

SECTION 6.3

ESTIMATION METHODS – INPUT, STOCK, RESOURCE, OUTPUT

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Estimation methods – Output

$$\boxed{\text{Output/production}} = \boxed{\text{Productivity}} \times \boxed{\text{Frame quantity}}$$

Harvest / cultured area	Total cultured area
CPUE	Efforts (active vessel days)

- Data evaluation:
 - Shape of data distribution
 - Stratification assumption
- Post-survey adjustment:
 - Post-survey data stratification
 - Transformation
 - Different analytical approach



Estimation methods – Aquaculture inputs, stock

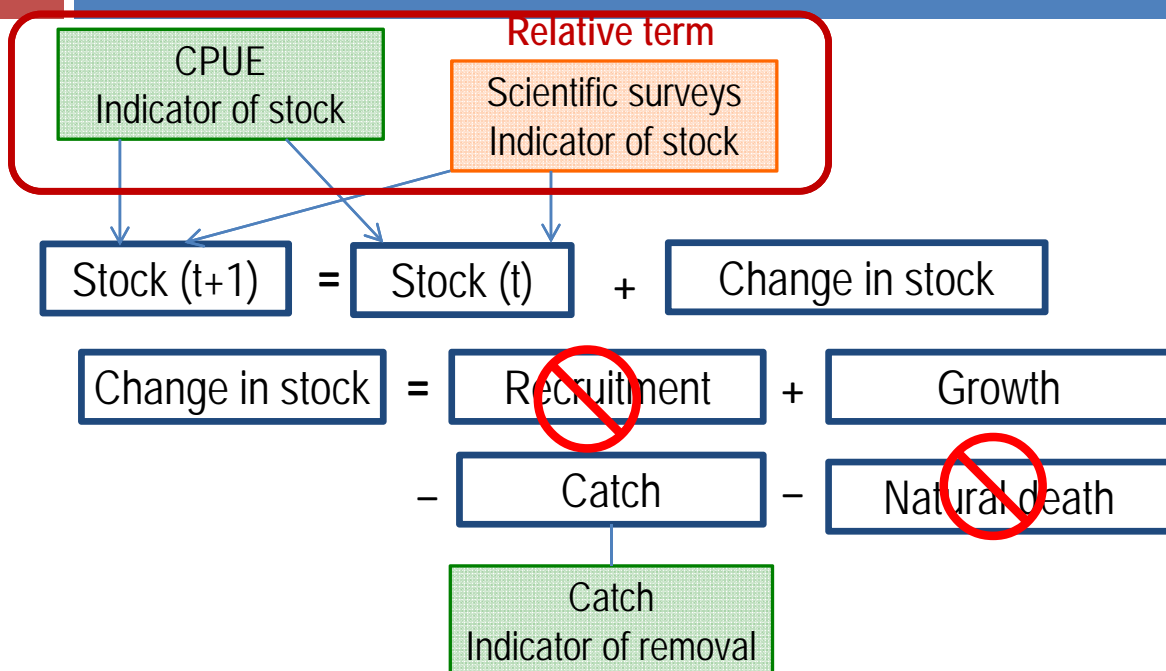
$$\boxed{\text{Target statistics}} = \boxed{\text{Unit ratio}} \times \boxed{\text{Frame quantity}}$$

Same principle applicable for some core statistics

- Aquaculture inputs (seeds, feeds, chemical, water)
- Aquaculture stock
- Other social, economic, and environmental data >>
 - Frame (census) survey (incl. sampling approach)
 - Supplementary dedicated surveys (e.g. price, cost of production)
 - Scientific surveys (natural environment, biology)

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Estimation method – fish resource



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How to cover whole data needs?

Ecosystem Approach of management, SDGs, Blue Growth Initiatives
> demanding more data

