



# A Social-Ecological Systems approach to improving aquaculture, marine ecosystems, and human well-being

Summary of the PICES-MAFF Project on Marine Ecosystem Health and Human Well-Being (MarWeB)

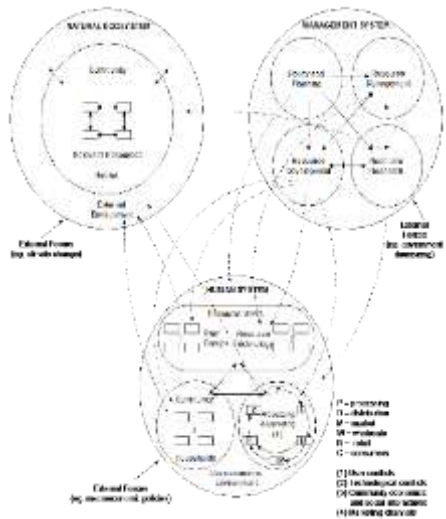


# PICES-MAFF Project on Marine Ecosystem Health and Human Well-Being (MarWeB)

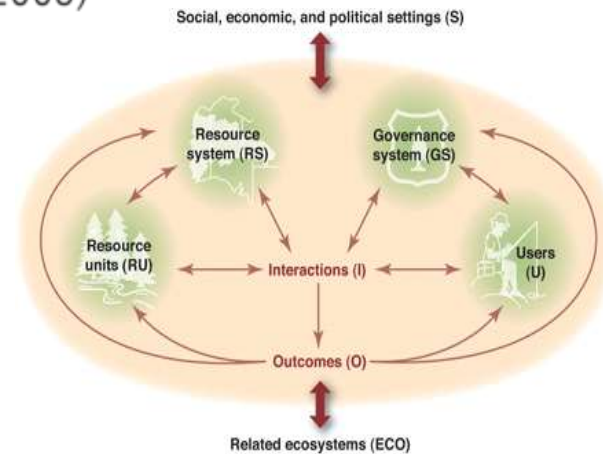
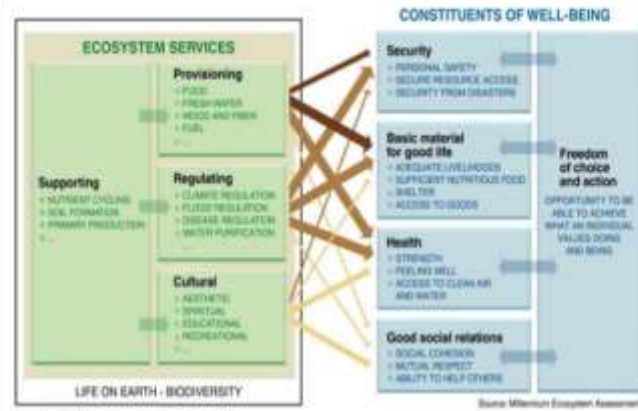
- Co-Chairs:  
Mitsutaku Makino (Japan) , Ian Perry (Canada)
- Funding : MAFF of Japan
- Duration: FY 2012-2016
- Key questions:
  - (a) how do marine ecosystems support human well-being? and
  - (b) how do human communities support sustainable and productive marine ecosystems?

# What is a social-ecological system?

- Social-ecological systems are integrated complex systems that include social (human) and ecological (biophysical) subsystems in two-way feedback relationships.
- Such concepts can provide an integrated understanding of how ecosystem changes affect human social systems, and vice versa. This integrated understanding is crucial to improve the stewardship of marine ecosystems.

