

YSLME



The UNDP/GEF YSLME Project

**Reducing Environmental Stress
In The Yellow Sea
Large Marine Ecosystem**



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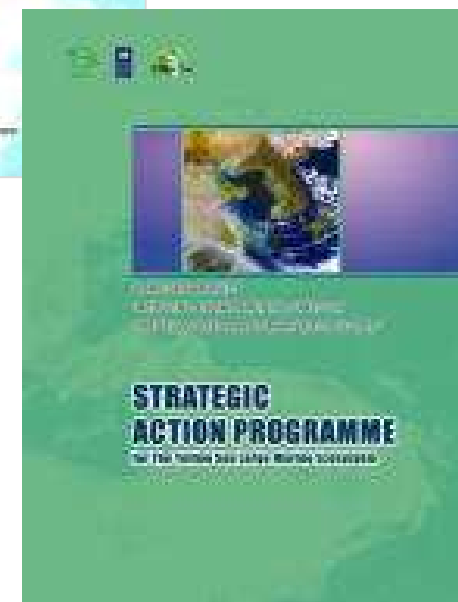
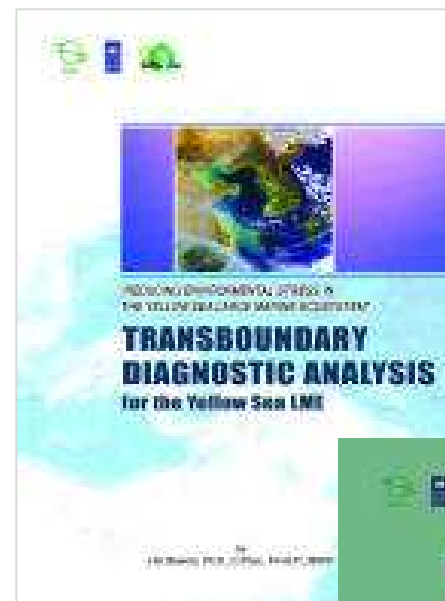


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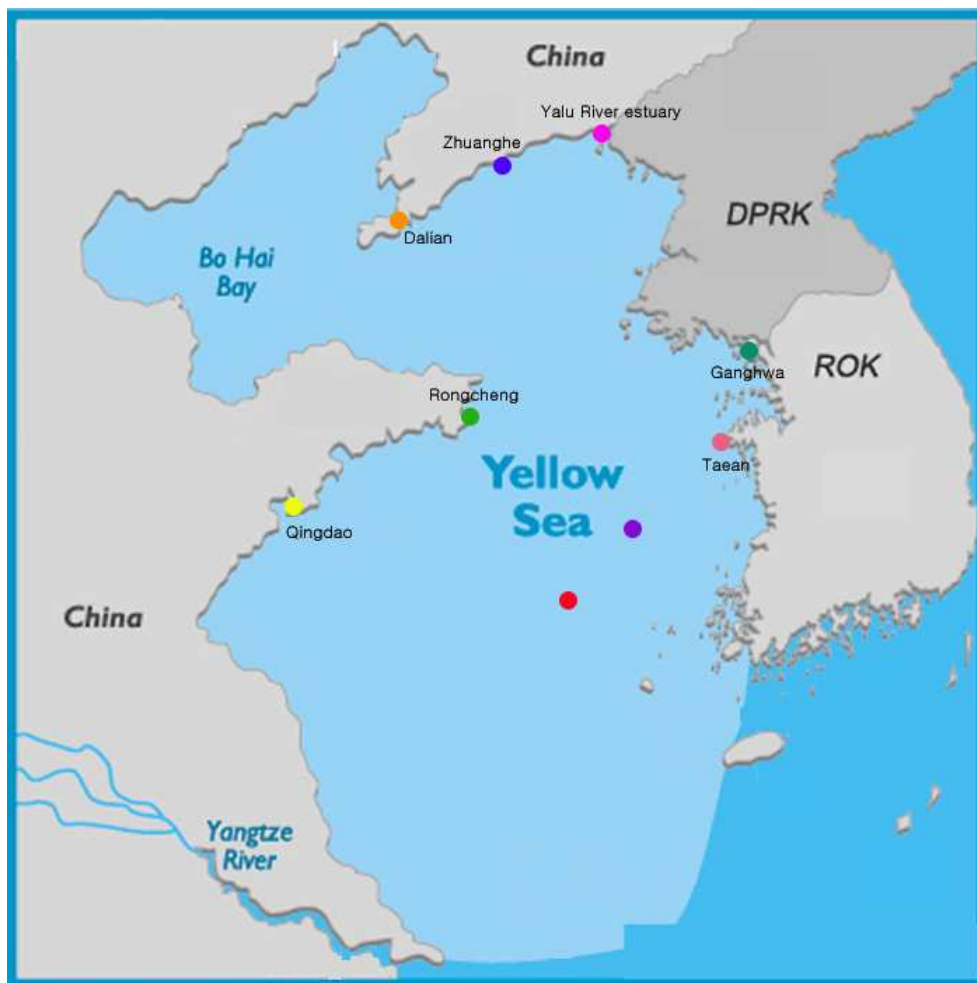
Note: This presentation focuses on environmental / technical issues of the YSLME project. Other major programme components such as capacity building, awareness, policy reform are not covered.

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The Yellow Sea

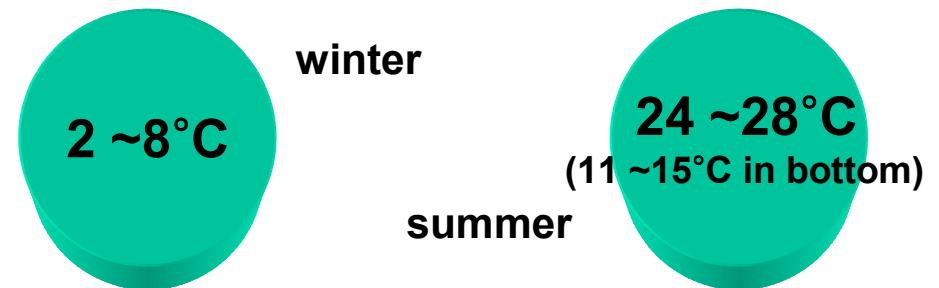


- Situated between the Chinese mainland and Korean Peninsula
- Shallow, Semi-enclosed sea
- Area 404,000 km², 1,000 km long, 700 km wide (max.)
- Large population – 600 million people
- Rapidly growing Industries
- Large Riverine Inputs (1.6bil.tons of sediments/year)
- High Fishing pressures (decline of major fish stocks)



The Yellow Sea

- Water temperature varies 2~28°C. Does not freeze but sea ice is frequently found during the winter in the coastal embayments in mid to northern parts:
- Salinity, 31 ~34‰ , low salinity (22 ~28 ‰) during the rainy season
- Strong tidal currents, 0.4 ~1.0m/sec, tidal height range 4 ~9m
- Sandy beaches, tidal flats are well developed particularly along the eastern (Korean) coast of the Yellow Sea.
- Yellow Sea has diverse habitats due to jagged coastline, many islands and bays; Intertidal flats (mud /sand flats), saltmarsh, beach, sand dune/ eelgrass bed.)
 - ✓ food resources, feeding/ spawning/ wintering grounds for migratory birds





Issues - Loss of Habitats and Biodiversity

- Coastal development activities (Reclamation) → loss of habitats, biodiversity and waste assimilation (purification) capacity.
 - Harbor/reclamation engineering projects → altered the patterns of current/sediment transport and caused coastal erosion.
 - Coastal development contributed in frequent outbreaks of red tides
- During past decades, more than 25% of total tidal flats in Korean coast has been reclaimed
- Decrease of wetlands → loss of habitats for nesting, feeding, stopover points of migratory birds; 27 endangered/threatened birds are listed by IUCN.



