Small fish, big stake:
Vulnerability and adaptation of small-scale small pelagic fisheries to global changes

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Three questions in three related initiatives

Too BIG To IGNORE

Global Partnership for Small-Scale Fisheries Research

(1) The importance of small-scale small pelagic fisheries

(2) Vulnerability of small-scale small pelagic fishing communities to changes

IMBeR

Integrated Marine Biosphere Research

(3) Adaptive strategies and responses to change

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Forage Fish: From Ecosystems to Markets

Jacqueline Alder,[1] Brooke Campbell,[1] Vasiliki Karpouzi,[1] Kristin Kaschner,[2] and Daniel Pauly[1]

Fisheries targeting small-to-medium pelagic, so-called forage fish, impact on human food security and marine ecosystems. Because their operations are shrouded by the myth that forage fish are unsuitable for human consumption, the role of these fisheries in intensive food production is not well understood or appreciated. Thus, although they account for over 30% of global landings of marine fish annually, our knowledge of how these levels of removal impact on marine ecosystems is limited. Nevertheless, there is considerable scope for policy makers to change the current management of these fisheries and to enhance their contribution to food security and economic development. Industry and consumers also have an important role in finding the balance between these fisheries contributing to human food security and poverty alleviation on the one hand, and sustaining intensive animal food production systems, especially aquaculture, on the other.

Annual Review of Environment and Resources 2008

WILEY FISH and FISHERIES

The little fish that can feed the world

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Abstract

Peru is home to the world's biggest fishery with catches of over 95 million tonnes of anchoveta (*Engraulis ringens*), since 2000, yet one in six small children in Peru suffer from chronic malnutrition. This is not because anchoveta is unsuitable for human consumption—on the contrary, they are nutritious, tasty and available year-round, close to the coast. Almost all anchoveta are, however, reduced to provide fishmeal and oil for export. Only a few per cent of the landings are used for direct human consumption, and while this use has increased significantly over the last decade, the growth has stopped because of perverse incentives that encourage landing for reduction purposes, combined with production methods that are expensive and unsuitable for large-scale operations. We discuss the roadblocks and prospects for significantly increasing the contribution of anchoveta to global food security and provide an outlook for how big this contribution potentially could be. It is time to change how anchoveta is used.

The humble sardine (small pelagics): fish as food or fodder

Moenieba Isaacs

Agriculture & Food Security 2016 5:27 | DOI: 10.1186/s40066-016-0073-5 | © The Author(s) 2016

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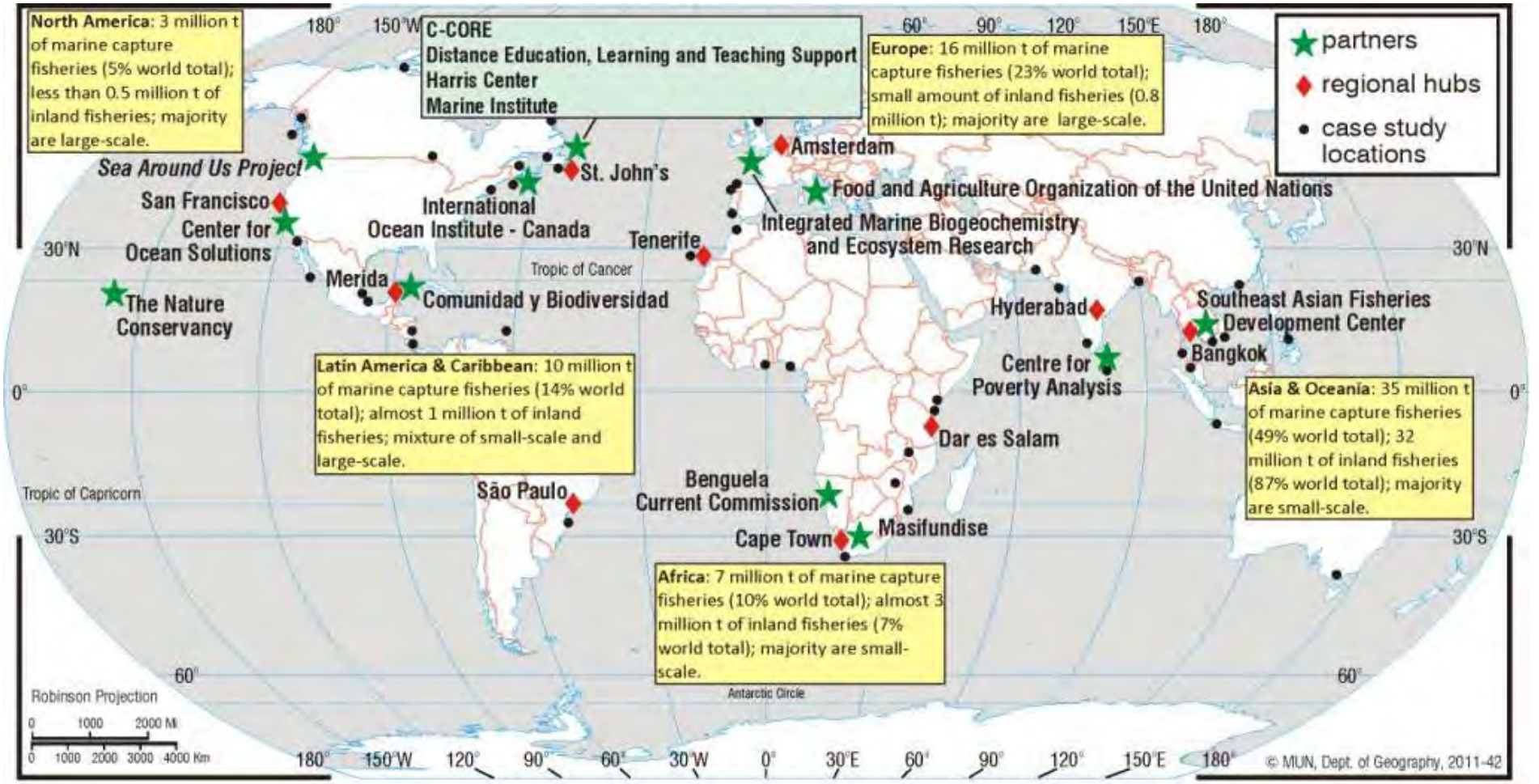
The group of small pelagic fish is the largest species group landed globally… The nutritional importance of small pelagics as an easily digestible protein source, rich in essential lipids with fatty acids (EPA/DHA), essential amino acids, minerals and vitamins, is well known and documented. Small pelagics contain all the elements of a healthy and nutritionally optimal food source for humans and are an important contributor to the food and nutritional security of many poor, low-income households in developing countries…Yet, all of the anchovy landings from large-scale fisheries are reduced to animal feed, fish oil and pet food in South Africa…This trend is also now prevalent in Tanzania, where most (84%) of the dagaa fished is reduced to fishmeal in Kenya, mainly to feed chickens. The main challenges are post-harvest handling and sanitation…The role small-scale fisheries play in providing fish for food security needs to be understood in the context of economic viability and of how data are reported in this sector as compared to large-scale fisheries.

