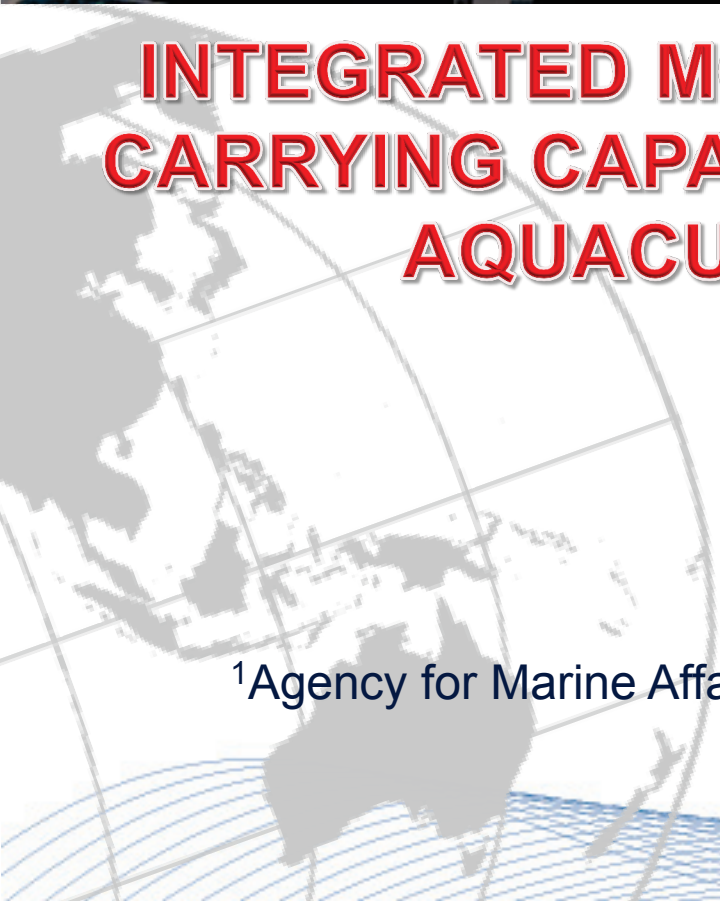




**Workshop on Modeling of Common Water Bodies
Bangkok, 11-12 June 2013**



INTEGRATED MODELING OF AQUACULTURE CARRYING CAPACITY TOWARD SUSTAINABLE AQUACULTURE IN INDONESIA

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