Decline of Fisheries

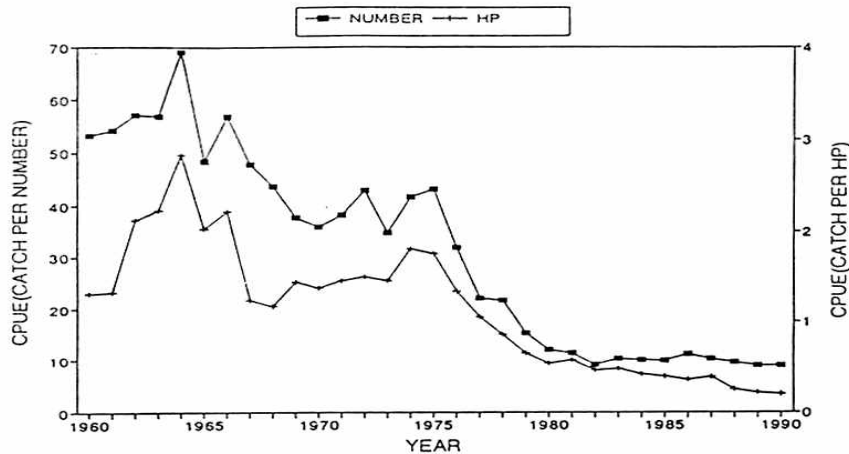
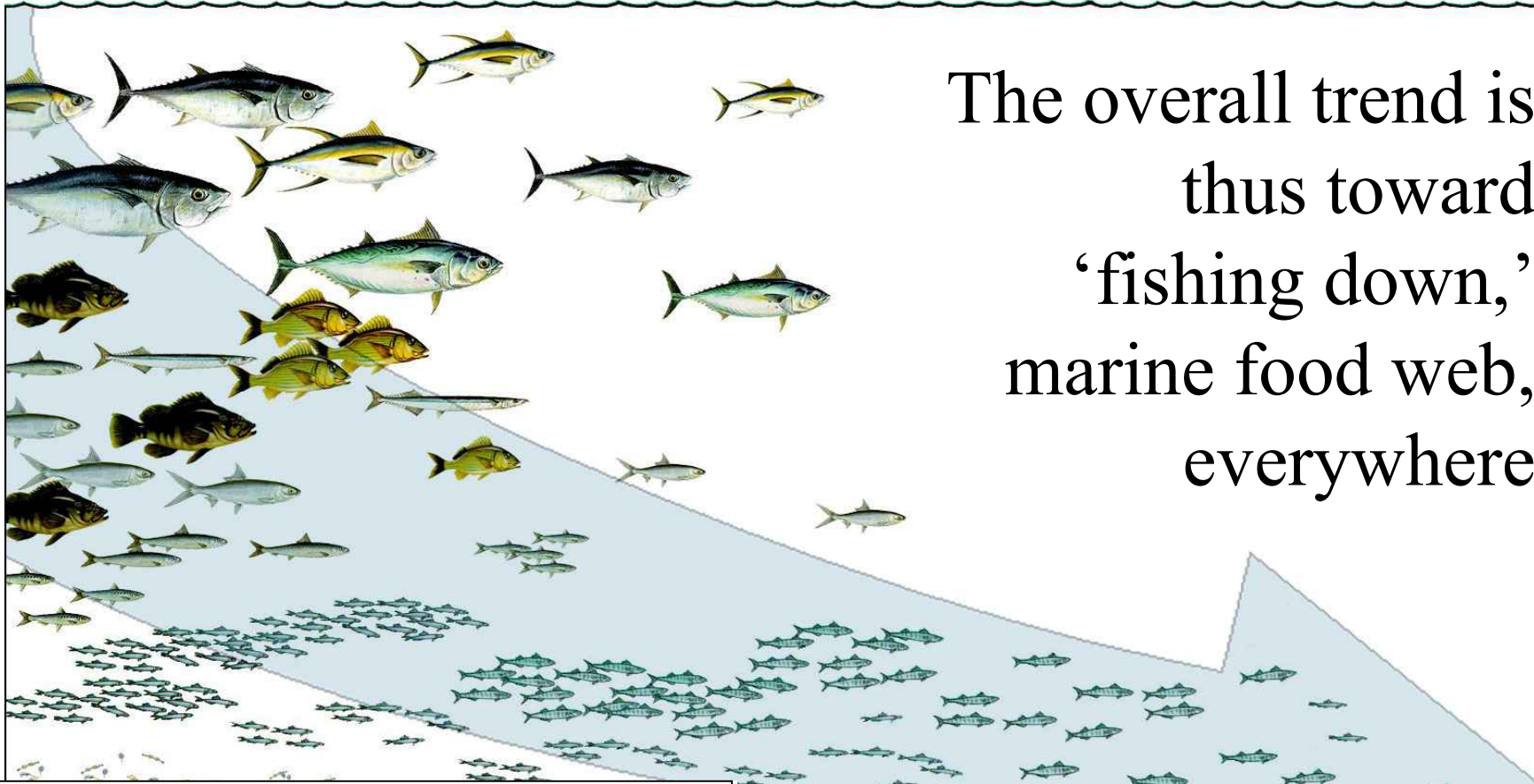
- CPUE (catch per unit effort) declined to 40%, while fishing effort increased more than 300% from 1960s to 1990s (Korean case)
- Stocks of small yellow croaker, hairtail, large yellow croaker, flatfish, cod and red sea bream have been greatly reduced
- Cold water species in the bottom water are almost extinct
- Shifts in species dominance are outstanding from small yellow croaker and hairtail in the 1950~60s to herring and chub mackerel in the 1970s. Smaller-bodied, fast growing, short-lived, and low-value fish such as anchovy and scaled sardine increased markedly in the 1980s.



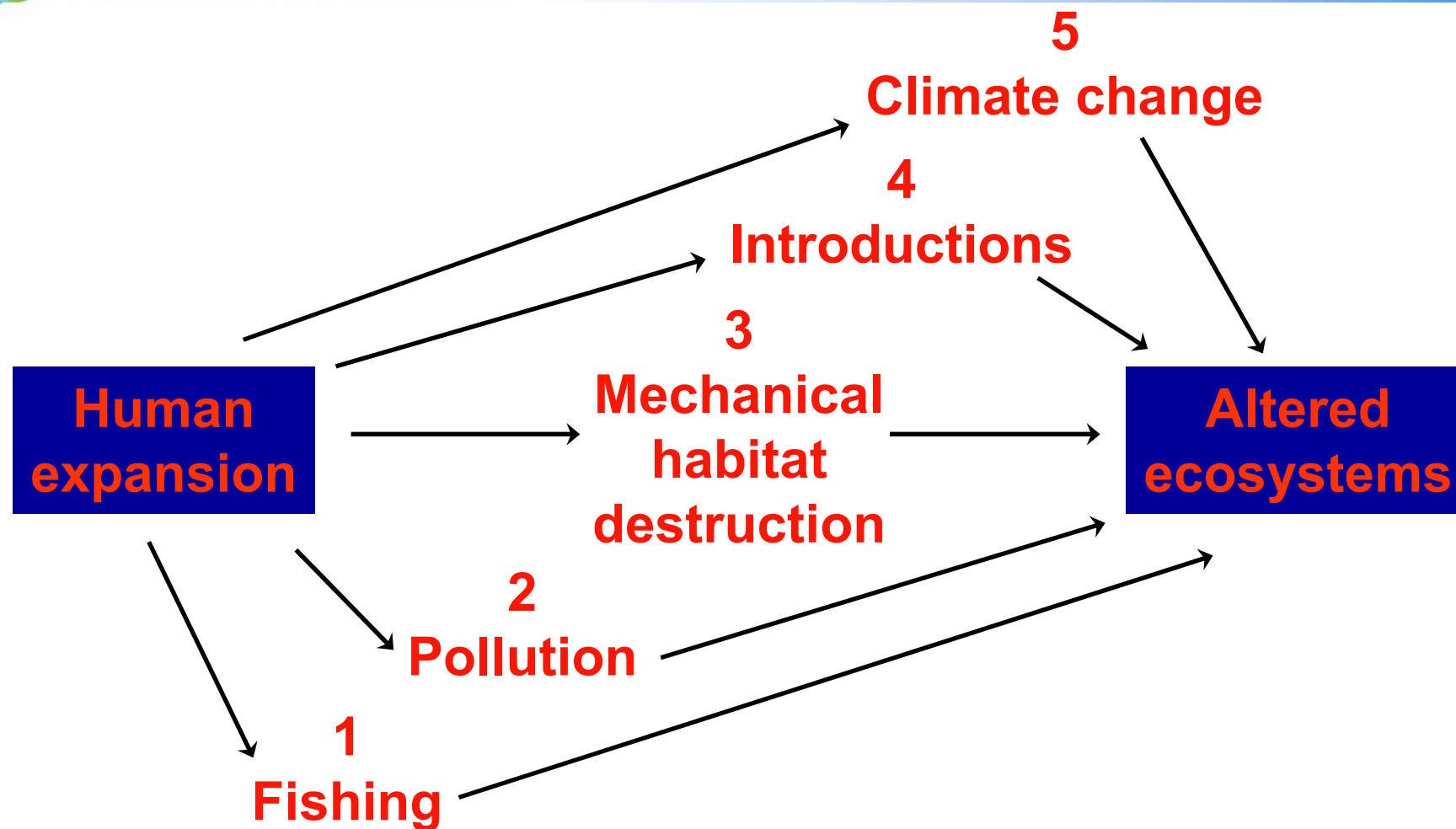
Pollution in the YSLME

- **Major sources** : nutrients, chemicals, pollutants, oil and hazardous materials, sewage related microbials, NOx etc.
- Chemical pollutants such as POPs, heavy metals, organometallics, PAHs (polycyclic aromatic hydrocarbons), etc. exert deleterious effects to marine organisms.
 - from industrial complex, agriculture, urban wastes, oil spills, ocean dumping
- Oil/chemical spills lead to biodiversity loss and threat to security of human population
- Organic pollutants from untreated sewage and ocean dumping could be main source of pathogenic microorganisms in the marine environment

The overall trend is thus toward 'fishing down,' marine food web, everywhere



CPUE by Korean Yellow Sea fisheries (Zhang, 1993)