- Large-scale fisheries, industrial/intensive production
- Use in fish meal, animal feed, fertilizer, etc.
- Global ‘north’ food security

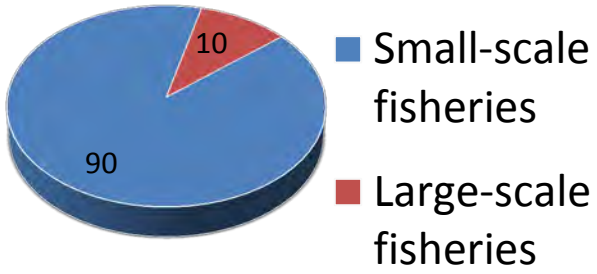
- Small-scale fisheries, family-based food production
- Use as direct food in households or in small trades
- Global ‘south’ food security



Too Big To Ignore (TBTI): an open research network and knowledge mobilization partnership, with > 300 researchers & 20 organizations from ~ 45 countries, working to elevate the profile of small-scale fisheries, argue against their marginalization, reduce their vulnerability, and address key concerns affecting their sustainability.

Why small-scale fisheries?

- Majority of the world fisheries are small-scale;
- About 120 million full-time and part-time workers are directly dependent on commercial fisheries value chain for their livelihoods;
- 95% of small-scale landings are for local consumption; and
- For the most part, small-scale fisheries are politically and economically marginalized.



% of fishing people by sector

FAO (2012; 2015); World Bank/FAO/WorldFish (2010)





Major concerns in global fisheries

Small-scale fisheries are highly affected by these concerns

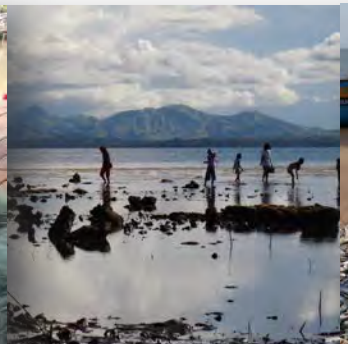
Ecosystem health
Social justice
Livelihoods
Food security

