International Coastal Management as Sustained Learning and Adaptation
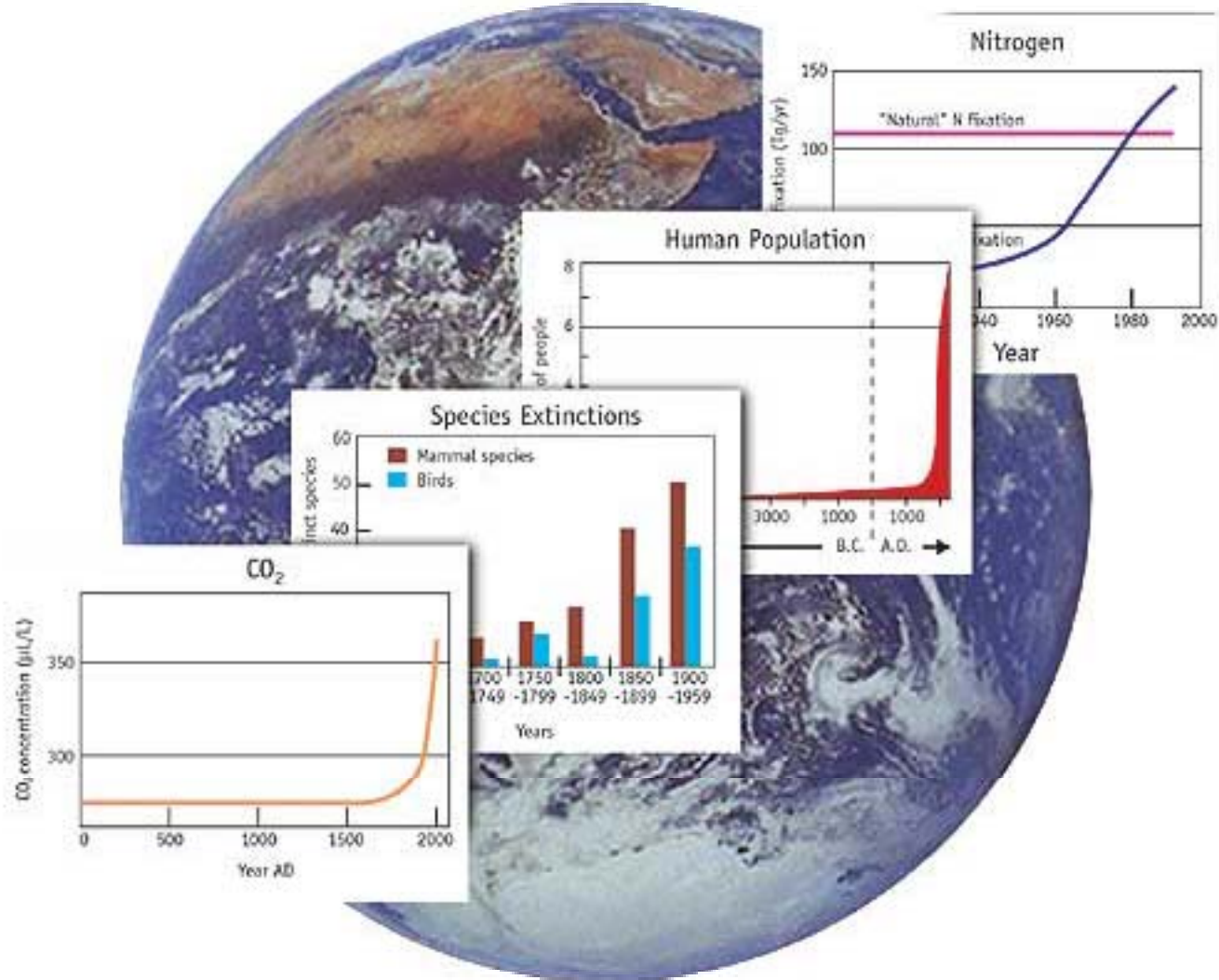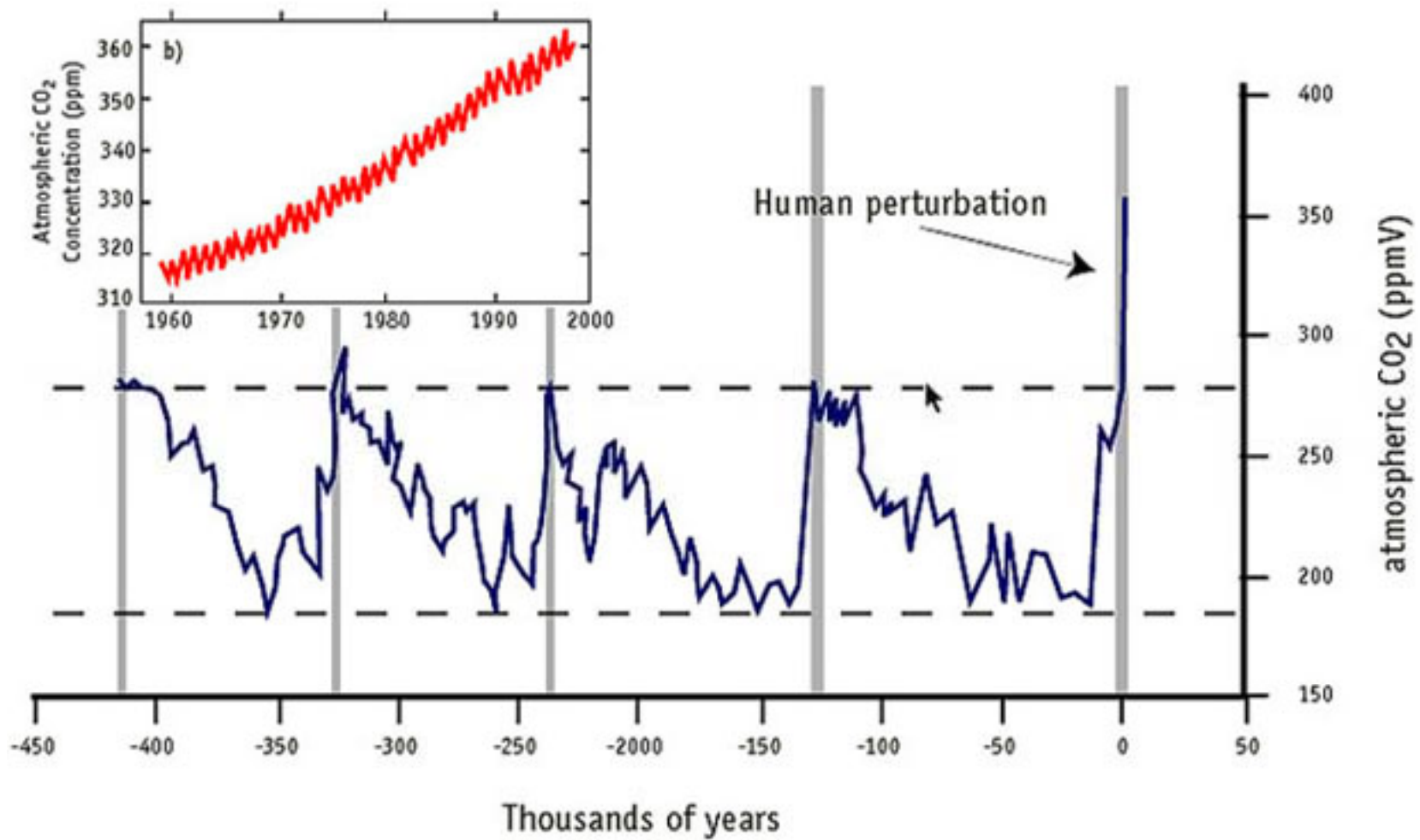