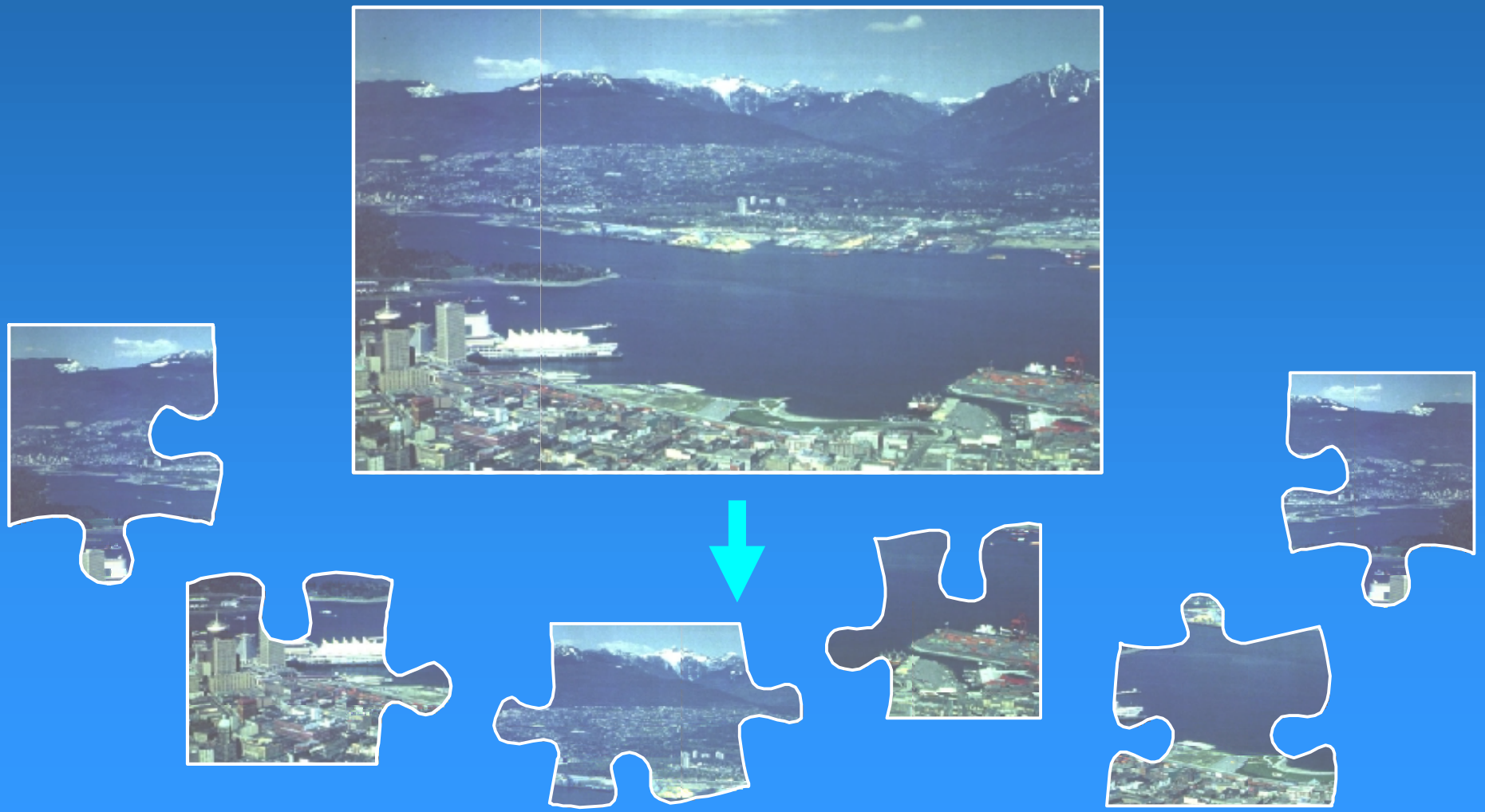
OVERVIEW OF INTEGRATED RESOURCE AND ENVIRONMENTAL MANAGEMENT

MEKONG RIVER COMMISSION
MRC
FOR SUSTAINABLE DEVELOPMENT

Characteristics of Conventional Management Approach

- Examines each resource sector and/or environmental component in isolation (e.g., water, air, forests, fish)
- Focuses on biotic components; limited, if any, consideration of ecological processes (e.g., hydrological process)
- Targets only specific resources of interest; typically those of commercial value
- Conflicting management policies

