Report of the First Training Workshop for Local Government Officers
Coastal Development vs. Protection of Marine Environment:
How to Make A Decision?

Reducing Environmental Stress in the Yellow Sea
Large Marine Ecosystem
UNDP/GEF Yellow Sea Project

Jeju, Korea, 25th to 27th September 2006

About this publication:

This publication contains the report of the "Training Workshop for Local Government Officers Coastal Development vs. Protection of Marine Environment: How to Make A Decision?," under the UNDP/GEF Project, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem." Conducted as one of the Project's public awareness activities, the Workshop targeted local government officials in the Yellow Sea's coastal provinces and cities in order to strengthen their capacity to address the coastal and marine environmental issues in the Yellow Sea. The Workshop focused on the Multi-Attribute Decision Analysis (MADA) as one way to approach the decision-making process that by integrating various issues relevant to coastal development. This report includes a summary of the Workshop as well as the lecture materials.

For reference purposes, this report may be cited as:

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REDUCING ENVIRONMENTAL STRESS IN THE YELLOW SEA LARGE MARINE ECOSYSTEM

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UNDP/GEF PROJECT ENTITLED "REDUCING ENVIRONMENTAL STRESS IN THE YELLOW SEA LARGE MARINE ECOSYSTEM"

UNDP/GEF/YS/LG.1/3
Date: 27 September 2006
English only

Training Workshop for Local Government Officers
Coastal Development vs. Protection of Marine Environment: How to Make A Decision?

Jeju, Korea, 25-27 September 2006

Report of the Meeting

Summary of the
Training Workshop for Local Government Officers
Coastal Development vs. Protection of Marine Environment:
How to Make A Decision?

The *"Training Workshop for Local Government Officers Coastal Development vs. Protection of Marine Environment: How to Make A Decision?"* was organised in Jeju, Republic of Korea, from 25-27 September 2006, as one of public awareness activities of the UNDP/GEF Project on "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem (YSLME)."

With assistance of the National Project Co-ordinators and National Focal Agencies in identifying participants, the Conference was attended by 16 participants from the Yellow Sea's coastal provinces and cities: 7 officials from China and 9 officials from Republic of Korea. Professional scholars and researchers with expertise in decision analysis, coastal zone management, and conflict resolution were invited as lecturers from prominent academic and research institutions in Korea. A list of the participants as well as the lecturers is attached as Annex I to this report.

The Workshop, focusing on the Multi-Attribute Decision Analysis (MADA) approach, provided the participants with an opportunity to gain practical skills to address coastal development issues in a holistic manner, which might greatly affect the environment as well as the society. Through lectures, computer exercise, and group work, the participants deepened their understanding about the process and techniques of decision-making and conflict resolution in order to secure high-quality planning and its implementation for both coastal development and environmental protection.

The Conference was conducted in English, and a simultaneous interpretation service was provided for two local languages: Chinese and Korean.

1. Objective of the Workshop

1.1 The objective of this workshop was to familiarise the officials with the concept and tools to make rational decisions for both coastal development and marine environmental protection.

1.2 It was expected that the participants would obtain practical skills to:

- incorporate various coastal development issues with conflicting objectives into decision-making; and
- solve conflicts among different stakeholders about coastal use.

2. Contents of the Workshop

2.1 The workshop focused on the Multi-Attribute Decision Analysis (MADA) as one of the approaches to integrate into the decision-making process, various issues—economy, environment, and society—relevant to coastal development.

2.2 The workshop consisted of lectures, computer exercise, and group work. The lecture topics included:

- Decision-making process;
- MADA approach;
- Conflict resolution of coastal use; and
- Integrated approaches for marine protected areas.

2.3 The computer exercise, using the software called, “Expert Choice,” provided an opportunity to practice Analytic Hierarchy Process (AHP), one of the qualitative techniques under the MADA approach.

2.4 During the group work followed by presentation of each group’s result, the participants engaged in a role-playing exercise, applied the decision-making techniques, and developed plans to use coastal resources.

2.5 The participants highly appreciated the organisation of such a training workshop, and indicated that the conflicts between marine environment protection and development activities were major problems for the local government officer. The training workshop provided additional useful tools to the regular ways to make a decision, which will be relevant to the current work in planning and approving coastal development activities faced daily by the local government officer

2.6 It was further noted that from the workshop, the participants realised a clearer understanding of the decision making process, and how to make more reasonable decisions. With the MADA, and associated computer software, their daily work may become more scientifically sound.

2.7 The lecture materials and the group presentation materials are attached to this report as Annex II and Annex III, respectively.

2.8 To organise the activities mentioned above, prominent scholars and professional researchers were invited as follows.

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3. Outcomes of the Workshop

3.1 Through the workshop, the participants obtained practical skills to design development plans in harmony with marine and coastal environments and to solve conflicts among relevant stakeholders.

3.2 Moreover, it is noteworthy that the participants deepened their understanding and knowledge about environmental protection issues through mutual learning and co-operation with other participants from different cities, provinces, and countries.

3.3 A questionnaire completed by the participants of the workshop revealed that:

- All the participants thought that the workshop was useful. Half of the participants (8 people) replied it was "very useful," so they will put into practice the techniques they learned.

- Most participants thought more information on practical application such as exercises and examples would be useful.

- Given a tentative theme for the next workshop, "Marine Environmental Legislation and Enforcement," many participants felt that focusing on management skills would be beneficial.

3.4 The summary of the survey results as well as the questionnaire is attached as Annex IV.

Annex I

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Annex II

Lecture Materials

Decision-Making Process and Multi-Attribute Decision Analysis Approach

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How to make better Decisions?
: Decision making process

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Nothing is more difficult and therefore more precious,
than to be able to decide

- Napoleon Bonaparte (Maxims, 1804)

Agenda

- 0. Decision and Decision Analysis?
- 1. Good outcome vs. good decision
- 2. High-quality output requires a good process
- 3. Essence of Decision-Making
- 4. Decision Analysis Cycles
- 5. Six dimension of decision quality
- 6. Decision Analysis?

What is a Decision?

- Conscious, irreversible allocation of resources with the purpose of achieving a desired objective.
  - Conscious
    - You are thinking what you are doing
    - Breathing
  - Irreversible
    - Amputation of an arm?
    - Some can be reversed with loss of time, money or ...
  - Desired objective
    - Amputation of an arm to save a life

What Makes a Decision Difficulty?

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- What kind of decisions?
- Sleepless CEOs
- Concerns

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Cingular's $41 Billion Offer Wins Bidding for AT&T Wireless

The New York Times **Business**

By ANDREW ROSS SORKIN
Published: February 17, 2004

Singular Wireless, the second-largest wireless telephone operator in the United States, made a stunning $41 billion last-minute bid early today to win the auction for AT&T Wireless. The deal would reshape the ferociously competitive mobile telephone market and create the largest United States wireless carrier.

The outcome is a dramatic turn of events because it had appeared late on Monday night that AT&T Wireless, the third-largest wireless operator in the United States, had all but clinched a deal with the Vodafone Group of Britain. Vodafone indicated on Monday evening that it was willing to raise its $38 billion bid to nearly $40 billion and had scheduled a meeting of its board for this morning to approve the new offer.

Meanwhile, Cingular steadfastly refused to increase its offer. Some executives working on the deal for Cingular even said that making a higher bid would be fiscally irresponsible. By late Monday, Cingular had sent its executives and advisers home believing that they had lost.
But in a daring game of brinkmanship, Cingular's parent companies, SBC Communications and BellSouth, hastily convened board meetings by conference call at about 1:30 a.m. New York local time - in some cases, waking the directors up - after the companies learned that AT&T Wireless did not expect to complete a deal with Vodafone until the morning, creating a potential window of opportunity for a last-ditch attempt.

Both boards, which had long sought to merge Cingular with AT&T Wireless, decided that they could not pass up on the chance and approved the submission of a final knockout offer while most of Vodafone's management and board were still sleeping.

Cingular submitted its final bid of $15 a share - far higher than anybody ever expected the auction would go - to AT&T Wireless at slightly after 2 a.m. The take-it-or-leave-it offer was accepted and approved by AT&T Wireless at nearly 3 a.m., blindsiding Vodafone just as it was about to begin its own board meeting this morning in Britain.

What is Decision Analysis?

- Decision analysis (DA) is a “prescriptive approach designed for normally intelligent people who want to think hard and systematically about some important problems,

  Keeney and Raiffa, 1976.