“Then” **“Now”**

PRINCIPAL CAUSES OF LME DEGRADATION



ECOSYSTEM MANAGEMENT: A PARADIGM SHIFT

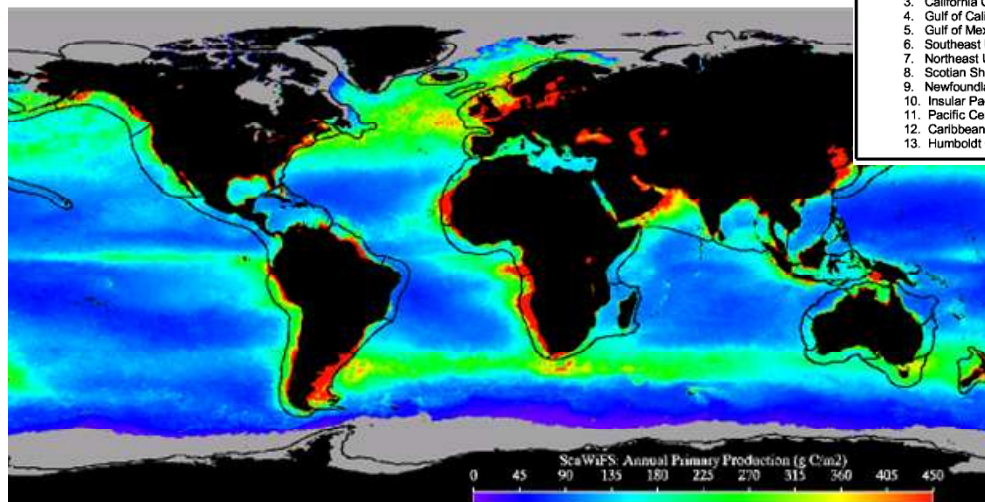
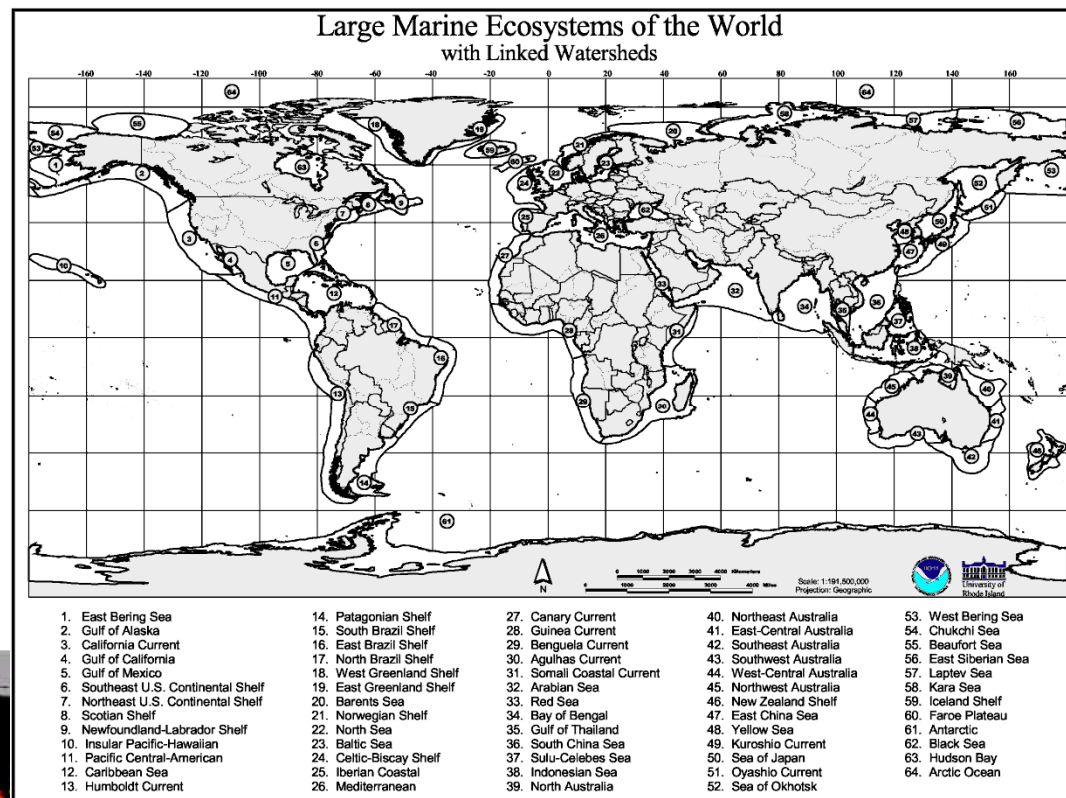
FROM		TO
Individual species		Ecosystems
Small spatial scale		Multiple scales
Short-term perspective		Long-term perspective
Humans: independent of ecosystems		Humans: integral part of ecosystems
Management divorced from research		Adaptive management
Managing commodities		Sustaining production potential for goods and services

NOTE: Some of the substantive changes between traditional resource management and ecosystem management.



THE WORLD'S 64 LMES

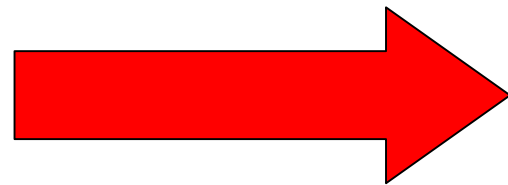
95% of the World's Annual Marine Fishery Catches are Produced in 64 LMES





GEF International Waters Operational Strategy

**Supports
New
Paradigm**

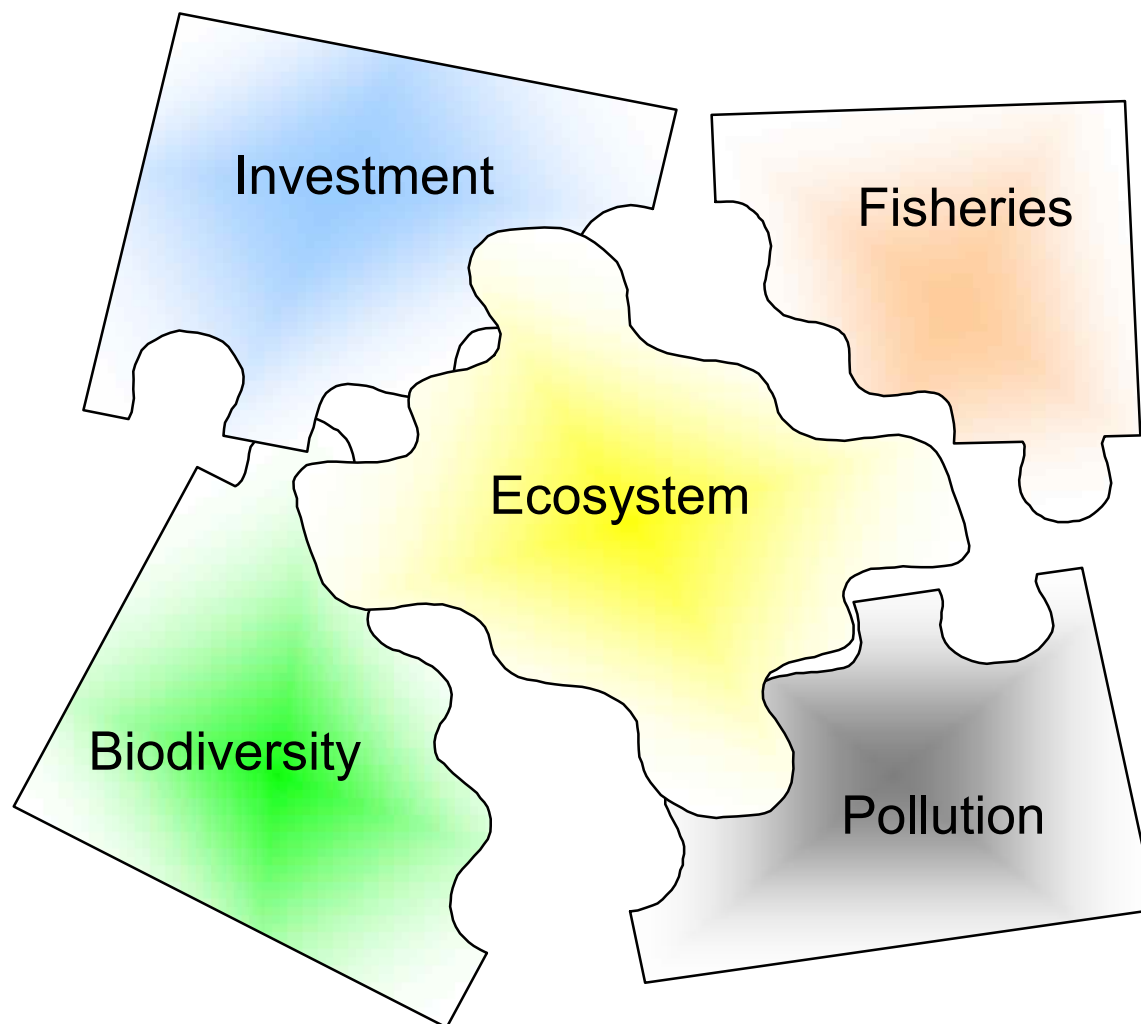


- **Ecosystem-based
LME Restoration
Actions**

- **TDA/SAP Priority
Actions**

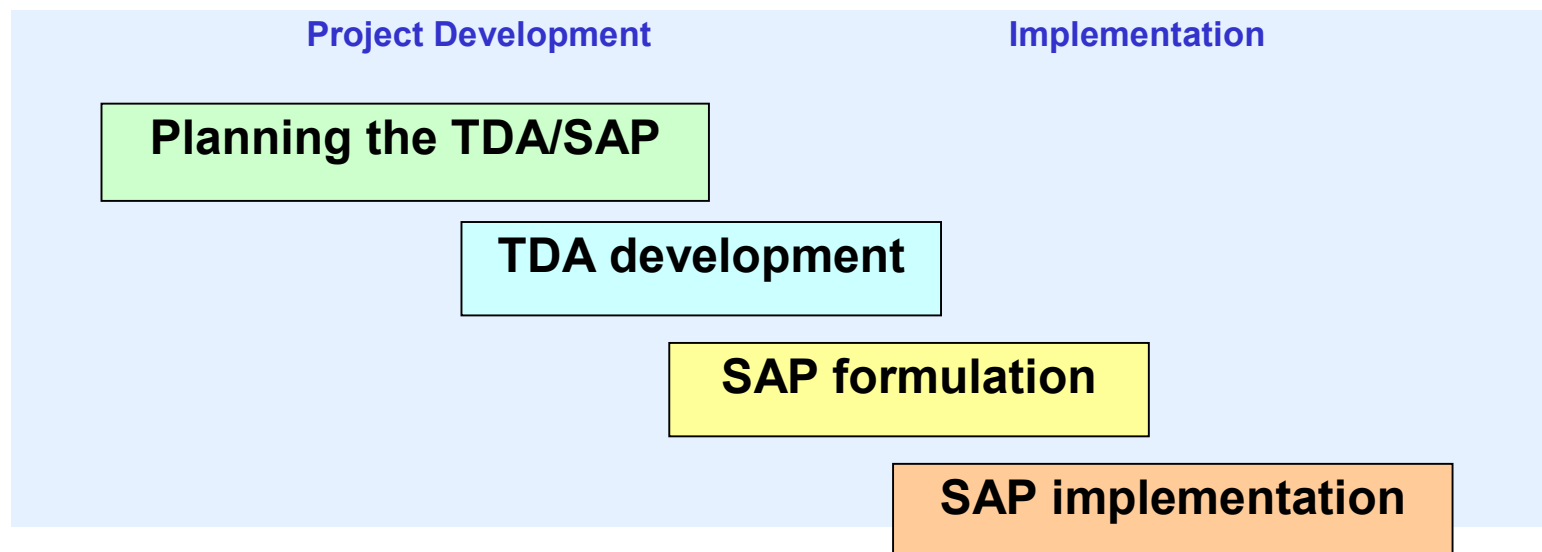


Project Focal Areas





Project Process



Transboundary Diagnostic Analysis (TDA)