Pieces of the Management Puzzle



Limitations of the Conventional Approach

- Ignores interdependencies; solution in one sector often causes problems in another (e.g., unsustainable forestry practices can severely impact fishery habitat)
- Jurisdictional and temporal fragmentation; each government agency has own mandate
- Ignores sectors/components which are not well-defined (e.g., who is responsible for protecting groundwater?)

Limitations of Conventional Approach (Cont'd)

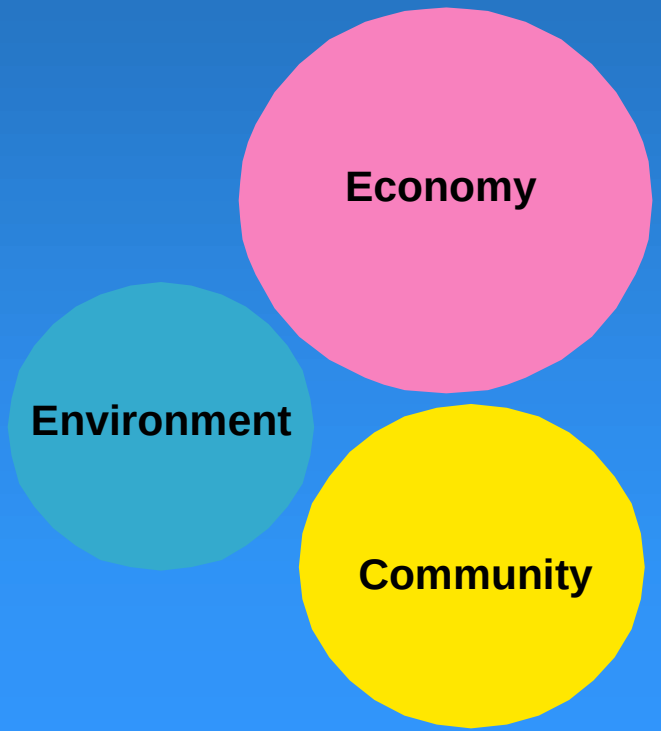
- Ignores impacts to ecological processes unless it directly relates to particular resource being managed (e.g., fisheries)
- Ignores cumulative effects from multiple stressors (i.e., seemingly unrelated development actions and management policies can affect the same environmental receptor)
- IGNORES THE BIG PICTURE!

The Alternative

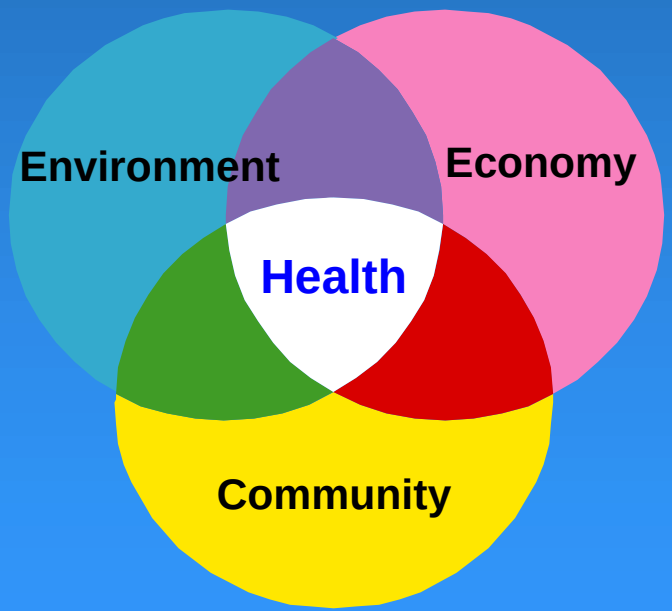
- A holistic and comprehensive approach to resource planning and management that encompasses ecological, social, and economic objectives
- IREM aims to address the entire suite of environmental and socio-economic elements as part of a complex, interwoven system

