# Human Dimensions and the SEES Approach in PICES


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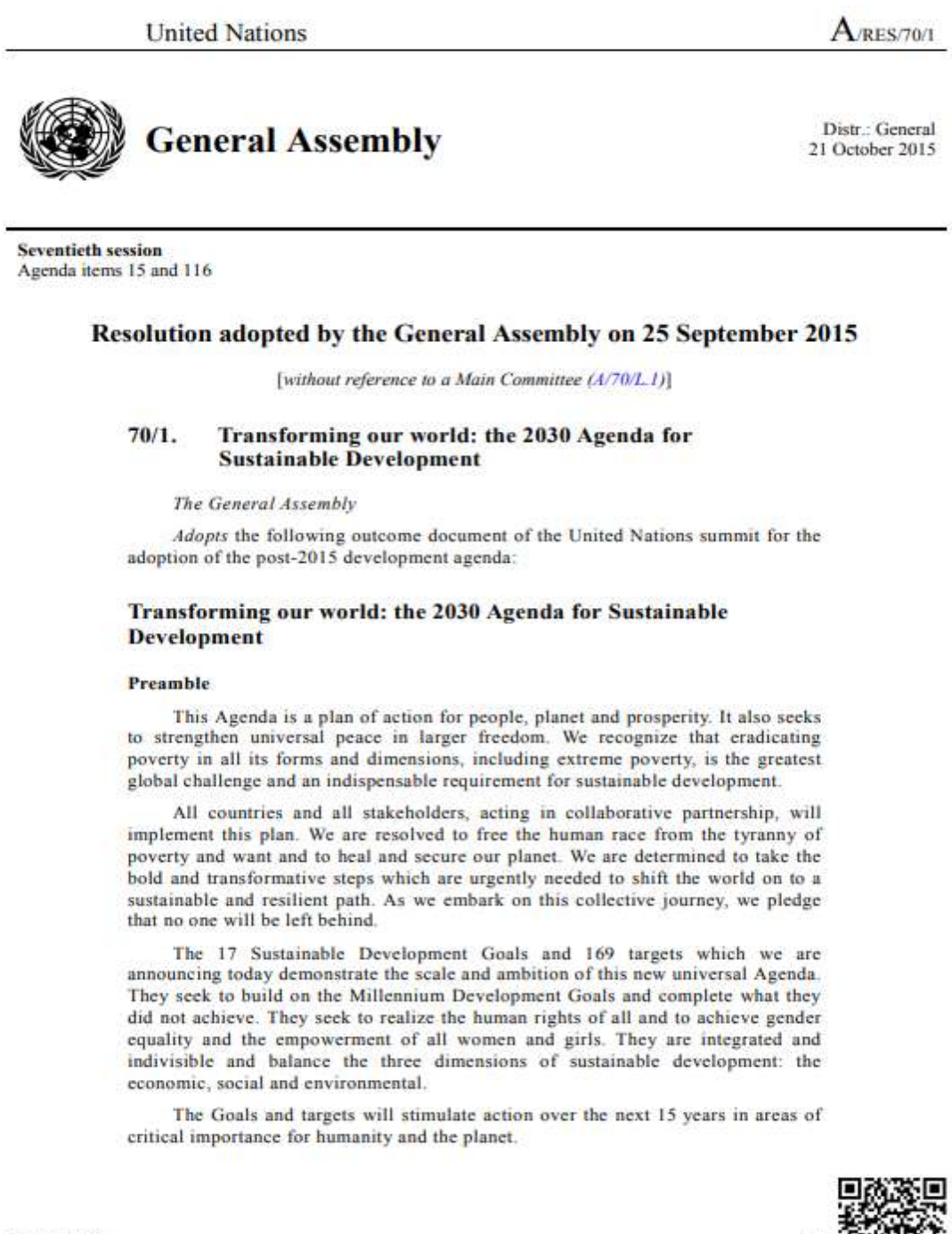
SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS



United Nations A/RES/70/1

General Assembly

Distr.: General
21 October 2015

Seventieth session
Agenda items 15 and 116

**Resolution adopted by the General Assembly on 25 September 2015**

[*without reference to a Main Committee (A/70/L.1)*]

**70/1. Transforming our world: the 2030 Agenda for Sustainable Development**

*The General Assembly*

*Adopts* the following outcome document of the United Nations summit for the adoption of the post-2015 development agenda:

**Transforming our world: the 2030 Agenda for Sustainable Development**

**Preamble**

This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development.

All countries and all stakeholders, acting in collaborative partnership, will implement this plan. We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind.

The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what they did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

The Goals and targets will stimulate action over the next 15 years in areas of critical importance for humanity and the planet.

# Transforming our world: the 2030 Agenda for Sustainable Development

(So called, SDGs)

The outcome documents of the United Nations summit adopted by the General Assembly on 25 September 2015

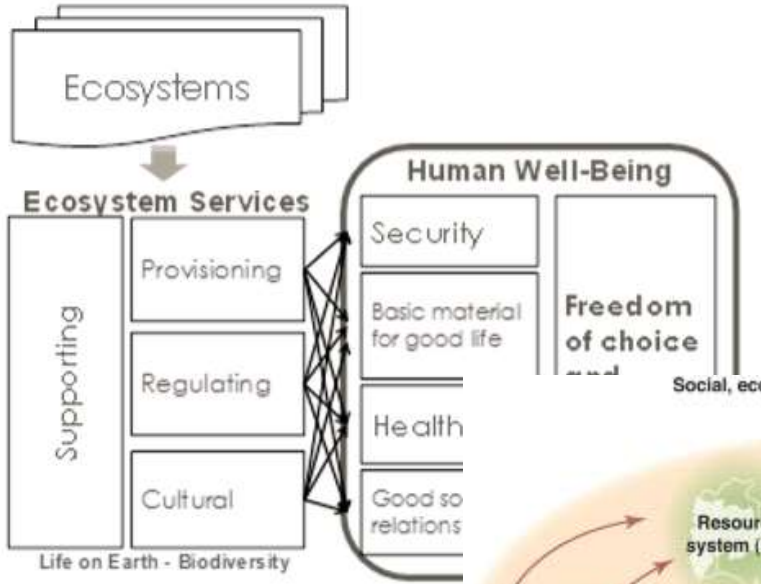
# Transforming our world: the 2030 Agenda for Sustainable Development (SDGs. )

- Declaration: “We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. We are committed to achieving sustainable development in its three dimensions — economic, social and environmental — in a balanced and integrated manner.”