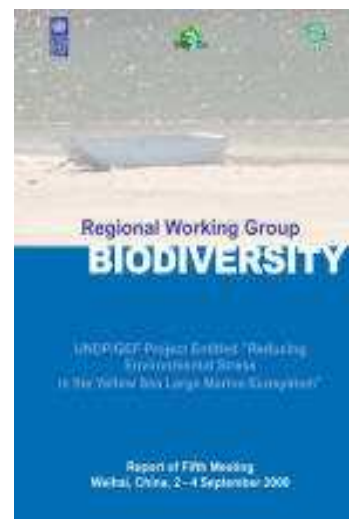
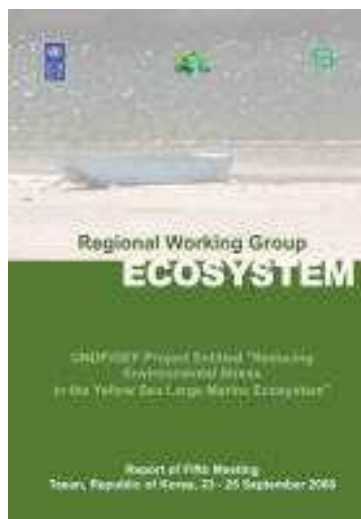
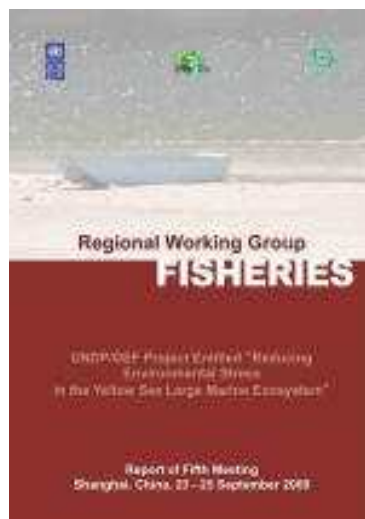
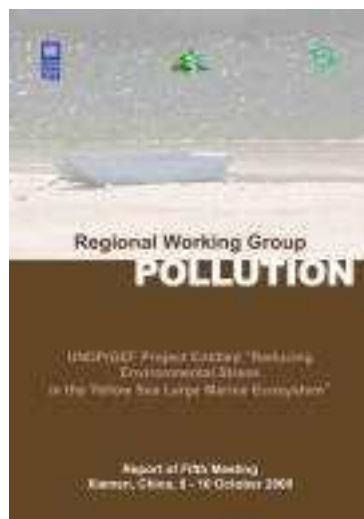
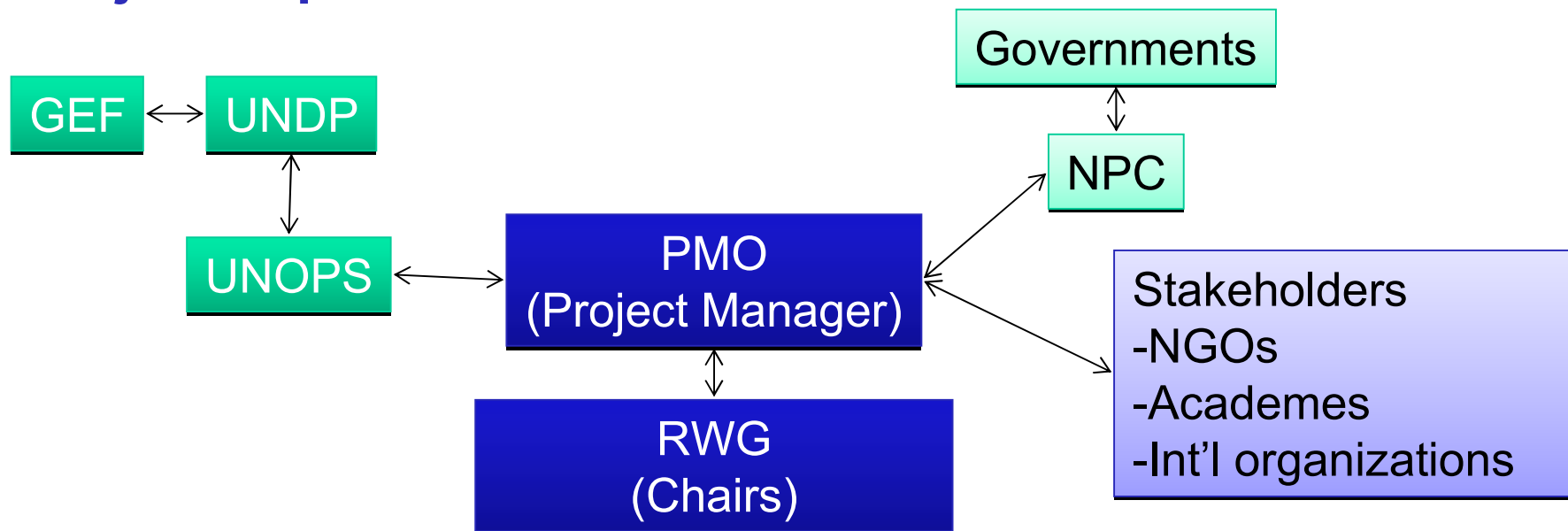
- GEF Scientific and technical process of fact-finding (or diagnosing) the state of, or threats to, international waters.

Strategic Action Plan (SAP)

- Activities related to the intervention of threats



Project Implementation Structure





The YSLME Project (1st phase: 2004-2009)

- Funding: Global Environment Facility (GEF); Implementing Agency: UNDP; and Execution Agency: UNOPS
- **The Goals**
 - ❖ to develop ecosystem-based, environmentally sustainable management strategies for the Yellow Sea and its watershed,
 - ❖ to prepare Transboundary Diagnostic Analysis (TDA), National Yellow Sea Action Plans (NYSAPs) and Strategic Action Programme (SAP).
 - ❖ to establish regional framework for cooperation



US \$ 29,416,700 (GEF \$14,300,000 + country contributions, UNDP, NOAA, etc.)



PROJECT OBJECTIVES

- Develop Regional Strategies for Sustainable Management of Fisheries and Mariculture
- Propose and Implement Effective Regional Initiatives for Biodiversity Protection
- Propose and Implement Actions to Reduce Stress to the Ecosystem
- Improve Water Quality and Protect Human Health
- Develop and Pilot Regional Institutional and Capacity Building Initiatives



TRANSBOUNDARY DIAGNOSTIC ANALYSIS

1. DIAGNOSIS - ASSESSMENT

- **IDENTIFICATION OF WATER-RELATED ENVIRONMENTAL ISSUES & PROBLEMS**
- **QUANTIFICATION OF IDENTIFIED ISSUES & PROBLEMS**

2. CAUSAL CHAIN ANALYSIS

- **IDENTIFICATION OF PROXIMATE & ULTIMATE CAUSES OF WATER-RELATED ENVIRONMENTAL ISSUES & PROBLEMS**
- **QUANTIFICATION OF CAUSES OF IDENTIFIED ISSUES & PROBLEMS**



TRANSBOUNDARY DIAGNOSTIC ANALYSIS

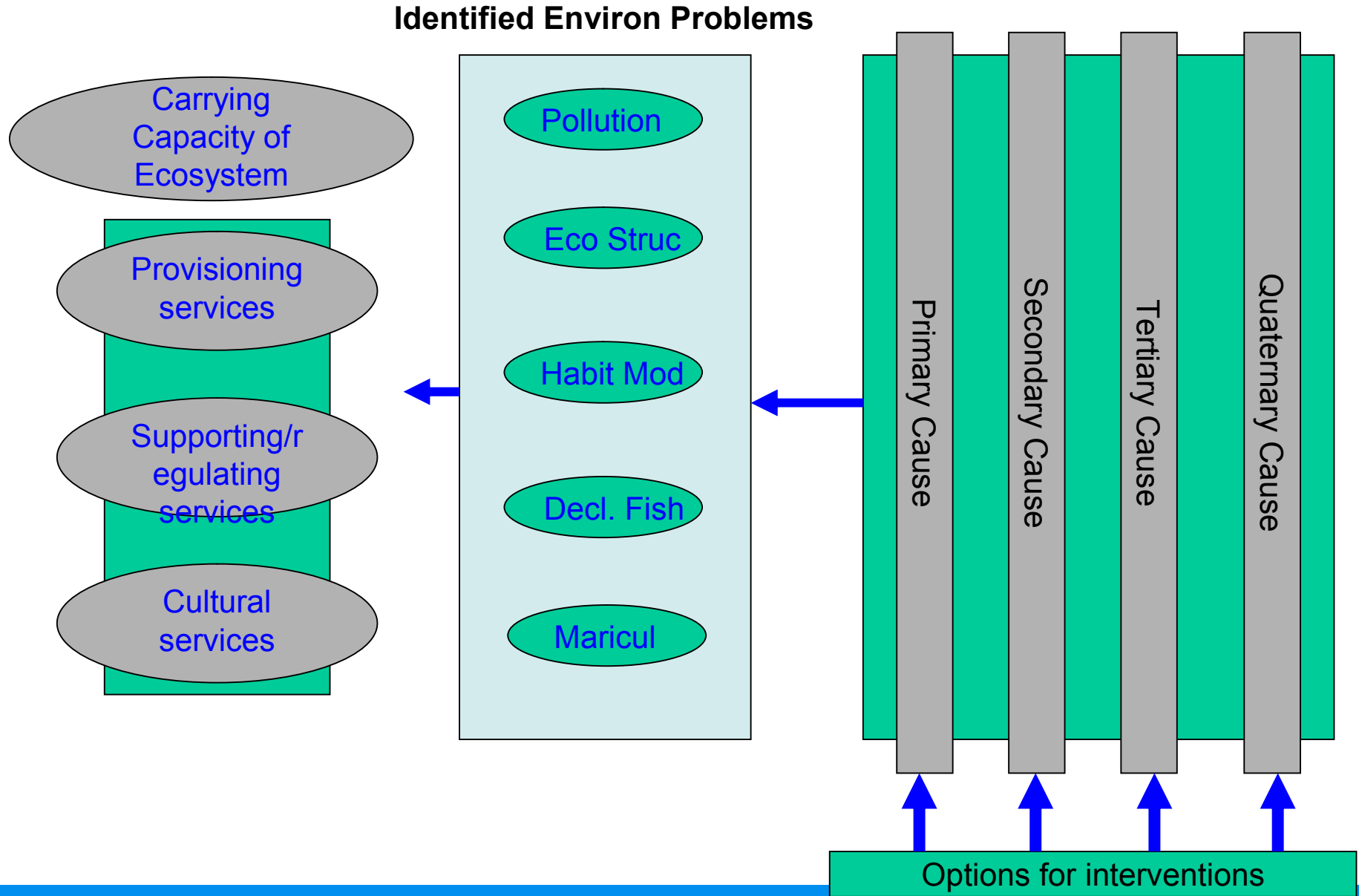
A CAUSAL CHAIN ANALYSIS IS

- **UNI-DIRECTIONAL AND STARTS FROM THE IDENTIFIED ENVIRONMENTAL ISSUE AND/OR PROBLEM**
- **MOVES FROM THE ENVIRONMENTAL (NATURAL SCIENCES) DOMAIN THROUGH THE CHAIN OF CAUSE AND EFFECT TO THE “ROOT” CAUSE WHICH LIES IN THE SOCIAL, CULTURAL AND ECONOMIC DOMAIN**
- **CONTAINS FEED-BACK LOOPS**