Prescriptive Nature of DA

- “Decision analysis is the best way I know for thinking about how to make a decision.”

  Ronald Howard, 1966.

DA Approach: Sport Coach

- Sports coach knows the natural mistakes of untrained athletics & smart strategies for playing games.
  - Most people are self-trained in decision-making without formal training
- Teaching excellent way of making decisions can be done by
  - How people have to make decisions based on the axioms that people take reasonable
    → Normative Approach
  - How to avoid typical behavioral mistakes that DM makes
    → Descriptive Approach
  - How to help people who want to think systematically
    → Prescriptive Approach

Value of Decision Analysis

- Provide analytical tools which facilitate the required thinking.
- Provide decision maker (DM) a clear **understanding** and **insight** of the problem through the analysis
- Provide a confidence in his/her decision.
- Provide an approach for defensible decisions.

1. Good Decision and Good Outcome

- One of the most important distinctions in DA
- You judge the quality of a decision **BEFORE** knowing the outcome
- It is not what people normally think!
  - "If it turned out bad, it must have been a bad decision."
  - "I drove drunk and made it home safely. What's so bad about that?"

Good Decision for Better Chance of Good Outcome

Quality of Decision \ Quality of Outcome	Good	Bad
Good	Driving sober and arriving safely	Driving sober and getting into an accident
Bad	Driving drunk and arriving safely	Driving drunk and getting into an accident

Example

Suppose that you can choose between deal A and B ..

- Certificate for Deal A
  - Flip a coin, When it lands and “Head”, you win \100,000.
  - Otherwise you win nothing
- Certificate for Deal B
  - A die is rolled. When the side facing up is a “One”, you win \ 100,000.
  - Otherwise you win nothing

- "Whether my decision is good or bad depends on how I make it - not on the outcome.“

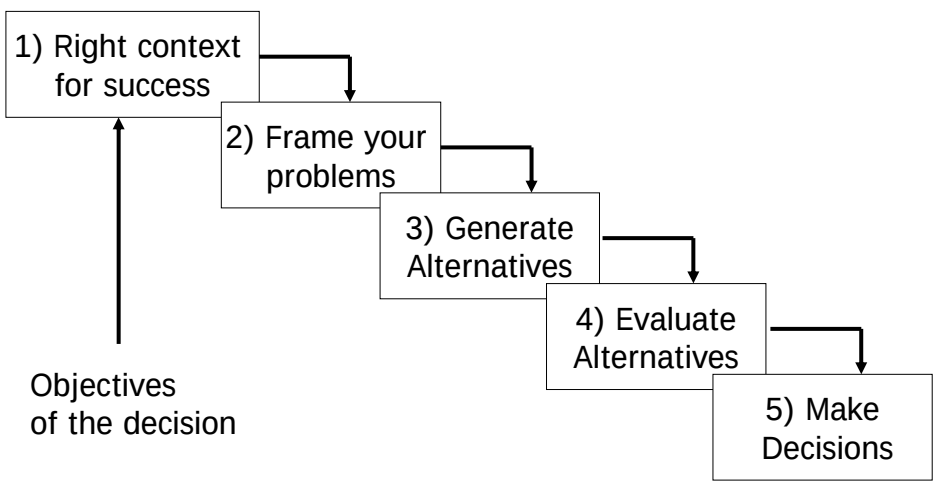
  - Decision Education Foundation

2. High-quality output requires a good process

- Being smart or hardworking does not ensure the quality or quantity of output. It will be haphazard in the absence of an effective process, whether you are producing an automobiles or making decisions.
- When the process is right, quality will improve. If you adopt an effective process and train people in its use, output will improve and will be consistently good. If you continually improve the process, the output will continue to improve

From the Harvard Business Essentials,
Decision making, 2006, pp. 5

3. Essence of Decision-Making



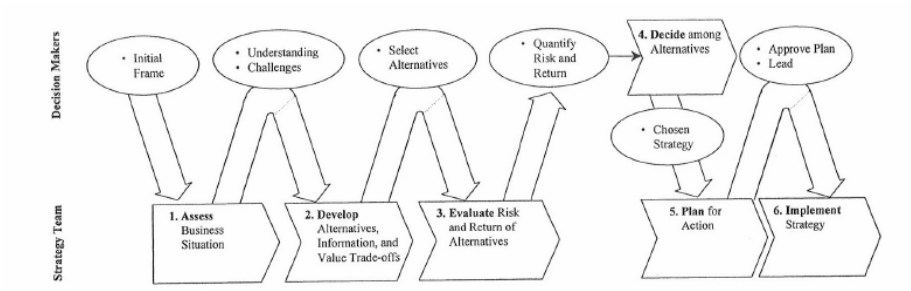
1). Right Context for Success

- Context for setting stage for quality and successful decision:
  - Context is …
  - Environment of interpersonal relationships and behaviors within which ideas and data are considered and decisions are made
- Try to establish a healthy and right context
  - Right People to Participate
  - Physical Environment
  - How decision is made?

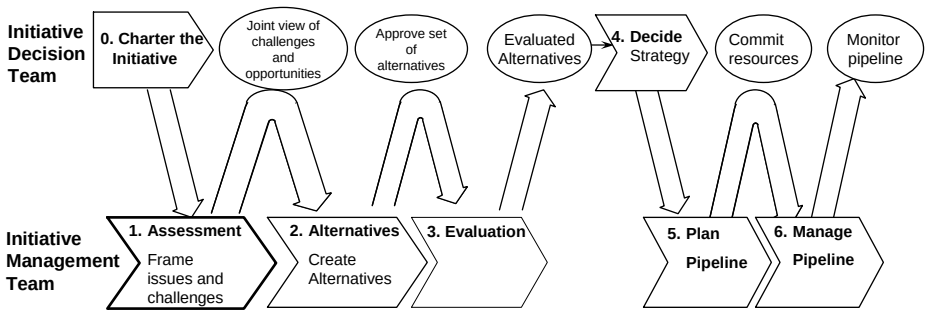
Right People to Participate

- Who to include?
  - People with authority to allocate resources and make decisions
  - Key stakeholders
  - Experts
  - Opponents
  - Proponents
  - With the size of no more than 6 or 7.

Example: Decision Dialog Process



Example: New Product / Process Development



Physical Environment

- Meet in physical locations that encourage creative thinking
  - Rather than supervisor's office
  - Conference room, off-site location, furniture re-arranged for face to face discussion.

How decision is made?

- Agree on how the decision will be made
  - Consensus
  - Qualified consensus
    - If failed, ...
  - Majority
    - Groups votes and majority wins
  - Directive leadership
    - When?

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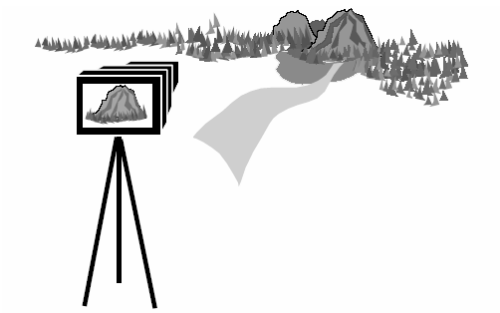
2). Framing your problems

- Frame is a mental window through which we view a particular problem.
- Therefore, it is a limited description of a problem that filters what is relevant



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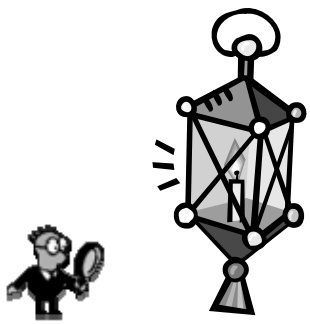
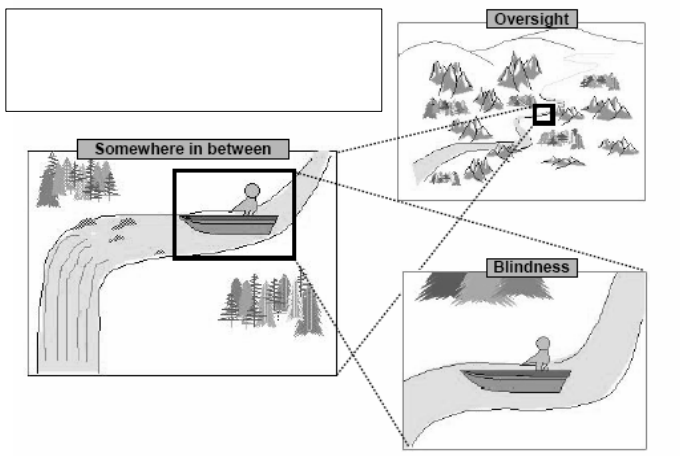
Issue of Framing – Right Problem?

