

Social-ecological conditions of fisheries and management, and ITQs: a global review

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Background

- Fishery is an industry which uses fisheries resources as one of the ecosystem services.
- In order to devise **Ecosystem-based fisheries management** measures in certain nation or areas, **both the natural conditions** based on the characteristic features of surrounding ecosystems, **and the social conditions** based on the position of fisheries in the human societies, **must be considered**.

Background (cont.)

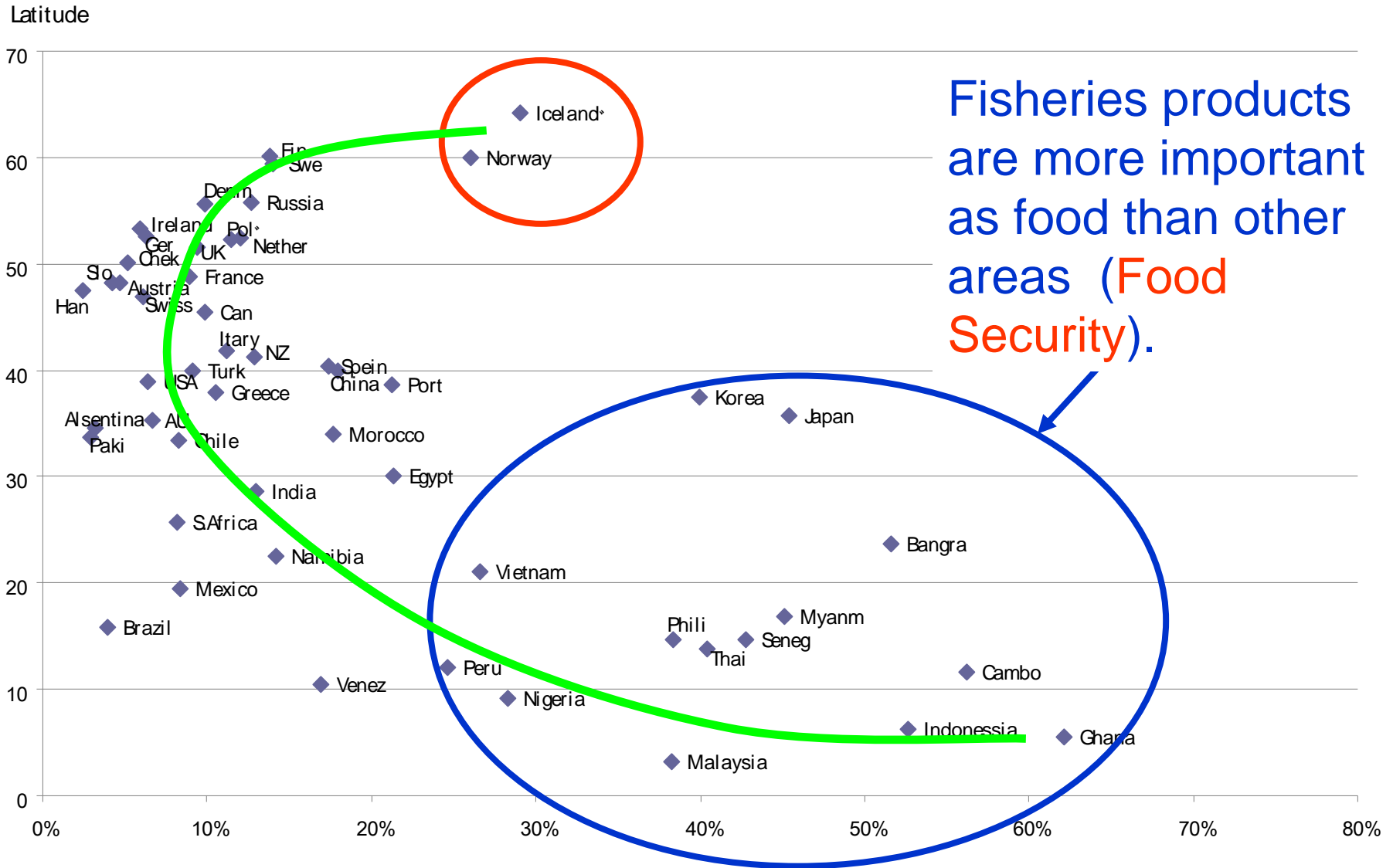
- This study tried to derive **several indicators representing the social and ecological conditions of fisheries** based on a country-by-country basis.
- Then, based on these indicators, fisheries management measures were compared, and the applicability of **ITQs** (Individual Transferable Quotas) are discussed.

Data

- FAO FishSTAT ([Catch](#))
- FAO Food Balance Sheet ([Food Supply](#))
- FAO Global Fishing Fleet ([# and size of fishing fleet](#))
- Number of fishers 1970-1997. FAO Fisheries Circular 929, FAO, 1999 ([# of fishers](#))
- World Development Indicator. WB, 2007 ([GDP](#))
- The world fact book. CIA, 2008. ([Length of the coastline](#))