Conventional versus IREM

Conventional Approach



Integrated Approach



Benefits of IREM

- Long-term protection of resources being managed
- Enhanced potential for non-deleterious multiple resource uses
- Reduced expenditure of energy and money on conflicts over competing uses
- More rapid and effective rehabilitation of damaged ecosystems

IREM Characteristics

- IREM aims to integrate ecological concerns into societal decision making
- Essential that IREM be premeditative (i.e., before land and resource use decisions are made)
- IREM emphasizes visioning and proactive planning - consciously defining and attaining specified desired states - versus merely reacting once problems materialize
- It is just as much prevention as remediation

Dual Perspective of IREM

- Holistic (broad) view: focuses on the system - the interrelationship among elements and considers multiple issues simultaneously
- Focused (narrow) view: concentrated efforts on key areas to achieve system goals as identified in the broad analysis

Long-Term Horizon

- Considers future generations
- Synchronizes environmental management with nature versus conventional social deadlines (e.g., political terms of office, annual budgets)
- Time frames are extended to centuries, rather than months, years and decades
- Combines necessary short-term tactical responses and long-term strategic plans that address fundamental causes of environmental problems

Ecosystem Perspective

- Includes the whole system, not just parts of it
  - uses a broad definition of environment
  - focuses on the interrelationships among the elements and recognizes the dynamic nature of an ecosystem
  - views humans as a part of nature, not separate from it
  - incorporates the concepts of carrying capacity, resilience and sustainability
  - encompasses both urban and rural activities

Ecosystem Perspective (Cont'd)

- Based on natural geographic units, such as watersheds or river basins
- Embraces all levels of activity: local, regional, national, international
- Emphasizes the importance of species other than humans (i.e., a non-anthropogenic view)
- Based on an ethic in which progress is measured by the quality, well-being, integrity and dignity it accords natural, social and economic systems

The Need to be Adaptive

- Surprise, uncertainty and the unexpected are the norm
- Ecological (i.e., human and non-human) systems are in perpetual motion
- It is not possible to anticipate all change and eliminate through management
- Uncertainty should not be reason for inaction
- Management must be flexible and responsive to change

Adaptive Management

- Experimental approach to management
- Continual course adjustments needed as understanding increases and social priorities change
- Communication and interaction among those who design, choose and endure the policies (i.e., environmental managers, decision makers, the public)
- Involves continuous evaluation and modification
- INVOLVES CONTINUAL LEARNING

Barriers to IREM

- The Nature of the Problem (e.g., complexity, uncertainty, wickedness)
- Scientific and Technical
- Economic Constraints
- Institutional Constraints
- Socio-Cultural Constraints

Problem Complexity

Problem complexity stems from:

- the multitude of ecological factors involved in any one environmental issue
- the high level of interaction among ecosystem components; cannot deal with one ecosystem component in isolation
- various dimensions of environmental issues (i.e., ecological, social and economical)
- constantly changing conditions

Uncertainty

Problem complexity is compounded by uncertainty which stems from:

- limited understanding of ecological systems (e.g., sensitivity, ability to absorb change, interrelationships)
- limited experience and understanding with interactions between ecological, social and economic systems

Wickedness

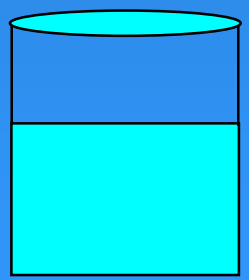
- Environmental problems are sometimes referred to as wicked or ill-structured
- In contrast to tame problems which are structured, well-defined and bounded, wicked problems may be definable and answerable but often cannot be effectively resolved due to time or resource constraints
- Wicked problems are extremely challenging because there is rarely one correct solution

Over-Reliance on Science and Experts

- Science and expert opinion are considered essential for sound environmental decision making
- Focus on scientific perspective have meant that other potential inputs have been under-valued and under-utilized (e.g., traditional ecological knowledge, public opinion, social science)
- Why do we regard science as providing the sole cognitive authority?