- Are you solving *right* problem?
- Statistical Error:
  - Type I error: Reject right hypothesis (H_0), and accept wrong hypothesis (H_1).
    - Ex: Give medical treatment to person who is healthy.
  - Type II error: Without accepting right hypothesis (H_1), accept wrong hypothesis (H_0).
    - Ex: Even though a person is sick, he is told to be healthy
- Framing Error: Type III error:
  - Trying to solve wrong problems

“I lost My Key!”



Issue of Framing - Right Level?



Issue of Framing - Imposed

- A toy manufacturer has a customer support phone line to answer questions about how to assemble its products.
  - The volume of customer calls has increased so much that support personnel cannot keep up with them. Customers have complained of waiting half an hour to get help.
- A manager responsible for the support line has put together a team to help him decide on the best way to address the issue.

j9 j10

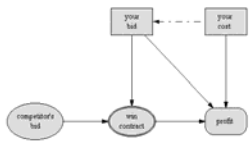
Never accept the initial frame

- " We have a serious problem with our customer support line. Customers are waiting too long for service. We need to fix it".
  - How can we reduce response time – for example, adding more representatives, hours of service, automated call distributor, etc?.
- Exercise
  - Creative alternatives?

Influence Diagram

- After setting frame, a tool for structuring decision problem
- 영향도, Decision Diagram, Relevance Diagram

- A Graphical tool used to capture the essence of a problem
- Facilitate communications among multi-disciplined teams and the decision board



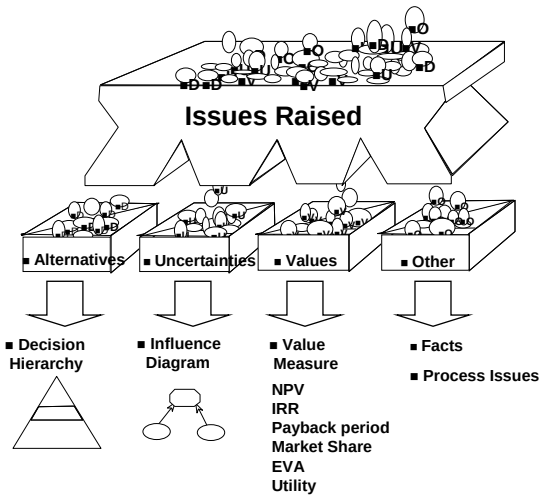
3). Generate Alternatives

- Creative and doable alternatives are preconditions for any decision,
  - James Matheson, Smart Organization

- Brainstorming
  - A technique used generate alternatives
  - No judgment in eliciting ideas and issues in the beginning
  - Later, categorize the issues and generate alternatives and other relevant elements for decision modeling

Categorization of Issues

- Issues with decisions, uncertainties, values, and others



Characteristics of Good Alternatives

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- Broadly constructed
  - Not a simple minor variation
- Genuine
  - No “straw man” alternative to make other alternative look strong
- Feasible
  - Saves the time for evaluation
- Sufficiently many
  - Want to evaluate enough alternatives to give a full range of options

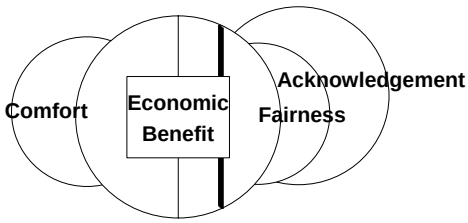
Try to Generate Creative Alternative

- Develop a third option satisfying conflicting interests

- **Zero Sum? (Fixed Pie)**

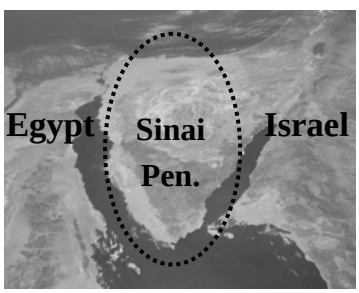
VS.

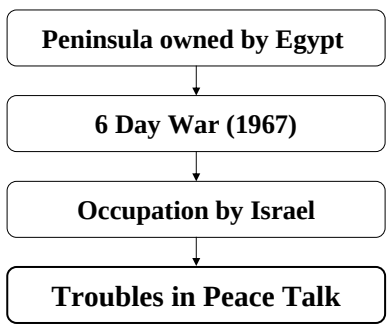
- **Positvie Sum? (Growing Pie)**



Sinai Peninsula

- Pie can be Increased with new alternative





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Six Day War

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Egypt and Israel Peace Negotiation ('78)

	Egypt	Israel
Position	100% Return	Willing to return some part
Interest	Restoring Self-Esteem	Safety
Creative Option	100% Return and Establish Safety Zone (UN)	100% Return and Establish Safety Zone (UN)
Result	Conflict Resolved	

4). Evaluate Alternatives

- Quantitative Approach
  - Uncertainty
    - Probability as an exact language for communicating uncertainty
    - Decision Tree Analysis and Influence Diagram
  - Multi-Attribute problem
  - Complexity and Dynamics
    - Mathematical Modeling Approach
  - Many tools
    - Financial analysis tools like NPV, IRR, Payback period, etc.
    - Real option evaluation tool
    - Simulation tools

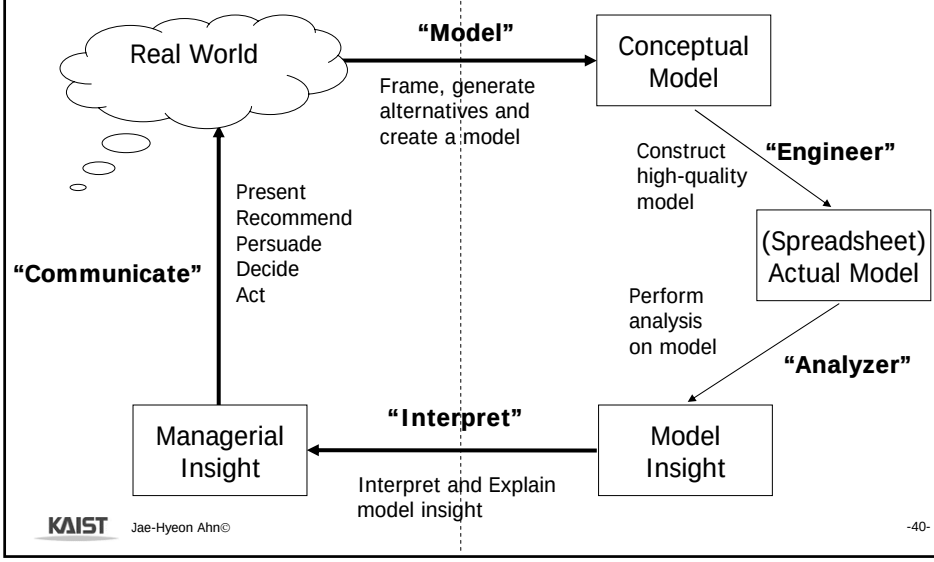
4). Evaluate Alternatives – con'd

- Qualitative Approach
  - AHP (Analytic Hierarchy Process)

5). Make the Decisions

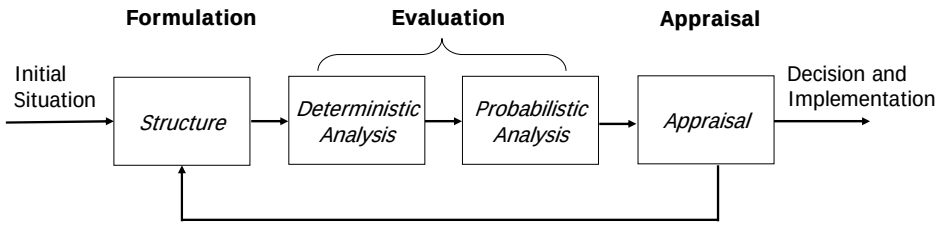
- Non-Probabilistic Method
  - Optimistic approach (max max)
  - Conservative approach (max min)
  - Minimax regret approach
- Probabilistic Method
  - Dominance
  - Expected Value Decision Criterion
- Human foibles:
  - Inherent human errors in decision-making: Decision Traps