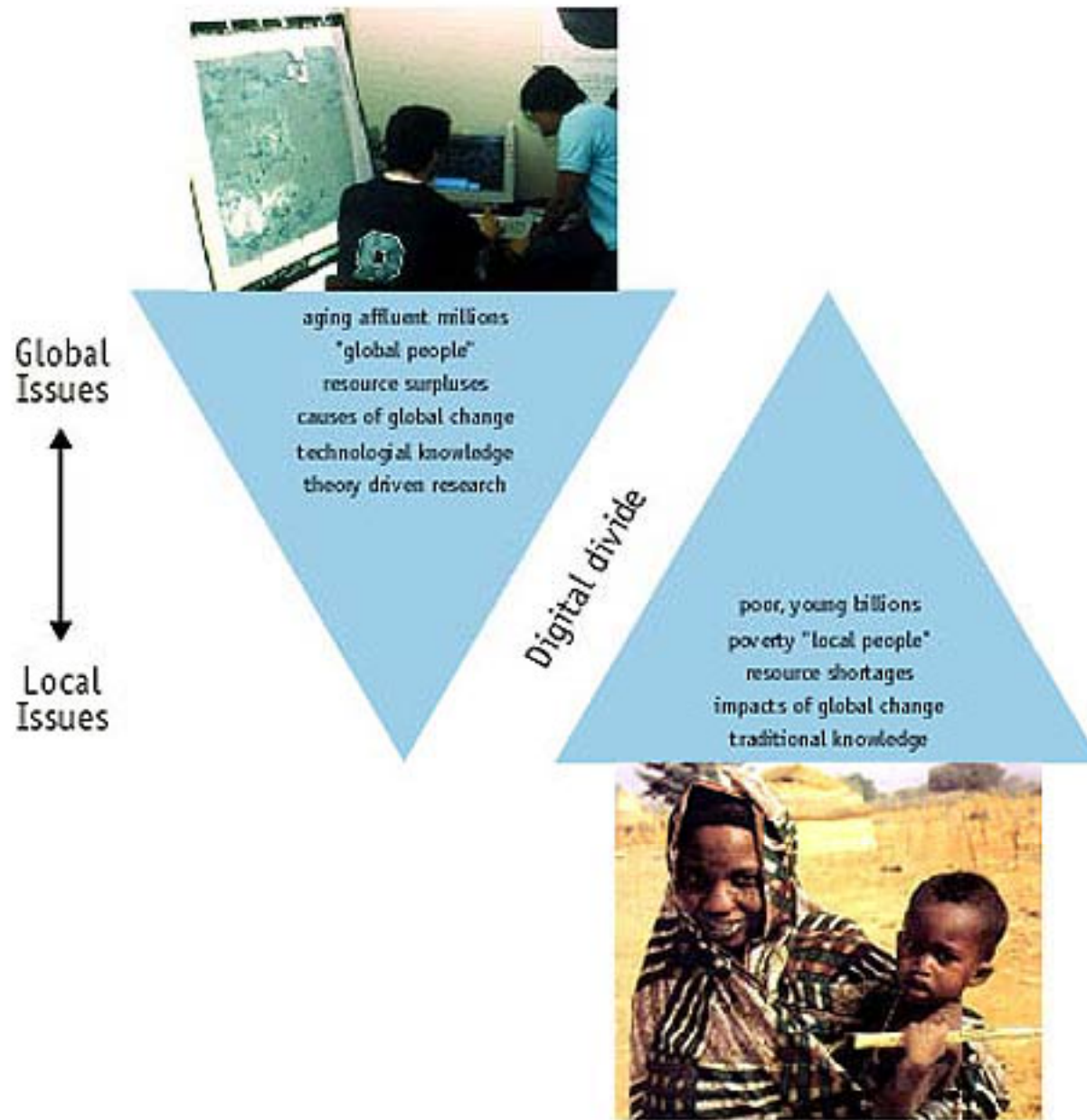
Stephen B. Olsen