Small-scale fisheries can make major contribution to address these concerns

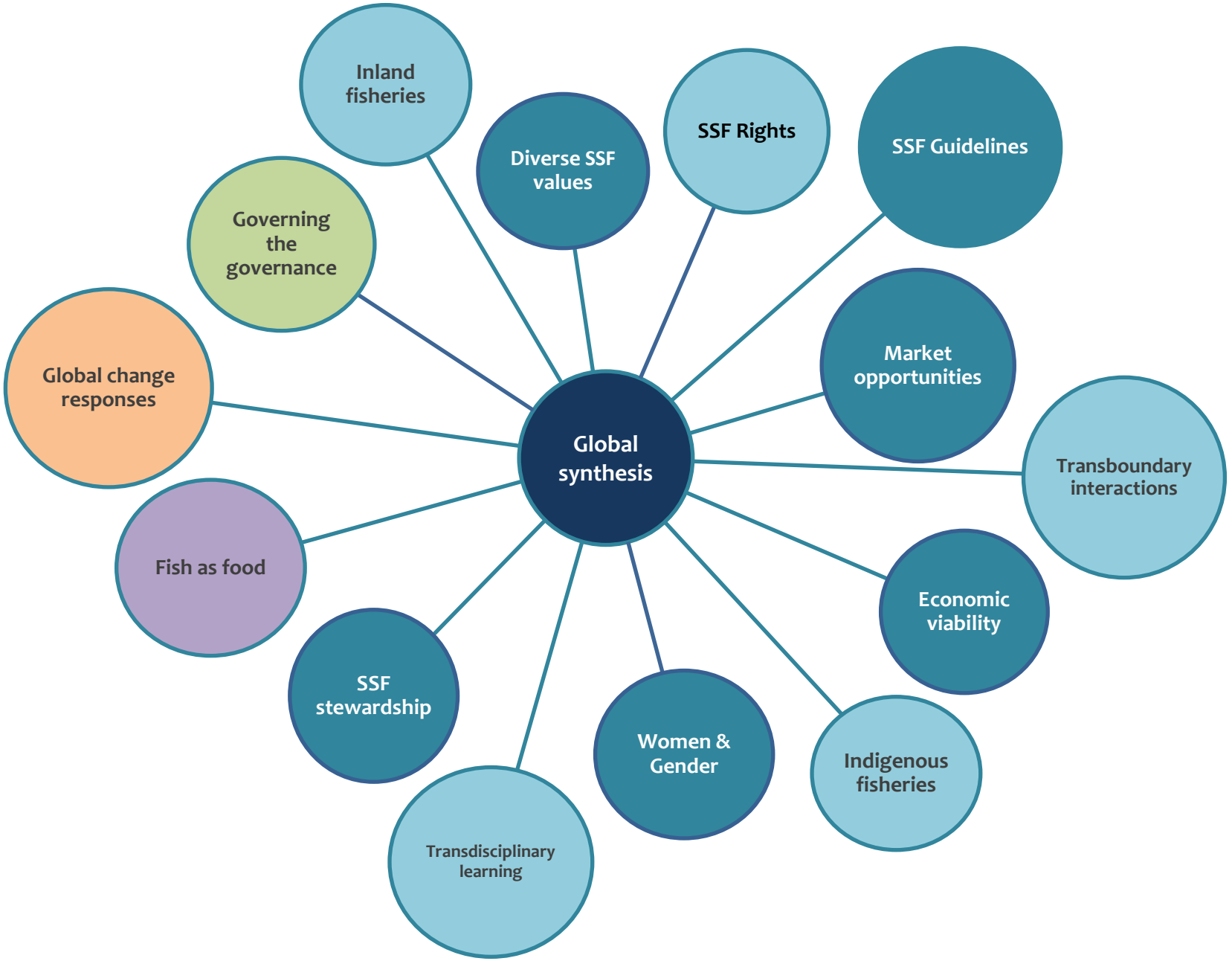
- ✧ Complex, social problems cannot be addressed using technical fixes
- ✧ Such complexity makes fisheries governance a wicked problem
- ✧ Climate/global change makes governance a 'super' wicked problem

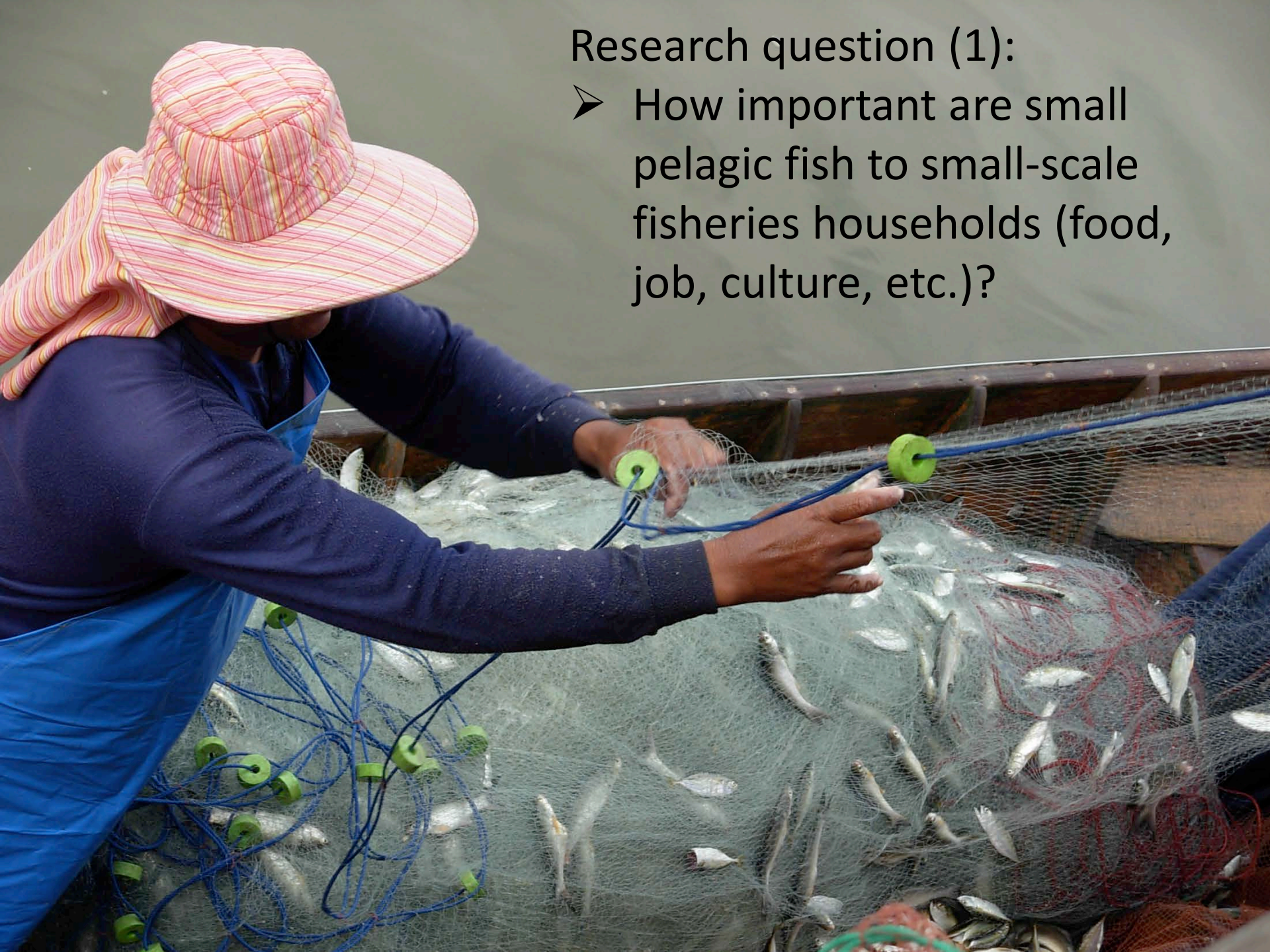
Chuenpagdee et al. (2005); Jentoft & Chuenpagdee (2009)