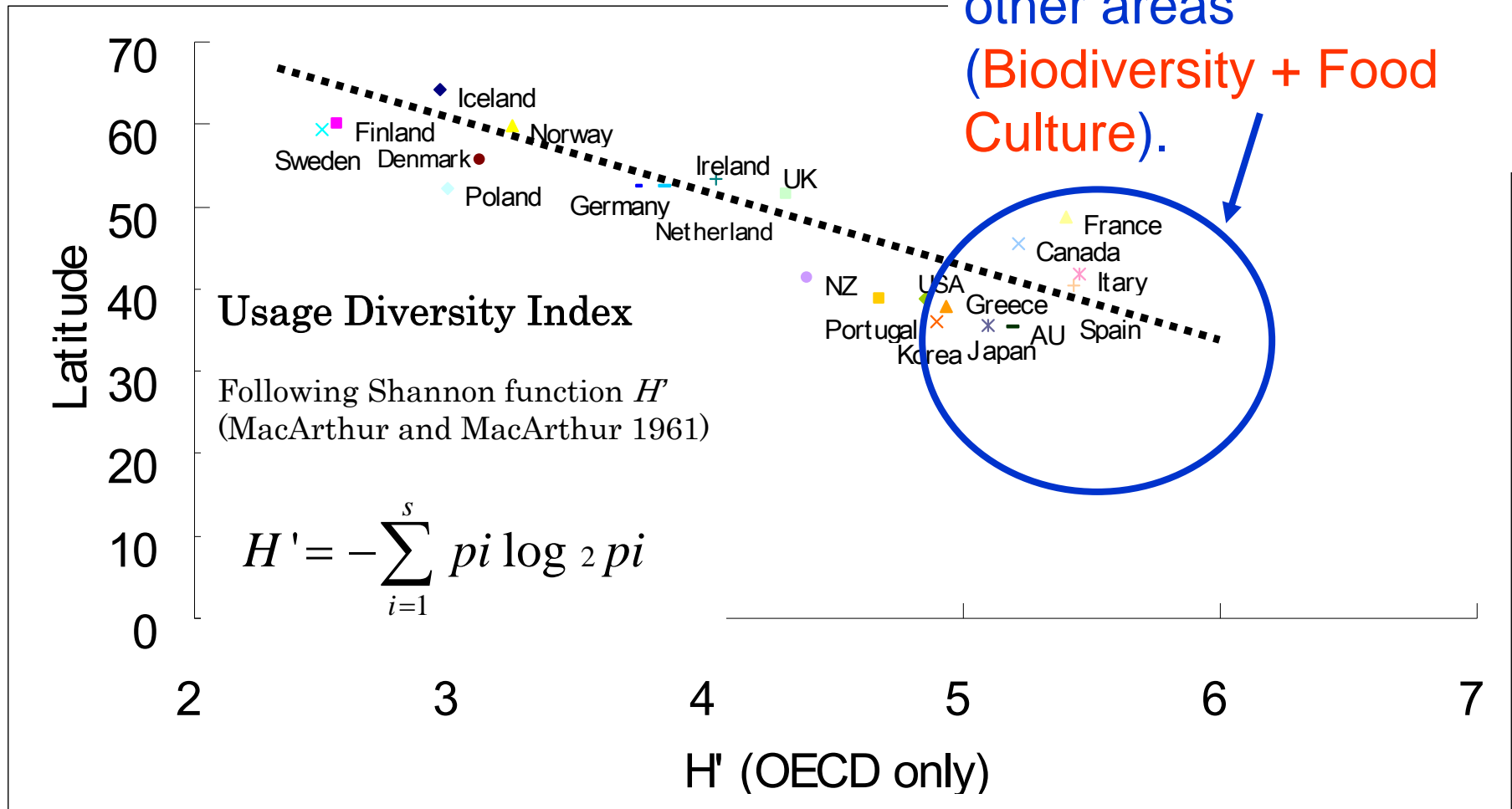
Results

Percentage of Seafood as the source of Animal Protein



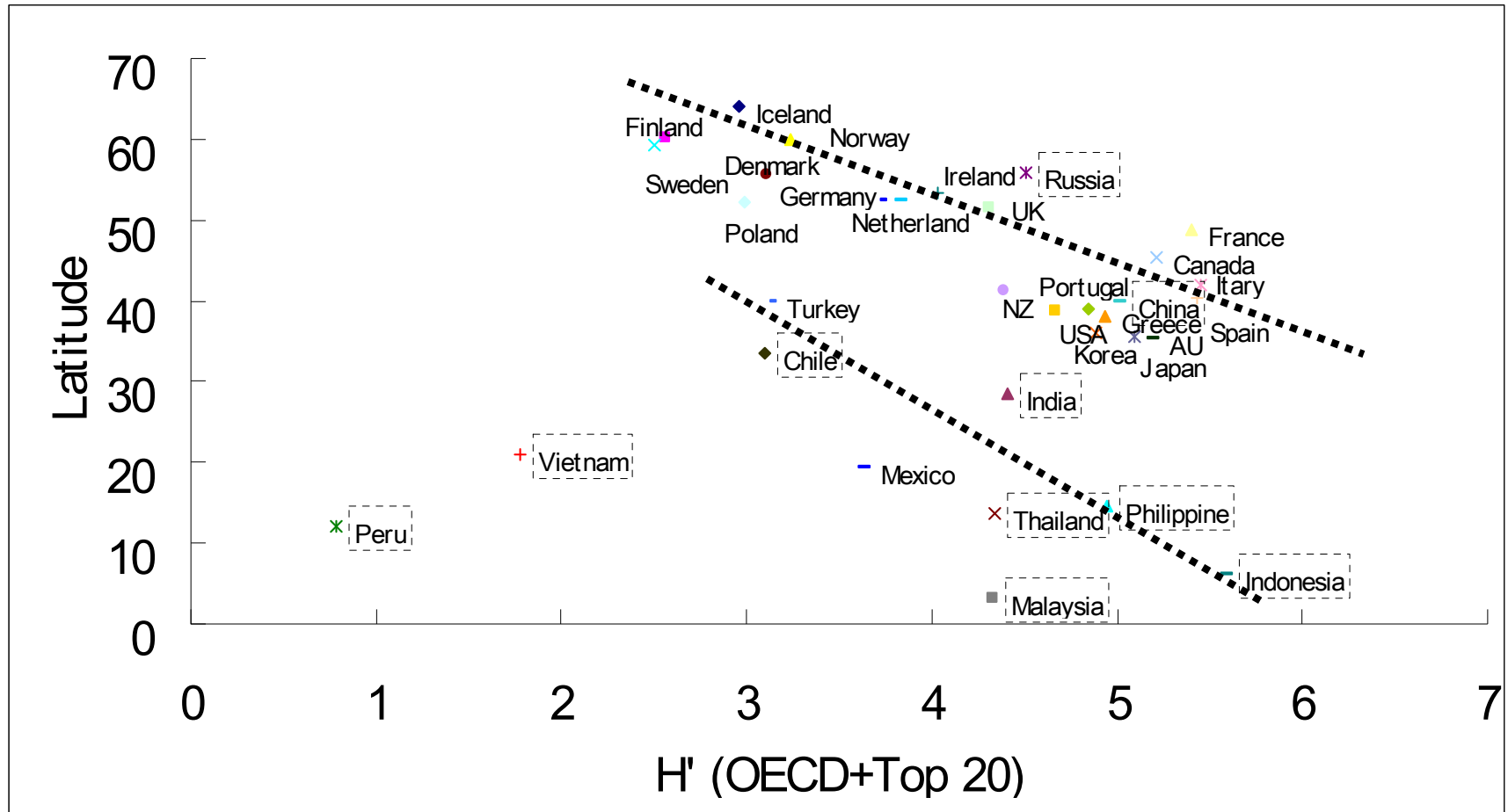
Diversity of Fisheries Resources Use (H') (OECD Only)

Wider range of species are utilized than in other areas
(Biodiversity + Food Culture).