Decision Making Process from the Modeling Perspective



4. Decision Analysis Cycles

- Most practical and engineering approach

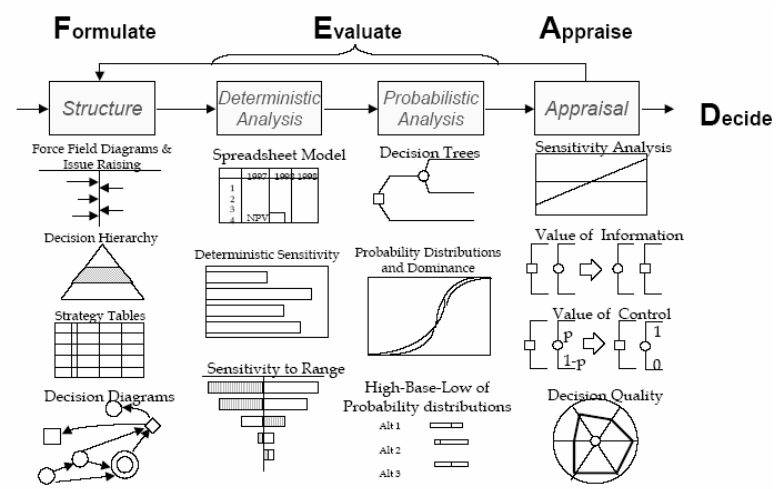


• Formulation stage raises important issues, frame the problem, creates wide range of alternatives, and provides framework for evaluation

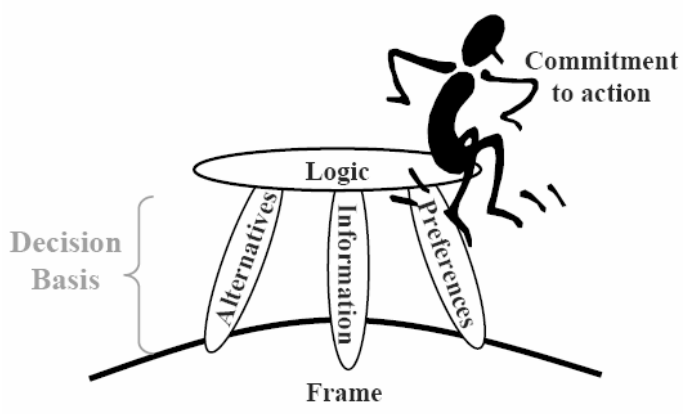
• Evaluation stage compares opportunity vs. risk for each alternative: Deterministically and Probabilistically

• Appraisal stage understand what is the driving forces for the decision, improve the model, and finally generate insight.

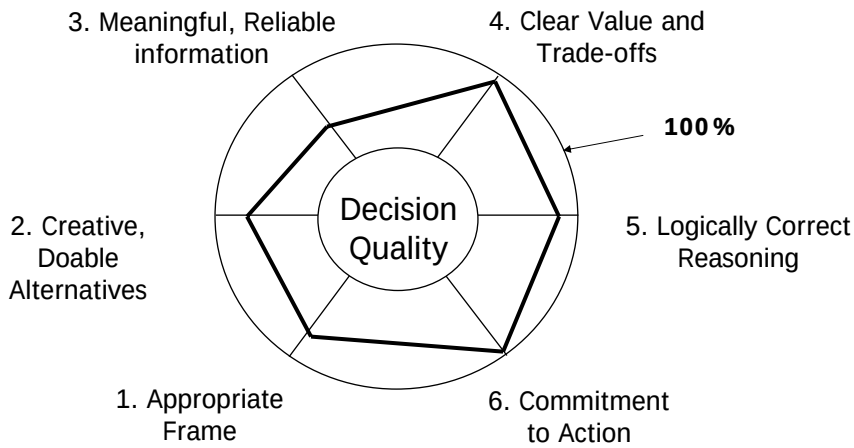
Decision Analysis Cycles and Tools



5. Six Elements of Decision Quality



Decision Quality



100%: No further improvement is justified.

Decision Quality -Description

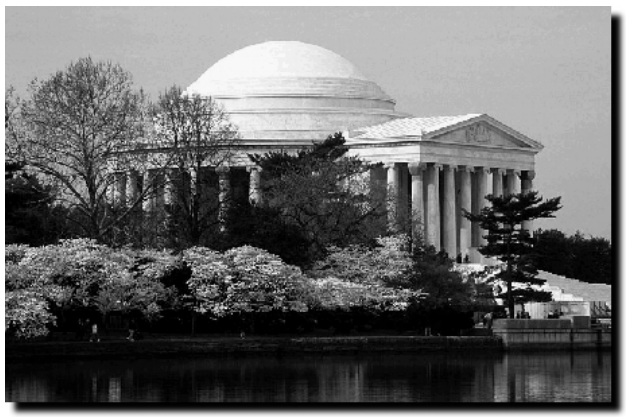
Appropriate Frame	Creative, Doable Alternatives
I. Do not simply accept the problem as first presented II. Frame strategic and operational problems differently III. As the strategic level, approach R&D activities as long-term investments, not as expenses Iv. Include multiple perspectives in establishing the decision frame	I. Separate the creation of alternatives from their evaluation. (Generate a good set of alternatives) II. Each alternative should be specified in sufficient detail to be clear, but not enough to be cumbersome. III. Generate alternatives that are significantly different, spanning the range of possibilities.
Meaningful, Reliable Information	**Clear Values and Trade-offs**
I. Understand the drivers of uncertainty. II. Be clear. Do not confuse ambiguity with uncertainty. III. Express uncertainty as ranges and probability distribution – not as point estimates. Iv. Use the best experts with the least bias. v. Focus on the information material to the decision.	I. All alternatives should be valued in terms of the same measure. II. Metrics for means objectives should either be avoided or be clearly defined as a surrogate for an end objective. Intangibles should be valued explicitly. III. The effects of strategic decisions should be traced through business activities to cash flows. Iv. Cost of capital, not adjustments for risk, should be used at the discount rate in calculating the time value of money. v. The expected value should be taken across many scenarios to value uncertain prospects.
Logically Correct Reasoning	**Commitment to Action**
I. Shift from political and advocacy logic to a scientific and systematic search for value based on evidence. Use the tools of decision analysis to clarify and illuminate key issues, not to defend points of view. II. Require an open process. Subject the inputs and analysis to critique and review. III. Use a rigorous quantitative process. Iv. Use initial insights to focus later efforts. Start with simple models. Use fine scales, and various forms of sensitivity analysis, to inspire better alternatives, focus attention on critical information, and clarify value measures.	I. Both decision makers and implementers should be included in the decision making process. II. Decision quality, trust, and confidence must be built during the process. It cannot be injected in at the end. "Official blessings" are not a substitute for the personal commitment of decision makers and implementers. III. Quality in the other dimensions is required for wide based commitment.

6. Decision Analysis?

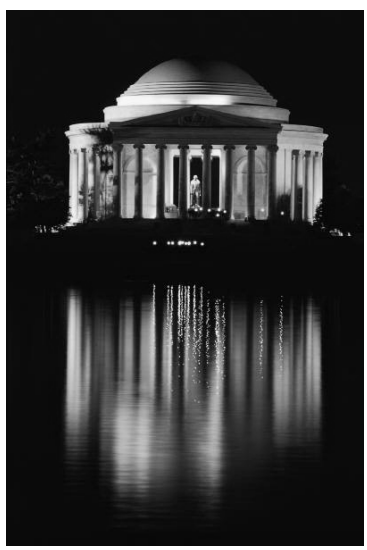
- It is about understanding the given problem better with systematic process
  - As a result, draw insights on the problem
  - Decision tree, Tornado D.ID, ..., are useful tools
- Find better creative alternative!
  - Based on the insight from the analysis and understanding
  - “Choice” is choosing between A and B. “Decision” is regarding the process to find better creative alternative “C”.

Jefferson's Memorial

- Thomas Jefferson(1743-1826) in USA



Night-View of Jefferson's Memorial



Jefferson's Memorial

- Pigeons came to the Jefferson's memorial and discharged excrements and ruined the beauty of the memorial. Also officers had to clean them.
- The managers in the Jefferson's memorial discussed this problem and concluded that the food from visitors attracted pigeons. So, they banned food-feeding, but they didn't go away.
- So, they decided to have a net so that pigeons can't sit and excrete on the roof. However, the problem was not only the cost of installing the net, but the outlook of the memorial.
- Should the net be installed?

j19

Jefferson's Memorial

- 워싱턴의 포토맥 강변에 미국의 3대 대통령 토마스 제퍼슨 기념관이 있다. 연간 200만명 이상이 방문하는 이 관광명소가 비둘기 문제로 크게 골치를 앓은 적이 있었다. 대리석으로 지은 건물 천장에 비둘기들이 집단으로 서식하며 배설물을 바닥이나 관광객들에게 쏟아내는 바람에 이만저만 문제가 아니었다.