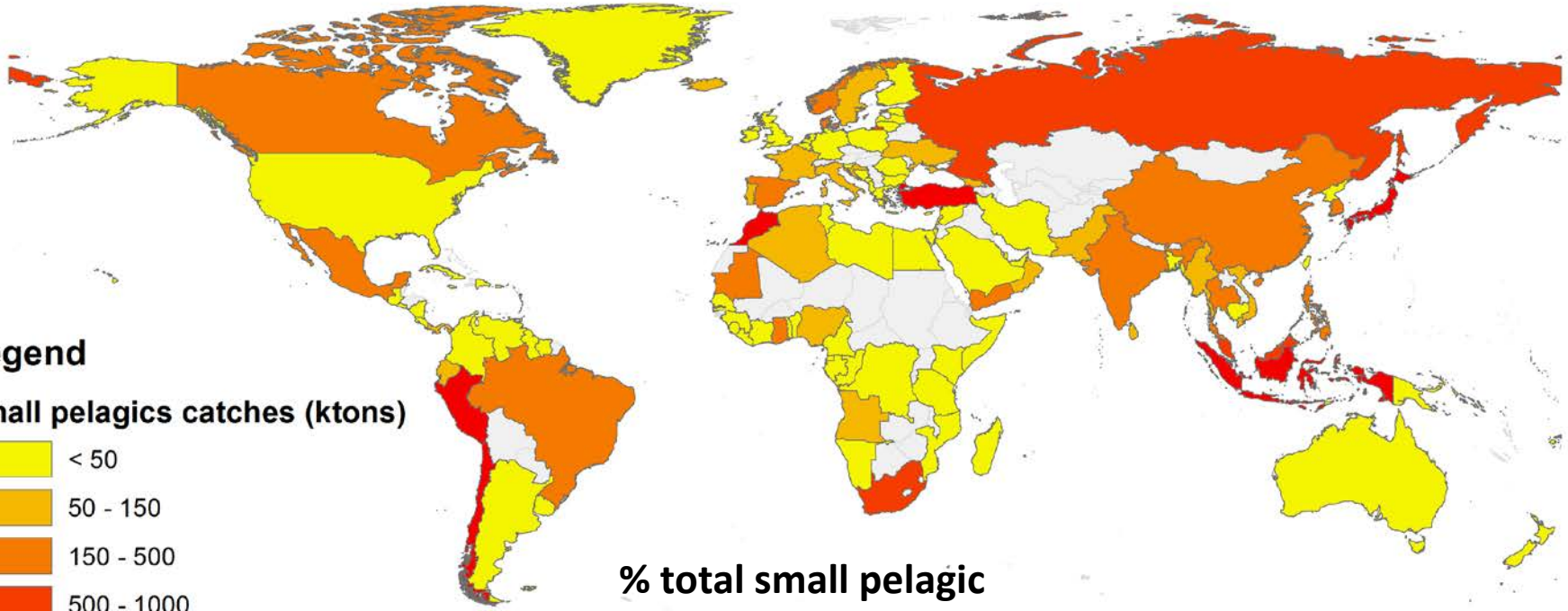
TBTI research clusters covering multiple aspects of SSF



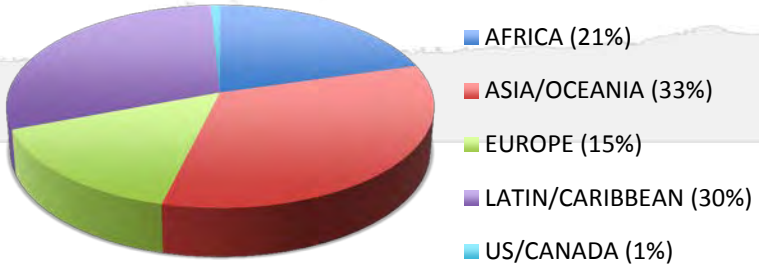


Research question (1):

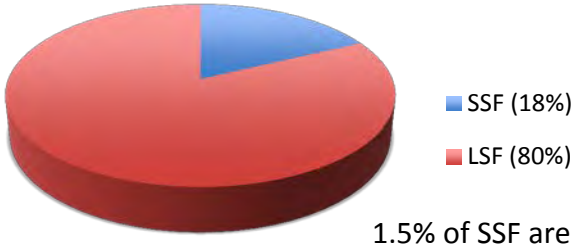
- How important are small pelagic fish to small-scale fisheries households (food, job, culture, etc.)?