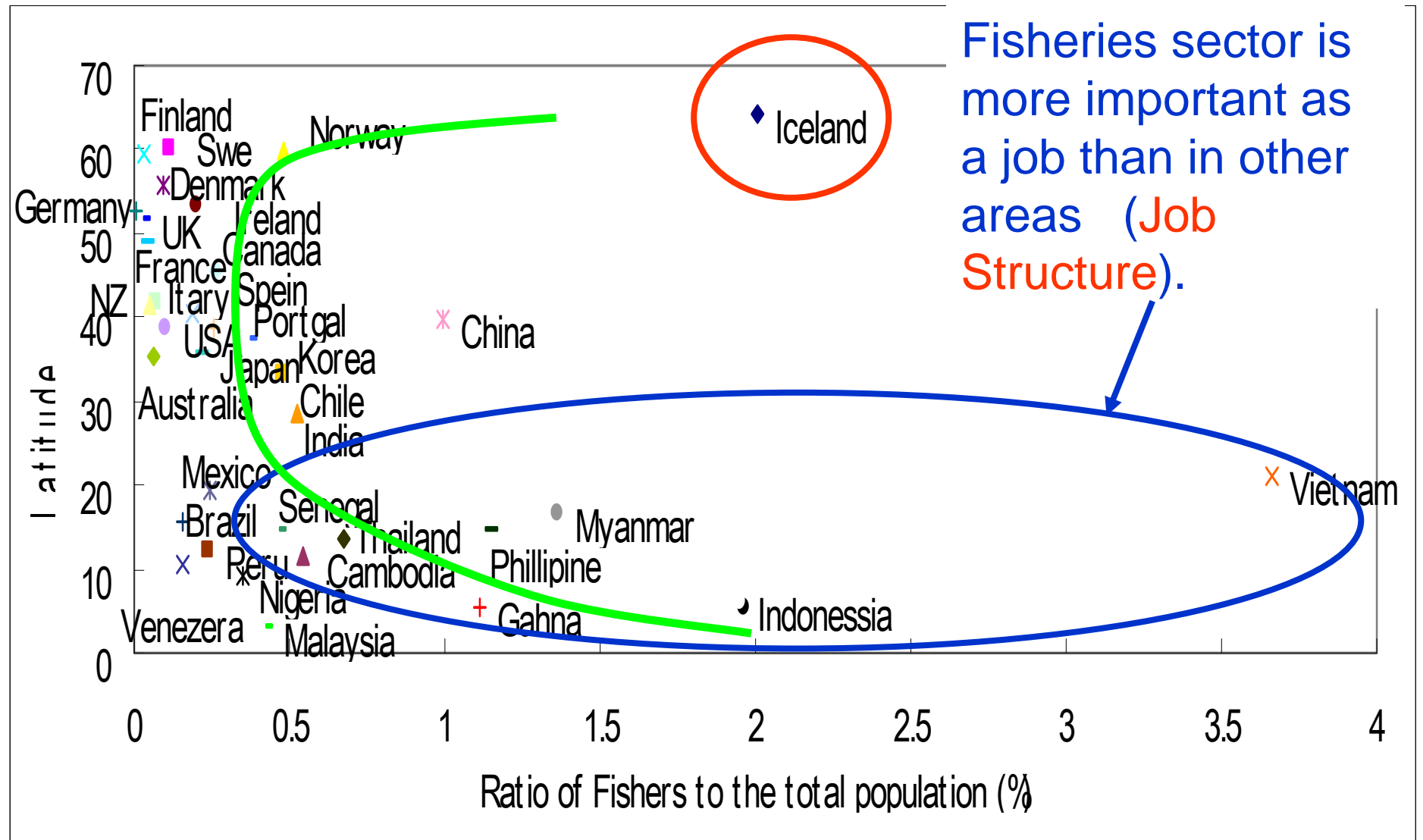


Diversity of Fisheries Resources Use (H')

(OECD + Top 20 fishery countries)