  담당자들은 오랜 회의 끝에 그 이유가 관광객들이 던져준 모이 때문으로 판단하고 온갖 수단을 동원해 모이를 완전히 없앴다. 그러나 비둘기들은 떠나가지 않았다. 결국 천장 밑에 비둘기 방지 그물망을 설치하기로 했으나 그 비용이 만만치 않았고, 더 심각한 문제는 그물망으로 인해 해치게 될 건물의 미관이었다.
- 그물망을 과연 설치해야 하는가?

Decision Analysis Applications

- Business
  - Marketing, Finance, Strategy
- Engineering:
  - Technical choice, assessment, R&D investment
  - Oil and Gas, Power generation and distribution, Automobile design & manufacturing
- Medical and Pharmaceutical
  - Treatment decision, Drug development
- Law
  - Litigation

Decision Analysis Applications

DA Application Papers & Society

- Dedicated Journal:
  - Decision Analysis (http://da.pubs.informs.org/)
- Review of DA applications
  - Donald L. Keeper, Graig W. Kirkwood, and James L. Corner, Perspectives on Decision Analysis Applications, 1990-2001, Decision Analysis, 2004.
  - J. L. Corner and C. W. Kirkwood, Decision analysis applications in the operations research literatures, 1970-1989, Operations Research, Vol. 39, 206-219.
- Decision Analysis Society
  - http://decision-analysis.society.informs.org

Reference

- A dialogue process for choosing value-creating strategies, Sam Bodily and Michael Allen, Interfaces, Vol. 29, No. 6, pp. 16-28, 1999.

End of the Session

Multi-Attribute Decision Analysis Approach : Quantitative Approach

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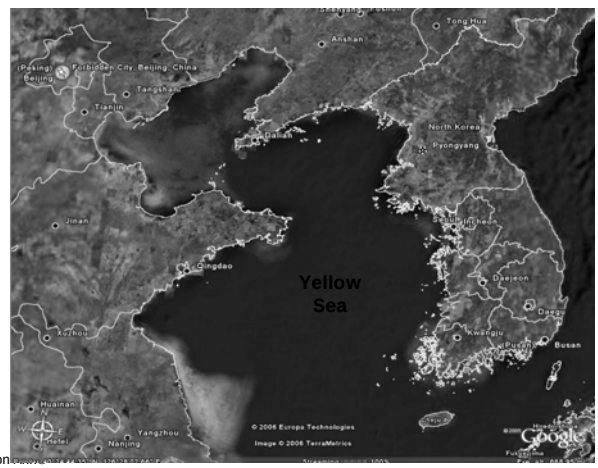
Example: Selecting Marine Protected Areas (MPAs)

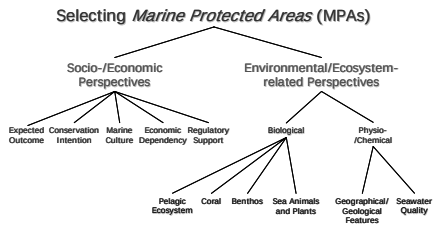
- How can we select/zone Marine Protected Areas (MPAs)?



Source: Google Earth

Background

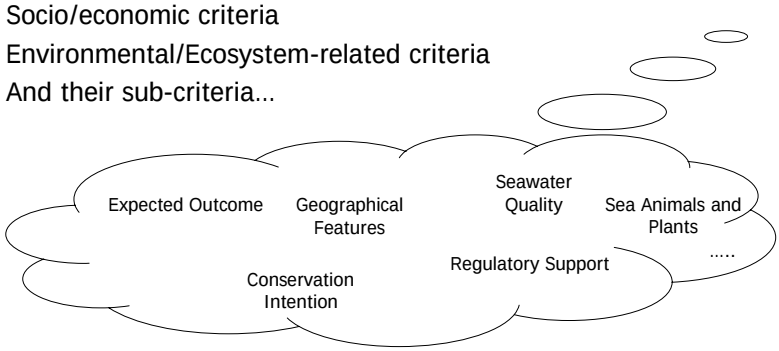
Ministry of Maritime Affairs and Fisheries (MOMAF) needs a *systematic* approach to select/zone MPAs,



and it also wants to minimize potential conflicts between stakeholders.

Selecting Marine Protected Areas (MPAs)

- Which decision criteria should we consider?
  - Socio/economic criteria
  - Environmental/Ecosystem-related criteria
  - And their sub-criteria…



- How much each criterion is important with respect to the overall objective?

Agenda

- 1. Tradeoff Multiple Objectives
- 2. Additive Utility Function Approach
- 3. Utility Assessment
- 4. Weight Assessment
- 5. Summary

1. Tradeoff Multiple Objectives

- Examples of Tradeoff:
  - Buying a new car trading off price, maintenance cost, insurance cost, prestige, safety, etc.
  - Selecting a MPA
    - Land cost, Labor availability, Water, ...
- Two objectives: Tradeoff between monetary return vs. riskiness.
  - Sure thing vs. expected utility using concave function

2. Additive Utility Function Approach

- Simple Additive Approach for Utility
  - Assume additive form of preference model → Develop multi-attribute utility function.
  - $U(x_1, x_2, \ldots, x_m) = k_1 U_1(x_1) + \ldots + k_m U_m(x_m)$.
  - Calculate utility score for each objective and add them with the relative importance of each objective

Objectives and Attributes (1)

- Fundamental objectives: objectives in the function!
  - Objectives that we really care about.
- Means objectives:
  - Objectives which directly, indirectly help to accomplish the fundamental objectives.
  - Not important in itself
- Attribute scale:
  - A way to measure accomplishment of fundamental objectives.
- Attribute:
  - Quantity measured on an attribute scale which provides the means to measure accomplishment of fundamental objectives.

Objectives and Attributes (1)

- Ex 1: Easily defined attribute
  - Objective: Reducing environmental pollution
  - Attribute scale: PPM
  - Attribute: Level of PPM
- Ex 2: Need to develop attribute scale
  - Objective: Favorable public attitude
  - Attribute scale: Constructed attribute scale for public attitude: 5 scales
  - Attribute: Quantity measured on an attribute scale.

Example: Constructed Scale for Public Attitude in the Nuclear Power Plant Location

- Support:
  - No groups are opposed to the facility, and at least one group has organized support for the facility
- Neutrality:
  - All groups are indifferent or uninterested
- Controversy:
  - One or more groups have organized opposition, although no group have action-oriented opposition (Example: Letter-writing, protests)
- Action-Oriented Opposition:
  - Exactly one group has action-oriented opposition. Other group have organized support, indifference, or organized opposition.
- Strong action-oriented opposition:
  - Two or more group have action-oriented opposition.

3. Utility Assessment for Additive Utility Function (1)

- General Form: $U(x_1, x_2, \ldots, x_m) = k_1 U_1(x_1) + \ldots + k_m U_m(x_m)$.
  - Assess k_i and U_i, where $U_i(x_i^+) = 1$, $U_i(x_i^-) = 0$,
    where x_i^+ is the best outcome and x_1^- is the worst outcome.
- Utility function assessment
  - Example: Choosing an automobile

	Honda Accord	L-Samsung SM7	Hyundai Sonata NX
Price ($)	$31,000	$26,000	$22,000
Life Span (Yrs)	12	9	6

3. Utility Assessment for Additive Utility Function (2)

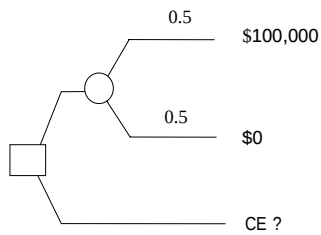
- Utility assessment using scale
- For an easily defined attribute
  - PPM for biological impact assessment
  - Price ($)
- For an abstract attribute
  - Develop a scale and use it.