% total small pelagic

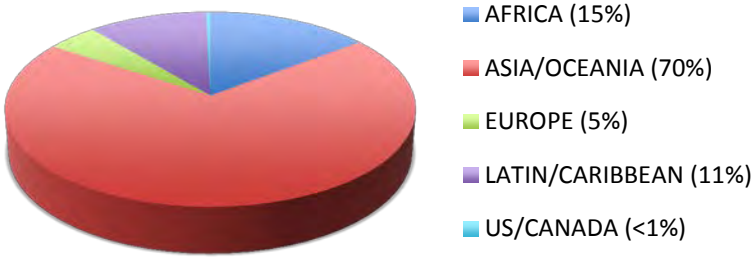


SSF vs. LSF



1.5% of SSF are for subsistence

% total SSF small pelgaic



Too BIG To IGNORE

Sea Around Us Project (2017)

The ‘values’ of Nomadic fisheries in the Meghna River Estuary, Bangladesh

- Hilsa fishery is much more than food and income!

Ecological conservation

Conflict resolution

Sense of freedom

Enhanced knowledge

Wellbeing and material wealth

Livelihood security

Enjoyment & pleasure

Sufficient catch and lifestyle

Sense of place

Responsible governing system

Community cohesion

Recruitment of youth

Compliance of rules and regulations

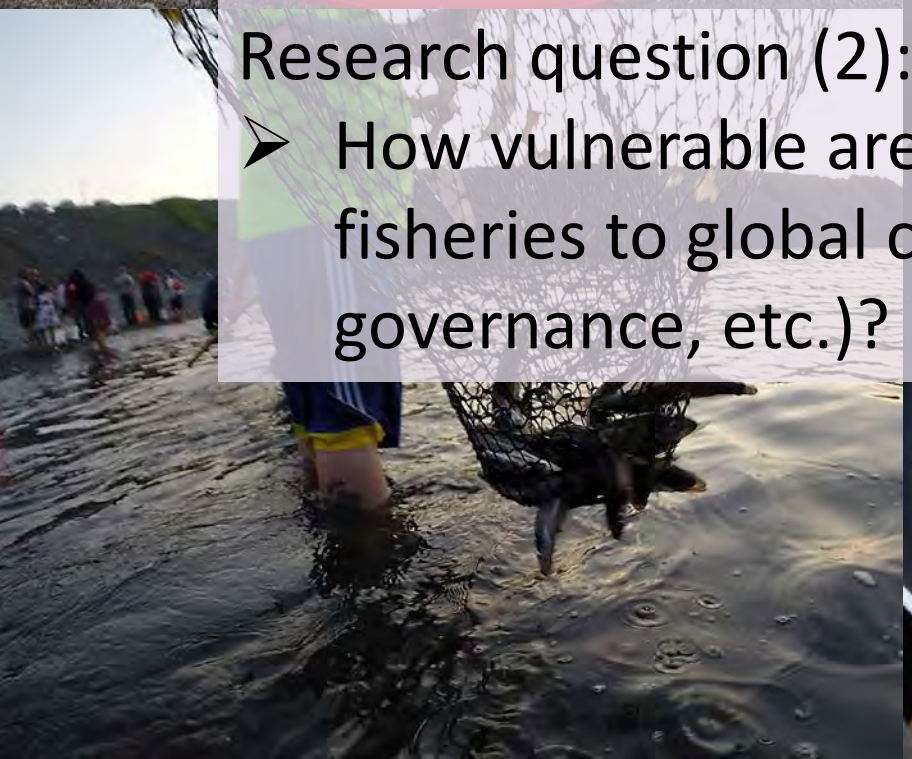
Gender equity

Fair distribution of benefits

Islam (2017) in Leis and Chuenpagdee, “The Meaning of Small” TBTI E-Publication


Research question (2):

- How vulnerable are small-scale small pelagic fisheries to global change (climate, markets, governance, etc.)?