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Nitrogen

Fixation (Tg/yr)

150

"Natural" N Fixation

100

...ixation

...40   1960   1980   2000

Year

Human Population

of people

8

6

3000   1000   1000

B.C.   A.D.

Species Extinctions

...nct species

60

Mammal species
Birds

50

40

1700   1750   1800   1850   1900
-1749   -1799   -1849   -1899   -1959

Years

CO₂

CO₂ concentration (µL/L)

350

300

0   500   1000   1500   2000

Year AD

b)

Atmospheric CO$_2$ Concentration (ppm)

Human perturbation

atmospheric CO2 (ppmV)

Thousands of years

Global
Issues

↕

Local
Issues

aging affluent millions
"global people"
resource surpluses
causes of global change
technological knowledge
theory driven research

Digital divide

poor, young billions
poverty "local people"
resource shortages
impacts of global change
traditional knowledge

Coastlines Have Become the Primary Human Habitat

- Almost half the people on 15% of the inhabitable landspace
  - 75% projected by 2050
- 12 of the 15 largest cities
  - sprawling tropical coastal megalopoli with many living in poverty by 2050

Coastal regions contain half to three quarters of the planet's:

- residential development

- energy production and consumption

- transportation infrastructure

- manufacturing infrastructure

- tourism sites and infrastructure

Food Security

- 90% of the fish harvest: livelihoods for 1 billion people
  - the majority of aquaculture is coastal
  - most seafood production is dependent upon estuarine habitats, freshwater inflows, and adequate water quality
- a high proportion of the best cropland is coastal
- climate change and freshwater allocations affect both

Equity Issues are Critical

- common property resources dominate
- access to the shore and coastal waters is increasingly at risk
- Half the people (women) often have no voice in planning and decision making
- the gulf between the wealthy few and the many poor is widening at all scales

Bio-physical Dynamics

- erosion and accretion processes threaten, and are altered by, shorefront development

- Waterborne diseases and invasive species are increasingly problematic

- Climate change is:
  - accelerating sea level rise
  - increasing the frequency and strength of storms
  - altering established patterns of rainfall

The Goal of ICM

The goal of ICM is to improve the quality of life of human communities who depend on coastal resources while maintaining the biological diversity and productivity of coastal ecosystems.

GESAMP, 1996

The Desired ICM Outcomes: Ecosystem Qualities

- the many goods and services that flow from healthy estuaries and other critical habitats are restored and sustained,

- nutrients inflows from sewage, agriculture and the atmosphere are dramatically reduced

- freshwater inflows to estuaries are sustained

- Networks of MPAs are embedded within ICM governance frameworks

The Desired ICM Outcomes: Societal Qualities

- The required changes in societal behavior are widely appreciated;progress is gauged against unambiguous goals

- Resources are distributed equitably

- Coastal governance frameworks that span municipal, provincial, national and regional scales are nested together as a internally consistent, decentralized systems

- Planning and decision making is efficient, effective, transparent and equitable
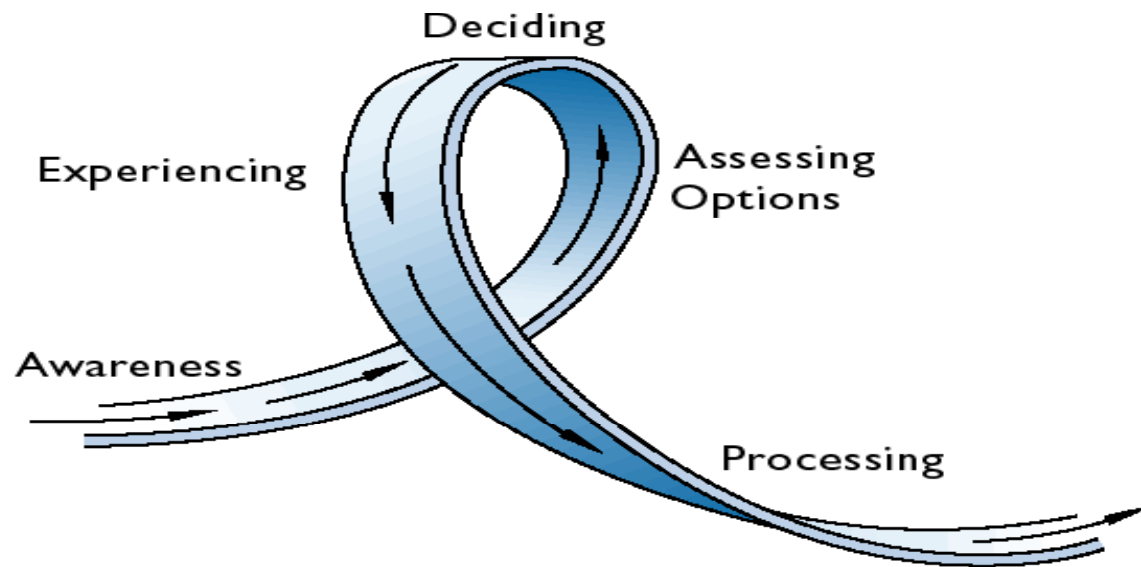
The Emerging Features of ICM