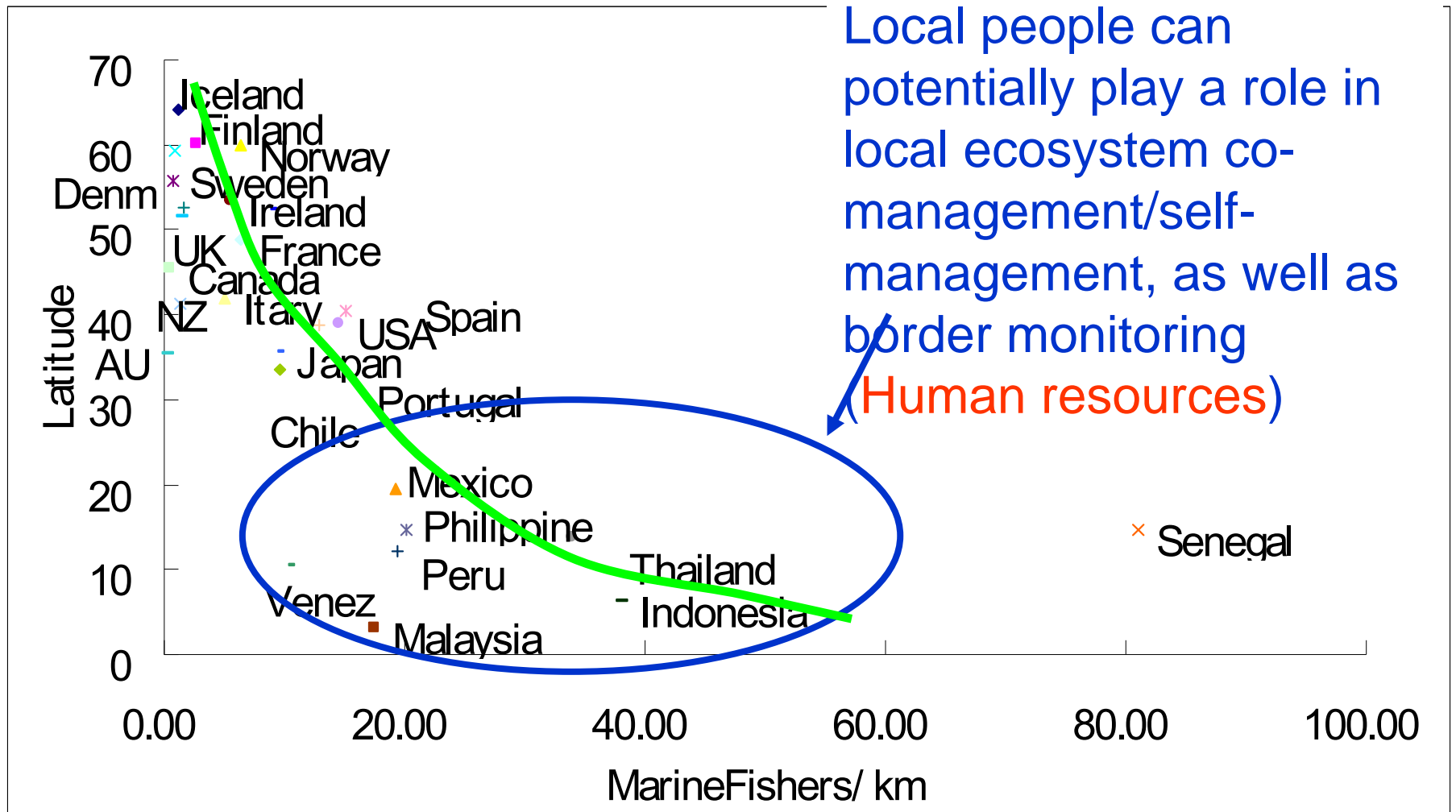


Percentage of fishers to total population



Fisheries sector is more important as a job than in other areas (Job Structure).

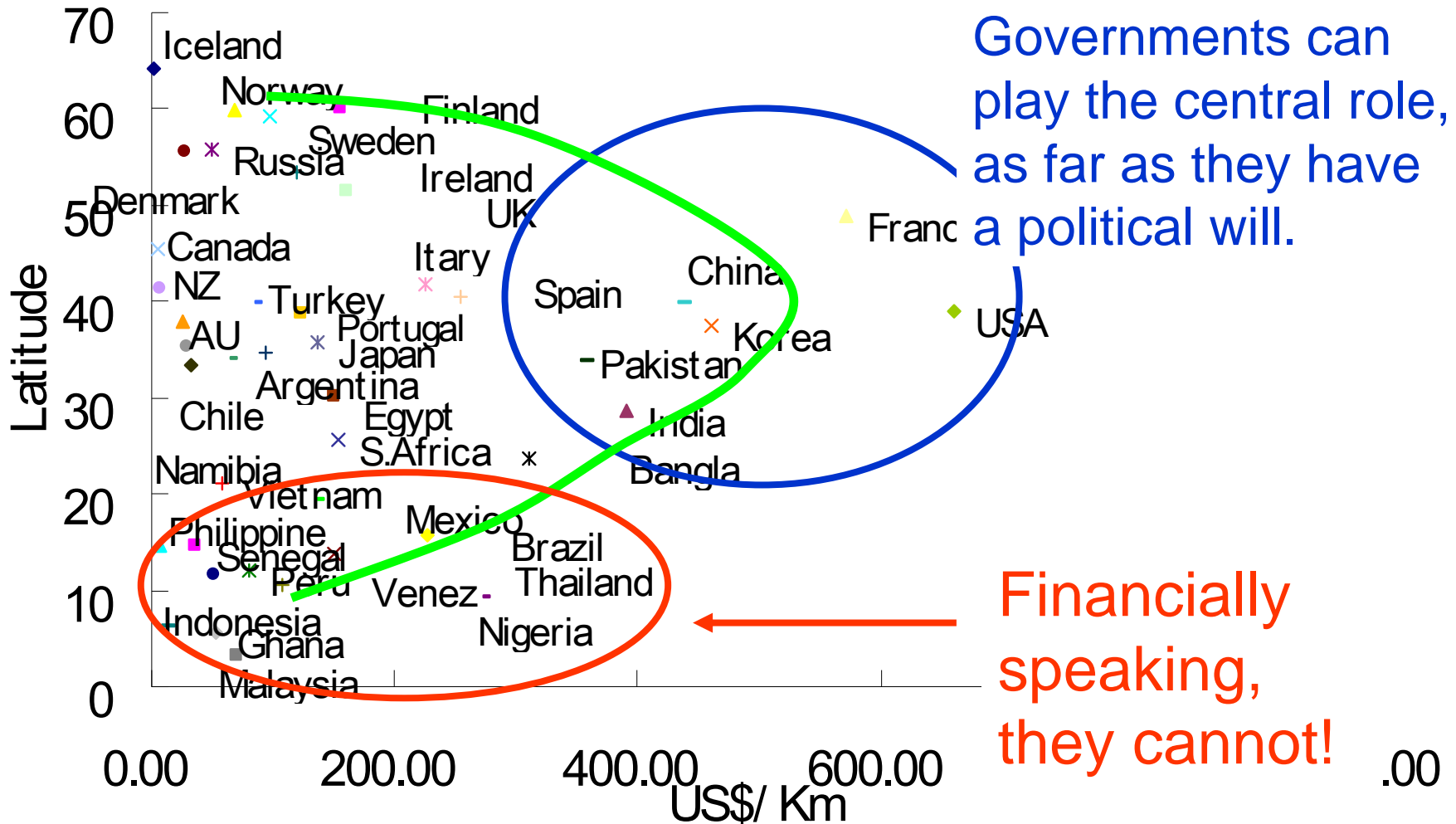
Average number of marine fishers per 1km of coast line (ρ).



Suppl.: Financial background

GDP per 1km of coast line

(rough index for feasible public expenditure on coastal ecosystem management/monitoring by gov.)



Structure of Fisheries Sector

Country	# of fishers	# of vessels	% of SSF*
Iceland	6,300	826	0.63
Norw	22,916	8,664	0.89
Denm	4,792	4,285	0.86
UK	19,044	9,562	0.82
France	26,113	6,586	0.78
Canada	84,775	18,280	0.74
NZ	2,227	1,375	0.74
Spain	75,434	15,243	0.76
USA	C.A. 290,000	27,200	0.53
Korea	180,649	50,398	0.9
Japan	278,200	219,466	0.98
AU	13,500	C.A. 5,000	N.A.