FISH and FISHERIES

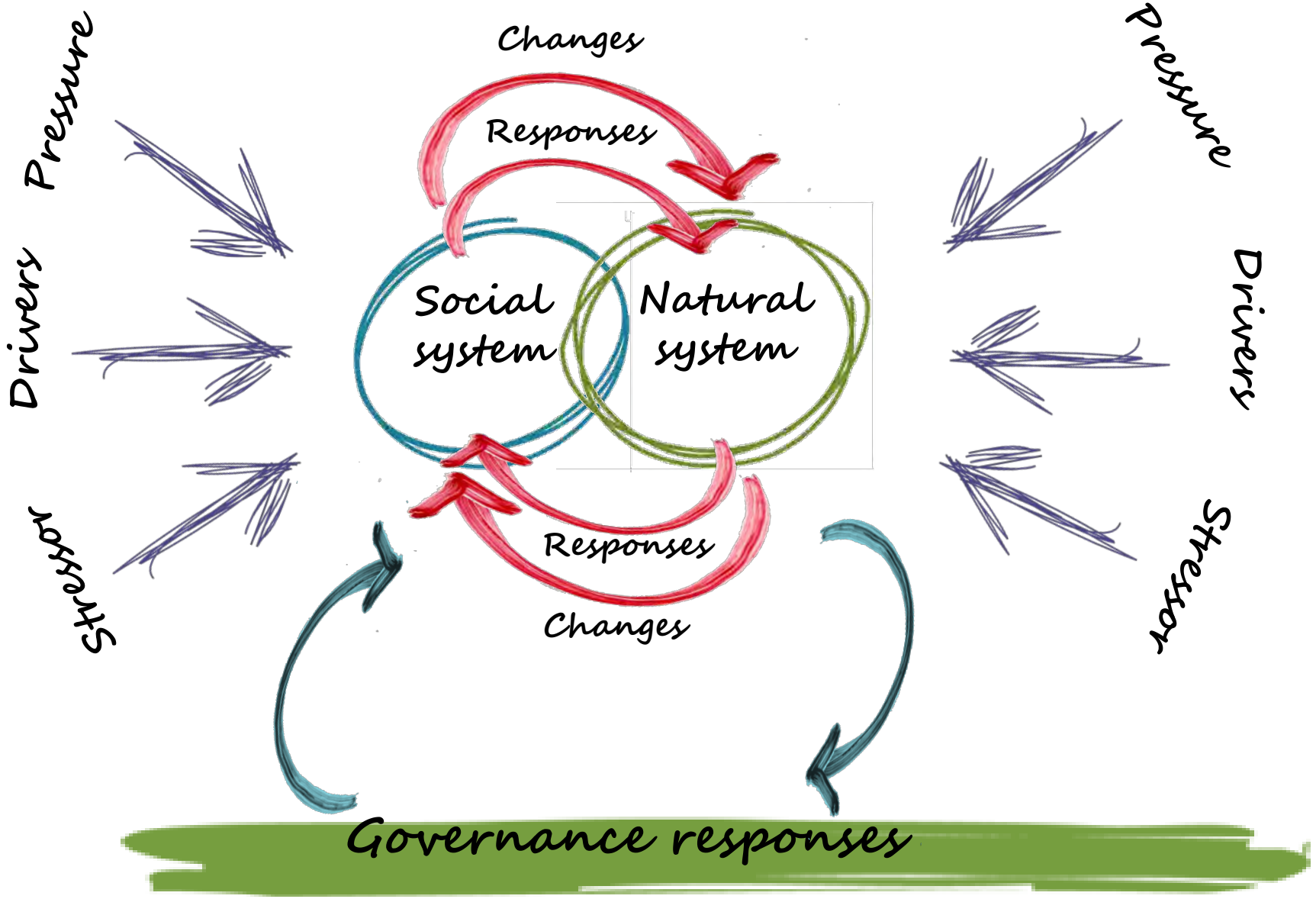
A decision support tool for response to global change in marine systems: the IMBER-ADApT Framework

Alida Bundy[1], *Ratana Chuenpagdee*[2], *Sarah R Cooley*[3,*], *Omar Defeo*[4], *Bernhard Glaeser*[5], *Patrice Guillotreau*[6], *Moenieba Isaacs*[7], *Makino Mitsutaku*[8] & *R Ian Perry*[9]

DOI: 10.1111/faf.12110

IMBER HUMAN DIMENSIONS

IMBeR
Integrated Marine Biosphere Research



Perry et al..(2010); Kooiman et al. (2005), Chuenpagdee (2011)

I-ADApT

Description

- Issues (what's going on?)
- Systems (natural, social, governing)
- Stressors (natural, anthropogenic)
- Change (caused by stressors)
- Impact (consequence of change)
- Responses (reaction to change)

Appraisal

- Outputs (objectives of response achieved?)
- Outcomes (issues addressed, side effects?)

Typology

- Tool for decision support and policy evaluation

11 case studies of small-scale small pelagic fisheries using I-ADApT
A study led by Manuel Muntoni, TBTI

A diverse set of changes facing small-scale small pelagic fisheries

Environmental changes (anthropogenically induced)
Pollution
Habitat degradation
Overfishing
Aquaculture

Economic and market changes
Fluctuation in the fish value

Small pelagic SSF

Regulatory changes
Fishing closures or size limit

Climate change
Water surface temperature

Socio-political shocks
Civil strikes
Conflicts between sectors






Various types of responses

- ✓ Seasonal activities & income diversification (migration)
- ✓ Self-regulatory measures (patrol & enforcement)