Focus on ‘Technical’ Dimension

- Focus on scientific technical dimension has also meant that insufficient attention given towards examining underlying values
- Science cannot attach meanings to observations; these are based on values



Science: The glass has 250 mL of liquid

Value Statement: The glass is sufficiently full

Over-Reliance on Science and Experts (Cont'd)

- Insufficient attention given towards developing strategies for addressing scientific limitations

  For example,

  - Conventional scientific practices are limited in their ability to address problems at the ecosystem level (i.e., an absolute scientific diagnosis of ecosystem health is highly unlikely, especially in large water bodies)

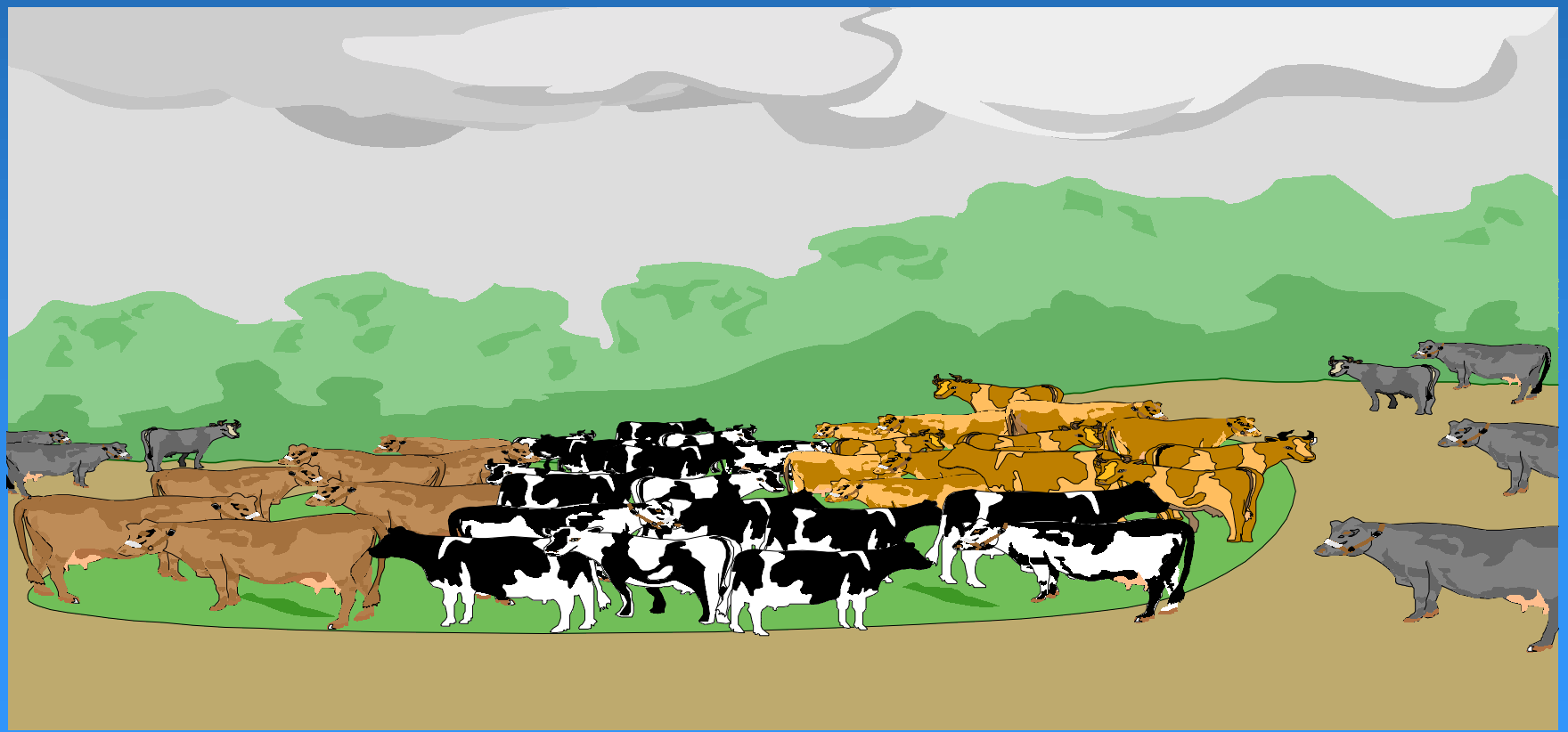
Economic Constraints

- Lack of resources
  - high cost of rehabilitating damaged or impacted ecosystems
  - insufficient resources dedicated towards integrated management
- Lack of incentives and disincentives to prevent market failures (e.g., managing the 'Tragedy of the Commons')
- Failure to consider non-market value of natural resources