Most of fishers are Small Scale (MCS/ Transaction Costs)

Status of ITQs Introduction

Country	ITQ	IQ	ITQs Fisheries
Iceland	●		> 98%
Norw	○	●	Vessel quota (partially transferable)
Denm	●	●	Provisionally in North Sea Herring
UK	●	●	Partially since 2002
France		●	
Canada	●	●	Partially (e.g. Atlantic scallop in 1985, swardfish in 2002)
NZ	●	●	> 95%
Spain		●	
USA	●	●	Partially (e.g., halibut, sablefish, surf cram, bluefin tuna, king crab, etc).
Korea			
Japan		○	
AU	●		> 60 %

Summary Table

Country	ITQ		H'		Food	Job	ρ	#	SSF%
Iceland	+++		-		+	++	-	-	-
NZ	+++		+		-	-	-	-	-
AU	++		++		-	-	-	-	N.A.
Den	+		-		-	-	-	-	+
UK	+		+		-	-	-	-	+
Canada	+		++		-	+	-	+	-
USA	+		+		-	-	++	++	-
Nor	+		-		+	++	+	-	++
France	-		++		-	-	+	-	+
Spain	-		++		+	+	++	+	-
Japan	-		++		++	-	+	+++	++
Korea	-		++		++	+	++	+++	++

Consideration: Position of fisheries

- **Iceland:** Fisheries is one of the most important industry, utilizing relatively simple target species by industrialized vessels as one of food source, as well as for exports.
- **NZ:** Small # of industrialized vessels utilizes resources as efficiently as possible (like oil or mineral mine development company), in order to gain foreign currency.
- **Norway:** H' and food importance are similar to Iceland, but SSF are large and dense, so the community-based co-management (right-based autonomous management), rather than ITQ management, seems to be appropriate.
- **AU:** Social conditions (Food, Job, ρ , #) are similar to NZ, so more ITQs might be applicable. However, H' is relatively large, and this is one factor that prevents the expansion of ITQs.

Consideration (Cont.)

- **Korea and Japan:** Fisheries industries utilize wide ranging species as an important food source, as well as a base of quite large number of SSF's livelihood.
 - > In these two countries, as well as SEA countries that have the similar ecological and social conditions, **the applicability of ITQ seems low, and community-based co-management (right-based autonomous management) should be promoted.**
- **USA and Canada:** Application of ITQs to the whole fisheries would be not appropriate, but only to certain fisheries, i.e., **fisheries targeting single and high-valued species with small number of vessels**, might be reasonable.
 - > For such fisheries, **ITQ would be one of management options** even in Korea, Japan, and SEA countries.

Next step

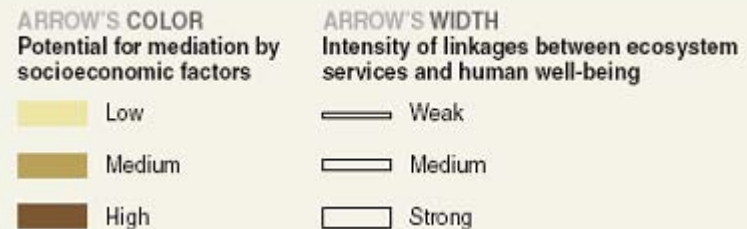
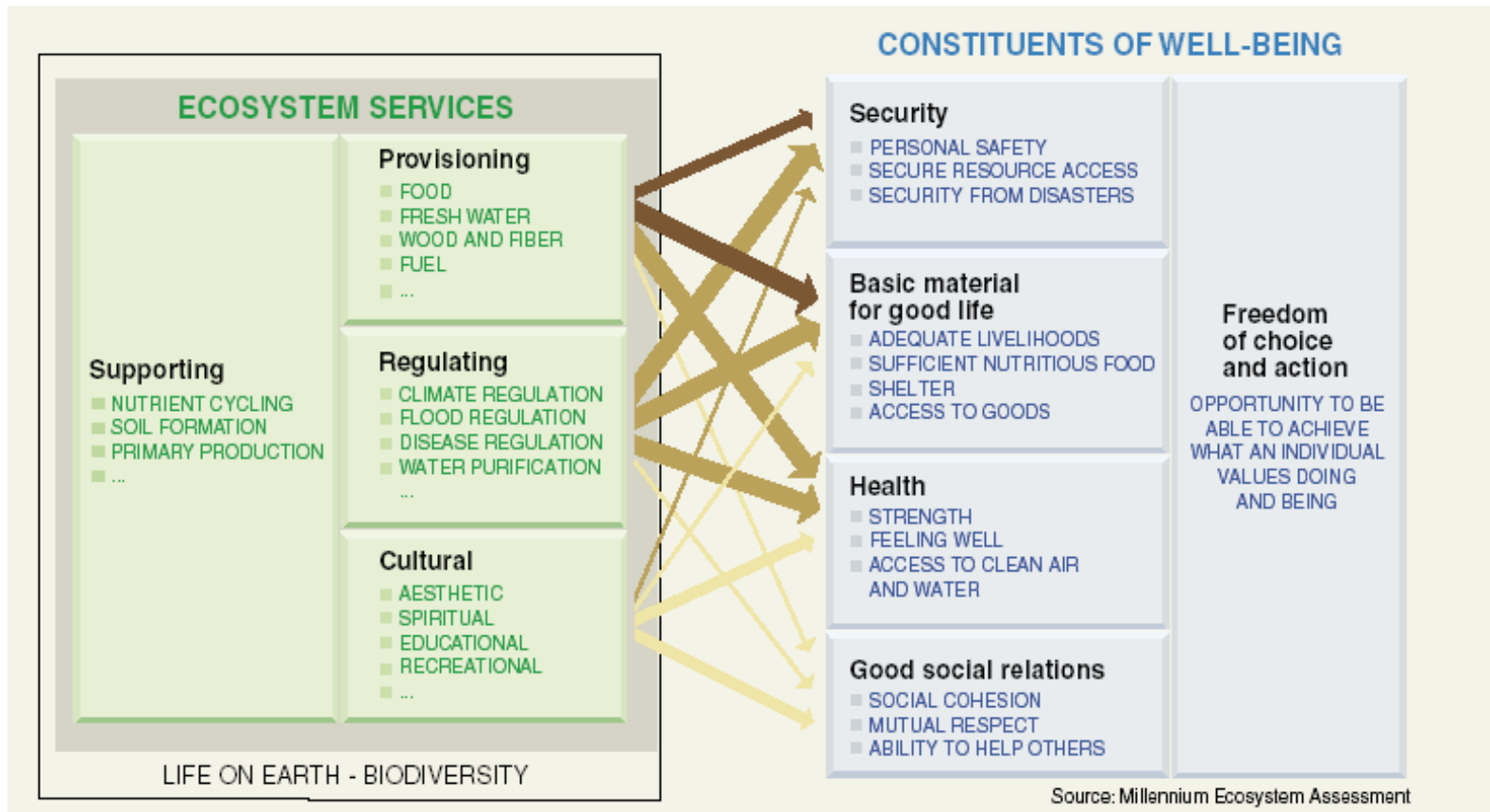
- 1) **TIME**: this is just a snap shot. **Trends in indicators** (time series) can give us insights on macro changes in societies, as well as in ecosystem services.
- 2) **SCALE**: large countries (e.g., USA, AU, China, Russia) cannot be represented by a single value. Division by states, or **Eco-region** are appropriate.
- 3) **REALITY**: more information on each countries' management institutions are needed for consideration. (I am waiting for **co-researchers/informants**)
- 4) **QUANTITATIVITY**: regression or principal component analyses would be fruitful next step.