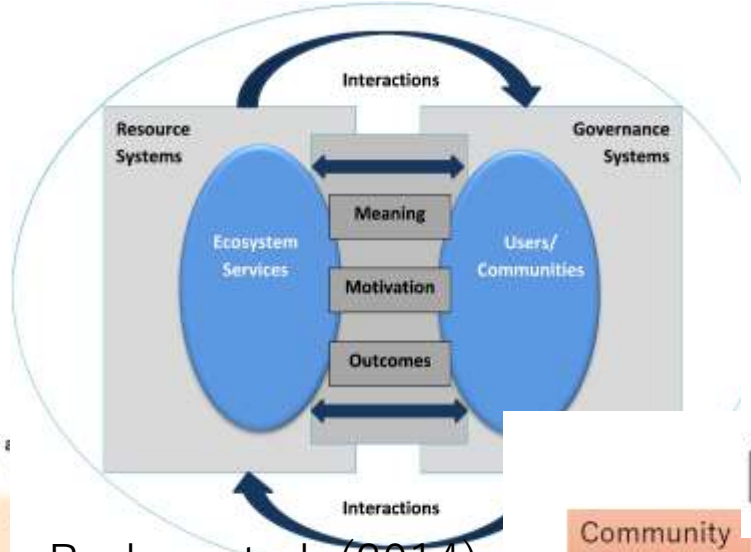
# Why in these three dimensions?
# (Economic, Social, and Environmental )

- The good natural scientific arguments for management actions are sometimes not accepted or implemented because of the perceived socio-economic or cultural costs.
- we need "realistic" arguments to achieve SDGs in the society.
- In order to do that, "integrated understanding" about how ecosystem changes affect human social systems, and vice versa, is necessary.

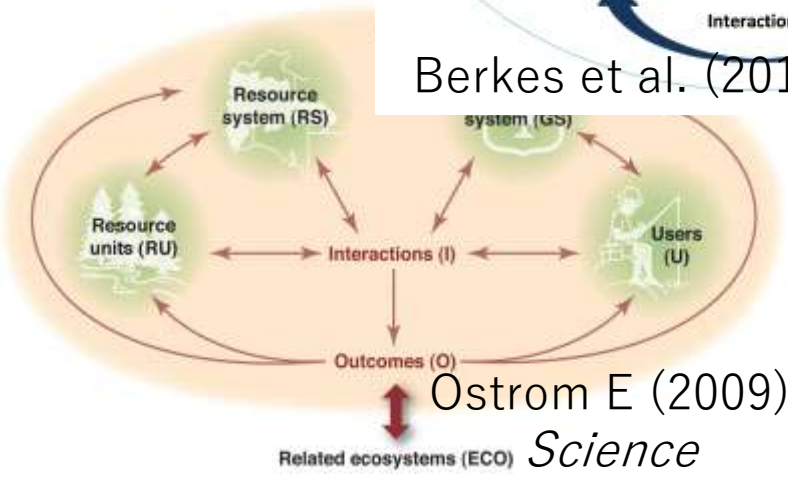
# Conceptual models for “integrated understanding”



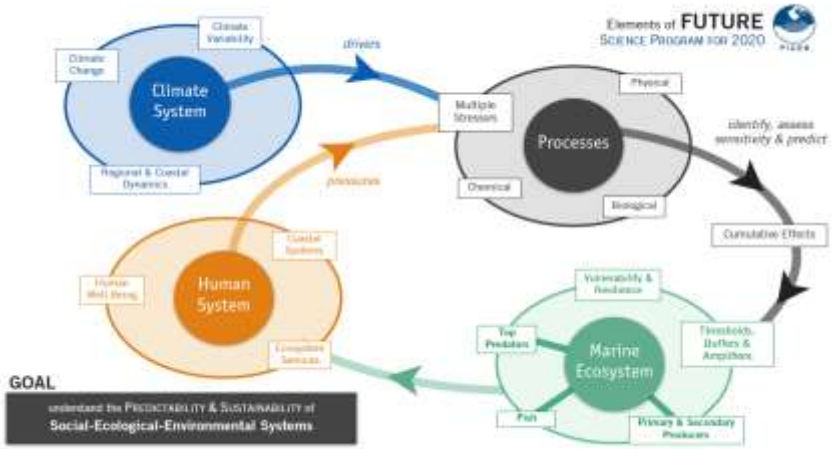

Millennium Ecosystem Assessment (2005)



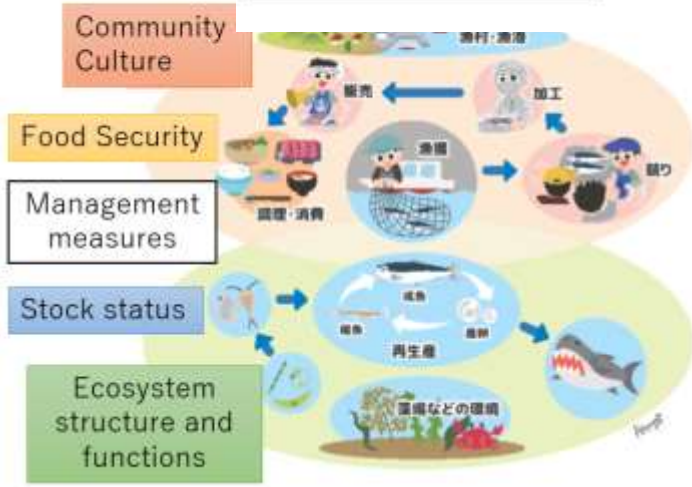

Berkes et al. (2014)




Ostrom E (2009) *Science*




PICES FUTURE (2019)




Recognition that Ecological Systems and Human Systems as dimensions of a Greater Whole (Perry 2010)

- Deep and sharp understandings about the physical /chemical/biological processes, material circulation, energy circulation, their diversities, interactions and dynamics, etc. are, of course, indispensable (No natural science, no ocean science!)