Insufficient Resources

- Poverty and hunger are today's crisis - it is difficult to allocate resources to long-term protection of the environment when human lives are threatened today
- Resources for environmental efforts are typically allocated to individual agencies - since resources are extremely limited, agencies focus on addressing their respective single-agency priorities

Managing the ‘Tragedy of the Commons’



Managing the 'Tragedy of the Commons' (Cont'd)

- Individuals pursuing their own interests often produce unacceptable collective effects on common resources
- Not addressed by conventional economic market model; open entry prevails
- Managing collective interests over individual pursuits is becoming increasingly difficult
  - greater demands per individual
  - population growth

Market Failures

- Predominance of monetary valuation (i.e., market values of natural resources as commodities) effectively excludes non-market values
- Failure to capture non-market values (e.g., value of forest as wildlife habitat versus market timber prices) biases cost-benefit calculations
- Externalities (i.e., an effect of one economic actor's activity on another's well-being) are not taken into account in the price system

Sectoral Structures

- Predominantly sectoral organization of government (e.g., fisheries, wildlife, water resources, pollution control) means that natural resources are often managed independently (i.e., management is compartmentalized)
- Sectoral approach generally effective for well-defined issues but ineffective in addressing ecosystem-level issues (i.e., complex or wicked problems are broken down into parts for resolution but difficult to recombine pieces afterwards)

Fragmented Legislation

- Weaknesses of sectoral management structure are exaggerated by fragmented legislation which is typically resource or activity-specific (e.g., fisheries, industry, water quality)
- Mandated to enforce legislation, government agencies subsequently adopt piecemeal approaches; discourages holistic responses
- Narrowly-defined agency mandates undermine collaborative efforts and can lead to conflicting policies and management strategies

Political and Governmental Processes

- Discontinuity (i.e., political and/or civil service changes) in government is disruptive and inhibits long-term, holistic management approaches
- Conventional government practices are:
  - reactive/focus on short-term products and results (e.g., ‘quick fixes’)
  - focus on concrete products; intangible benefits (e.g., increased coordination, improved decision-making process) are almost always undervalued

Lack of Interdisciplinary Perspective and Expertise

- Society has institutionalized disciplines
- Problems are often framed in discrete compartments:
  - an ‘Economic’ problem
  - a ‘Fisheries’ problem
- Result: Problems are framed narrowly and there is a limited knowledge base and lack of tools for holistic assessment

The Tool Box

Practical tools commonly applied in IREM are:

- Environmental Planning and Policy
- Environmental Impact Assessment (EIA)
- Environmental Management Systems (EMS)
- State of the Environment (SoE) Reporting
- Environmentally Sensitive Area (ESA) Management

Environmental Planning and Policy

- Allows governments to guide development activities in order to maximize social and economic benefits while avoiding or minimizing undesirable impacts
- Land use planning policy dictates where developments such as urban, industrial, rural, and natural resource use can occur, and establishes development guidelines
- Local zoning ordinances can be written to limit or exclude certain types of development near water bodies or ecologically sensitive areas

Policy Instruments

Four main categories:

- Regulation
- Voluntary
- Government expenditure
- Financial incentives

Two target populations:

- General public
- Individual firms or industries

Regulations

- Include laws, licenses, permits and standards
- Make up the largest number of environmental protection measures
- Example: water quality standards are regulations that limit the type and amount of pollutants that can be discharged into a receiving water body or in a waste effluent stream
  - The standards should be designed to complement environmental management objectives

Voluntary Actions

- Actions taken by individuals, groups or industries to protect the environment, without being forced by law or persuaded by financial incentives
- Example: voluntary recycling, voluntary clean-up of an urban neighborhood, ‘green’ consumerism
- The voluntary adoption of an EMS such as ISO 14001 is one of the most significant environmental protection options available to industry

