheries production statistics (tons) at Shiretoko WNH, compiled by 3 FCAs.

Very informative time-series data for monitoring the changes in ecosystem structure/functions.
Therefore
3) Endangered species

Sea lion
(IUCN Red-list Species)

- Traditionally, local people eat sea lions.
- Local population of Sea lion is increasing, and causing fisheries damage by destroying set-nets.
- Potential Biological Removal (PBR) theory was applied and the catch limit was calculated as 120/year to reduce fisheries damages.
4) inter-connection btw land and sea
There were a lots of artificial constructions along the rivers in this area.

Some of them were removed, as far as it does not increase the disaster risk for local residents. Others were modified (e.g., fish pass)
How much did the government have to pay? (in FY 2006)

<table>
<thead>
<tr>
<th>Cost item</th>
<th>Amount (1000 yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running costs for Scientific Council</td>
<td>17,548</td>
</tr>
<tr>
<td>Running costs for the Review Committee and Eco-tourism Association</td>
<td>15,120</td>
</tr>
<tr>
<td>Research and monitoring</td>
<td>54,731</td>
</tr>
<tr>
<td>River improvement</td>
<td>284,927</td>
</tr>
<tr>
<td>Personnel</td>
<td>101,778</td>
</tr>
<tr>
<td>Total</td>
<td>470 million</td>
</tr>
</tbody>
</table>

- Fisheries production: 22,966 million yen
- Tourists spent: estimated 36,617 million yen.
- the total administrative cost corresponds to 0.8% of the sum of two principal industries.

(Makino et al. 2009)
The Japanese fisheries management framework (community-based co-management) led to a different EBM from, for example, that in Iceland or New Zealand, where market-based ITQs are the central policy tool.

A careful assessment on the existing institutional framework is one of prerequisites for better EBM.
Preface;

Part I. Context:
1. Admit the problem;
2. Why is an ecosystem approach now strongly heralded and merited?;
3. Being audacious;
4. Framework for scientific information to support EBFM;
5. When does it make sense to do EBFM?;

Part II. Making EBFM Operational - Technical Considerations:
6. Ecosystem indicators;
7. Expanding the stock focus: what we should have been doing yesterday;
8. A systemic focus: what we can do now;
9. Assessing risk: a different view of ecosystem information;

Part III. Institutional Considerations:
10. Why most fisheries biologists become amateur social scientists;
11. Management institutions regarding EBFM;
12. It's all about tradeoffs;
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1) Implication
2) Future challenges
Per Capita GDP (PPP, US$)

Source: WB
Financial background:
GDP per 1km of coast line
(index for feasible public expenditure on marine policy)

Government can play the central role, as far as they have a political will.

Financially speaking, they cannot!
Average number of marine fishers per 1km of coast line.

Local people can potentially play a role in local ecosystem monitoring/management (Human resources)

Source: FAO(1999), CIA(2009)
Implications from the Shiretoko case for EBM in the mid-low latitude countries.

- Due respects paid to the local fishers’ knowledge and their autonomous activities;
- No exclusion of local fishers from the heritage area (they are the core of the EBCM).
- No destruction of local norms and livelihoods;
- Participation by local fishers to all the D/M processes;
- No expensive measures by the government.

The deputy director of the UNESCO World Heritage Center, Mr. Kishore Rao remarked “this is a new model of environmental conservation under the World Heritage Program” (Mainichi 2008).
Future Challenges 1: Advice from IUCN (2008)

- Development of practical indicators for adaptive management, and verification of mgmt effects.
- Development of action plan for climate change,
- Promotion of Eco-tourism, etc.
Challenge 2: the scaling up

- WNH area is just a part of LME.
- On the other hand, Japan has territorial disputes at the area just next to the *Shiretoko WNH*. 
Idea of cross-boundary peace park

Role of Sciences

(Dr M. Kobayashi)
Biological diversity and Cultural diversity compose One Mother Nature

Traditional pole near Shiretoko WNH

Totem pole in Alaska

Thank you very much
Global characteristics of the Japanese Fisheries (and mid-low latitude countries in Asia)

Cond.1: Expensive policy measures are impossible (financial condition).

Cond.2: Fisheries operations are small-scale (industrial profile condition)

Cond.3: Diversity in resource use is high, reflecting the high biodiversity of the surrounding sea (marine resource condition).

Cond.4: People largely rely on seafood as a source of animal protein (food security condition)

Cond.5: Fisheries sector is important as a source of employment (social security condition)

Cond.6: Rich in the potential human resource in the coastal area (human resource conditions)
<table>
<thead>
<tr>
<th><strong>Public Services</strong></th>
<th><strong>Legal basis</strong></th>
<th><strong>Administrative body</strong></th>
</tr>
</thead>
</table>
The fundamental concept (Sec. 1 of the law) is “the Holistic Utilization of Sea Surfaces”.

To arrange and coordinate various fishing operations within a certain area from an overall point of view, not from the viewpoint of each economic unit.

Various levels and scales of coordinating organizations have been instituted.

Fishing rights are not exclusive real rights, but limited real rights (subject to limitations set out by coordinating org.s).
<table>
<thead>
<tr>
<th>Level</th>
<th>Organization</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Level</td>
<td>Fishery Policy Council</td>
<td>The advisory body to the government for national level fishery coordination, design of national fishery policy, etc.</td>
</tr>
<tr>
<td>Multijurisdictional Level</td>
<td>Wide-Area Fishery Coordinating Committees (WFCCs)</td>
<td>Coordination of resource use and management of highly migratory species. Also addresses Resource Restoration Plans.</td>
</tr>
<tr>
<td>Prefectural Level</td>
<td>Area Fishery Coordinating Committees (AFCCs)</td>
<td>Mainly composed of democratically elected fishermen. Coordination through the Fishery Ground Plan, Prefectural Fishery Coordinating Regulations, and Committee Directions.</td>
</tr>
<tr>
<td>Local Level</td>
<td>Local Fisheries Cooperative Associations (local FCAs)</td>
<td>Composed of local fishermen. They establish operational regulations (FCA regulations) that stipulate gear restrictions, seasonal/area closures, etc., according to local environment.</td>
</tr>
<tr>
<td>More Specialized Purpose</td>
<td>Fishery Management Organizations (FMOs)</td>
<td>Autonomous body of fishermen. FMO rules are more detailed and stricter than the FCA regulations.</td>
</tr>
</tbody>
</table>
TAC species

- Saury (*Cololabis saira*)
- Walleye pollack (*Theragra chalcogramma*)
- Jack mackerel (*Trachurus japonicus*)
- Spotlined sardine (*Sardinops melanostictus*)
- Chub Mackerel (*Scomber japonicus, S. australasicus*)
- Sagittated calamary (*Todarodes pacificus*)
- Snow crab (*Chionoecetes opilio*)