- Learning and adaptation are central to sustained success

- But in low-income nations successful initiatives are not being supported long term

- Success requires the decades of effort required to change societal behavior

- Such change ultimately requires programs that operate at the regional scale

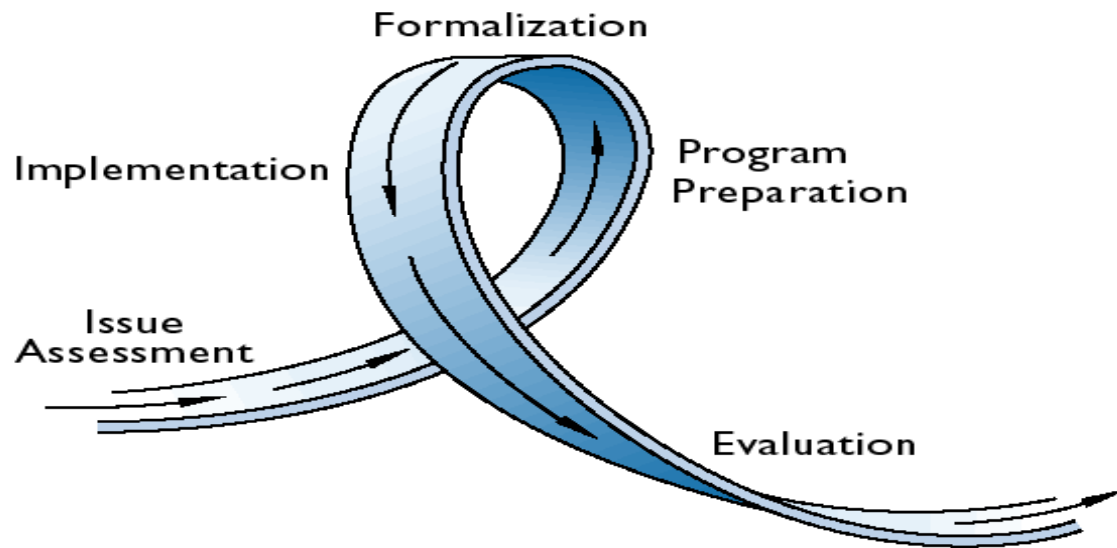- Decentralized authority is most efficient in complex systems

Principle #1:Design for Learning and Adaptation

Expand the scope of a program through a sequence of linked generations of planning and implementation