Utility Assessment for Additive Utility Function (3)

- Standard methods for utility assessment:
  - Proportional score for simple utility assessment:
    - Risk neutral

$$U_i(x) = \frac{x - \text{Worst Value}}{\text{Best Value} - \text{Worst Value}}$$

  - CE method



Utility Assessment for Additive Utility Function (4)

- Utility Assessment through Ratios
  - Assess utility on the basis of some ratio comparison: Usually good for quantitative attribute.
  - AHP (Analytic Hierarchy Process) proposed by Thomas Saaty uses ratio scale.
  - Example: Choice of Color for a Car
    Blue color is twice as good as red.
    Yellow is three times as good as red.
    → Red: 10, Blue: 20, Yellow: 30.

    Then convert the score into 0 and 1 scale.

4. Weight Assessment (1)

- Swing weighting
  - Step 1: Set base case as a worst for all attributes.
  - Step 2: For each attribute, construct consequences swing from worst to best.
    : # of consequences = # of attributes or objective.
  - Step 3: Rank order each consequence.

Weight Assessment (1)

- Step 4: Access the amount of satisfaction (% or point) comparing between (moving from base to consequence to evaluate) and (moving from base to the best consequence).

  Ex: If the prices is the most important objective, how much satisfaction does the change of life span from 6 to 12 years comparing with the change of price from $31,000 to $22,000.

예: 가격이 최우선 목표라면, 내구연수가 6년에서 12년으로 바뀌는 것이 가격이 ₩$31,000 에서 $22,000으로 바뀌는 것에 대비 얼마나 만족 면에서 감소가 있나?

- Step 5: The point is normalized to get weight.

Weight Assessment (3)

- Swing weighting - Summary
  - U(Life Span, Price, Color) = k_L U(L) + k_p U(P) + k_c U(C).

$$U(x_L^-, x_P^-, x_C^-) = 0$$
$$U(x_L^+, x_P^-, x_C^-) = k_L$$
$$U(x_L^-, x_P^+, x_C^-) = k_p$$
$$U(x_L^-, x_P^-, x_C^+) = k_c$$

  - Suppose that attribute p was chosen to be the best k_p among the consequences.
  - Assessment is done in a way that $\frac{k_L}{k_p}$, $\frac{k_C}{k_p}$ is assessed

$$Amount\ of\ Satisfaction = \frac{U(x_L^+, x_P^-, x_C^-)}{U(x_L^-, x_P^+, x_C^-)} = \frac{k_L}{k_p}$$

Weight Assessment (4)

- Example:
  - Step 1: Base case – 6 years, ₩29M, Red
  - Step 2: Three Objective and three consequence
  - Step 3: Order it based on preference
  - Step 4: Tradeoff: from base to consequence vs. from base to best
  - Step 5: Normalize the rate

Attribute from the worst to best	Consequences to compare	Rank	Rate	Weight
Bench mark	6 years, $31,000, Red	4		
Life Span (Yrs)	**12 years**, $31,000, Red			
Price	6 years, **$22,000**, Red			
Color	6 years, $31,000, **Black**			

Summary

- Use Additive Utility Function for Multi-attribute or Multiple Objective
  - $U(x_1, x_2, \ldots, x_m) = k_1 U_1(x_1) + \ldots + k_m U_m(x_m)$.
- For each objective, measure the value
  - Use natural scale or constructed scale
- For each objective, measure the weight, and make the optimal decision
  - With uncertain variables, decision can be made using expected utility

Multi-Attribute Decision Analysis Approach : Qualitative Approach

Analytic Hierarchy Process (AHP)

Ex: Buying a New Car

- Which car do you want to purchase considering price, fuel efficiency, reliability, prestige, etc?

OPIRUS GH350

BMW 525i

EQUUS JS350

LEXUS ES330

Agenda

- 1. Basic Principle of AHP
- 2. Pairwise comparison
- 3. Computer Exercise: EC Software

1. Basic Principle of AHP

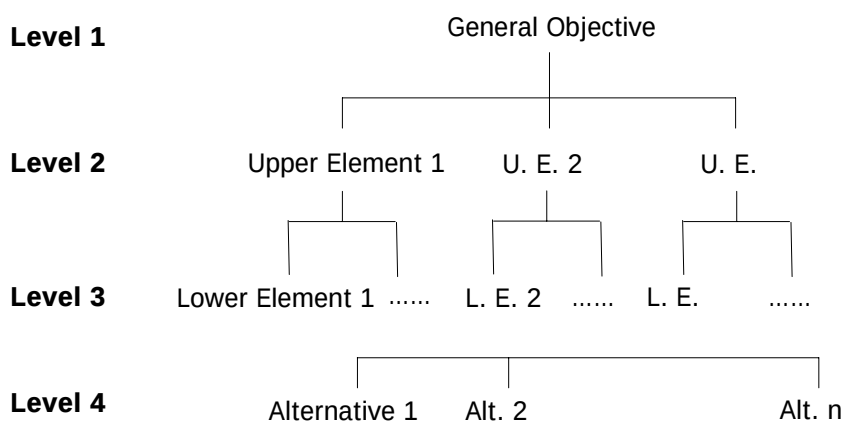
- Purpose
  - A simple decision-aiding tool with a simple hierarchical decision structure
  - Prioritize alternatives having multi objectives
- Basic Principle

Hierarchical Structure	Decomposition and Integration
Preference Measurement	Pair-wise comparison
Preference Consistency	Preference transitivity

Hierarchical Structure for Decision-Making

- Most general objectives on top
- Attributes that impact on the objectives
  - Upper Element
  - Lower Element
  - Note: Same level attributes need to be independent and lower level attributes need to be dependent in the hierarchical structure
- Alternatives for choice

General Hierarchical Structure

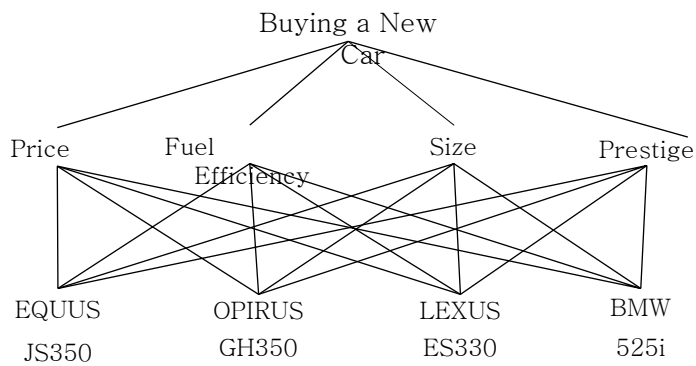


Example of Hierarchical Structure

Objective:

Attribute:

Alternative:



Advantages of AHP

- Hierarchical Structure:
  - Structure value attributes on different levels in a hierarchical structure
  - Compatible with the natural cognitive process
- Measurement:
  - Consider both qualitative and quantitative attributes at the same time
- Consistency check:
  - Can check the measurement consistency of evaluators
- Simple and easy-to-use decision-making tool:
  - User-friendly software (Expert Choice): SA, Model development
  - Group decision-making is very well facilitated

Examples using AHP

- Vendor Selection
- Site selection for manufacturing
- R&D priority setting and selection
- Technology choice
- Evaluation and employment of employees
- Evaluation of weapon system
- Investment priority
- Priority for developing tourism
- Evaluation of policy for water quality improvement
- Evaluation of preferences for new telecommunications services
- Other evaluation of alternatives

i2

2. Pairwise Comparison

- Develop pairwise comparison matrix among attributes
  - For each upper level element, measure the importance or preference among lower level elements
    - a_{12}: measure how much the first attribute (1) is importance or preferred to second element (2)
  - Number of pairwise comparison
    - With "*n*" number of attributes, total n(n-1)/2 comparisons required
    - Measure the green color part (For yellow part, use $a_{ij} = 1/a_{ji}$, $a_{ii} = 1$, for all i)

$$A = \begin{bmatrix} 1 & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & 1 & a_{23} & \cdots & a_{2n} \\ a_{31} & a_{32} & 1 & \cdots & a_{3n} \\ \vdots & \vdots & \vdots & \cdots & \vdots \\ a_{n1} & a_{n1} & 1 & \cdots & 1 \end{bmatrix}$$

Measurement Scale

- Use nine scale measurement

Importance	Definition	Explanation
1	Equal importance	For certain attribute, both contributes in the same way
3	Moderate importance	Preferred moderately
5	Strong importance	Strongly preferred
7	Very Strong importance	Very strongly preferred
9	Extreme importance	Extremely strongly preferred
2, 4, 6, 8	In Between	