- In addition, we need other scientific approaches(social sciences, arts & humanities, etc.) to understand the mechanism/dynamics of the social systems, and their interactions with ecological systems.

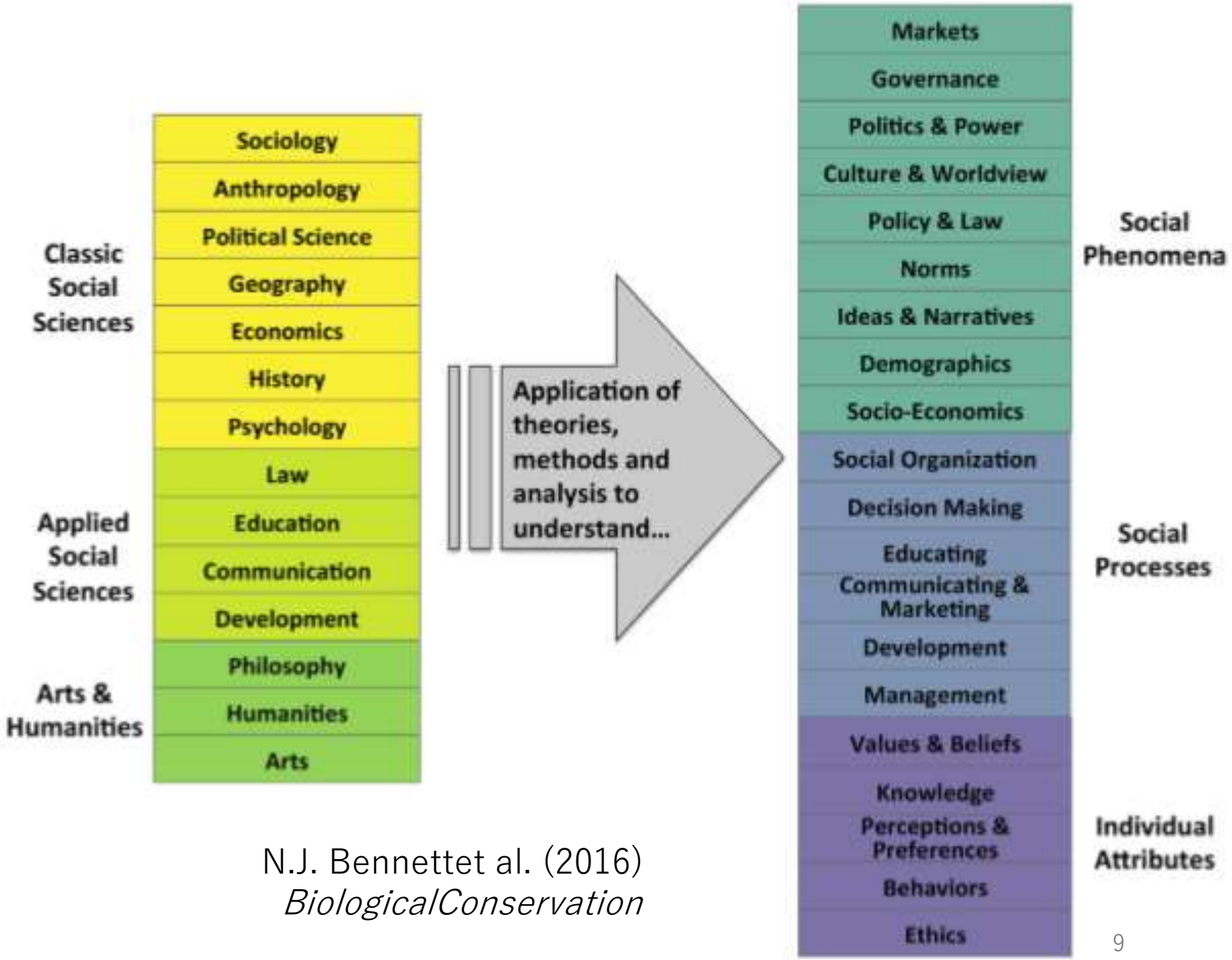
**Multiple disciplinary Approach is needed.**

# Definition of “Ocean Science” by UNESCO
## 2017 Global Ocean Science Report

“…all research disciplines related to the study of the ocean: physical, biological, chemical, geological, hydrographic, health, and social sciences, as well as engineering, the humanities, and multidisciplinary research on the relationship between humans and the ocean….”

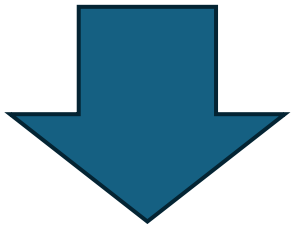
# The social science disciplines

(incl. Arts and Humanities)