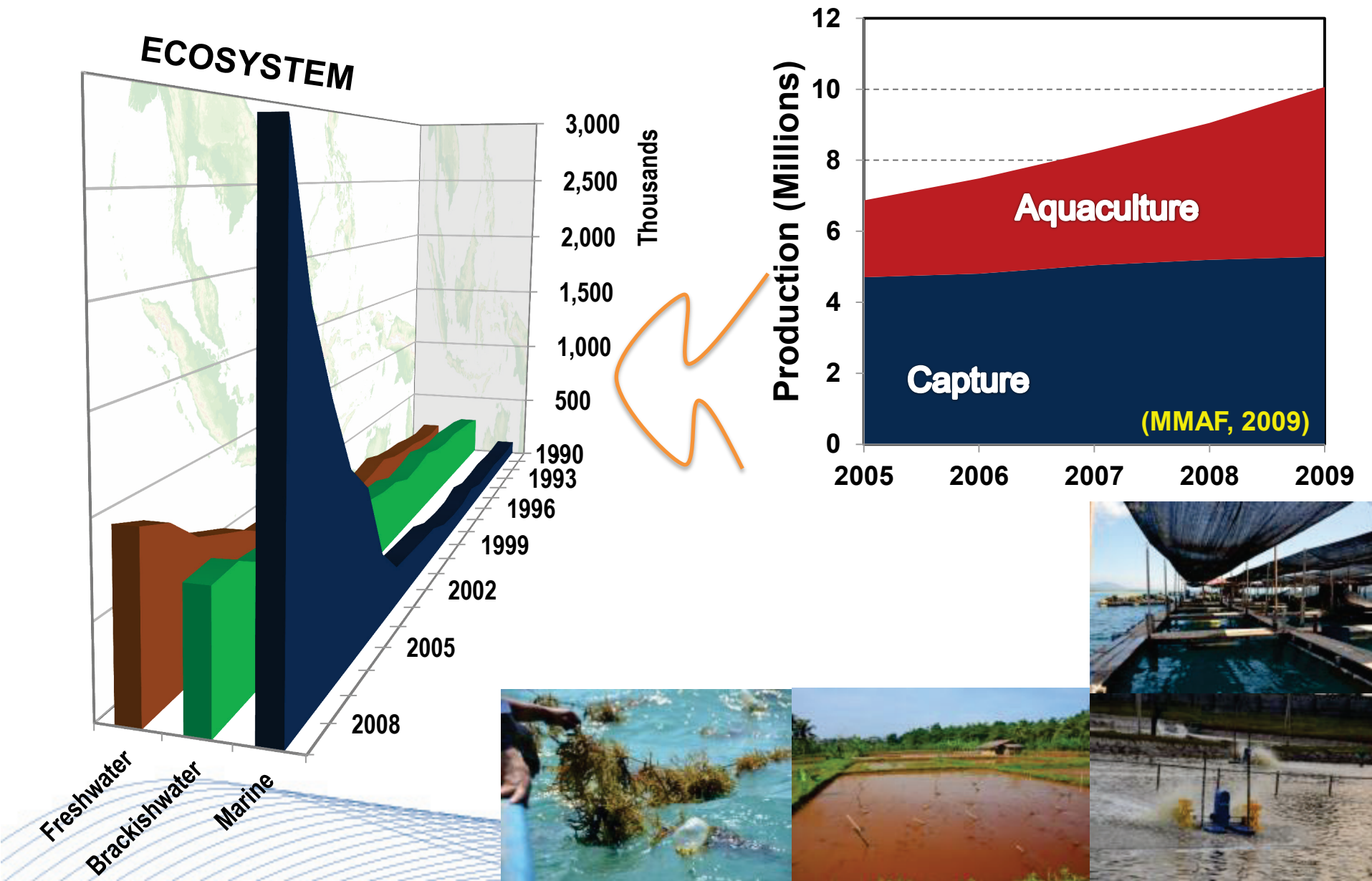
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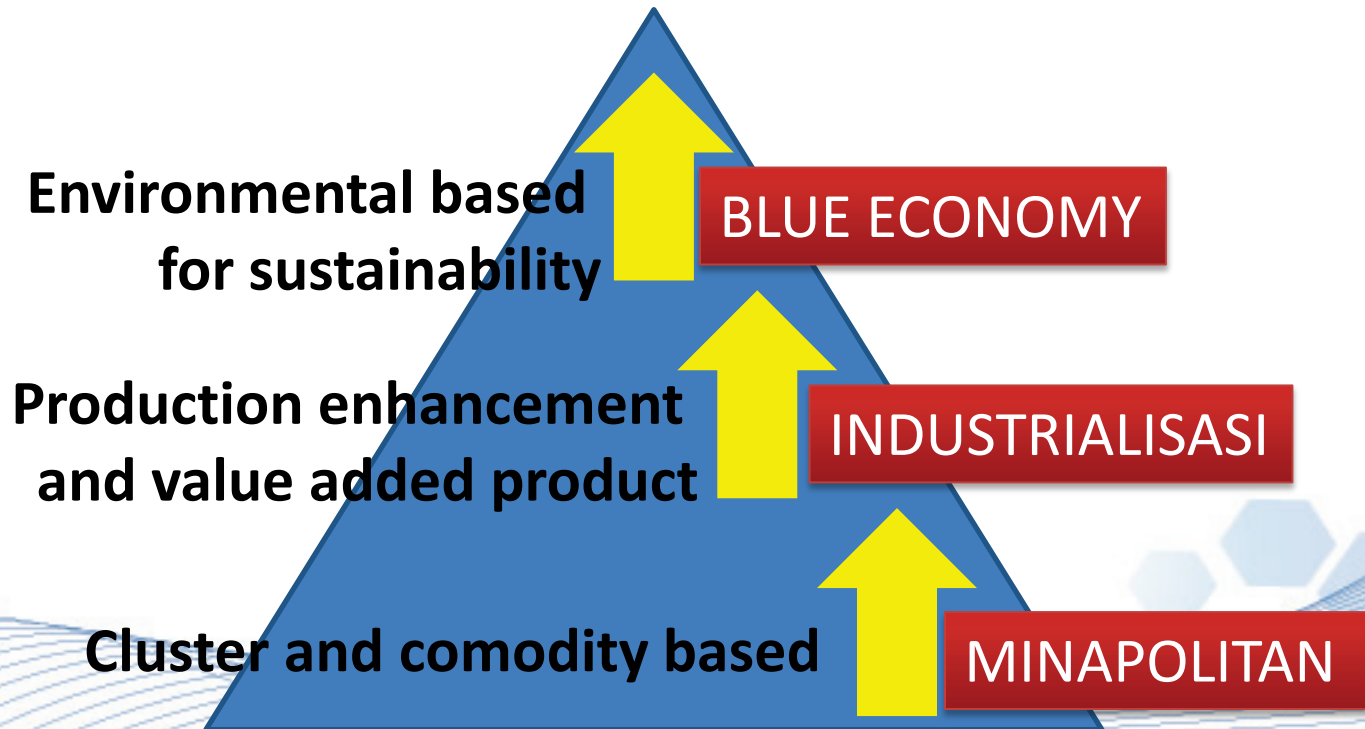
- Indonesia Aquaculture
- Aquaculture Carrying Capacity (ACC)
- Research to support ACC
- Future Perspective