**TDA PROVIDES A SOUND SCIENTIFIC BASIS FOR ACTION,
WHICH MUST BE FULLY UNDERSTOOD BY ALL
STAKEHOLDERS**



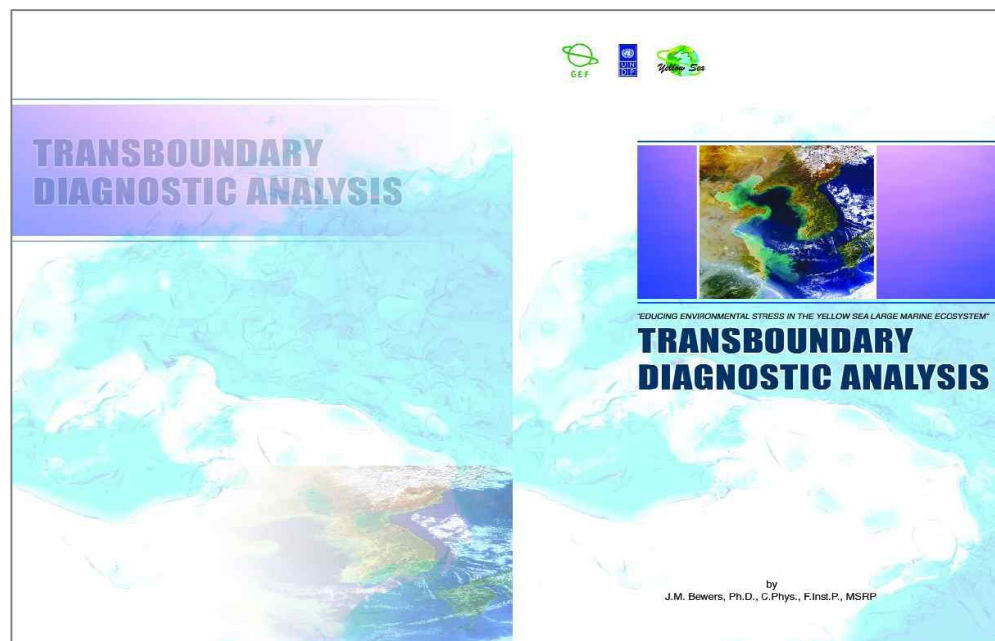
TDA Process





TDA - Transboundary Problems

- Pollution and contaminants
- Eutrophication
- Harmful Algal Bloom (HAB)
- Fishing efforts exceeding Ecosystem Carrying Capacity
- Mariculture facing unsustainable problems
- Habitat loss and degradation
- Change in ecosystem structure
- Jellyfish Bloom
- Climate change-related issues





Habitat destruction and coastal development

1990



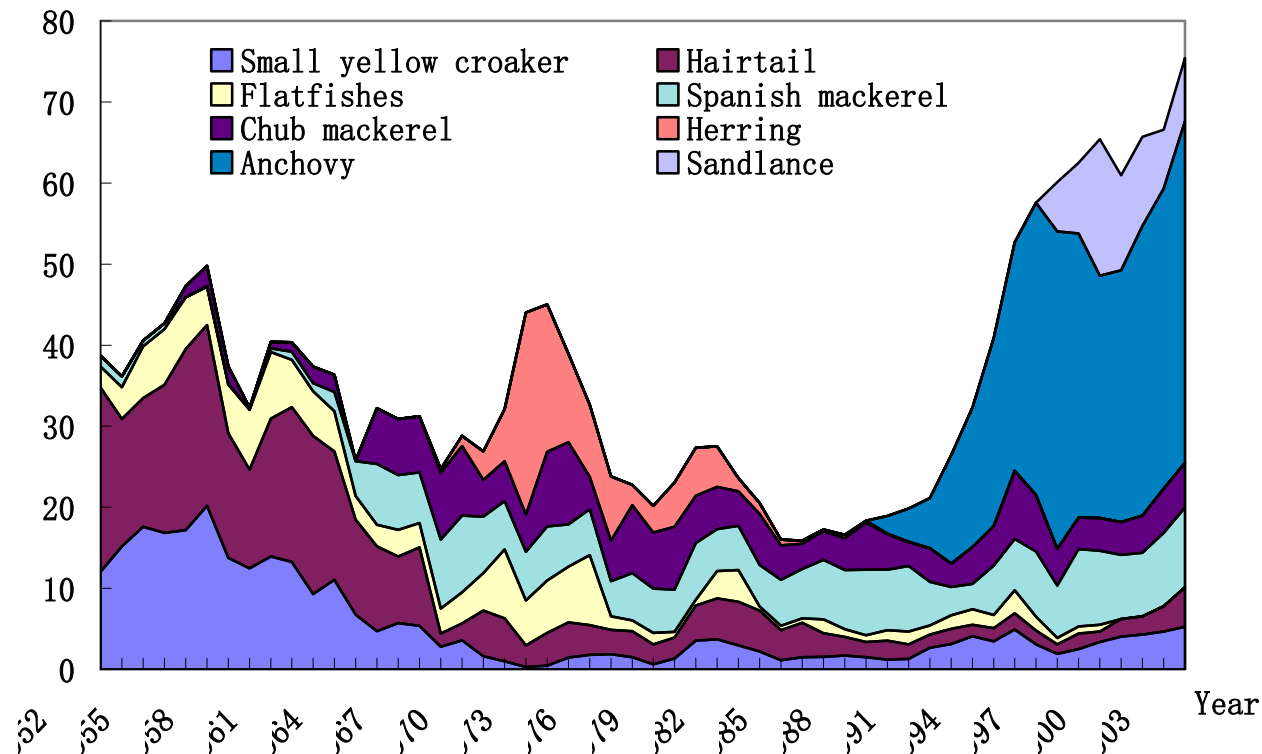
2004





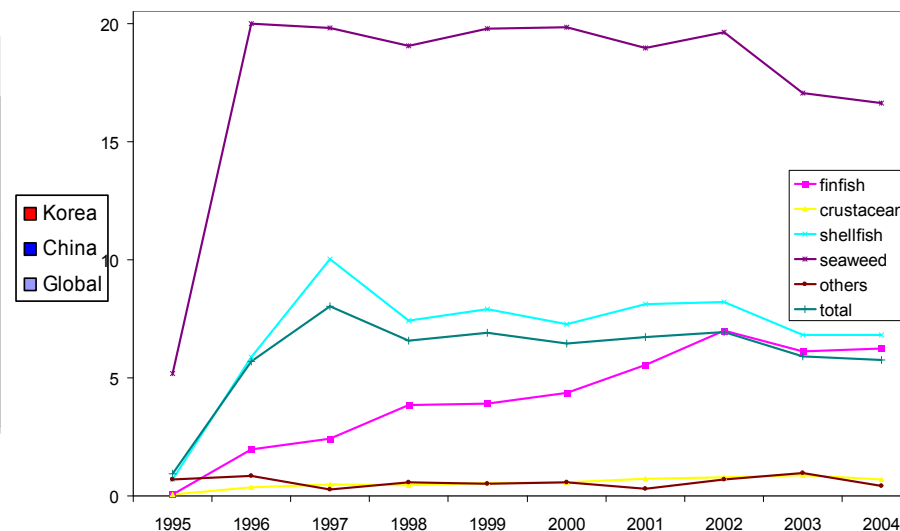
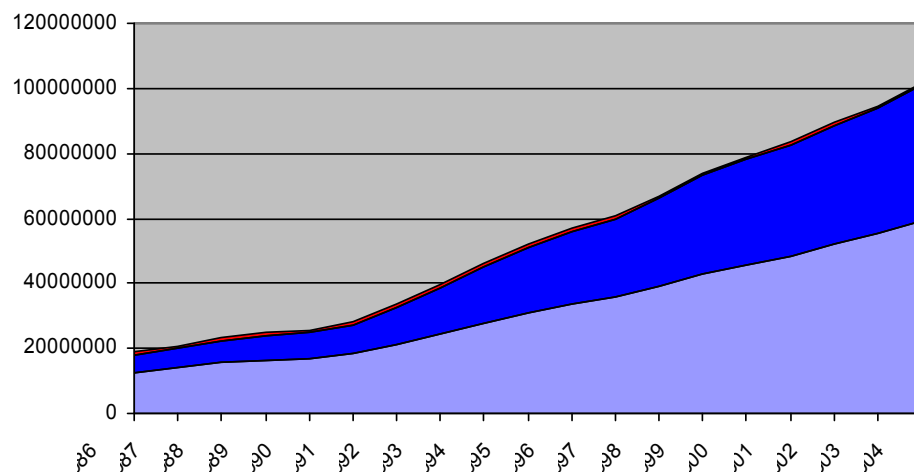
Overfishing

- Change in fish species composition from large, valuable, demersal fish to small, less valuable pelagics in the Yellow and Bohai Seas due to over-fishing and other drivers (UNDP/GEF 2007).





Aquaculture



- Rapid increase in aquaculture production in metric tonnes (fresh, salt and brackish water culture) since 1986 (FAO).