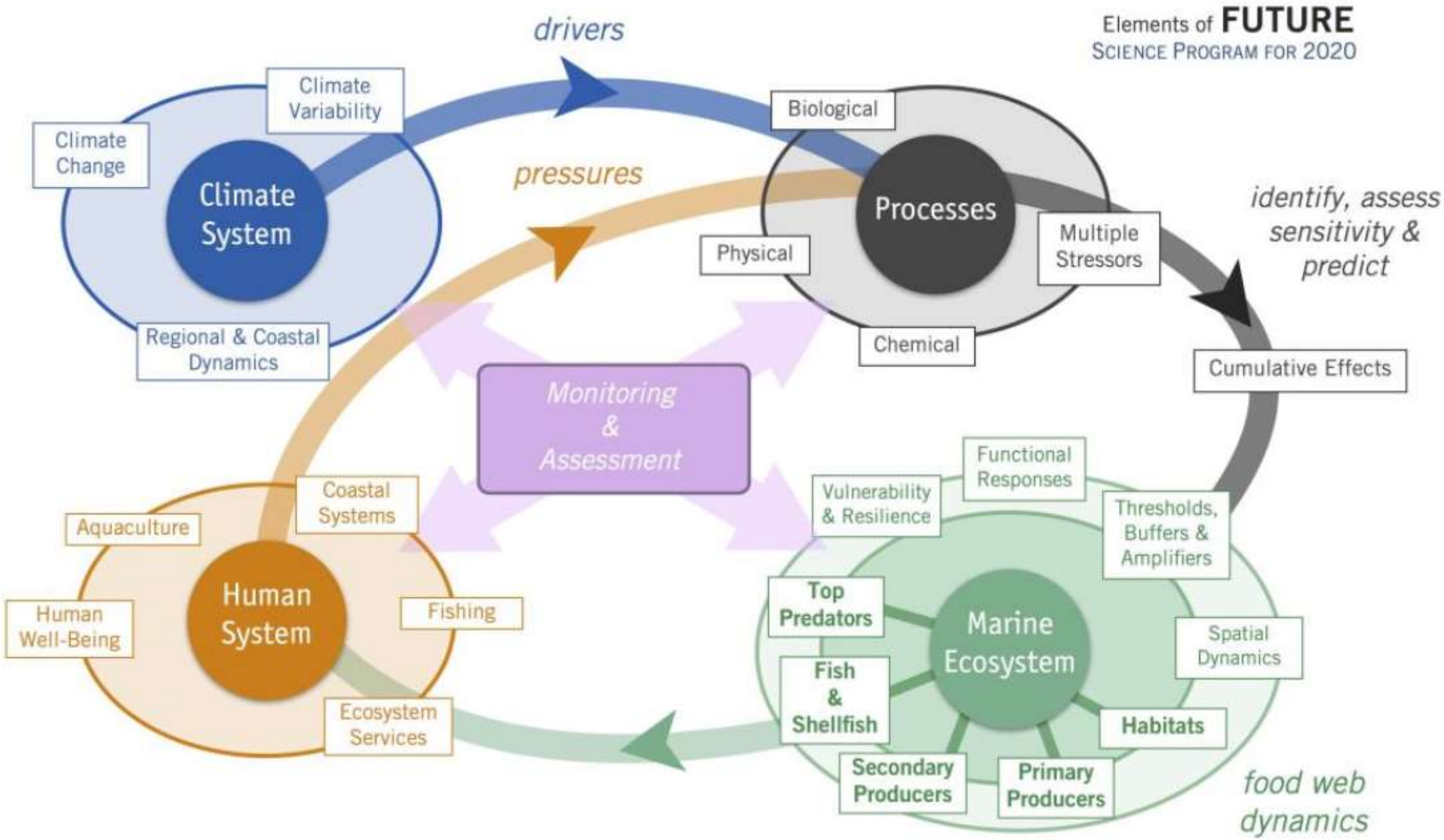



N.J. Bennettet al. (2016)
*BiologicalConservation*

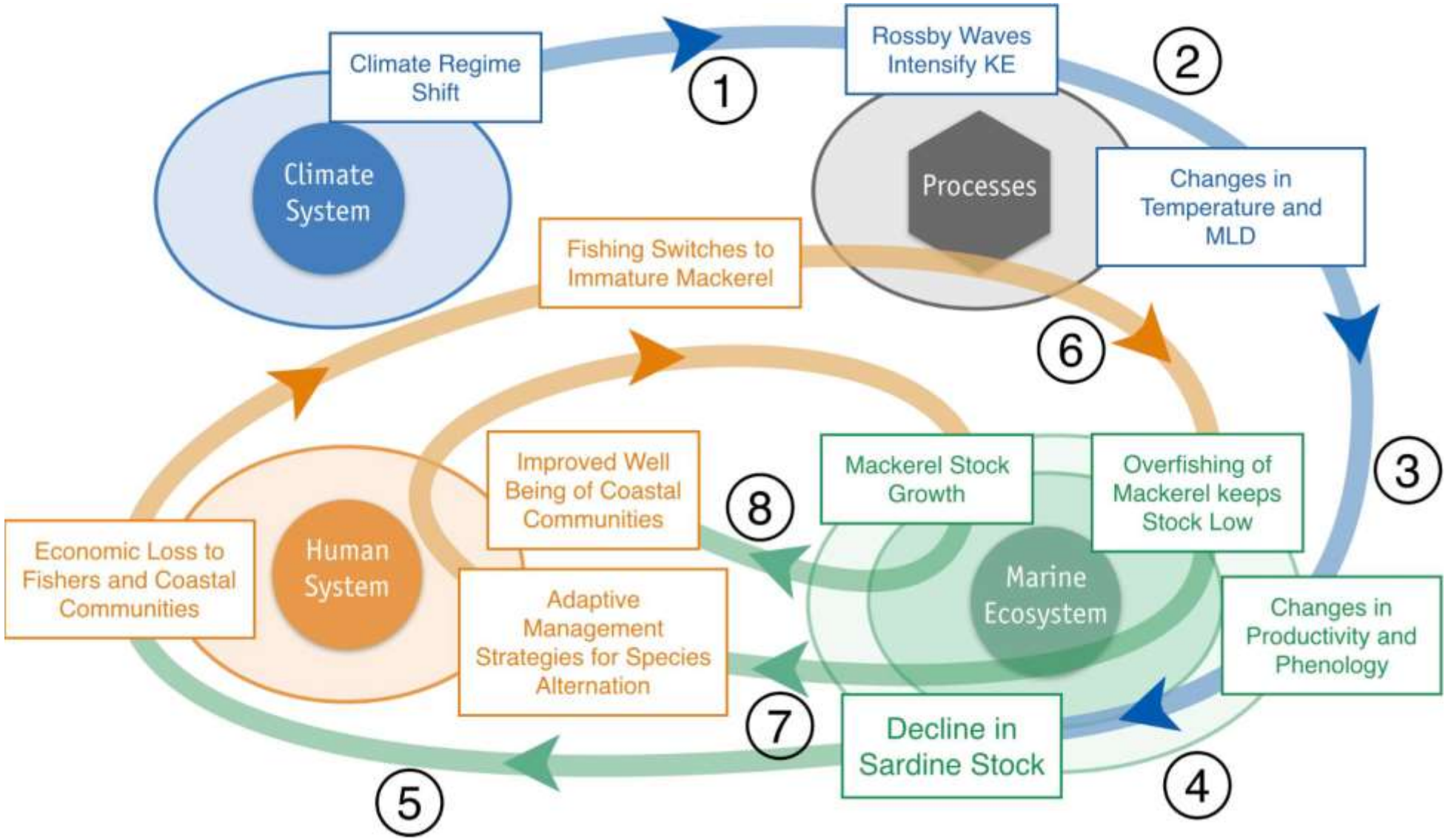
How can we integrate these variety of disciplines/methodologies?