INDONESIAN AQUACULTURE

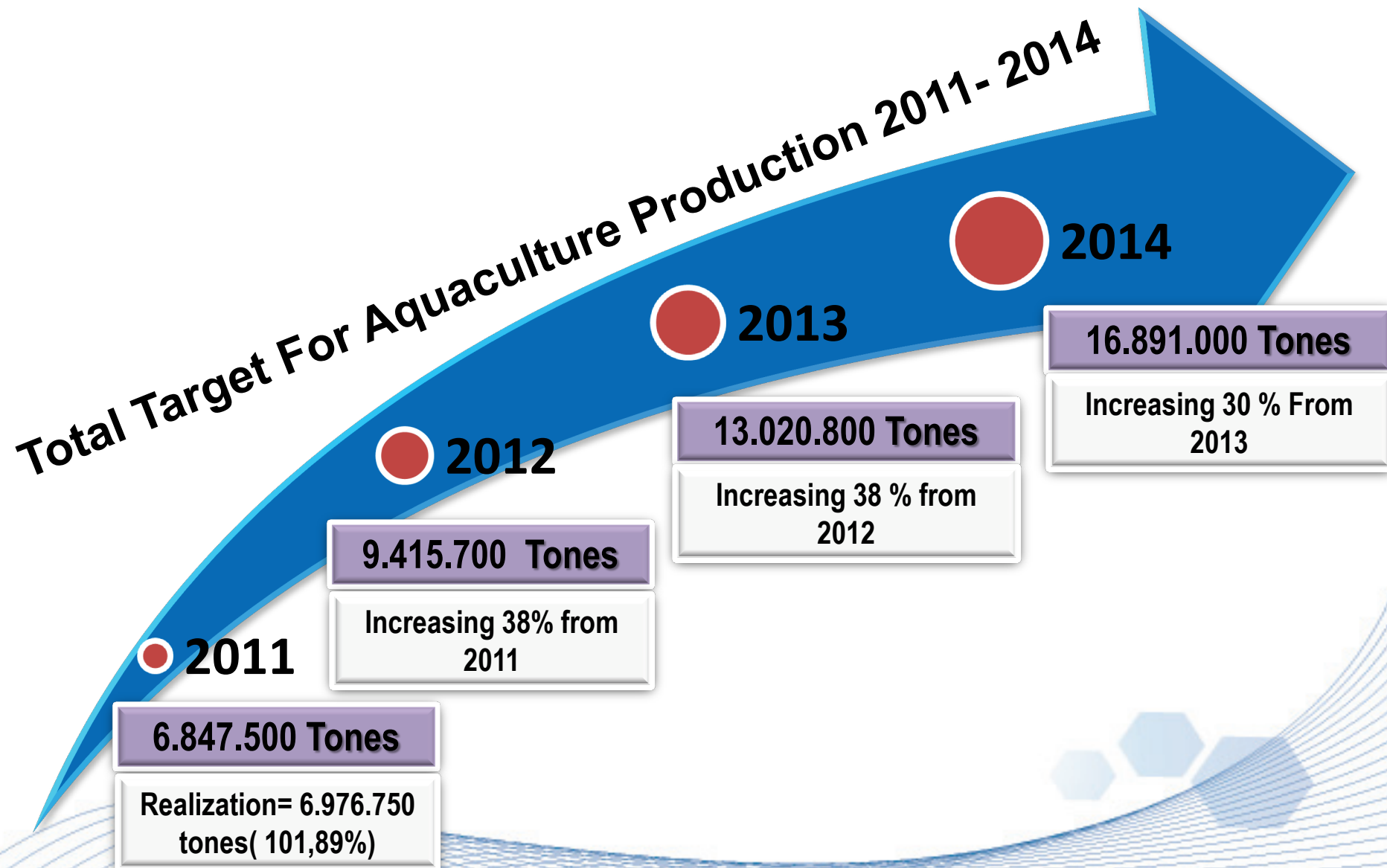


INDONESIAN AQUACULTURE

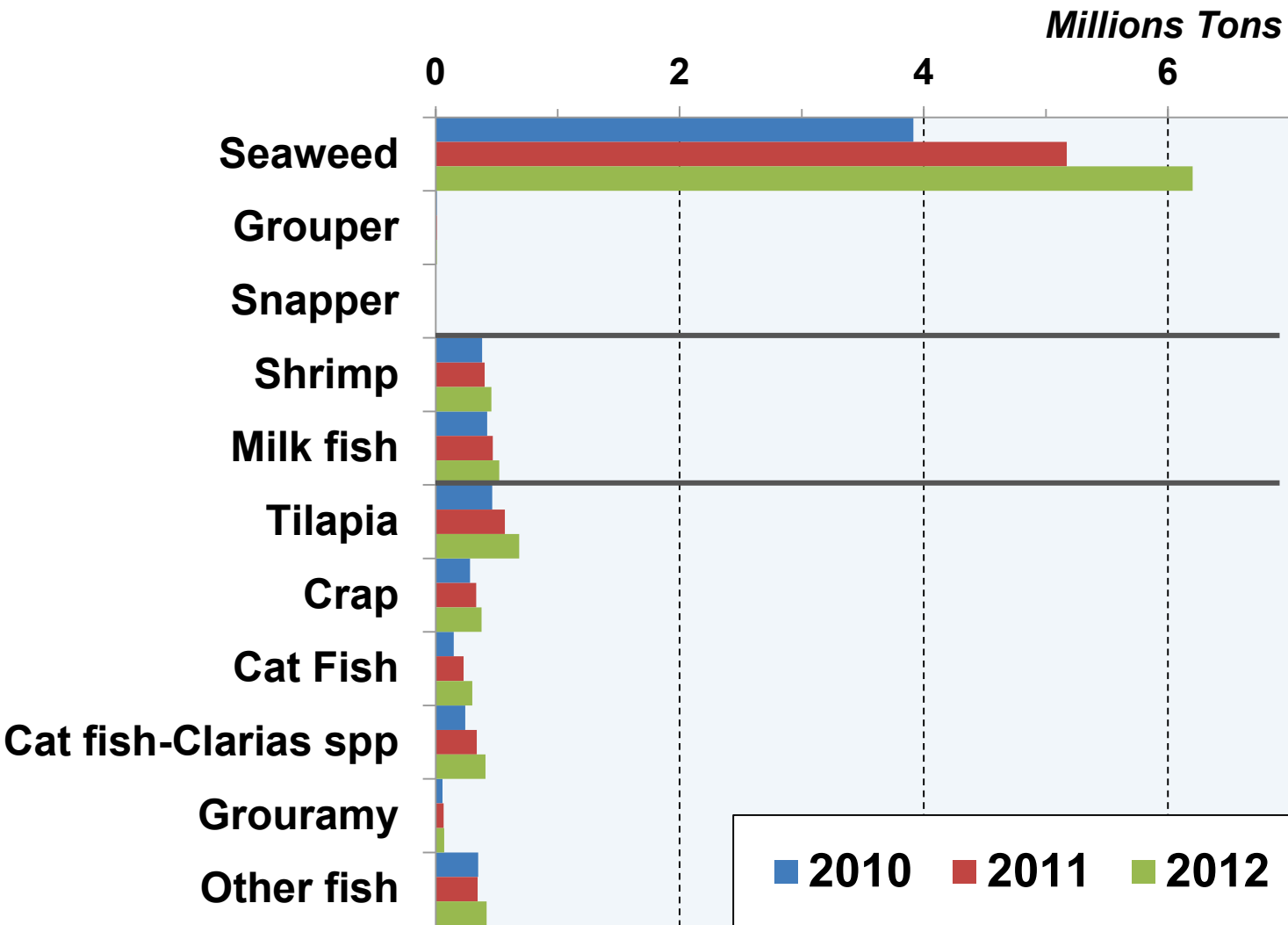
- ❑ Development of aquaculture sector needed a strategic and innovative policies through effective actions as well as look at the recent trend (i.e. environmental aspect; carrying capacity; climate change issues)
- ❑ MMAF Indonesia Program → Enhancement of quantity and quality fisheries and aquaculture products in Indonesia