Thank you very much

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Ecosystem services and well-being (MA2005)

Ecosystem services are wide, so the objectives and stakeholders of EBM are also wide-ranging.



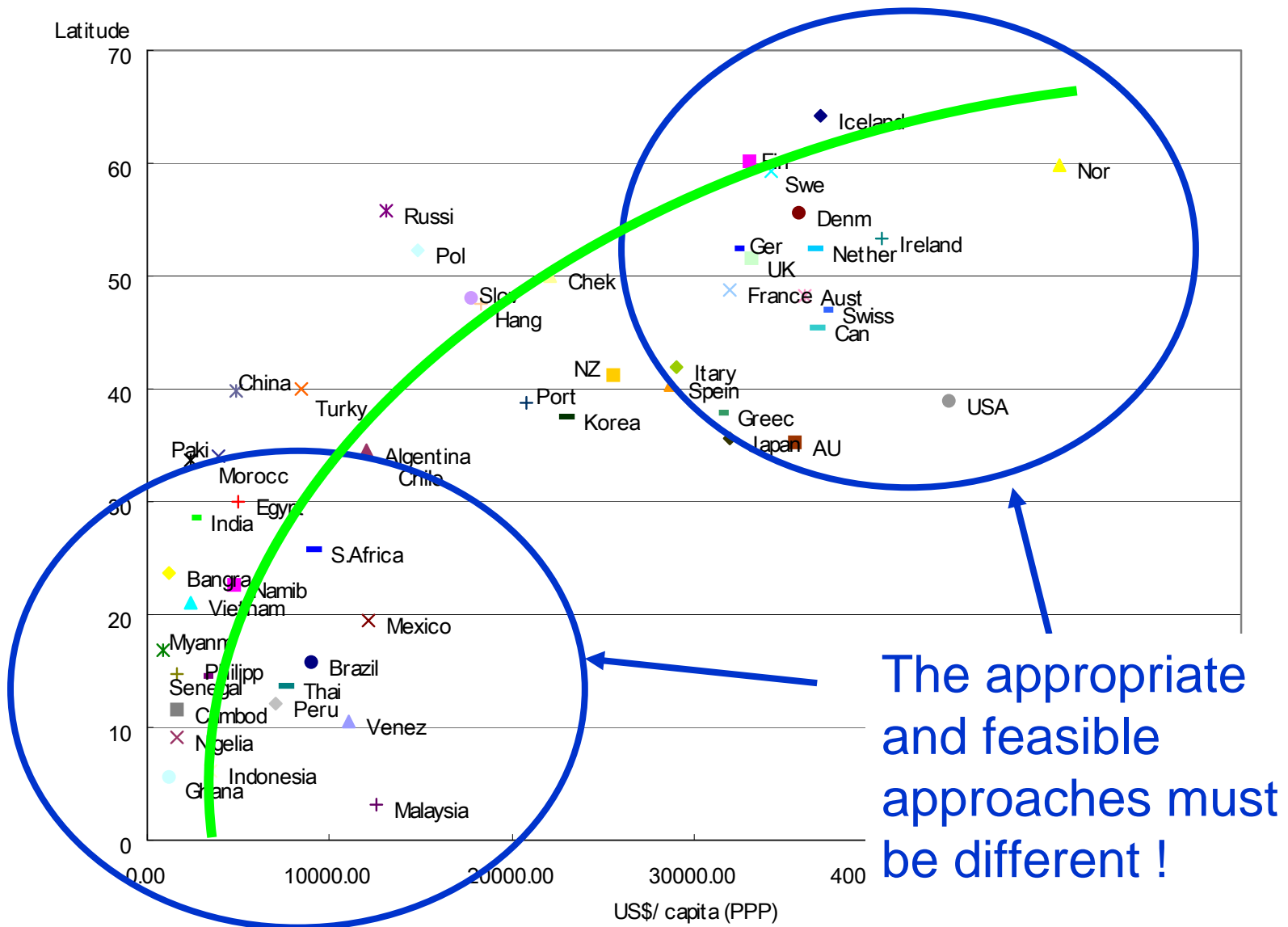
Also, anthropologists pointed out

(K. Ruddle 08)

- In many part of the world, a redistribution of wealth through **social inter-dependence and traditional credit system** is the norm.
- That may bind fishers to their communities and occupation, as a **sense of sub-cultural identity**.
- Crew sizes may be determined more by the **social imperatives or obligations to share economic benefits**, than by the economically rational choices.

Social Norm

Per Capita GDP (PPP, US\$)



The appropriate and feasible approaches must be different !

Source: WB

It is not difficult to believe.

- The percentage of recovering stocks in the world is increasing
(Garcia and Grainger 2005)
- More than 100 million MT, US\$ 140 billion in revenue within 30 years can be possible, by recovering stocks, growth in unexploited stocks, improved forecasting and fine tuning of harvest targets, etc
(Sanchiricon and Wilen 2002) .