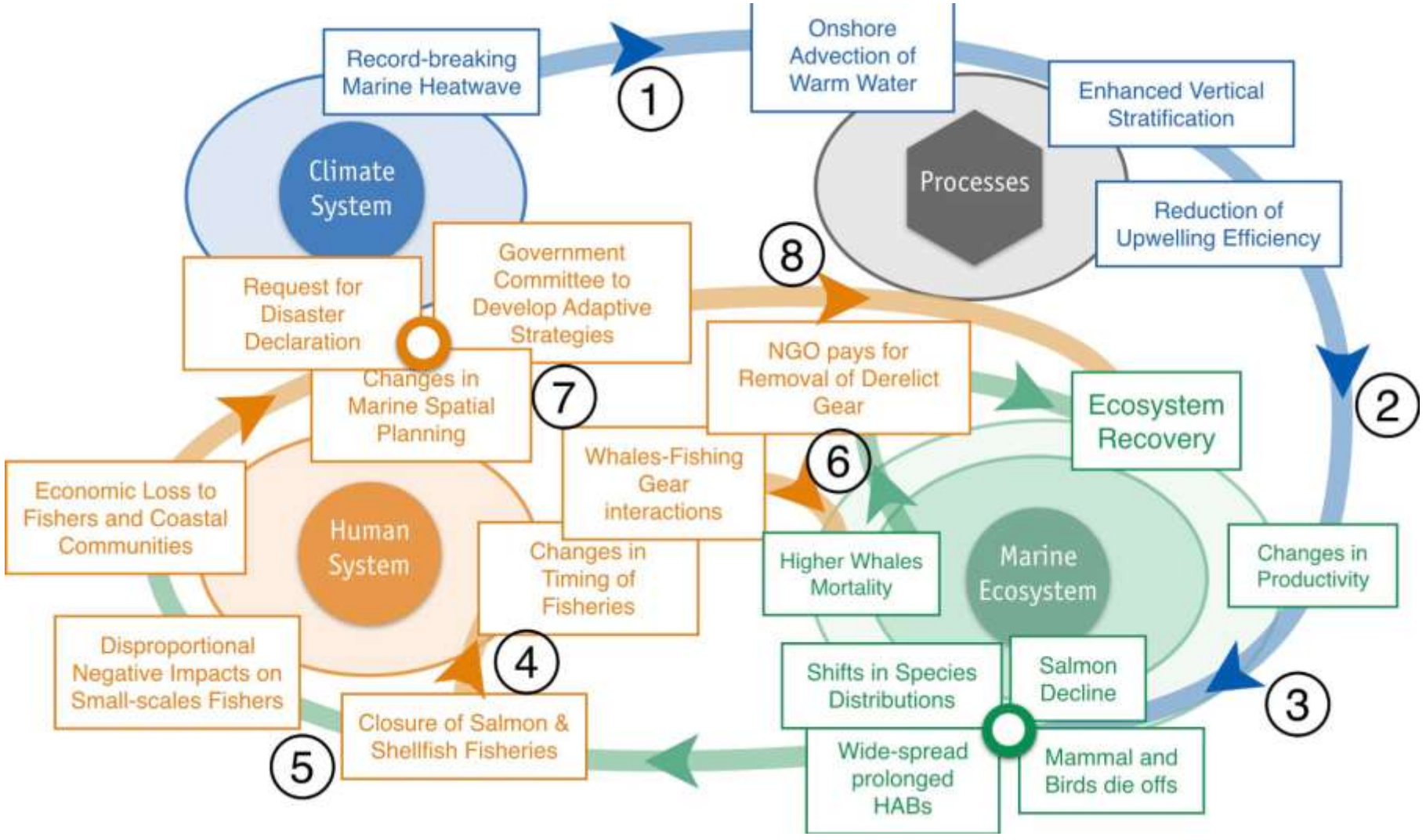
PICES's
Social-Ecological-Environmental System (SEES) Framework