INDONESIAN AQUACULTURE



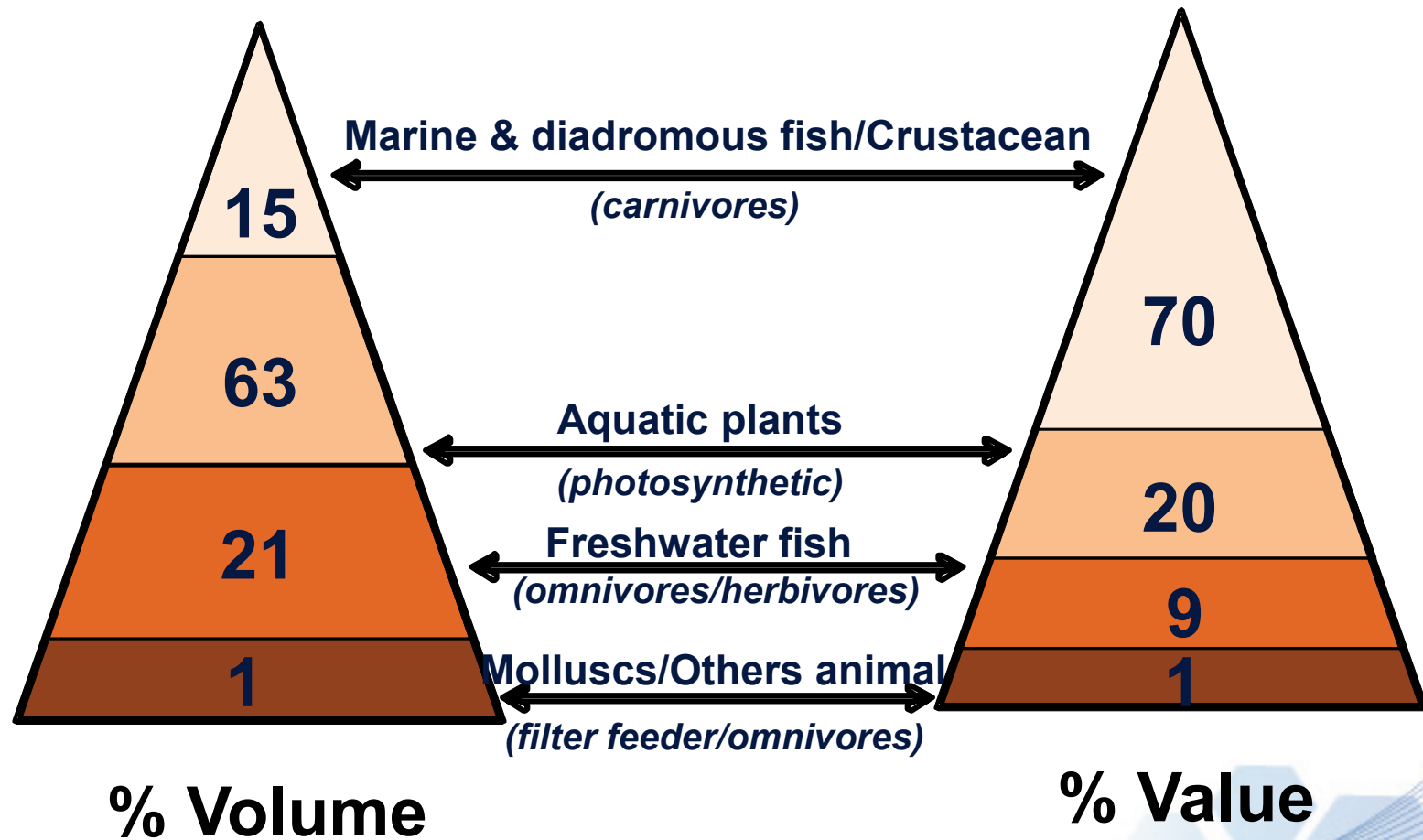
INDONESIAN AQUACULTURE



Aquaculture Production Based on Commodities

INDONESIAN AQUACULTURE

Aquaculture production in 2009



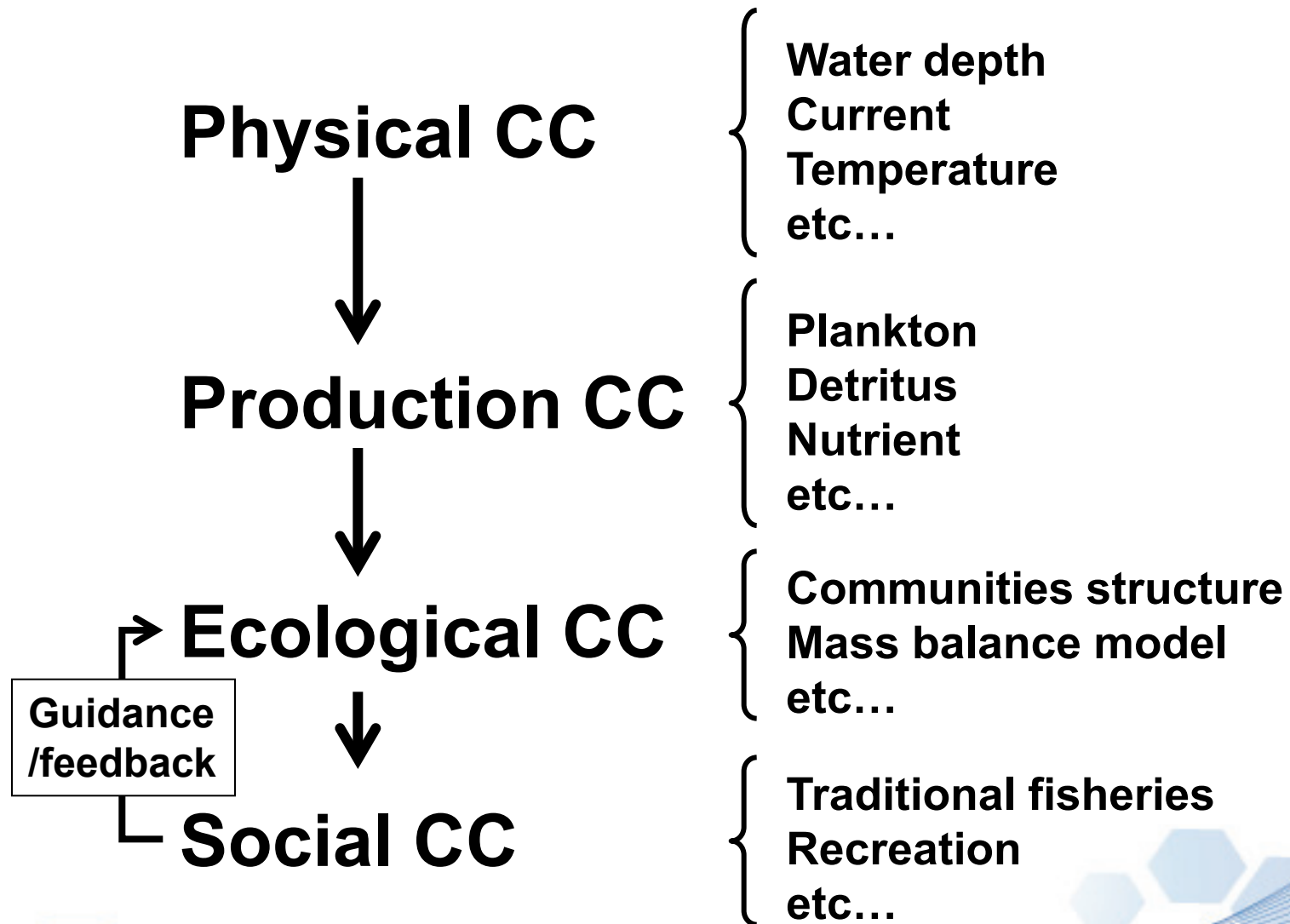
Reanalysis from FAO online database (FAO, 2011)

AQUACULTURE CARRYING CAPACITY

Four generic types of carrying capacity can be applied to aquaculture development (Inglis *et al.*, 2000):

1. **Physical carrying capacity**: the total area of farm that can be accommodated in the available physical space,
2. **Production carrying capacity**: the stocking density of species at which harvests are maximised,
3. **Ecological carrying capacity**: the stocking or farm density which causes unacceptable ecological impacts,
4. **Social carrying capacity**: the level of farm development that causes unacceptable social impacts.