The decrease in the aquaculture yield per ha since 1996 points to an increase in environmental stress (UNDP/GEF 2007)



Silicate change



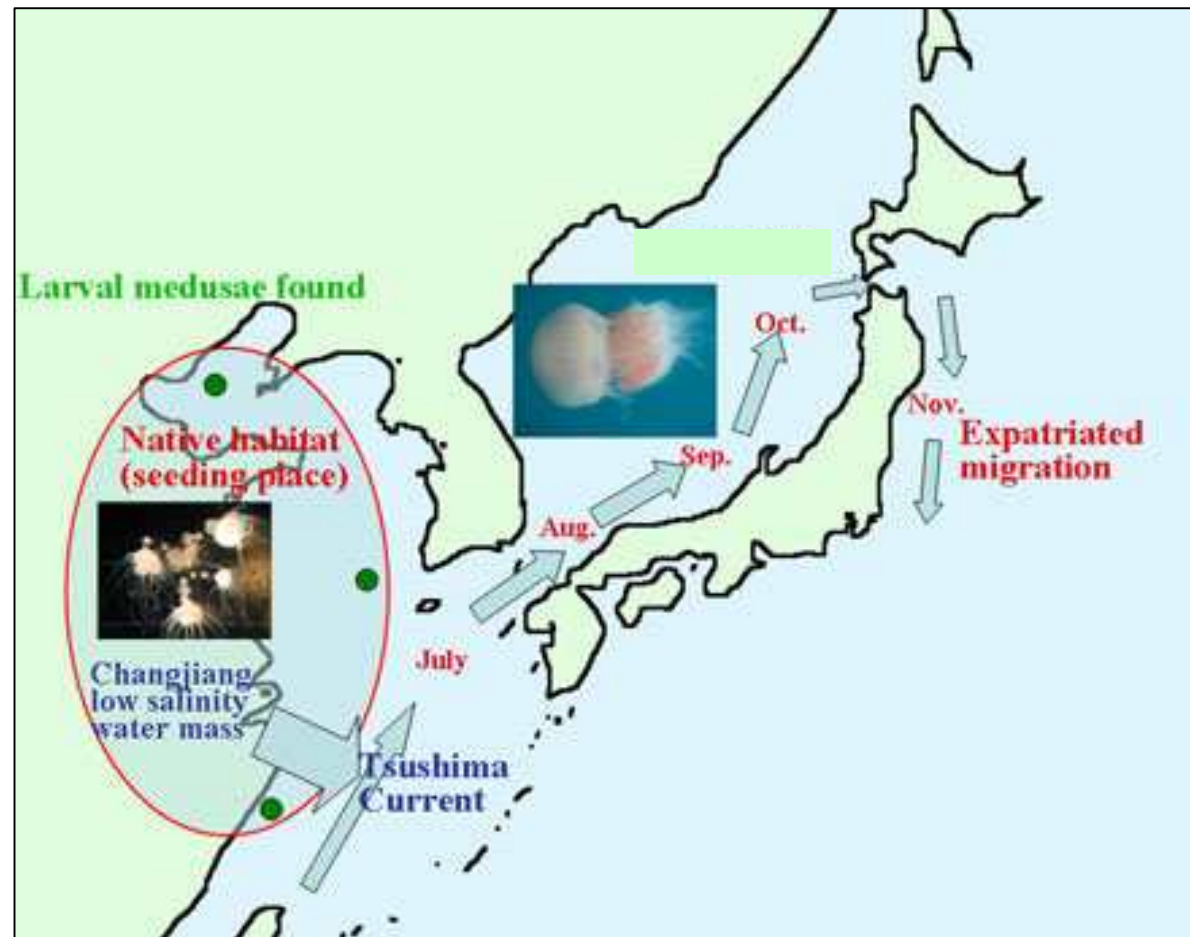
Extracted from Lin et al, 2005

Silicate concentrations have been falling in the Yellow Sea over the last decades due to changes in freshwater inputs as a result of irrigation and hydroelectric schemes. At the same time nitrogen concentrations are rising due to domestic and industrial effluent, and increasing fertilizer use. The result is a decrease in the N:Si ratio – which could lead to changes in phytoplankton communities.



Jellyfish Bloom

- Increase in jelly fish blooms due to over-fishing, changing N:Si ratio, coastal modification and climate change