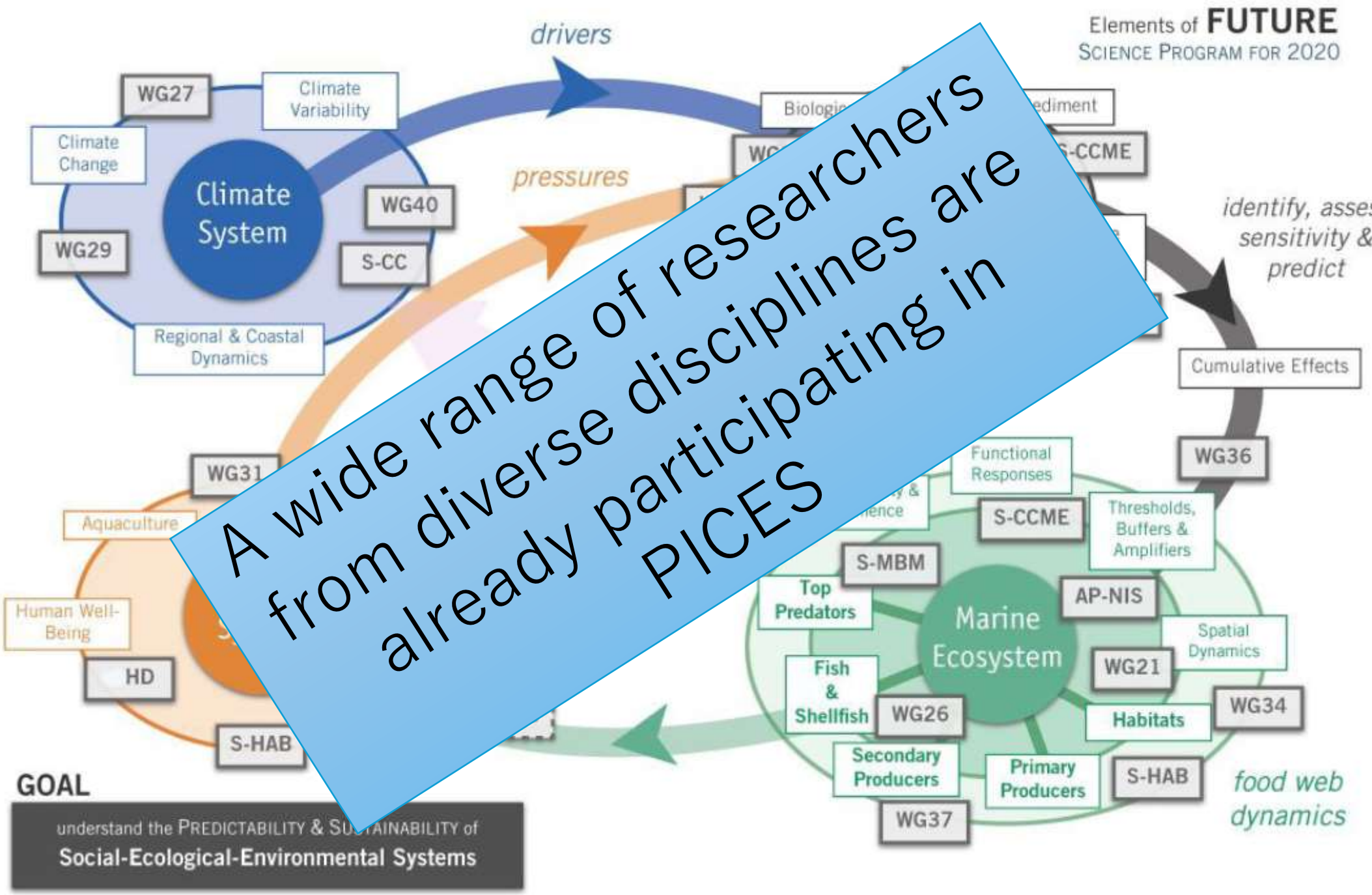

Elements of FUTURE
SCIENCE PROGRAM FOR 2020
drivers
Climate Variability
Climate Change
Climate System
Regional & Coastal Dynamics
pressures
Biological
Processes
Physical
Chemical
Multiple Stressors
identify, assess sensitivity & predict
Cumulative Effects
Monitoring & Assessment
Functional Responses
Vulnerability & Resilience
Thresholds, Buffers & Amplifiers
Top Predators
Marine Ecosystem
Spatial Dynamics
Fish & Shellfish
Habitats
Secondary Producers
Primary Producers
food web dynamics
Coastal Systems
Aquaculture
Human System
Fishing
Human Well-Being
Ecosystem Services

# FUTURE SEES case study 1:
# Species alternation in the western Pacific.



# FUTURE SEES case study 2: Ecosystem impact of a marine heat wave (The Blob) in the eastern Pacific.






A wide range of researchers from diverse disciplines are already participating in PICES

# You can find more examples from a paper published by FUTURE SSC

- Case study 3: Jellyfish blooms in the western Pacific
- Case study 4: Warming and distributional shifts in highly migratory species

In Bograd S et al. (2019) Developing a Social–Ecological–Environmental System Framework to Address Climate Change Impacts in the North Pacific. *Front. Mar. Sci.* 6.

(You can download it from FUTURE webpage)

This afternoon, we will see **new case studies** using SEES framework. **Stay tuned!**

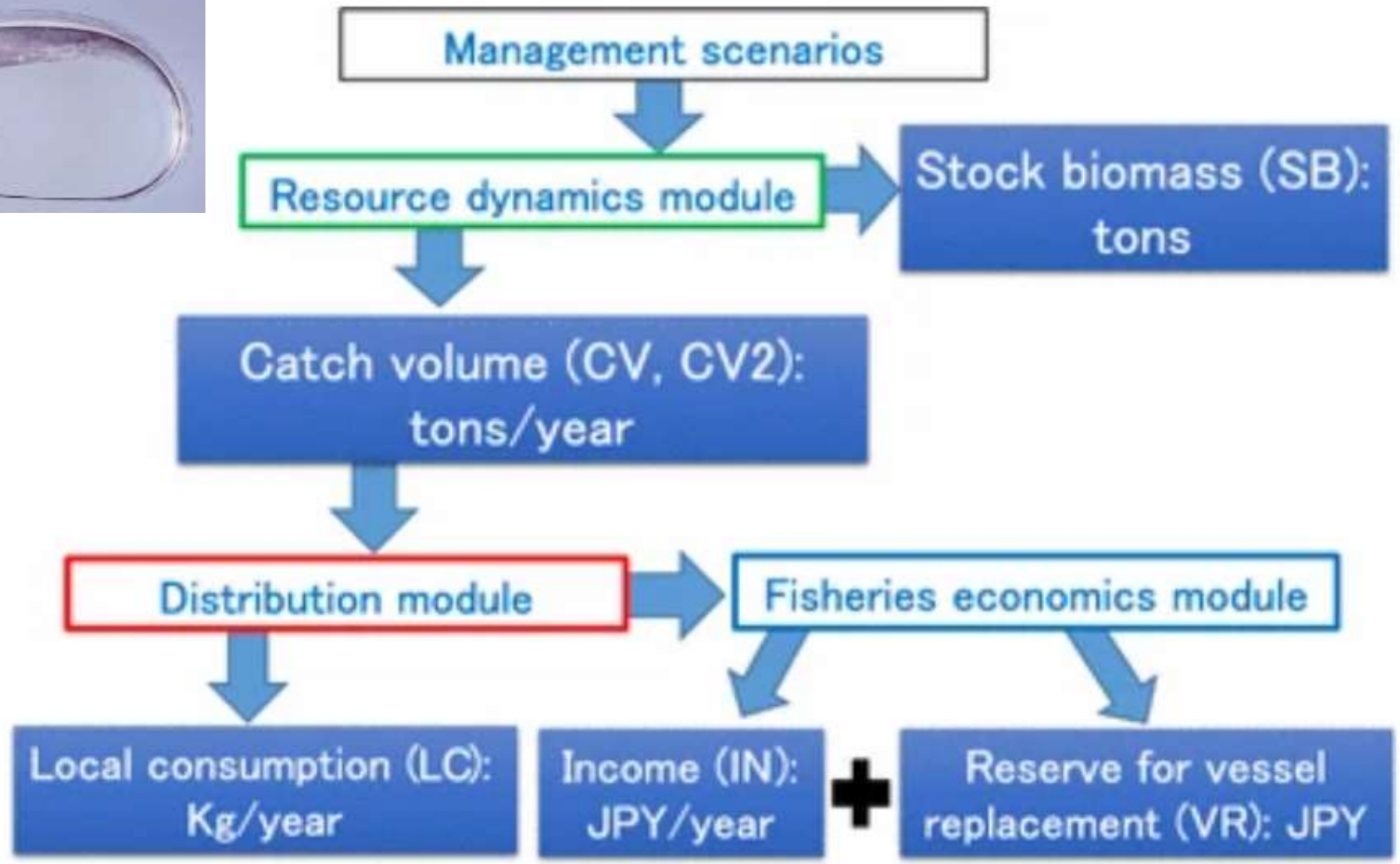
# Please use SEES framework for the future of PICES (esp. by ECOP)

- Researchers from different disciplines, especially natural and social scientists, can collaboratively conceptualize real-world complex problems and identify analytical methodologies or disciplines needed to conduct **Multi-disciplinary researches**.