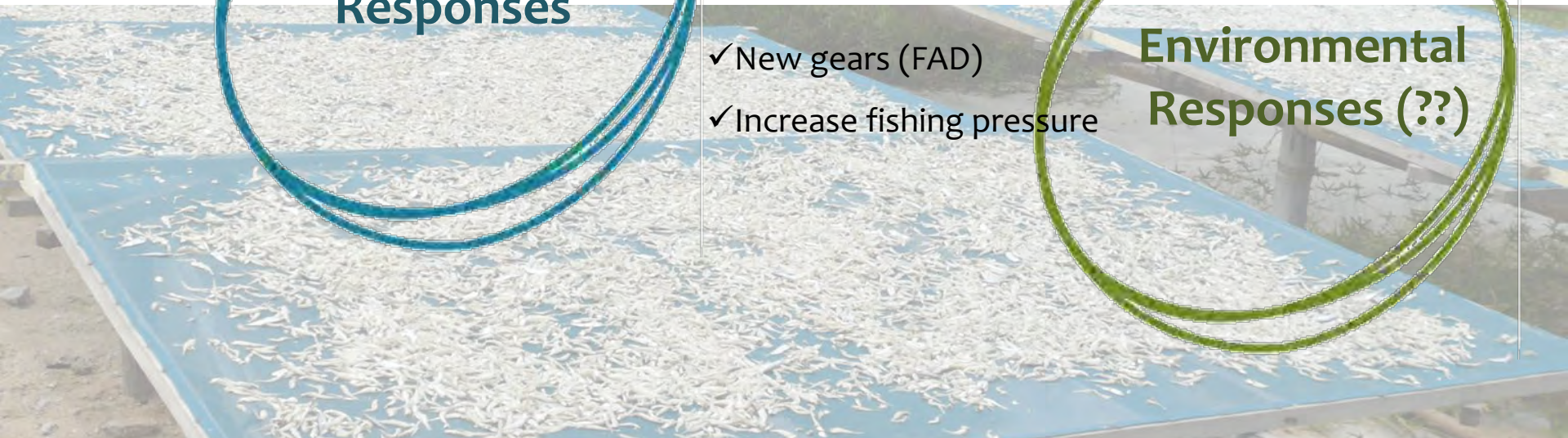
Governance Responses

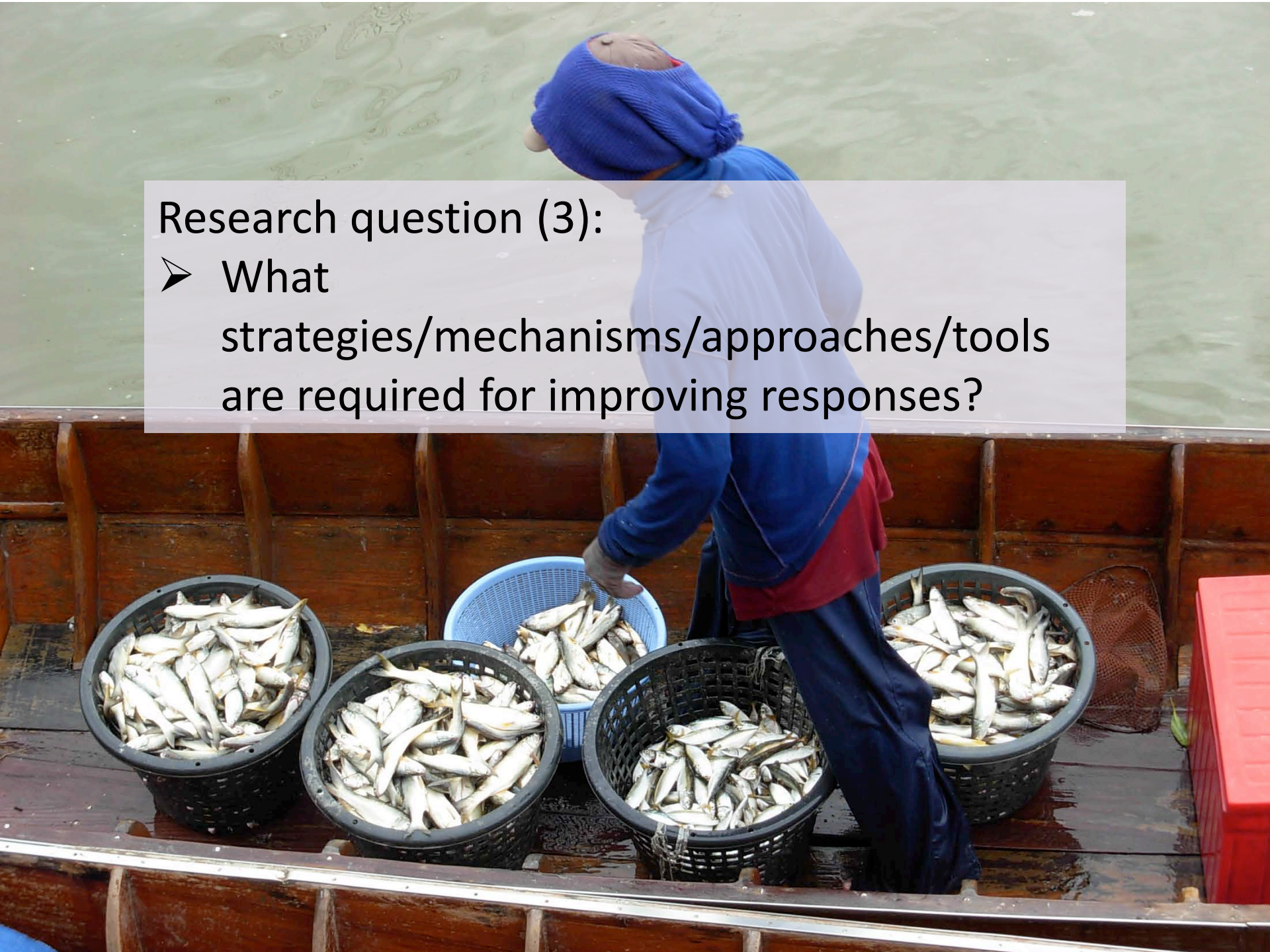
- ✓Enhance MCS
- ✓Redefine regulations
- ✓Support local users (subsidies)
- ✓Co-management
- ✓New fishing gears (midwater trawl)

Social Responses

- ✓New gears (FAD)
- ✓Increase fishing pressure

Environmental Responses (??)