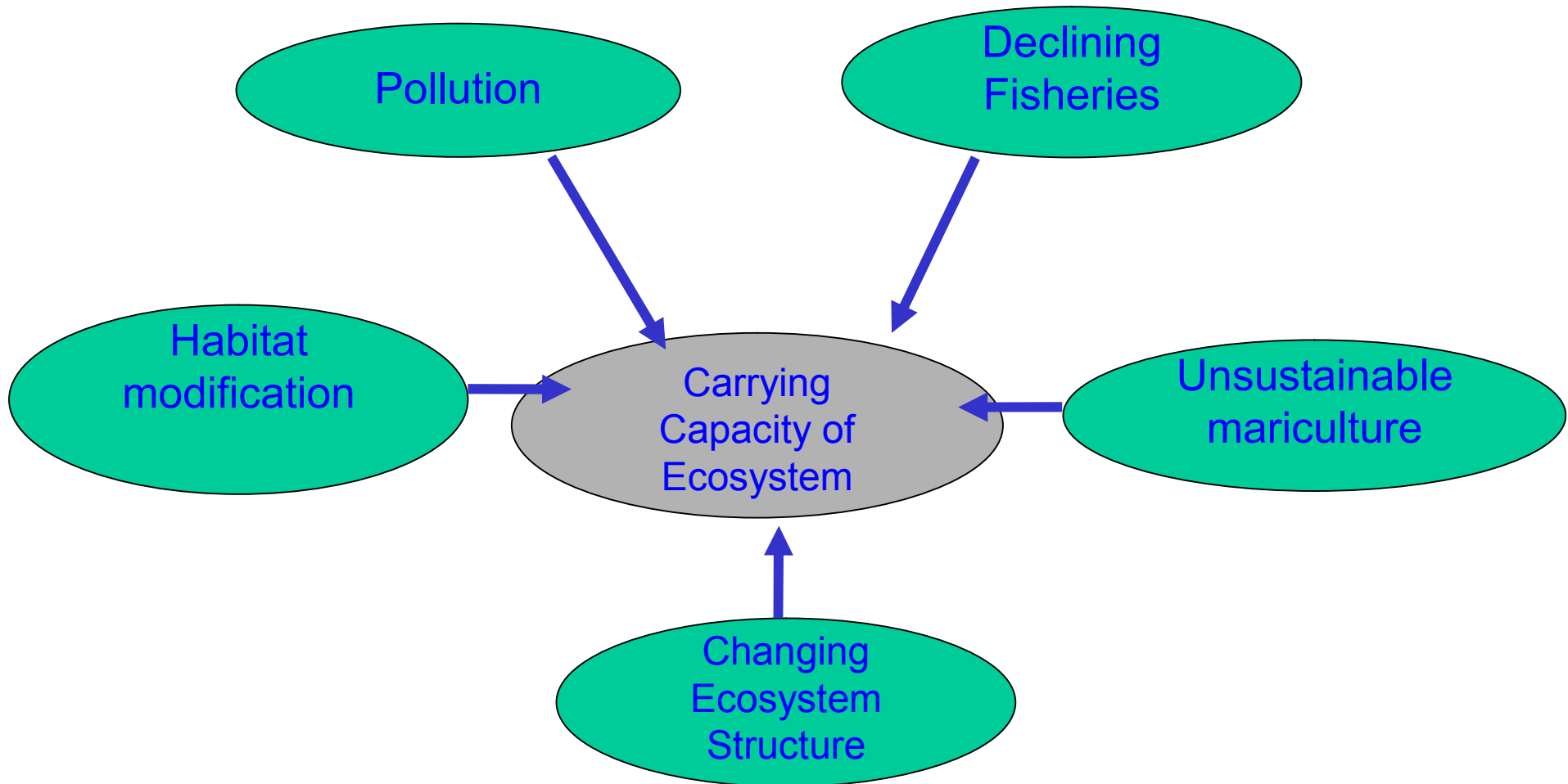


UNDP/GEF YELLOW SEA
LARGE MARINE ECOSYSTEM PROJECT



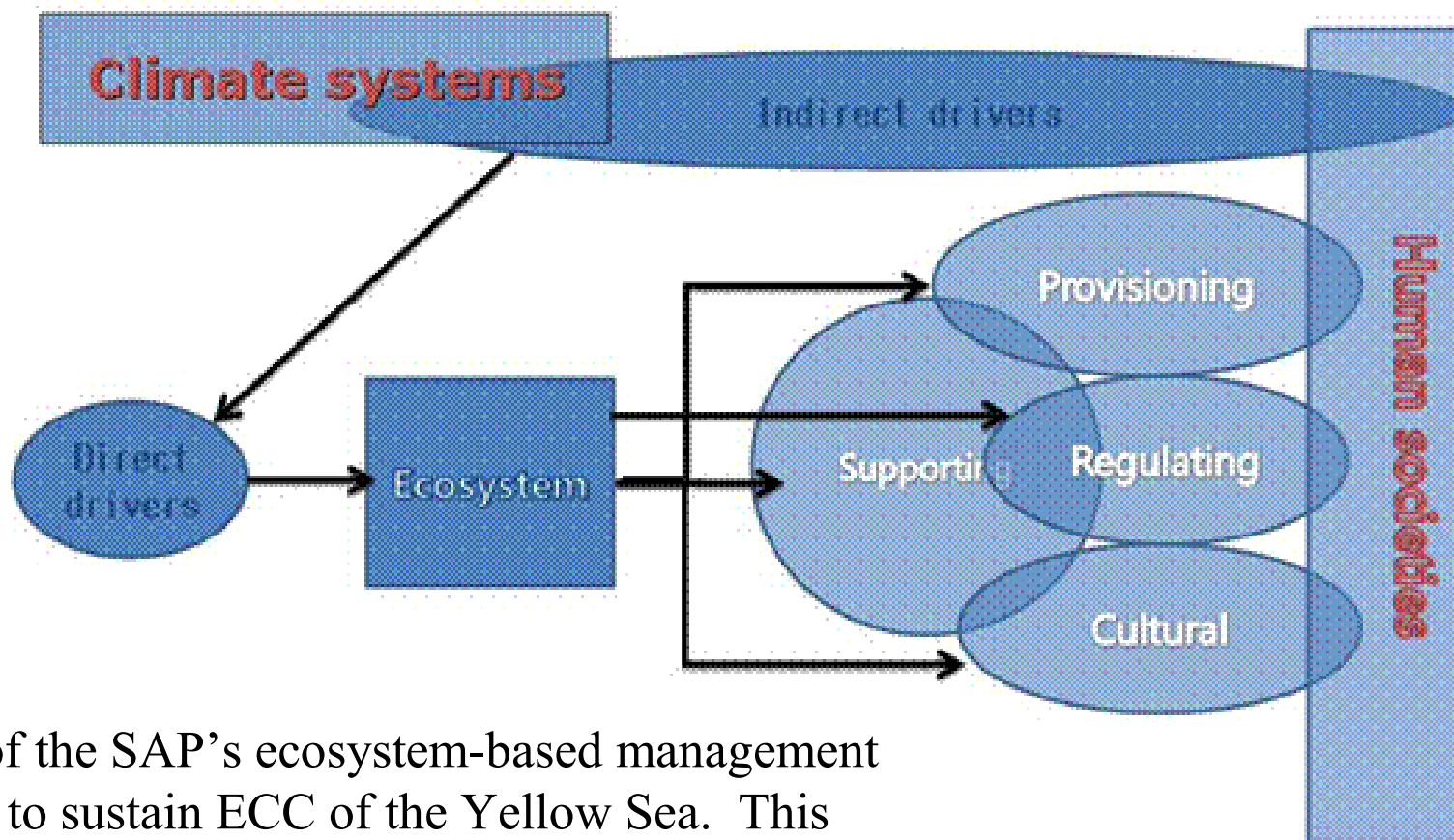


Ecosystem Carrying Capacity (ECC)





Ecosystem Carrying Capacity & Ecosystem-based approach



The aim of the SAP's ecosystem-based management should be to sustain ECC of the Yellow Sea. This requires that management should be based on long-term scientific research and adaptive strategies.



Addressing Transboundary Issues

- Managing ecosystem services is a complicated issue as there are linkages and trade offs among services.
- Transboundary problems affect multiple ecosystem services.
 - Regulating fishing activities alone will be insufficient to sustain provisioning services.
- Managing to meet the targets should aim to improve ECC as a whole.
- Improving ECC means improving its components: provisioning, regulating, cultural, and supporting services.

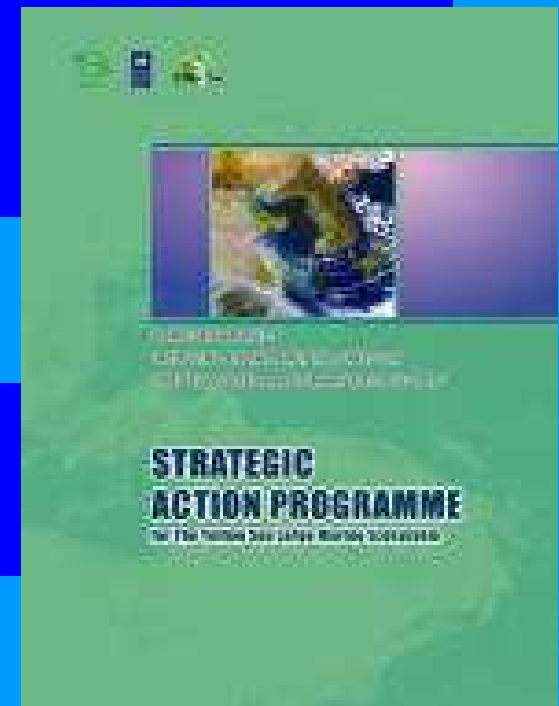


BUILDING THE STRATEGIC ACTION PROGRAMME

REGIONAL AGREEMENT ON GOALS & PRIORITIES

1. SHORT-TERM OBJECTIVES
2. IMMEDIATE ACTIONS
3. MEDIUM TERM ACTIONS

- **EVALUATE ALTERNATIVE ACTIONS**
Cost effectiveness
Practicality and possibility of achieving results





What's special about YSLME SAP?

- Adopt Ecosystem-based approach (vs. traditional sector approach)
- Strong governmental commitment
- Co-operation & co-ordination mechanism (e.g. YSLME Commission)
- set the regional measurable targets until 2020 for environmental quality of the Yellow Sea
- analyse existing national & regional mitigation measures
- devise management actions (national & regional) to meet the targets



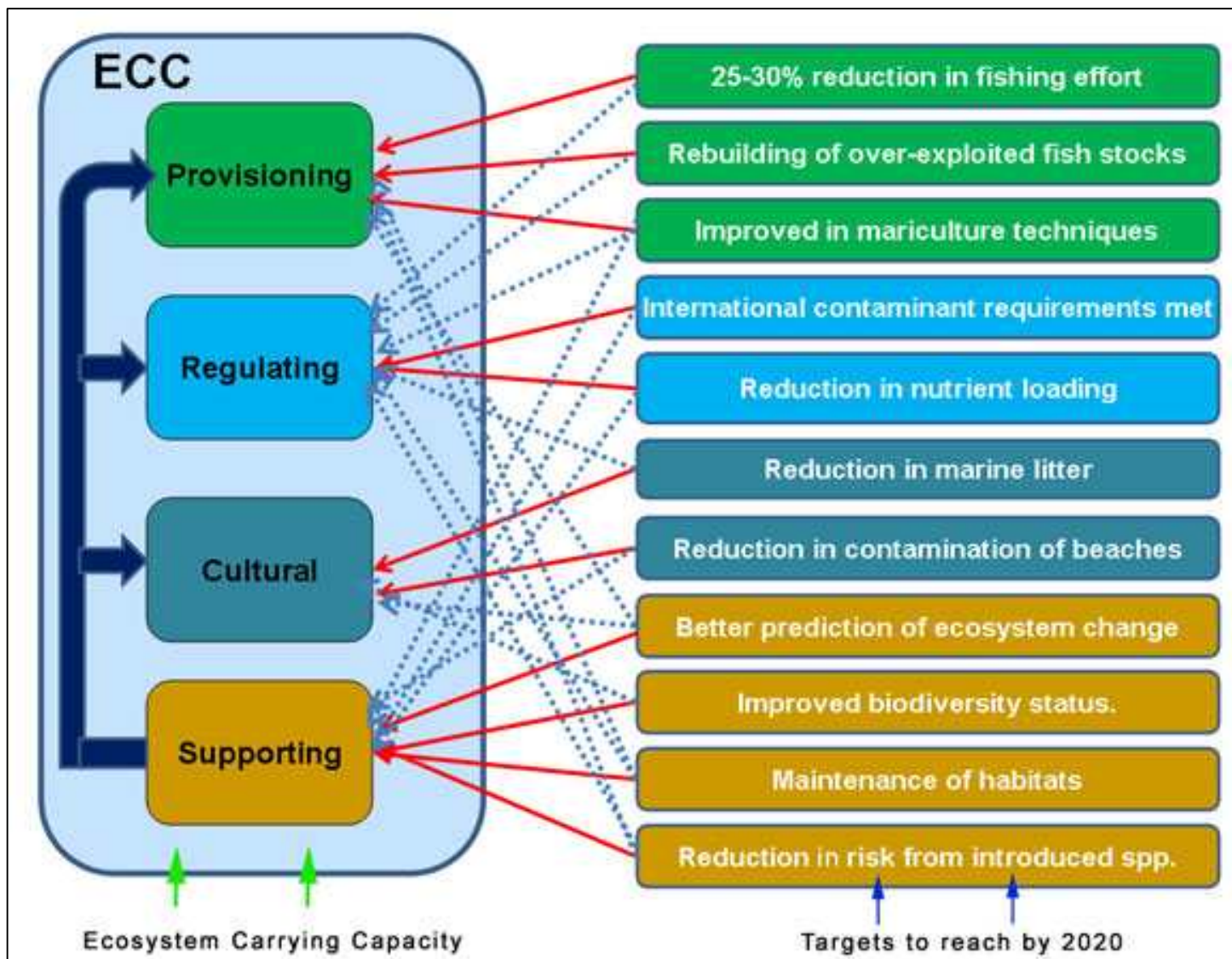


SOME QUANTITATIVE TARGETS IN THE SAP

- 11 tangible targets have been identified to meet the 4 ecosystem services.
- Most of them are **quantitatively measurable**.
- **Examples:**
 - 25-30% reduction in fishing effort
 - 10% reduction in nutrient loading every 5 years
 - Reduction in standing stock of marine litter from current level
 - Maintenance of current habitats according to standards and regulations of 2007



ECC and Targets by 2020



Box 1: Regional targets and technical actions proposed by the YSLME SAP

Provisioning Services

Target 1: 25-30% reduction in fishing effort

- Action 1-1: Control fishing boat numbers
- Action 1-2: Stop fishing in certain areas/seasons
- Action 1-3: Monitor and assess stock fluctuations

Target 2: Rebuilding of over-exploited marine living resource

- Action 2-1: Increase mesh size
- Action 2-2: Enhance stocks
- Action 2-3: Improve fisheries management

Target 3: Improvement of mariculture techniques to reduce environmental stress

- Action 3-1: Develop environment-friendly mariculture methods and technology
- Action 3-2: Reduce nutrient discharge
- Action 3-3: Control diseases effectively

Regulating Services

Target 4: Meeting international requirements on contaminants

- Action 4-1: Conduct intensive monitoring and assessment
- Action 4-2: Control contaminants discharge with reference to Codex alimentarius and Stockholm Convention
- Action 4-3: Implementing MARPOL 1973/78 effectively

Target 5: Reduction of total loading of nutrients from 2006 levels

- Action 5-1: Control total loading from point sources
- Action 5-2: Control total loading from non-point sources and sea-based sources
- Action 5-3: Apply new approaches for nutrient treatment