- It will be a platform to create a common understanding, not only within academia, but also with wide **stakeholders** such as policy makers, industries, env.NGOs, etc. to **co-design Trans-disciplinary research** projects.

**“Actionable Science”**

# My experience: Co-design of operating model with hairtail (*Trichiurus japonicus*) fishers and stakeholders




Makino et al. (2017) *Fisheries Science,* 83: 853-864

Fishers willing to collected data and helped interpretation of model results

The result was adopted and implemented by fishers and local gov.

# Summary

- We need the balance among environmental, social and economic aspects.

- In order to analyze this balance, we need the multiple disciplines researching together. Ecological and Social Systems are dimensions of the greater whole.

- The PICES's SEES framework is a useful platform to create a common understanding and **co-design**, not only within academia, but also with wide stakeholders. This is a key for "**Actionable Science**".

## The more, the merrier

**Let's enjoy science together with society!**

# Some examples of the Human Dimension topics

1. Definition of “Fisheries Resources”

2. Value system for marine ecosystem services

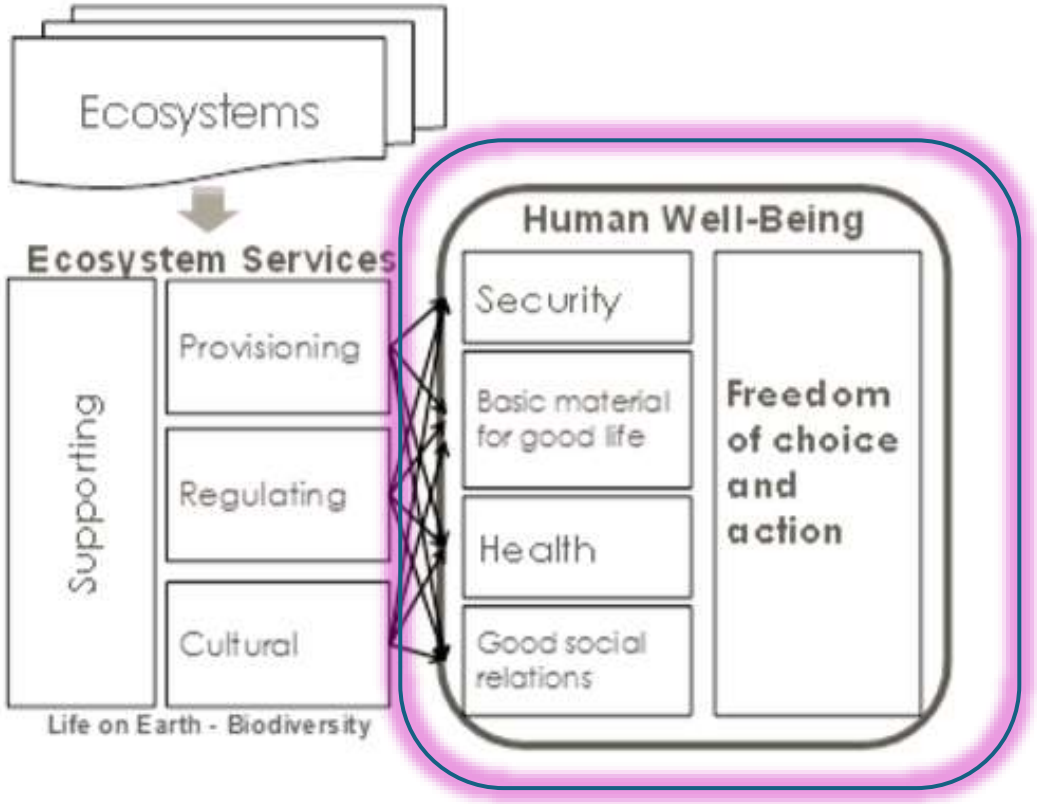
3. Important ocean-related Issues in Australia, France, Japan & USA (“Ocean We Want” global survey project by PICES/ICES)

# 1. Definition of the resources (Zimmermann 1933)

- Natural resources are not fixed things. Their meaning and value evolves as humans develop the scientific and technical knowledge to transform them into useful commodities in the society and as humans ascribe intrinsic value to them