Government Expenditure

- The use of public money in the form of subsidies or grants provided by government to households and industry sectors
- Example: tax allowances provided to industry as incentives to reduce pollution or provision of grants to fund research into more effective pollution controls

Financial Incentives

- These are designed to discourage environmentally damaging activities by making them more expensive
- Example: increasing taxes on industrial polluters - ‘polluter pays principle’

Institutional Arrangements

- Functional institutional framework is crucial to implementation of plans and policies
- Integrated management necessitates a strong context for implementation
- Institutional characteristics necessary for successfully implementing IREM are:
  - legitimacy
  - inclusiveness
  - coordination/collaboration

Environmental Impact Assessment

"A process which attempts to identify and predict the impacts of legislative proposals, policies, programs, projects and operational procedures on the biophysical environment and on human health and well-being.

It also interprets and communicates information about those impacts and investigates and proposes means for their management."

(CEARC, 1988)

EIA as a Management Tool

- Like economic analysis and engineering feasibility studies, EIA is an important management tool for guiding decisions
- EIA provides information regarding potential adverse environmental impacts and available mitigation measures; armed with this knowledge managers and decision makers can determine how best to proceed.
- EIA is equally important as a tool for guiding planning initiatives and other policy development

EIA Cornerstones

- Apply to all types of development activities (e.g., projects, plans, policies or programs)
- Consideration of changes over various time spans and spatial scales
- Consideration of social and cultural viewpoints in addition to scientific opinions
- Identify and communicate potential impacts to interested parties and encourage thoughtful discussion and problem solving

EIA and Decision Making

- Timing: EIA conducted early in project cycle
- Disclosure: transparency, access to information
- Weight: results guide decision making process
- Revisions: project design revised to include feasible mitigation measures or less damaging alternatives, as appropriate
- Mitigation: agreed-upon mitigation measures are implemented
- Monitoring: follow-up monitoring undertaken and acted upon

What are Environmental Management Systems?

- EMS is the part of an organization's management structure which addresses the immediate and long-term impact of activities, products, services and processes on the environment
- An effective EMS is essential to an organization's ability to anticipate and meet growing environmental performance expectations and to ensure ongoing compliance with national and international requirements

Elements of the EMS Framework

- Clearly defined policy
- Assignment of roles, responsibilities and resources
- Objectives and targets based on environmental significance and legal requirements
- Action plans and programs to meet objectives
- Efficient documentation and information system
- Procedures for monitoring and evaluating program implementation

ISO 14001

- The International Organization for Standardization has developed this EMS standard to offer a structured means for organizations to set environmental goals and assess their progress towards those goals
- Compliance with the ISO 14001 standard is becoming increasingly valued in the international marketplace
- Demonstrates voluntary commitment by organizations (e.g., industry) to improving their environmental performance