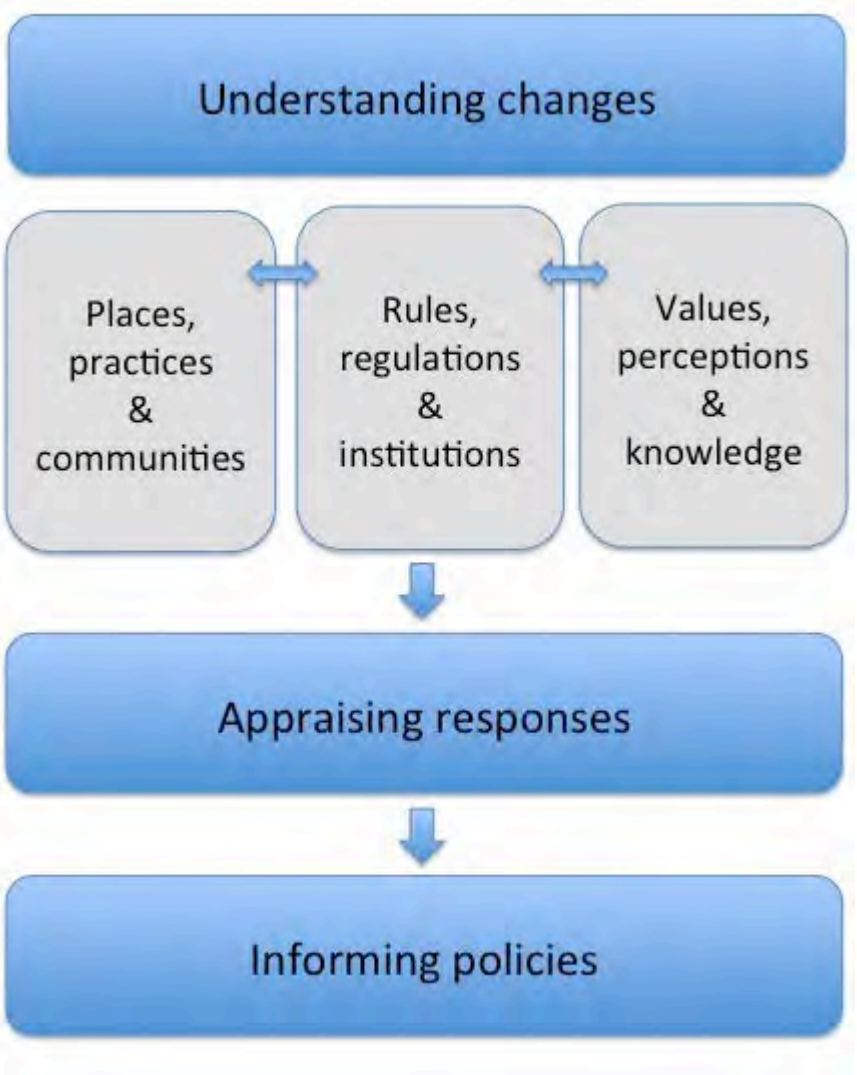




Research question (3):

- What strategies/mechanisms/approaches/tools are required for improving responses?

Informing Governance Responses in a Changing Ocean



"Anticipatory Governance"

Reduce vulnerability

Formulate proactive strategies

through

"Community-based Response System"

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Thank you for your attention!

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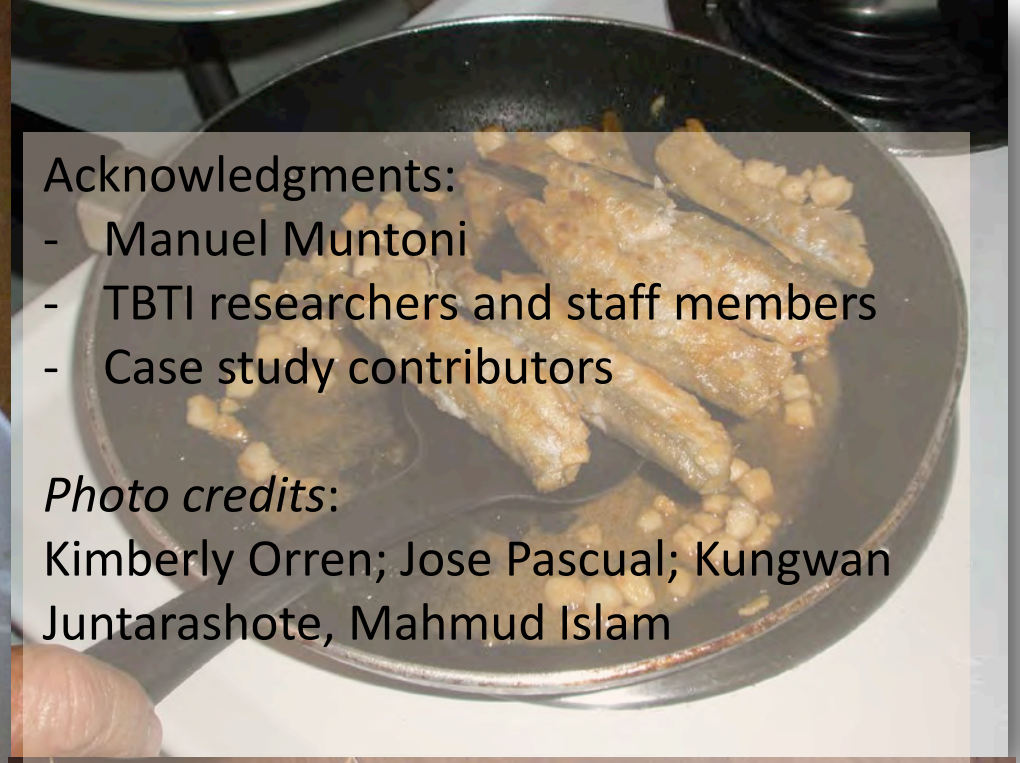

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