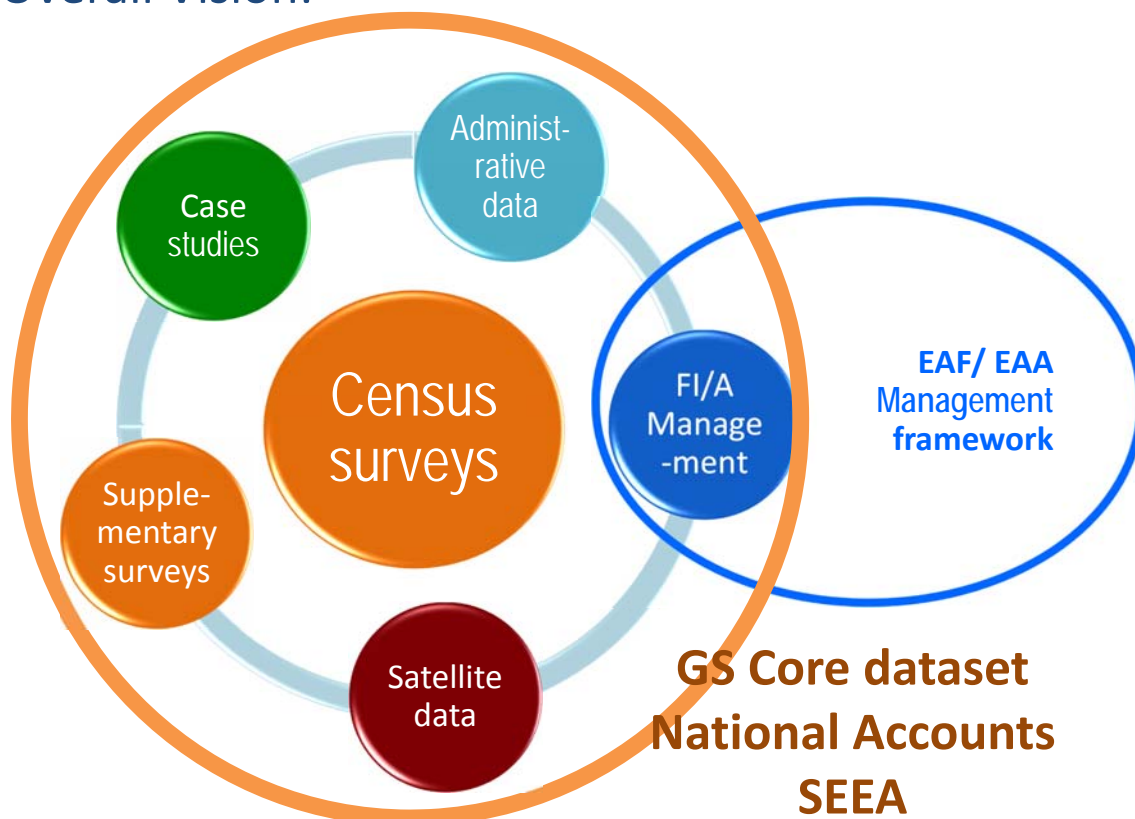
Requirements too high, available resources too limited

>> integration of multiple sources information

- Global Strategy -- Master sampling framework
 - Survey schedule – stay as the same
 - Coverage – extend to include fishery and aquaculture
- Non-statistical/ analytical linking of information to produce required indicators
 - Survey efforts allocation according to priority area
 - Full utilization of existing information

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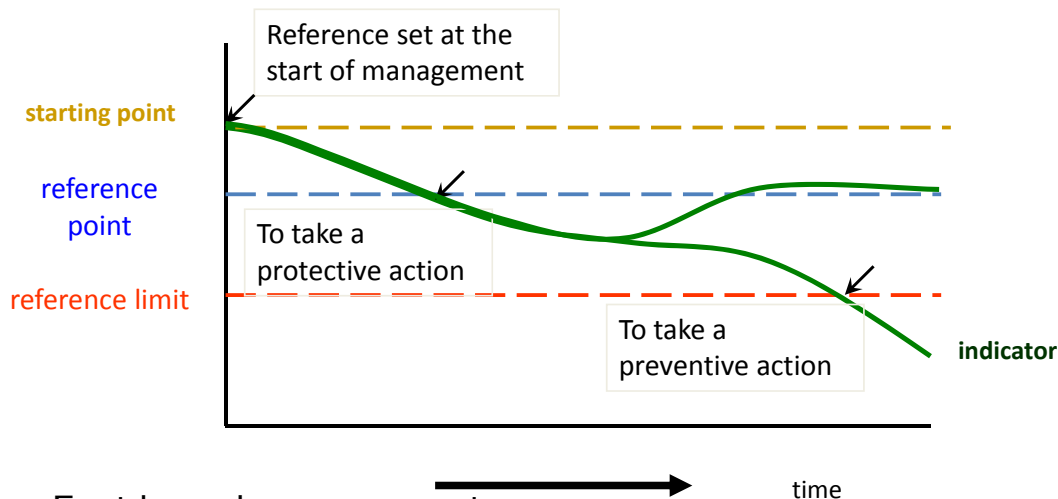
Overall Vision:



Is it really necessary to cover all data needs? – Ecosystem Approach of management

- targeting toward long-term sustainability of healthy ecosystem:
 - To pass all benefits to the next generations
 - Fishing community, so its livelihood, food security, is part of ecosystem
- type of risk management – “Adaptive management”:
 - Prepare a plan of monitoring risks and corresponding actions when risks are detected
- can be extremely simple, or can be very complex
- broadly accepted (e.g. mitigation and adaptation of climate change impacts)