Wrap-up

- Decision Analysis
  - It is about understanding the given problem better with systematic process --> insights on the problem
  - There are many tools for decision making: Decision tree, Tornado Diagram, ID, etc.
  - Find better creative alternative! Find alternative C.
- Multi-Attribute Decision Analysis approach: Quantitative way
  - Assess utility and weight for each attribute
- Multi-Attribute Decision Analysis approach: Qualitative way
  - AHP

- Expert Choice Exercise

Analytic Hierarchy Process (AHP)

Computer Lab: Expert Choice

Sang Pil Han (韓尙弼) and Jae-Hyeon Ahn (安宰賢)
(Korea Advanced Institute of Science & Technology,
Graduate School of Management)

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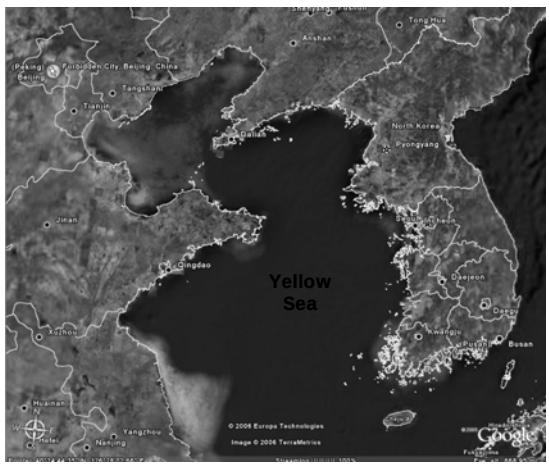
- How can we select/zone Marine Protected Areas (MPAs)?



Source: Google Earth

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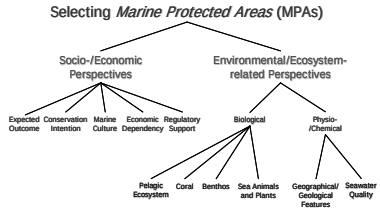

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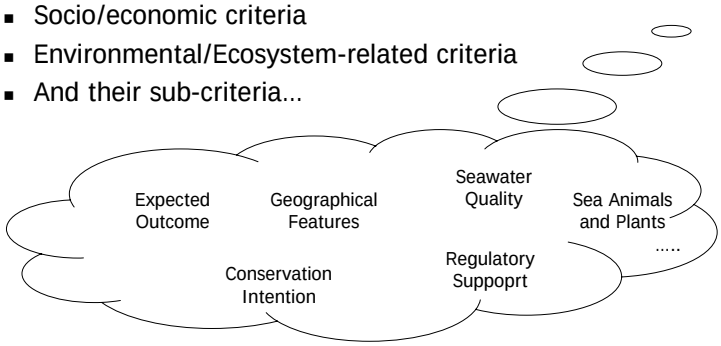
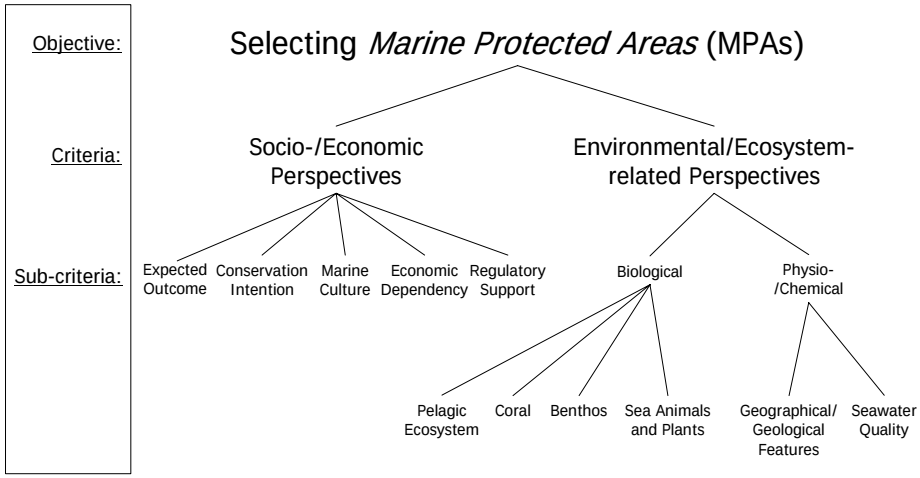


- How much each criterion is important with respect to the overall objective?

Decision Hierarchy

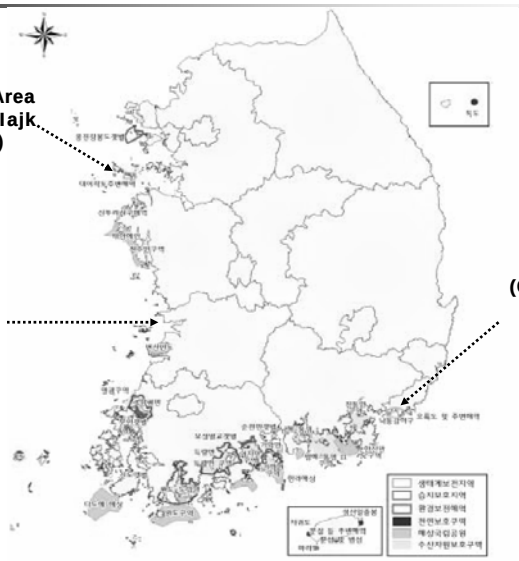


Source: Korea Maritime Institute

Three MPA Candidates

(A) Ecosystem Conservation Area on Island Dae Iajk (near Incheon)

(B) Saemangum Sea Dike Area



(C) Wetlands on the mouth of Nakdong River (near Busan)

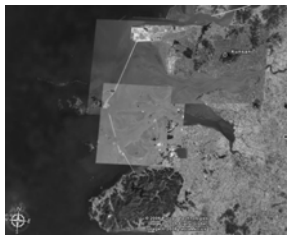
(A) Island Dae Iajk

Resorts and beaches

A rare bird: Blackfaced Spoonbill
(저어새, 漫畵鳥)

(B) Saemangum Sea Dike Area

33Km long sea dike &
40,100ha reclaimed land



Protest & demonstration against
the development project

Loss of wet lands and
migratory birds

(C) Mouth of Nakdong River

Resorts

Migratory bird arrival &
source of water supply

Agenda

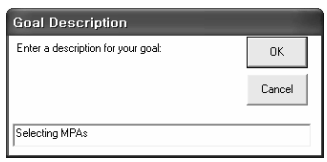
- 1. Basics of 'Expert Choice'
- 2. Hierarchic Structuring
- 3. Judgment: Pairwise Comparisons
- 4. Synthesis
- 5. Sensitivity Analysis
- 6. Group Decision Making: Aggregation

1. Run “Expert Choice”

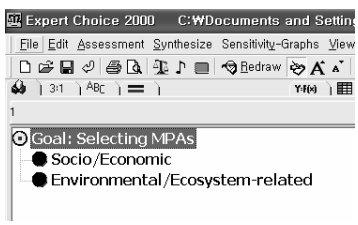
- Install “Expert Choice” trial version, and run it.
- Click the [File] button on the pull-down menu, and create a new file by clicking [New] button.

2. Hierarchic Structuring

- Input your own decision goal or objective in the pop-up box.



- Construct decision hierarchy
  - Right click the “Goal” on the screen.
  - Select “Insert the Child of the Current Node”.
  - Input each decision criterion and enter it until you have no more to put in.



- Expand your decision hierarchy
  - Right click “Socio/Economic”, and select the “Insert the Child Node of the Current Node”.
  - Repeat it to next node.
- Insert alternatives
  - Press the “A+” button on the right-hand side of the screen
  - Input the alternatives one-by-one.

Abbreviated Decision Hierarchy

3. Judgment: Pairwise Comparisons

- Evaluate relative importance of each decision criterion with respect to the next level criterion (or overall goal)
  - Right click the “Goal” and select “Pairwise Comparison”.
  - Select an evaluation mode: Numerical (3:1), verbal (ABC), graphical (〓)
- Calculate inconsistency index
  - If Inconsistency index is greater than 0.2, then re-evaluate it.