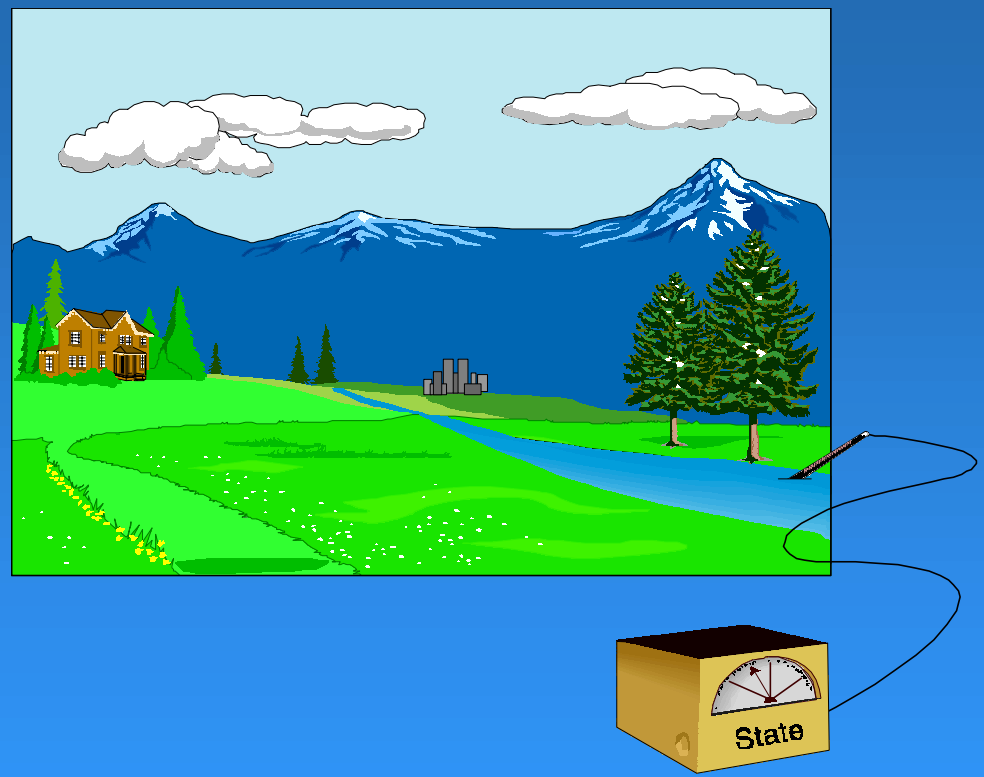
State of the Environment Reporting

- Provides a comprehensive and holistic assessment of status and trends in environmental conditions
- Informs interested parties as to whether environment conditions have improved, remained stable, or deteriorated over a defined time period
- Guides policy development (e.g., reveals priority areas, indicates level of effort required, identifies data gaps)

Fundamental Questions

- What is happening in the environment?
- Why is it happening?
- Why is it significant?
- What are we doing about it?
- What environmental trends are occurring?

Measuring the State of the Environment



There is often no quick and easy way to assess status and trends.

Characteristics of Good Indicators

- Relevant and representative
- Scientifically credible
- Responsive to change
- Quantifiable (e.g., below or above a target)
- Data collection is cost effective
- Easy to communicate and understand
- Comparable with other regions and/or countries

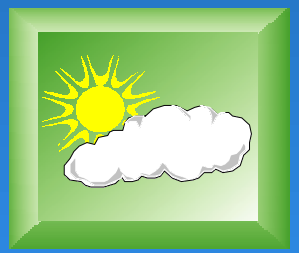
Examples of SoE Indicators

Wildlife Population

Protected Areas

Fish

Water Quality



Greenhouse Gases

Example SoE Report for the MRB

THREATENED

- Forests
- Water
- Ecological Systems

What is Environmental Sensitive Area Management?

- ESA is a management tool that is used to protect specified areas through land or water use designations (i.e., provides a mechanism for protection)
- Process by which managers can identify and prioritize areas for conservation and protection
- Involves management of an area that warrants special attention to preserve and maintain its ecological structure and function

ESA Identification Criteria

- Size
- Diversity
- Vital Ecological Function
- High Quality Communities
- Rarity
- Fragility/High Sensitivity
- Representative
- Aesthetics
- Intrinsic Appeal
- Scientific Research

ABC Method

ABIOTIC	BIOTIC	CULTURAL
• Landform • Dranage nework • Soil type • Floodplain mapping • Erosion susceptibility • Earthquake susceptibility • Aquifer areas	• Vegetation cover • Fish habitat • Wildlife habitat • Bird and other wildlife distribution • Rare and endangered species • Biotic communities	• Archaeological sites • Historic sites • Land zoning • Scenic areas • Recreation

Application of IREM Tools in Lower Mekong Basin

	EIA	EMS	ESA
Cambodia	Yes	Not Yet	Yes
Lao PDR	Evolving	Not Yet	Yes
Thailand	Yes	Yes	Yes
Vietnam	Yes	Yes	Yes

Concluding Thoughts

Important points to remember are:

- Fundamental shift is needed in conventional (i.e., traditional) resource management practices
- IREM represents an alternative management strategy which focuses on interrelationships among ecosystem components
- Practical IREM tools such as EIA, EMS and ESA have been under-utilized to date by government and industry in meeting environmental performance requirements