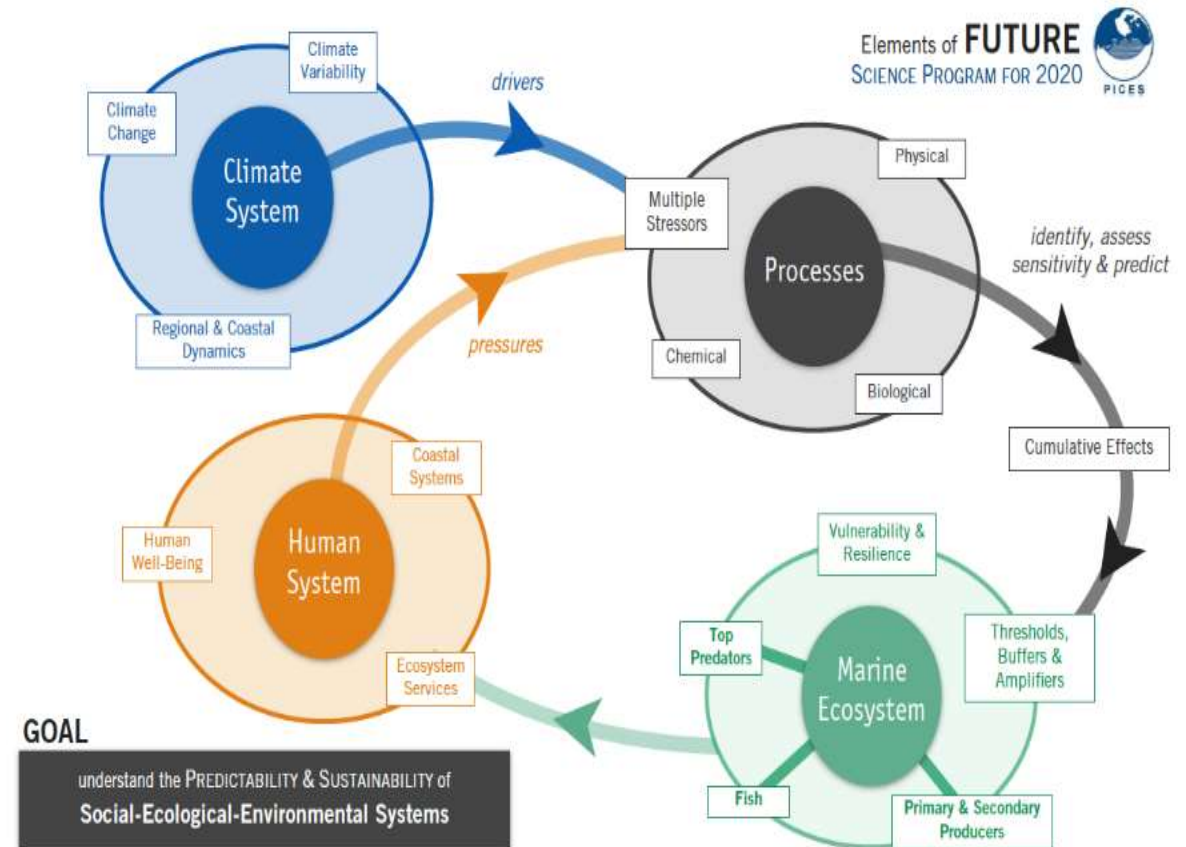


Millennium Ecosystem Assessment (2005)