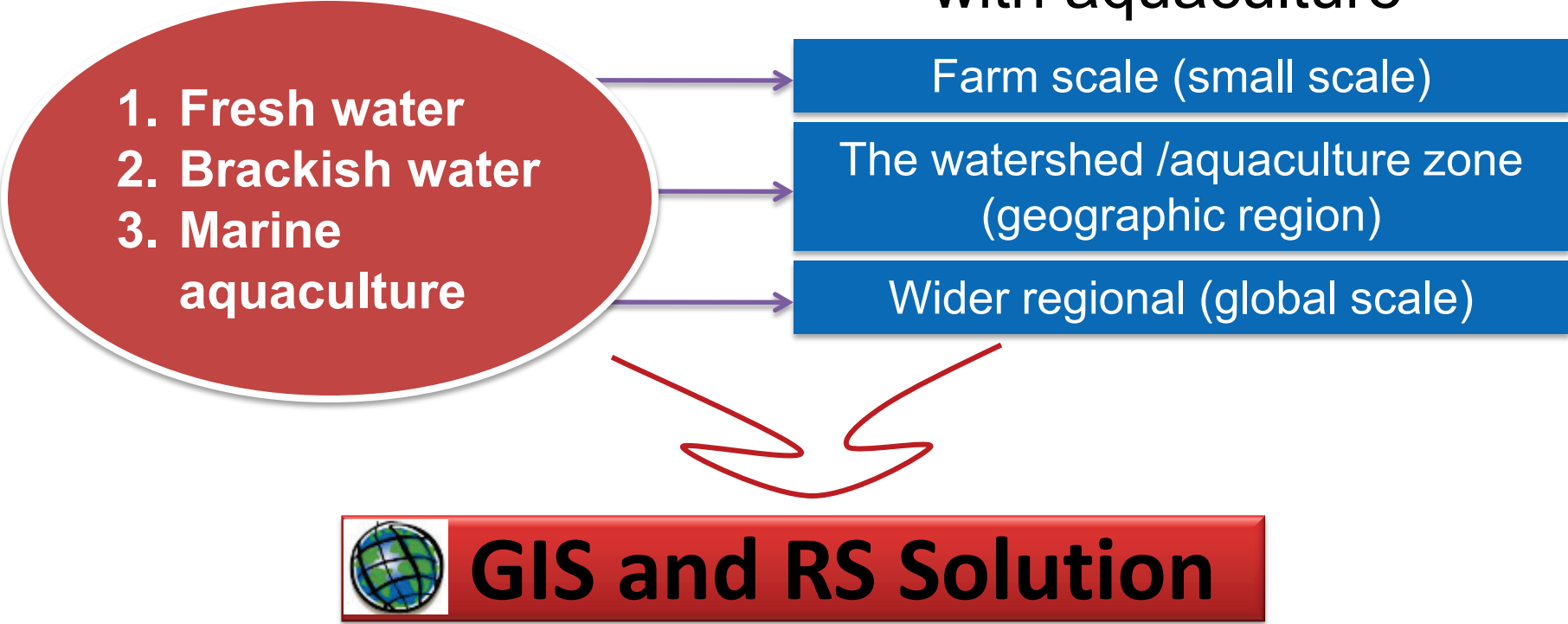
AQUACULTURE CARRYING CAPACITY



AQUACULTURE CARRYING CAPACITY

Aquaculture ecosystem

Spatial scale related
with aquaculture

- 
1. Fresh water
 2. Brackish water
 3. Marine aquaculture

Farm scale (small scale)

The watershed /aquaculture zone
(geographic region)

Wider regional (global scale)