The Learning Cycle

Deciding

Experiencing

Assessing Options

Awareness

Processing

The ICM Policy Cycle

Formalization

Implementation

Program
Preparation

Issue
Assessment

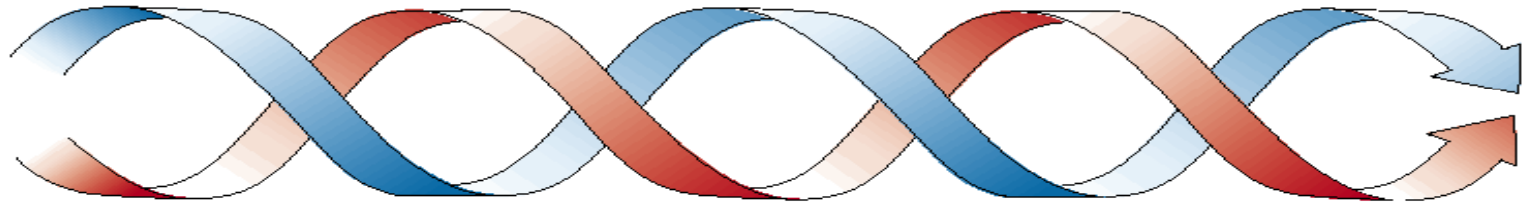Evaluation

The Two Threads of Adaptive Governance

1.) Participatory Democracy. The sustained expression of which is founded on the principles of accountability, fair dealing and transparency in how and why decisions are made.
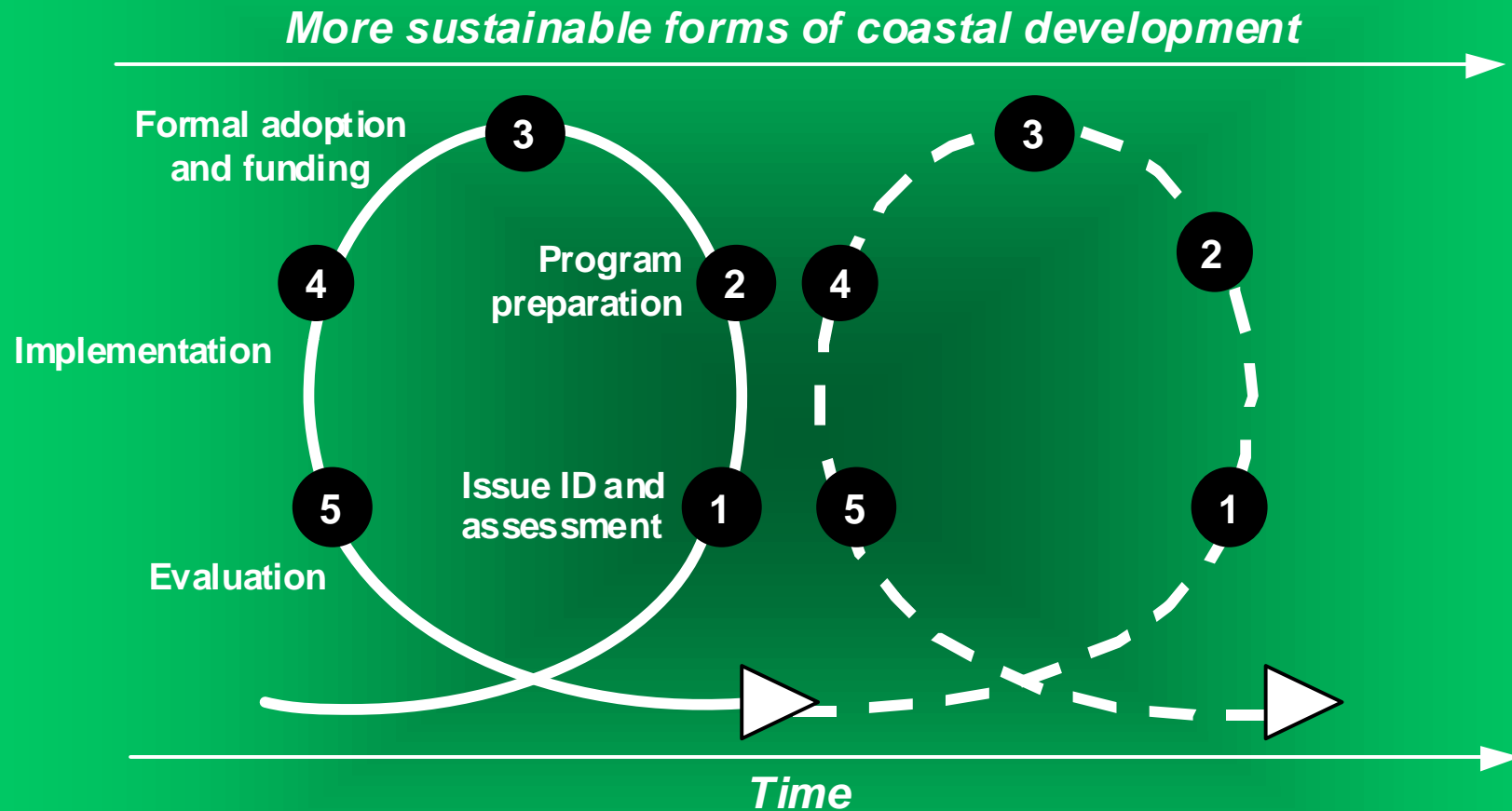
2.) Reliable Knowledge. In which learning accumulates from experimentation with its attendant hypotheses, data gathering, analysis and drawing of conclusions.