# 2. Value system for marine ecosystem services

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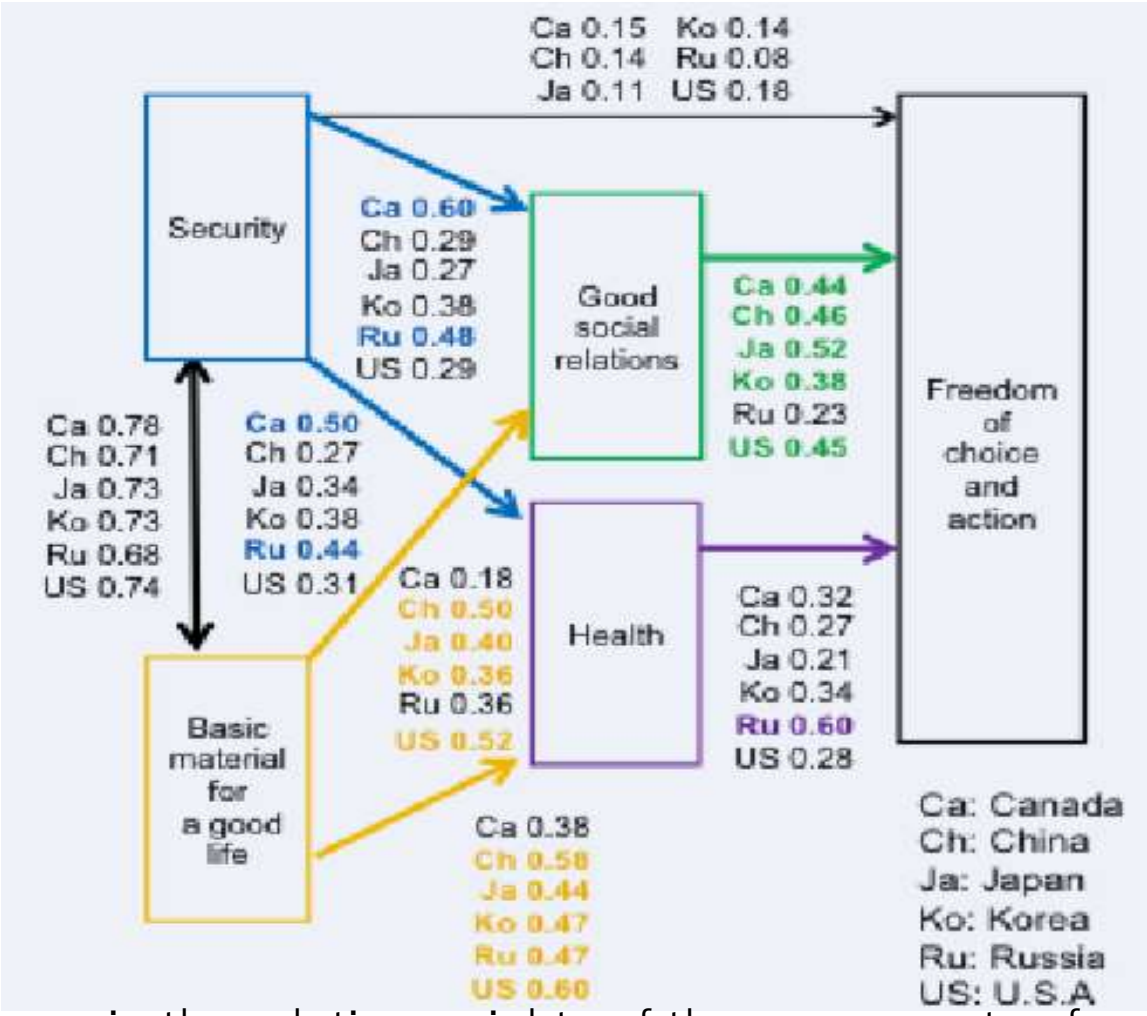
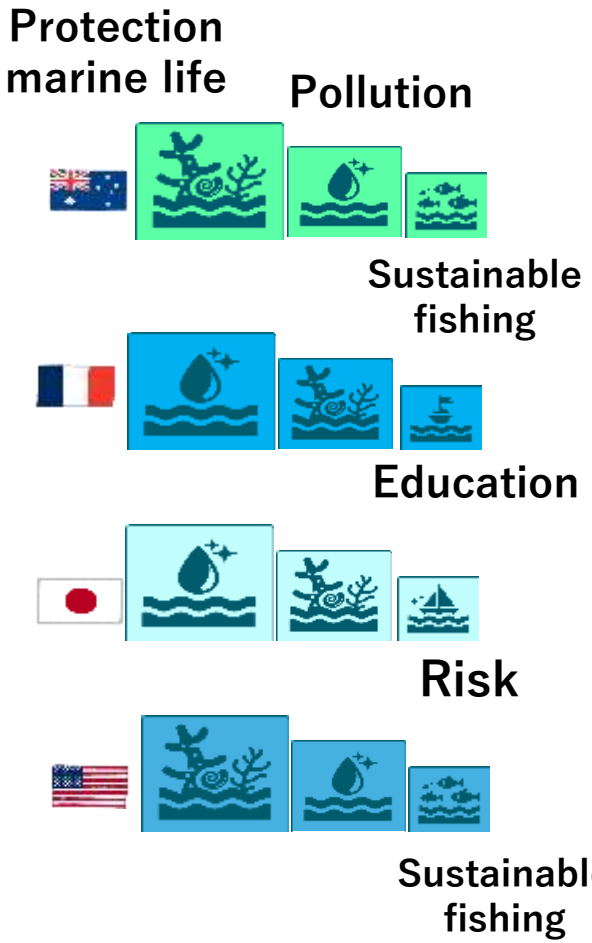



Differences in the relative weights of the components of Human Well-being (Hori and Makino 2018 *Marine Policy*)

# 3. Important ocean-related Issues in Australia, France, Japan & USA

## ("Ocean We Want" global survey project by PICES/ICES)




| Issues to prioritize | Ocean outcome(s) | ALL | Australia | Japan | USA | France |
|---|---|---|---|---|---|---|
| Reducing marine pollution | A clean ocean | 73.2% | 77.1% | 69.0% | 70.9% | 75.7% |
| Minimizing negative impacts from ocean-related tourism | A healthy and resilient ocean | 56.5% | 65.5% | 41.8% | 59.3% | 59.3% |
| Ensuring sustainable commercial harvesting of marine life (like fish and seagrass) in the ocean is sustainable | A productive ocean | 62.8% | 72.7% | 45.5% | 65.7% | 67.3% |
| Protecting marine life from extinction | A healthy and resilient ocean | 72.9% | 78.1% | 64.9% | 73.3% | 75.1% |
| Ensuring people have access to the ocean and its resources | An accessible ocean | 44.9% | 55.2% | 30.8% | 52.0% | 41.5% |
| Increasing clean energy (wind, solar, wave, and geothermal) in the oceans | A productive ocean | 58.5% | 66.1% | 53.3% | 61.3% | 53.4% |
| Protecting ocean-related tourism and recreation opportunities | A safe ocean | 43.6% | 56.1% | 23.9% | 48.2% | 46.0% |
| Ensuring safety of shipping and transportation vessels | A safe ocean | 55.7% | 63.4% | 48.9% | 58.7% | 51.6% |
| Developing ocean-based business opportunities | A productive ocean | 36.6% | 45.1% | 24.8% | 39.7% | 36.8% |

(Lew et al. in prep.)