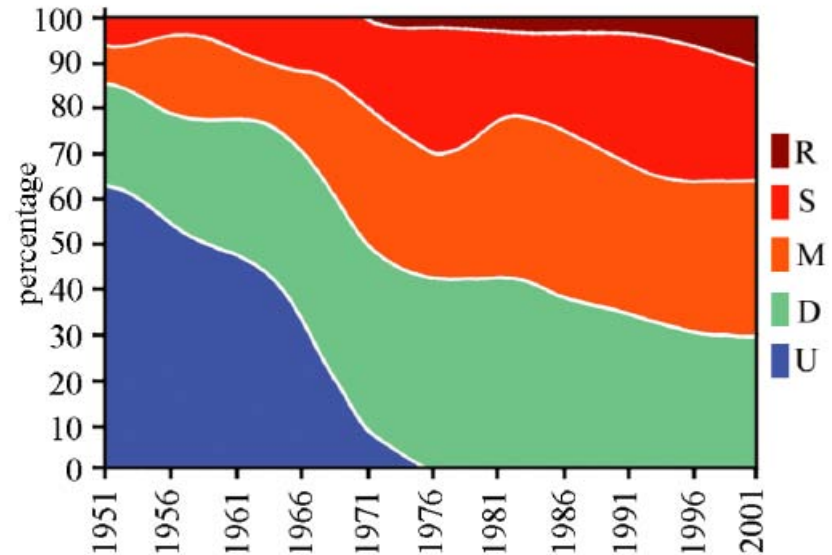
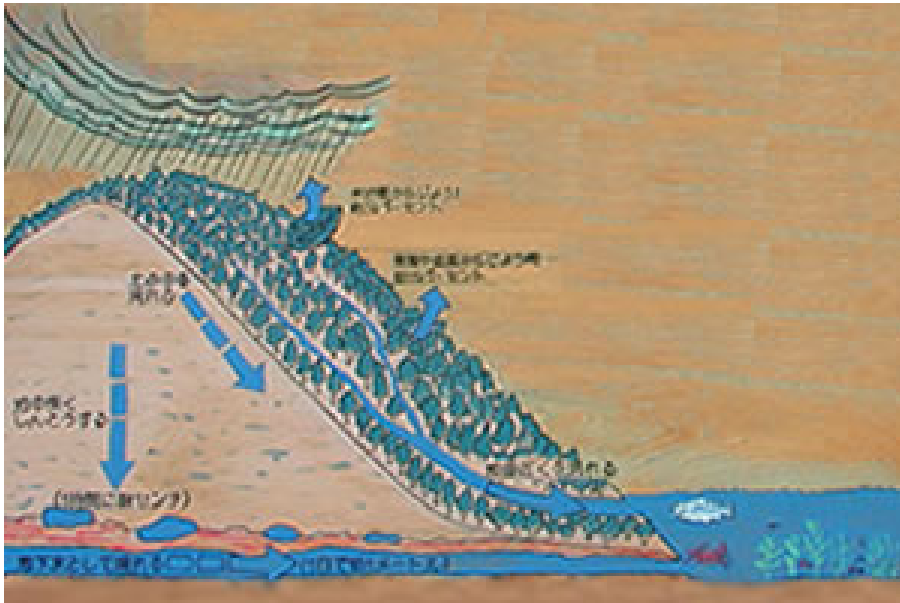


Figure 2. Percentage of major marine fishery resources in various phases of development with five-year intervals: 1950–2001. U, undeveloped; D, developing; M, mature; S, senescent; R, recovering. (Modified from Grainger & Garcia (2004).)

Area	Marine fishers (1000 person)	Total fishers (1000 person)
N. America	643	767
S. America	393	769
Asia	2939	24715
EU	275	381
Oceania	114	115
Former Soviet	251	251
Africa	551	1915

FAO (1999) Fisheries Circular 929 (Rev.2)

Voluntary Activities (1)



Local legend says

“Forests are the roots of coastal fish”

(<http://www.jf-net.ne.jp/amhiranaigyokyo/>)



Forestation activities by local people

(<http://www.jf-net.ne.jp/hkyubetsu/sigen.htm>)

Voluntary Activities (2)



Promotion of environmentally-friendly detergent produced by the local fishers association.

(<http://www.jf-net.ne.jp/fsgyoren/work1.html>)



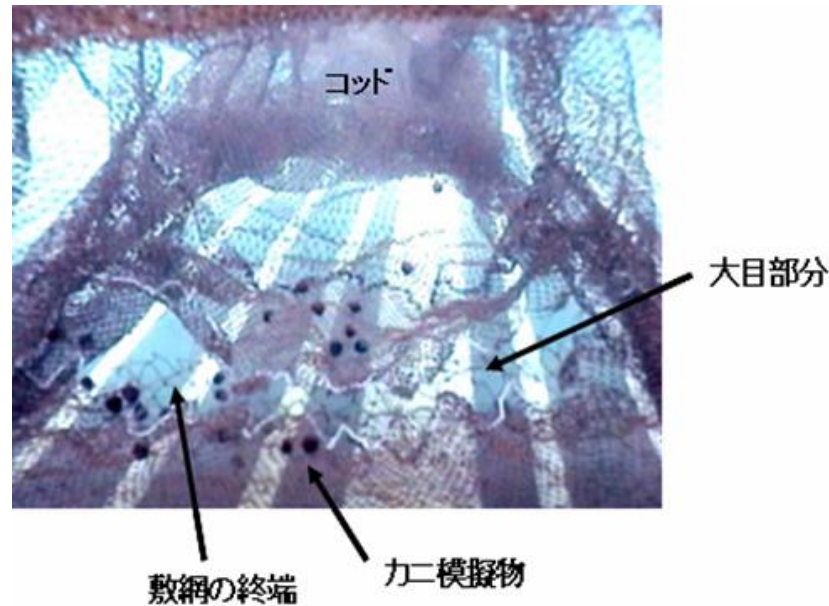
Cleanup activities by local people

(<http://www.minato-j.fks.ed.jp/seito/gyouji/shizen/shizen.html>)

Voluntary Activities (3)

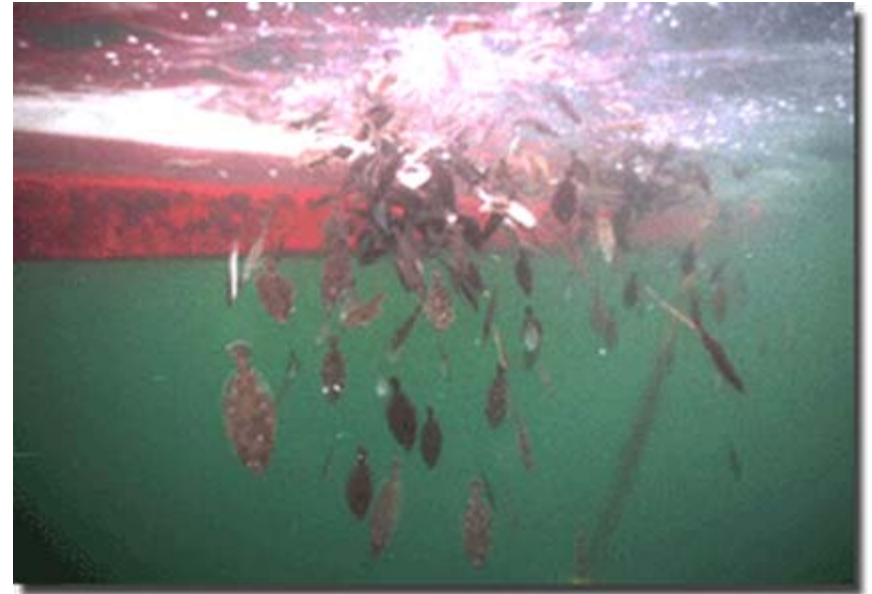


Fish scale distributed to fishers
(<http://www.jf-net.ne.jp/cbgyoren/sigen.html>)