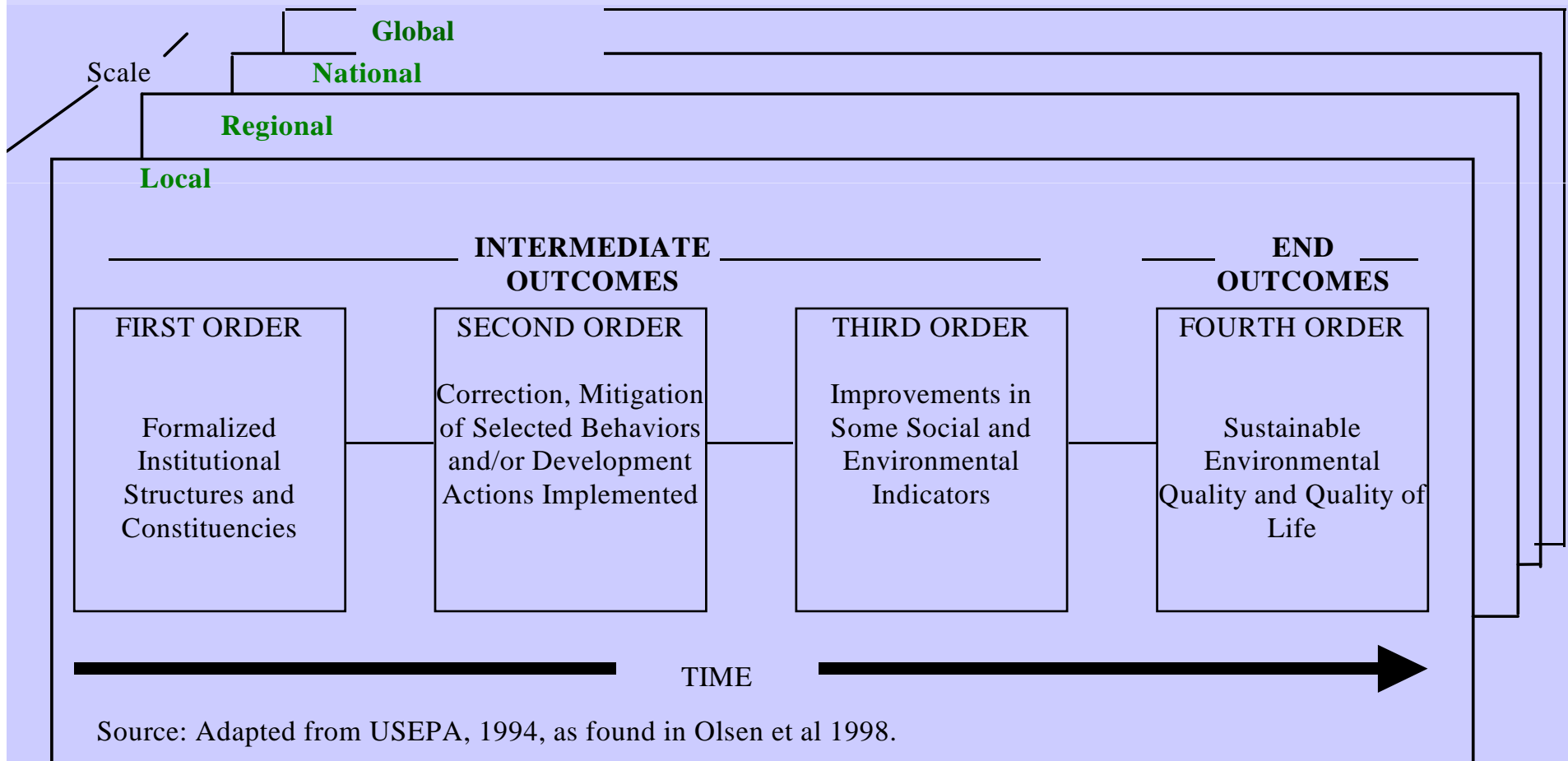# Adaptive Governance combines the two as sustained learning and adaptation.