Is it really necessary to cover all data needs? – Ecosystem Approach of management



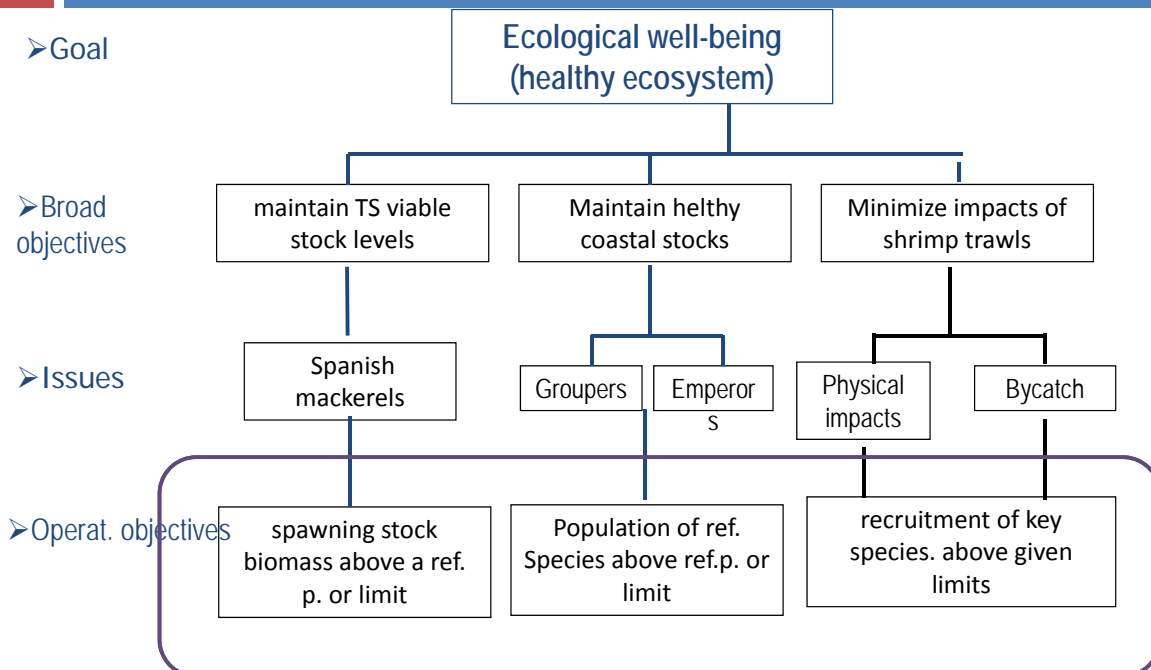
- Fact-based management
 - Agreed indicators/ agreed actions;
- type of risk management – “Adaptive management”:

Monitoring indicators need to describe:

- Pressure/ affecting factors:
 - Status of targets – operational objectives:
 - Factors directly controlled by management procedures – monitoring implementation of management procedures:
 - Response of targets to managements.
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- Support management decision making
 - Track progress towards meeting management objectives
 - Communicate effects of complex impacts and management processes to a non specialist audience
 - Perception that indicators would be a way of dealing with increased complexity

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Hierarchical tree – biological aspects (example)



What information need to collect?

Impacts of fisheries operations to natural resources/ environment:

- Status and changes of operations
- Status and changes of biological environment (targeted and non-targeted components)
- Status and changes of physical environments **Fisheries specific**

Contribution of fisheries sector:

- Food security
- Social aspects (number of people supported by fishery sector)
- Economic aspect (contribution to national GDP)

Impacts from other sectors/ environment:

- Interaction with other sectors (e.g. inputs, outputs, competitions with aquaculture and agriculture)
- Shift and changes of environments supporting fisheries sector (e.g. habitat deterioration, climate changes impacts)

Global Strategy

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Group discussion – Section 6.3:

The current status:

- Final objective: the inland rural population becomes sustainable in their fish food supply.
- Issues:
 - After the construction of hydro-power in the neighboring country, water flow getting less..
- Consider the possible operational objectives and corresponding indicators.

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- G1:
 - Operational objective – find alternative for water supply
 - Introduction of hybrid who can survive with low water
 - Negotiation with hydro power company and affecting villages
 - G2
 - Increase fry fish, small scale farming – diff Dept. monitoring, - measure increase of fish production,
 - balance among trade, production and consumption; ind – loan, for establishment of SSFarm, policy framework for marketing,
 - Active farmers; advocacy
 - G3
 - Intl conference on hydro power, water management, use water in the area needed, farmers – flow