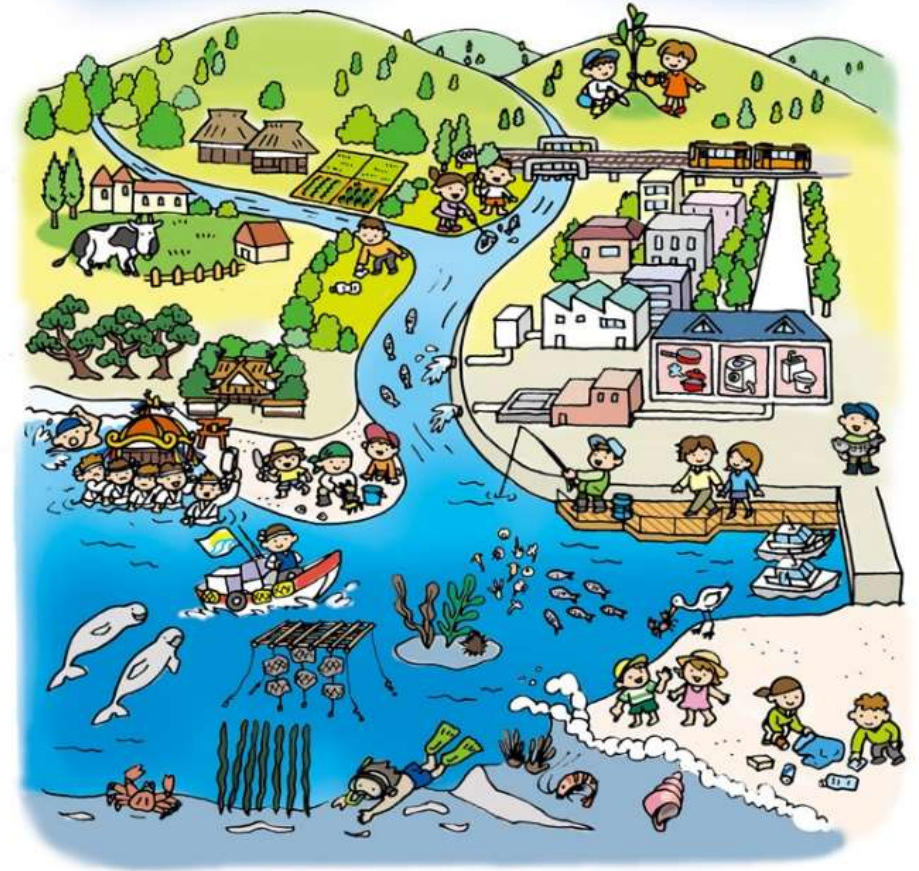
# Social-ecological systems and PICES

- The PICES integrative science program, FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems: 2010-2020), also has significant activities and strong linkages with ecosystems and people.