A Strategic Process for Effecting Change

Progressively larger cycle loops indicate growth in project scope

Questions that Probe the Outcomes of ICM

- Are the enabling conditions for ICM practice in place?
- What impacts is the program having on planning and decision making processes?
- What impacts is the program having on coastal social and environmental conditions?
- Are sustainable conditions being defined?

Orders of Outcomes in ICM

Scale

Global

National

Regional

Local

INTERMEDIATE OUTCOMES

END OUTCOMES

FIRST ORDER	SECOND ORDER	THIRD ORDER	FOURTH ORDER
Formalized Institutional Structures and Constituencies	Correction, Mitigation of Selected Behaviors and/or Development Actions Implemented	Improvements in Some Social and Environmental Indicators	Sustainable Environmental Quality and Quality of Life

TIME

Source: Adapted from USEPA, 1994, as found in Olsen et al 1998.

An Example: Coastal Water Quality Restoration

First Order: Formalized Structures, Constituencies

Research, pilot projects, public education plans, legislation, allocation of funds

Second Order: Correction, Mitigation

Point sources treated/controlled, land use measures implemented, regulations enforced, water quality monitored against goals

Third Order: Selected Quality Gains

Water quality measurably improved, public health benefits, habitat recovery, related human uses expand

Fourth Order: Sustainable Ecosystems and Societies

Sustained good water quality contributes to long term ecosystem and societal well-being

Principle #2: Incorporate the Scientific Method into ICM Practices

- Without experimentation, reliable knowledge accumulates slowly, and without reliable knowledge there can be neither social learning nor sustainable development.

  Kai Lee, 1993

- Science in support of ICM must be management-driven within a structure for solving problems

  GESAMP 1996

But Recognize the Tensions Between Scientists and Resource Managers

"Act before scientific consensus is achieved."

"Rely on scientists to recognize problems, but not solve them."

"Confront uncertainty. Once we free ourselves from the illusion that science or technology (lavishly funded) can provide a solution to resource or conservation problems, appropriate action becomes possible."

After Ludwig et al. 1993

Principle #3: Involve Those Affected

Sustained success in program implementation always relies heavily on voluntary compliance

A Philosophy of Learning

I Hear and I Forget

I See and I Remember

I Do and I Understand

Confucius

A Philosophy of Participation

Go to the people,

live among them,

learn from them,

love them.

Start with what they know,

build on what they have;

but of the best leaders,

when their task is accomplished,

their work done,

the people will remark:

'We have done it ourselves.'

Principle #4: Assure that Program Ownership Lies with the People of the Place

Build constituencies for the program simultaneously at both the national level and within coastal communities

The Two-Track Strategy

- Programs are initiated with community-based "experiments" supported by an interagency council at the highest level of national government:
  - tangible results build constituencies
  - management issues become sharply focused
  - methods of participatory management are worked out at a pilot scale
  - impediments to implementation are quickly discovered
  - The threats of re-allocation of authority at the national level are assuaged

Management or Governance?

<u>Management</u> is the process by which human and material resources are harnessed to achieve a known goal within a known institutional structure.

<u>Governance</u> addresses the policies, laws and institutions by which a set of issues are addressed. Governance defines the fundamental goals, the institutional processes and the structures that are the basis for planning and decision-making. Governance sets the stage within which management occurs.