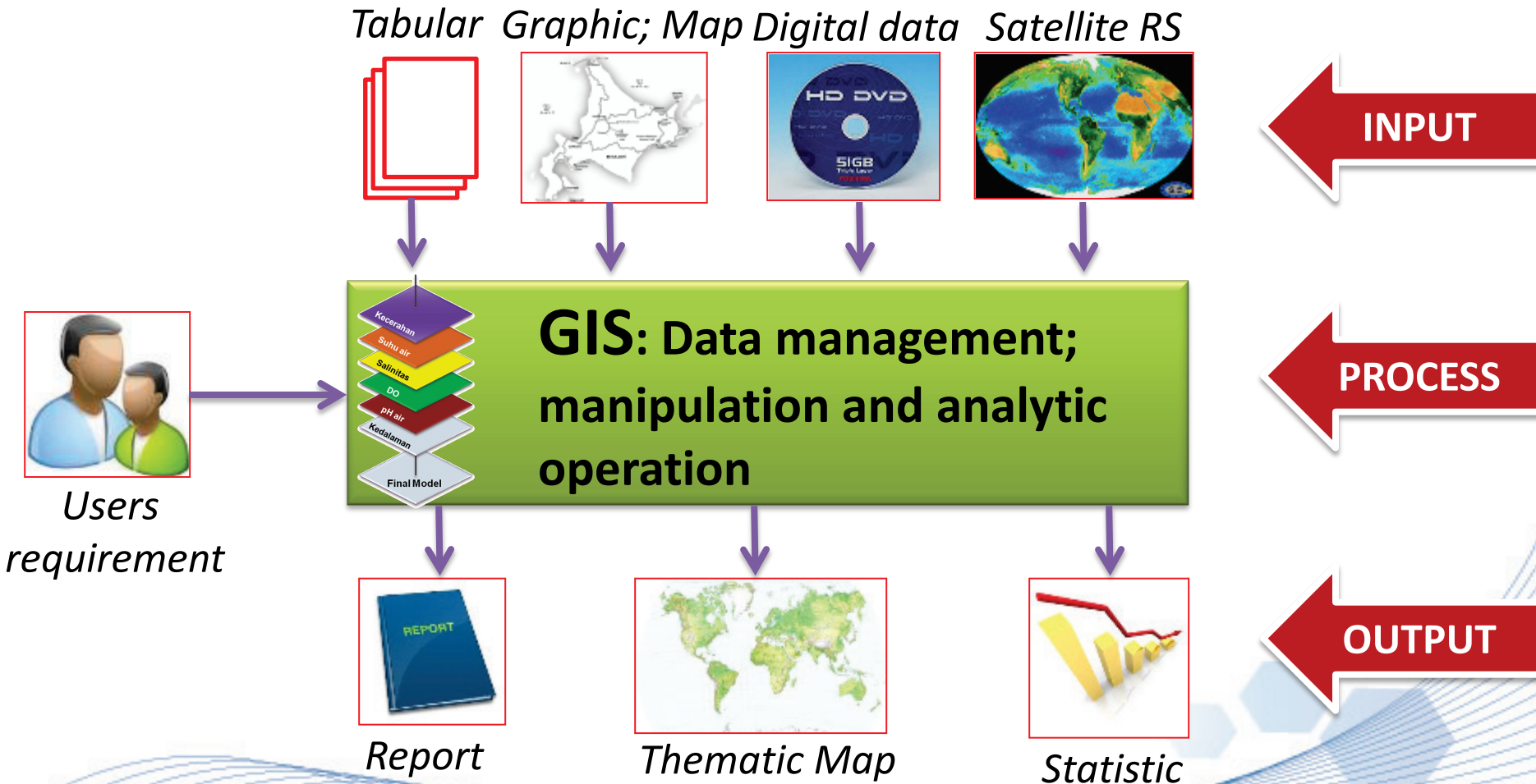


GIS and RS Solution

- ❑ Greatly improve understanding of the interaction between aquaculture, other sectors and the ecosystem.
- ❑ Assist decision maker for making better planning and management.

AQUACULTURE CARRYING CAPACITY

Common RS/GIS Analyses



RESEARCH TO SUPPORT ACC

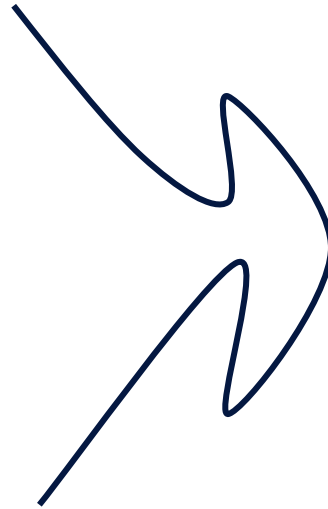
Problems



Limited sites

**Impact on
environment**

Multi-use conflicts



Solution



Stock Enhancement
(Uki, 2006)

INTAQ/IMTA
(Troell *et al.*, 2009; FAO, 2010)



**RESEARCH AND DEVELOPMENT TO SUPPORT
AQUACULTURE CARRYING CAPACITY**

RESEARCH TO SUPPORT ACC

1. Inventory and monitoring of aquaculture environment
2. Modeling of site selection
3. Integrated aquaculture - IMTA