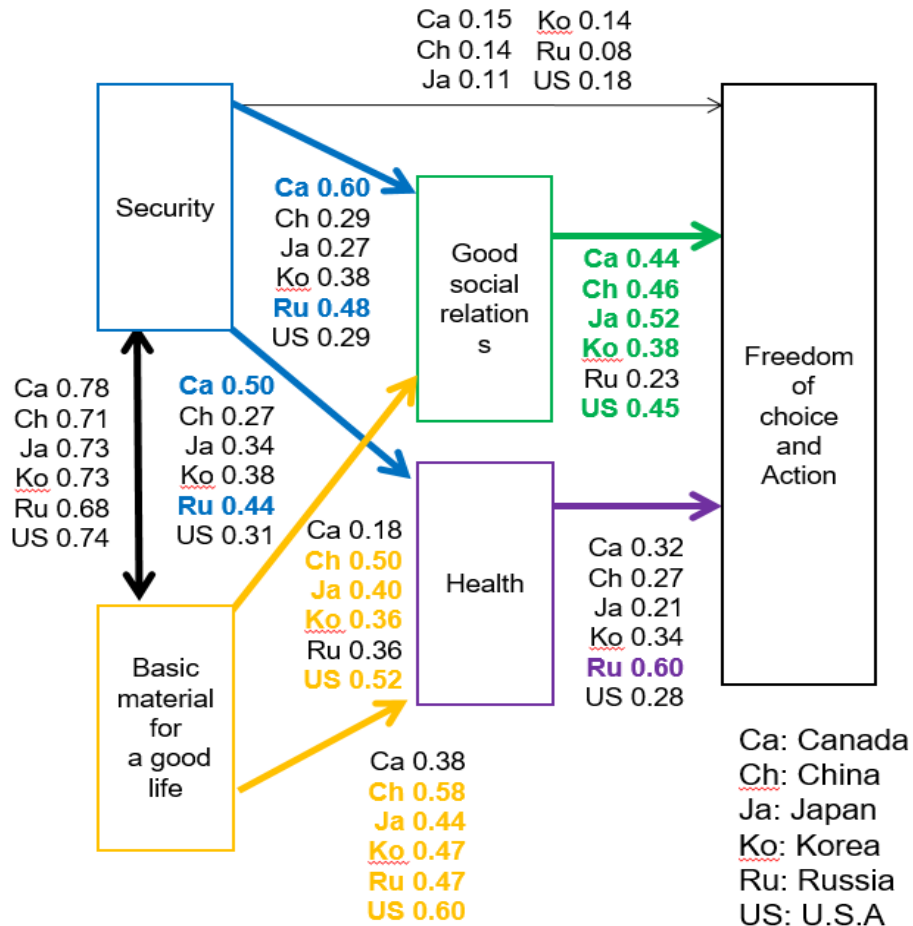


# Satoumi

- The Japanese concept of *sato-umi* represents one version of this humans-in-nature approach, in which a healthy ecosystem is seen to nourish human well-being, but human activities are seen as necessary for sustaining ecosystem health.
- *Sato* means community or village, and *umi* means sea or coast. Therefore, *sato-umi* refers to human communities that have long-standing relationships with marine environments, and in which human interactions have resulted in high marine productivity and biodiversity

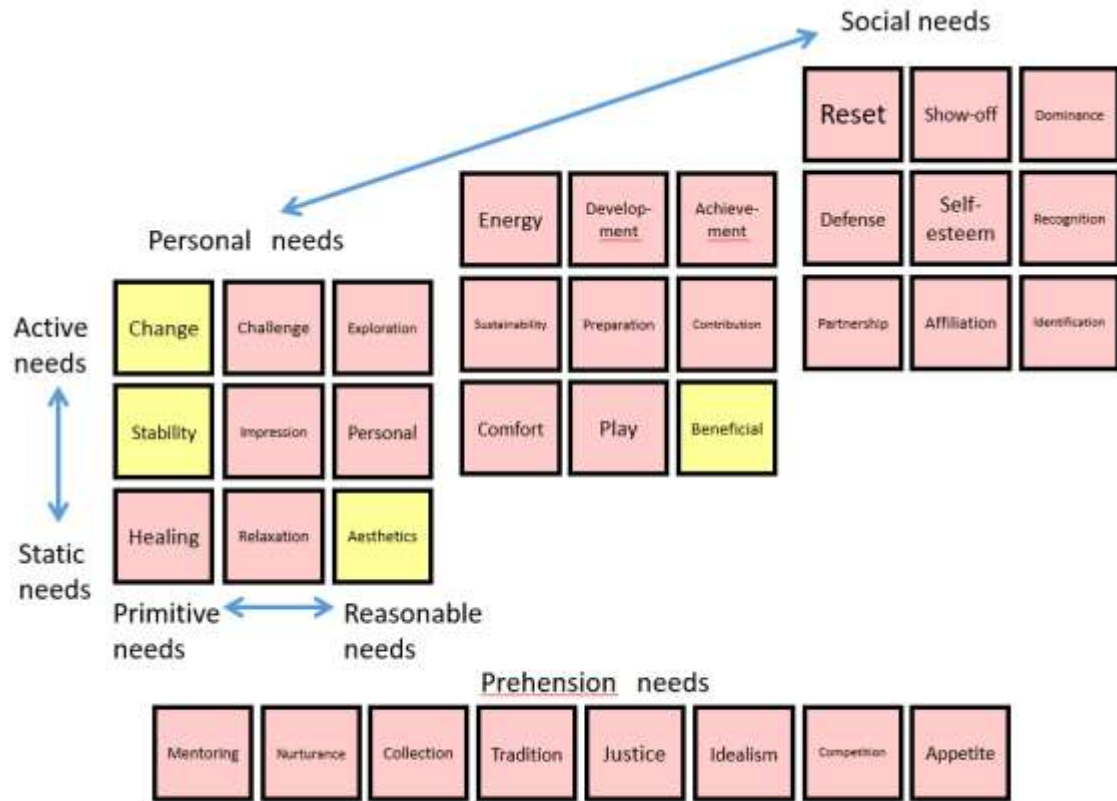


# Each country/sector/community has specific priority in ecosystem conservation



- “Security” is relatively important in Canada and Russia, while “Basic material for a good life” is for other countries.
- Similarly, the “Health” is relatively more important for Russian people for achieving the freedom of choice and action, while other countries are more about the “good social relations”.