Improvement in fishing gear

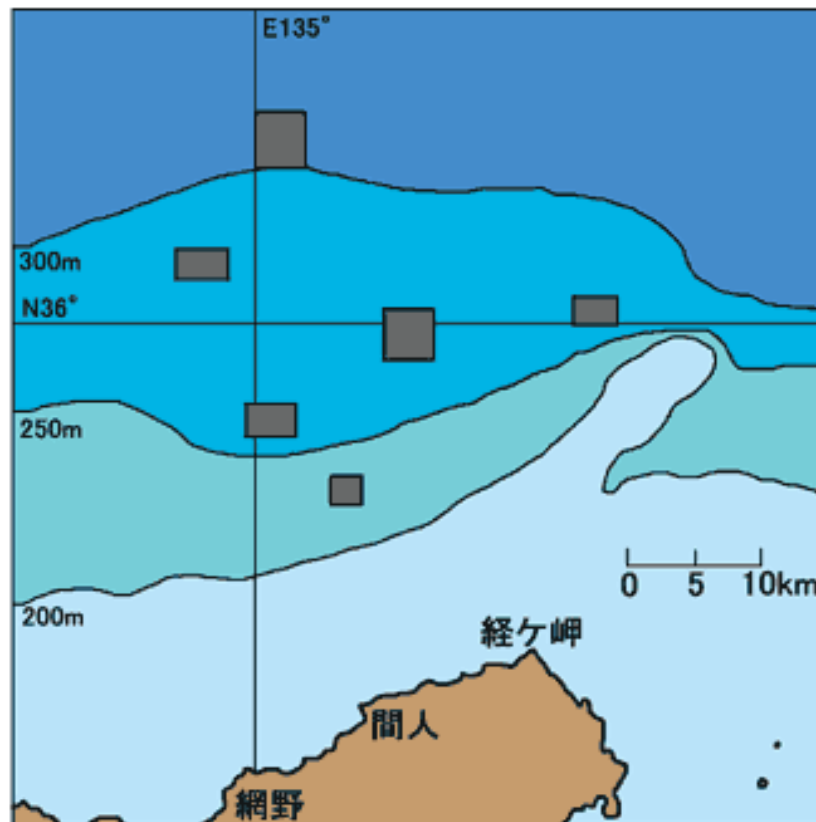
Voluntary Activities (4)



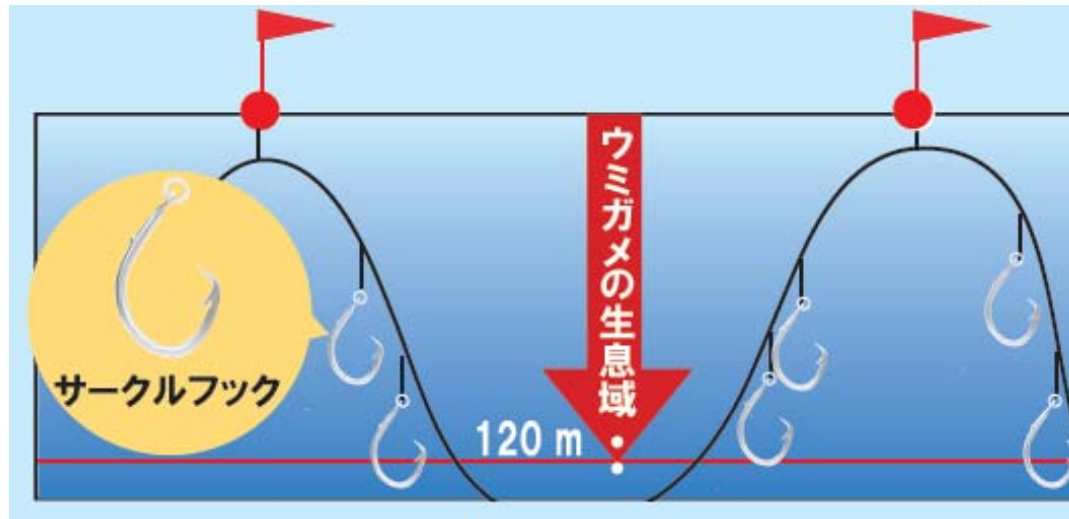
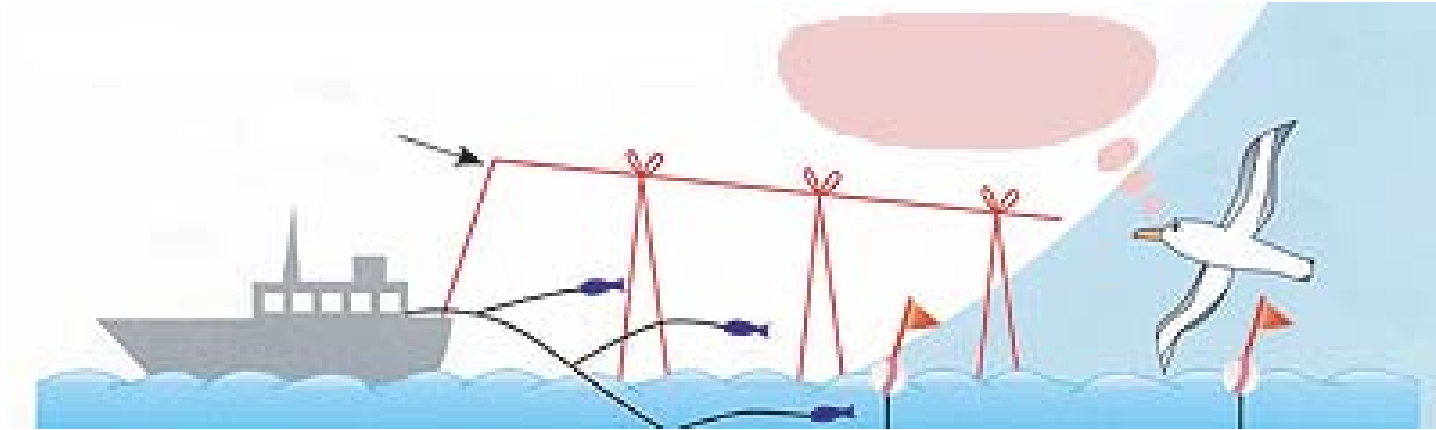
Resource Enhancement (release of seeds)

Voluntary Activities (5)

Introduction of MPAs (no-take zones) in
Kyoto prefecture (Makino 2007 in FAO Tech. Paper)



Voluntary Activities (6)



Introduction of Bycatch Prevention Gears for longline

<http://www.oprt.or.jp/>