Cultural Services

Target 6: Reduced standing stock of marine litter from current level

- Action 6-1: Control source of litters and solid wastes
- Action 6-2: Improve removal of marine litter
- Action 6-3: Increase public awareness of marine litter

Target 7: Reduce contaminants, particularly in bathing beaches and other marine recreational waters, to nationally acceptable levels

- Action 7-1: Conduct regular monitoring, assessment and information dissemination particularly in bathing beaches and other recreational waters
- Action 7-2: Control pollution in bathing beaches and other marine recreational waters

Supporting Services

Target 8: Better understanding and prediction of ecosystem changes for adaptive management

- Action 8-1: Assess and monitor the impacts of N/P/Si ratio change
- Action 8-2: Assess and monitor the impacts of climate change
- Action 8-3: Forecast ecosystem changes in the long-term scale
- Action 8-4: Monitor the transboundary impact of jellyfish blooms
- Action 8-5: Monitor HAB occurrences

Target 9: Maintenance and improvement of current populations/distributions and genetic diversity of the living organisms including endangered and endemic species

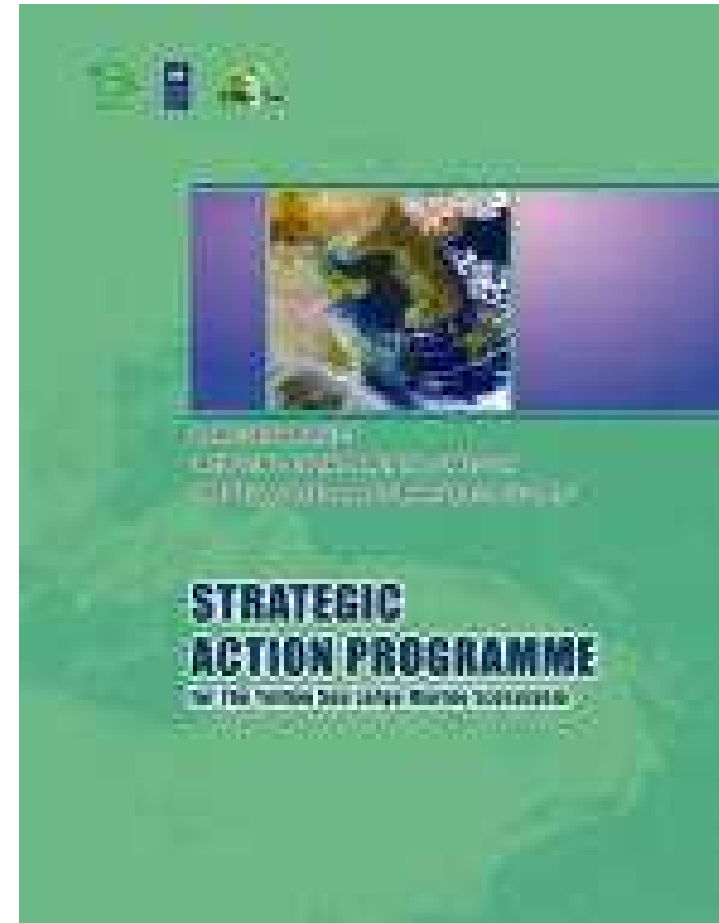
- Action 9-1: Establish and implement regional conservation plan to preserve biodiversity

Target 10: Maintenance of habitats according to standards and regulations of 2007

- Action 10-1: Develop regional guidelines for coastal habitat management
- Action 10-2: Establish network of MPAs
- Action 10-3: Control new coastal reclamation
- Action 10-4: Promote public awareness of the benefits of biodiversity conservation

Target 11: Reduction of the risk of introduced species

- Action 11-1: Control and monitor ballast water discharge
- Action 11-2: Introduce precautionary approach and strict control of introduction of non-native species





Governance actions

- Management actions include not only technical measures, but also **institutional and legislative actions or reforms** to strengthen:
 - Laws and regulations
 - Law enforcement
 - Capacity of NGO & local governments
 - Environmental awareness and education
 - Monitoring network



Implementation mechanism

- Create the YSLME Commission for better coordination & for effectiveness of regional efforts.
- Improve effectiveness of legal instruments
 - ✓ Improve & periodically review the implementation of international & regional treaties and guidelines
- Invite stakeholders' wide participation
 - ✓ Strengthen partnerships with existing regional cooperative institutions

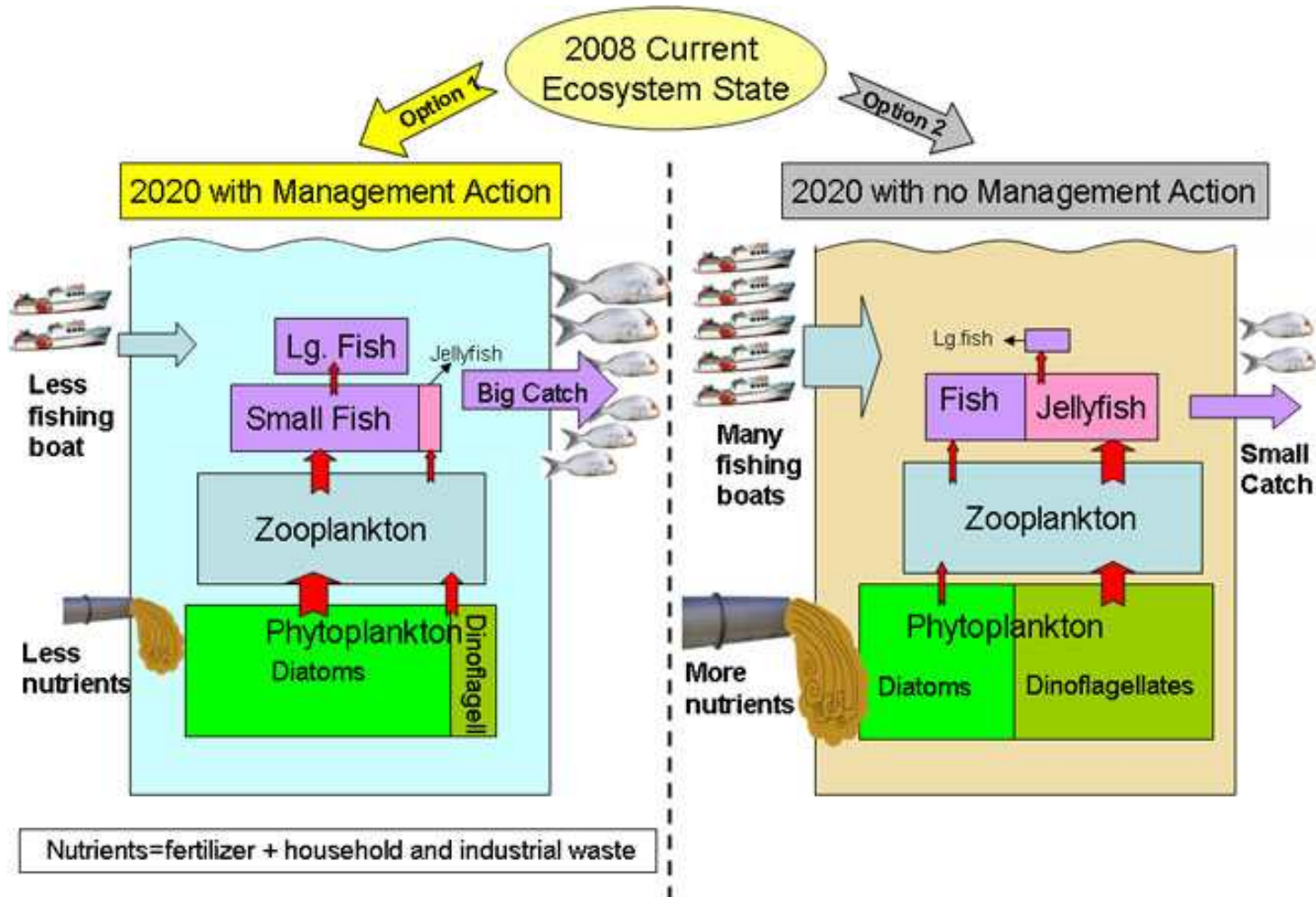


YSLME Commission

- Objective:
 - To continue and expand current efforts through the YSLME Project
 - To contribute not only to better coordination but also to enhancing effectiveness of regional efforts
- Nature: Soft, non-legally binding and co-operation based institution.
- Institutional framework: Steering Committee, Secretariat, & Sub-Commissions.



Management Action (with and without)





Partners

People's Republic of China

- United Nations Development Programme - China (UNDP PRC)
- State Oceanic Administration (SOA)
- National Marine Environmental Monitoring Center (NMEMC)
- First Institute of Oceanography (FIO)
- Yellow Sea Fisheries Institute (YSFI)
- Bureau of Fisheries, Ministry of Agriculture
- State Environmental Protection Administration
- Ministry of Communication

Republic of Korea

- United Nations Development Programme – Republic of Korea (UNDP ROK)
- Korea Ocean Research and Development Institute (KORDI)
- Korea Maritime Institute (KMI)
- Ministry of Land, Transport, and Maritime Affairs (MLTM)
- Ministry of Foreign Affairs and Trade (MOFAT)
- Ministry of Environment (MOE)
- National Fisheries Research and Development Institute (NFRDI)

Other

- Yellow Sea Eco-region Planning Programme (YSEPP)
- North American Oceanographic and Atmospheric Administration (NOAA)
- Wetlands International
- Marine Stewardship Council (MSC)
- National Marine Science Centre (NMSC)
- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Environment Programme - Northwest Pacific Action Plan (UNEP-NOWPAP)
- North Pacific Marine Science Organisation (PICES)
- Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)
- Intergovernmental Oceanographic Commission - Sub-Commission for the Western Pacific (IOC/WESTPAC)



Way Forward

- 2nd Phase YSLME Project
 - GEF investment for SAP implementation
 - Country (RO Korea and China) cash and in-kind contributions
 - Possible participation of DPR Korea
- Establishing YSLME Commission
- Regional collaboration among partners for improving Ecosystem Carrying Capacity of Yellow Sea

YSLME



Thank you



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