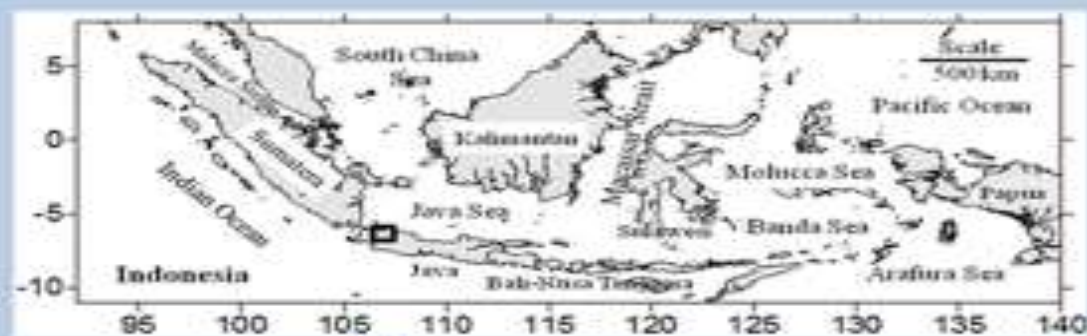
# Identification of issues/needs with local communities



- For Indonesian people, “Change”, “Stability”, “Aesthetics” and “Beneficial” are important needs

- Workshop at Guatemala to identify local needs

# SITE LOCATION





# TRADITIONAL POND AQUACULTURE

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The experiment comprised 4 x 1000 m<sup>2</sup> ponds at the National Center for Brackishwater Aquaculture, Karawang.

Pond 1) Only Shrimp

Pond 2) Shrimp + *Gracilaria* (0.1 kg/m<sup>2</sup>)

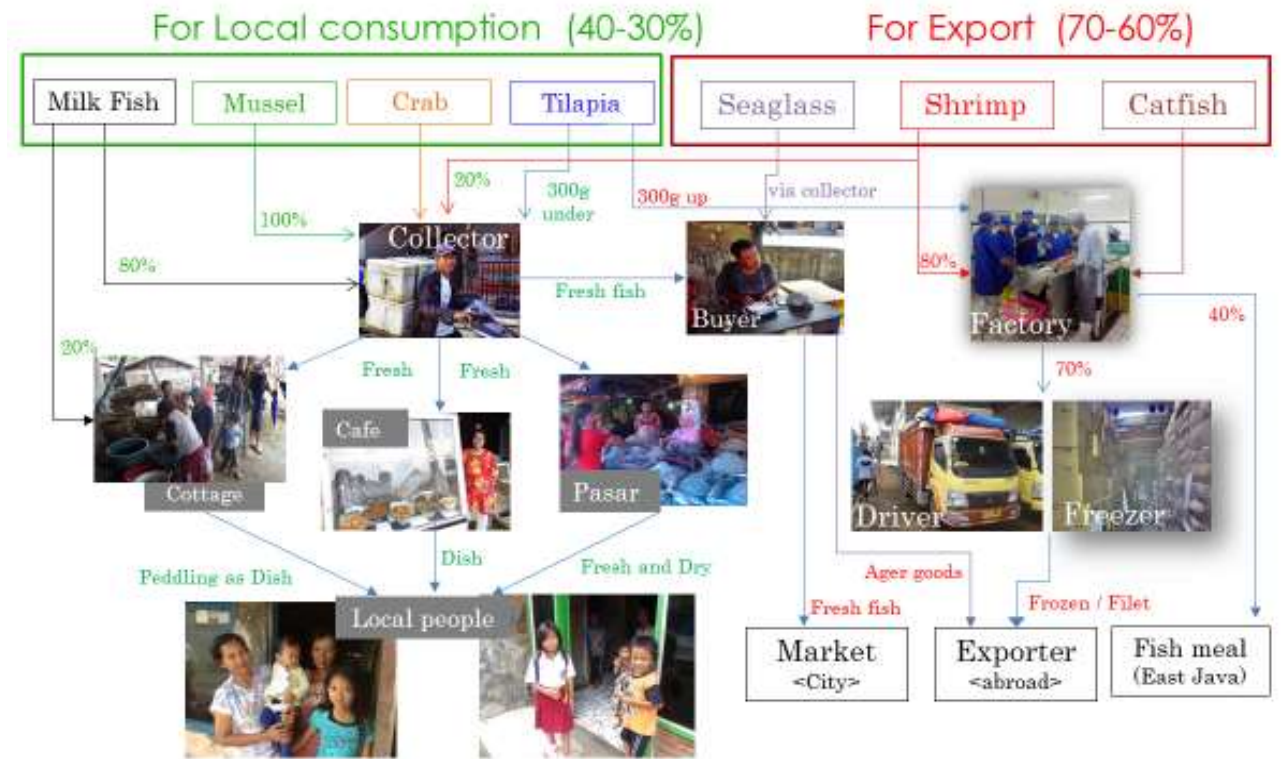
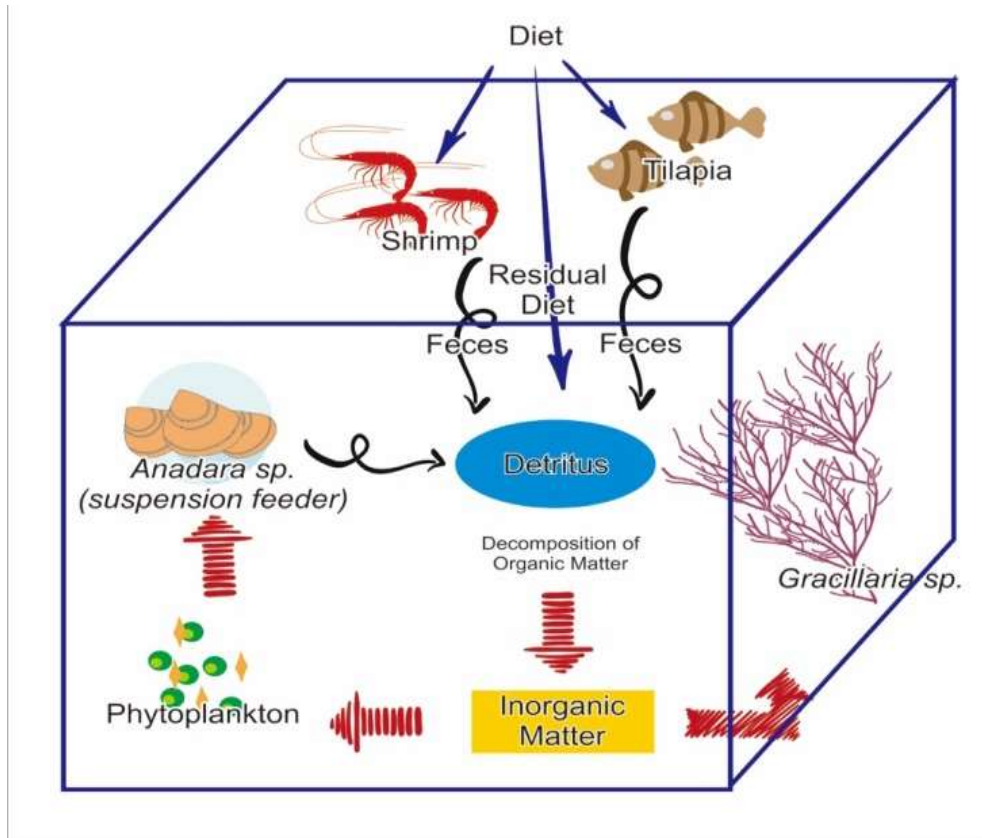
Pond 3) Shrimp + *Gracilaria* (0.2 kg/m<sup>2</sup>)

Pond 4) Shrimp + *Gracilaria* (0.4 kg/m<sup>2</sup>)

Shrimp was added at 13/m<sup>2</sup> and *Gracilaria* was placed in floating mats to maximize light exposure



# The Integrated Multi-Trophic Aquaculture (IMTA) and its social effects



IMTA **changes** the conventional practice and achieve better coastal water quality (**aesthetic**).

How IMTA products can contribute to the **stability** and **benefit** of the local people (value chain analysis)

# Researching together

- It is inevitable for us to, at some point of time, withdraw the efforts from the sites.
- Therefore, as one of the most important processes for a social-ecological system research, collaboration with local stakeholders, especially in terms of dissemination of the results and capacity building of local researchers/technicians are needed to develop the research works by their own initiatives.



# Lessons learnt

- Communication efforts with locals are needed
- Both natural and social sciences needed (SES)
- Multi-disciplinary team needed (one can not do all)
- Capacity building for local people needed (we have to leave).



But rewarding and exiting!!



## Marine Ecosystem Health and Human Well-Being

**Acronym:** MarWeB

**Term:** April 2012 - March 2017

**Project Science Team Co-Chairs:**

Mitsutaku Makino (Fisheries Research and Education Agency, Japan)

Ian Perry (Department of Fisheries and Oceans, Canada)

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## Background

Progress is being made internationally on an ecosystem approach to the management of marine systems, in particular as applied to ecosystem-based fisheries management (EBFM; e.g., FAO 2003; Hollowed *et al.*, 2011). Recent initiatives have expanded the concept of ecosystem approaches to include people in what have been called coupled marine social-ecological systems e.g., De Young *et al.*, 2008;

## MarWeB Advisory Report

The [MarWeB Advisory Report](#) on “*Improving aquaculture, marine ecosystems and human well-being: A social-ecological systems approach*” provides an overview of the social-ecological systems approach and the Sato-umi concept for local government officers and researchers in developing countries and for general public.

## MarWeB Database

This database includes data collected during this MarWeB project:

1. [Data for the comparative well-being analysis in PICES member countries and Indonesia](#) (see Section 2 in the MarWeB Scientific Report)
2. Data from the 2014, 2015 and 2016 Aquaculture Pond Experiments in Indonesia (see Section 3 in the MarWeB Scientific Report) [These data will be publicly available after publication of the findings. Data are now available to [Project Science Team members and Indonesian colleagues](#) involved in the experiments. Other scientists interested in accessing these data before publication should contact PICES ([secretariat@pices.int](mailto:secretariat@pices.int)) with a specific request and explanation for how these data will be used.]
3. Electronic clicker survey data for the community needs assessments in [Las Lisas](#) and [Monterrico](#) in Guatemala (see Section 4 in the MarWeB Scientific Report)
4. Bibliography on the key concepts used in the project: [social-ecological systems/human well-being](#) and [Sato-umi](#)

## Annual Progress Reports (PR)

[PR-Year 4](#) (Apr. 2015 - Mar. 2016)

[PR-Year 3](#) (Apr. 2014 - Mar. 2015)

Summer 2017, Vol. 25, No. 2, pp. 31-34 [[download](#)]

PICES/MAFF MarWeB project collaborates with the United Nations program on the development of Marine Protected Areas in Guatemala

Summer 2016, Vol. 24, No. 2, pp. 28–31 [[download](#)]

A community needs assessment for coastal Guatemala– Balancing ocean and human health

Winter 2016, Vol. 24, No. 1, pp. 29–30 [[download](#)]

Moving towards more sustainable shrimp and tilapia aquaculture in Karawang, Indonesia

Summer 2015, Vol. 23, No. 2, pp. 31 [[download](#)]

A good relationship between local communities and seafood diversity

Summer 2015, Vol. 23, No. 2, pp. 28-30 [[download](#)]

A psychological perspective on human well - being: An international comparison of the well - being structure

Summer 2013, Vol. 21, No. 2, pp. 18-19 [[download](#)]

PICES-MAFF Project on Marine Ecosystem Health and Human Well-Being: Indonesia Workshop

Winter 2013, Vol. 21, No. 1, pp. 26-28 [[download](#)]

New PICES MAFF-Sponsored Project on “*Marine Ecosystem Health and Human Well-Being*”