Decision Hierarchy with Weights Calculated

HAN1

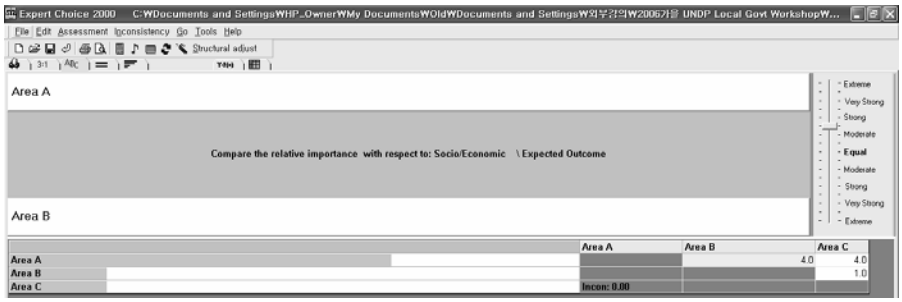
- Evaluate relative attractiveness of each alternative with respect to the decision criterion at the next higher level.

- A hypothetical example
  - Area A: attractive from the “Socio/Economic Perspectives”
  - Area B: attractive from the “Biological Perspective”
  - Area C: attractive from the “Physio-/Chemical Perspectives”

	Socio/Economic			Biological			Physio/Chemical	
	SE1	SE2	SE3	B1	B2	B3	PC1	PC2
Area A	High	High	Moderate	Low	Moderate	Moderate	Low	Moderate
Area B	Low	Moderate	Moderate	High	High	Moderate	Low	Moderate
Area C	Low	Moderate	Low	Low	Moderate	Low	High	High

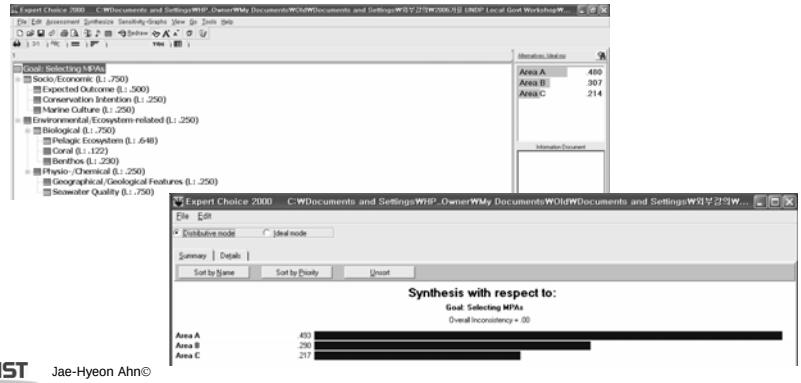
- Example:

  Compare the relative importance with respect to “Socio/Economic Perspectives”



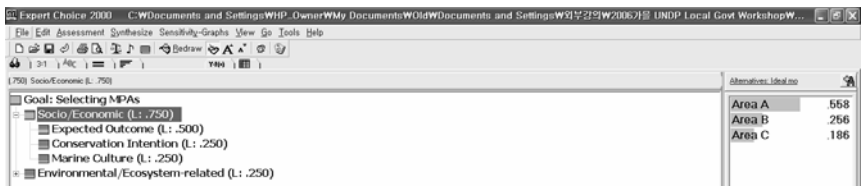
4. Synthesis

- Calculate the overall preference of each alternative
  - In the hypothetical example, Area A is more attractive.
  - Click [Synthesize] on the pull-down menu, and select “With Respect to Goal”.



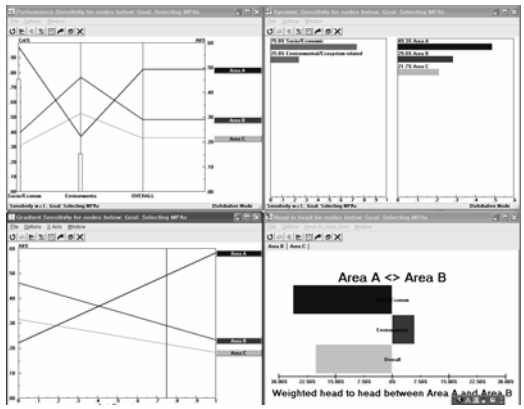
- Derive relative attractiveness of alternatives with respect to each decision criterion
  - Left click a particular decision criterion wrt to which you would like to obtain relative preference

-Socio/Economic Perspective-



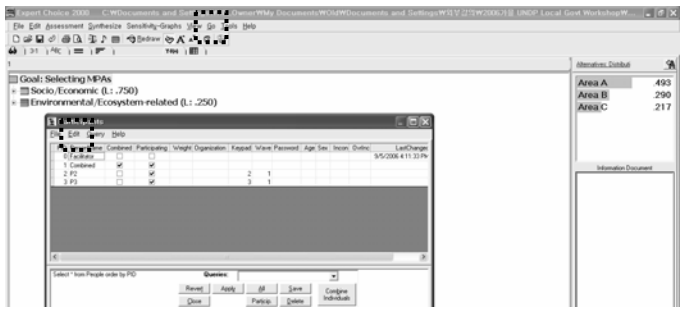
5. Sensitivity Analysis

- Left click [Sensitivity-Graphs] on the pull-down menu, and select “Open Four Graphs”.

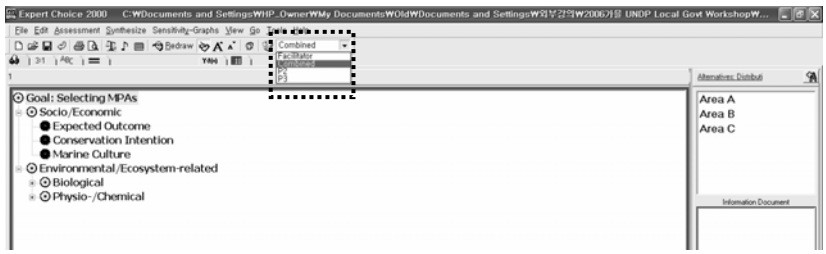


6. Group Decision Making: Aggregation

- Combine each participants’ judgments
  - Left click [Go] on the pull-down menu, and select “Participants Table”.
  - Left click [Edit] on the menu, select ‘Add N Participants’, and input the number of participants. Close the pop-up window.



- Select each participant to input his/her judgments on the pull-down menu on the screen (see the dotted box below)
  - Note that the first participant is denoted as “P2”.
- Select the ‘Combined’ on the menu to see the combined result.



Thank You!

Coastal Use Conflicts and their Resolution for the Successful Integrated Coastal Management: End-of-Pipe and Front-of-Pipe Approaches

Mr. Jungho NAM

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How to Designate & Manage COMPAS with Less Conflicts

*** COMPAS (Coastal and Marine Protected AreaS)**

UNDP/GEF YSLME Training Workshop for Local Government Officers
26th September , 2006

Jungho Nam
Korea Maritime Institute

Based on Nam et al. (2004)

Contents

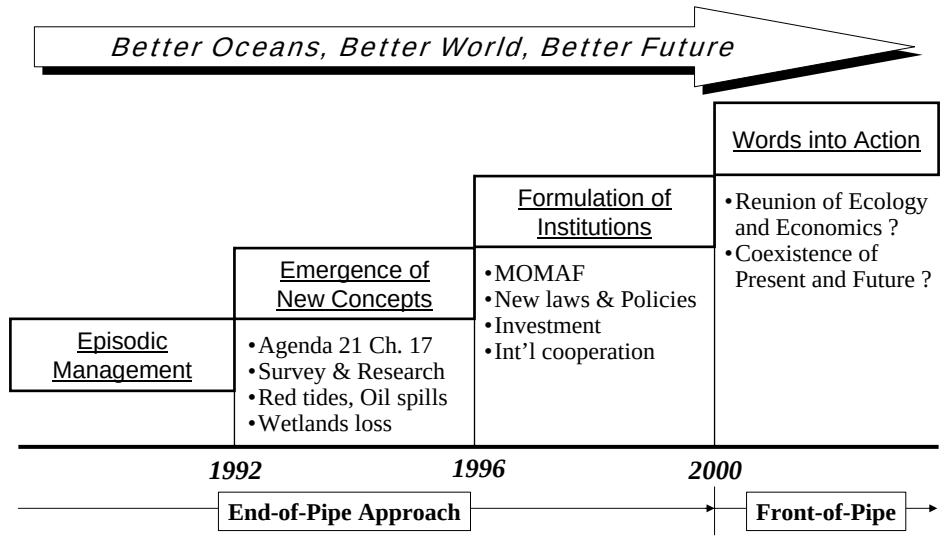
1. **Major Coastal Features And Brief History of Management Regime**
2. **Coastal & Marine Protected Areas and Their Management Issues**
3. **Toward the integration of Protected Area Management**
4. **Suggestions**

Ocean, who is the source of all.

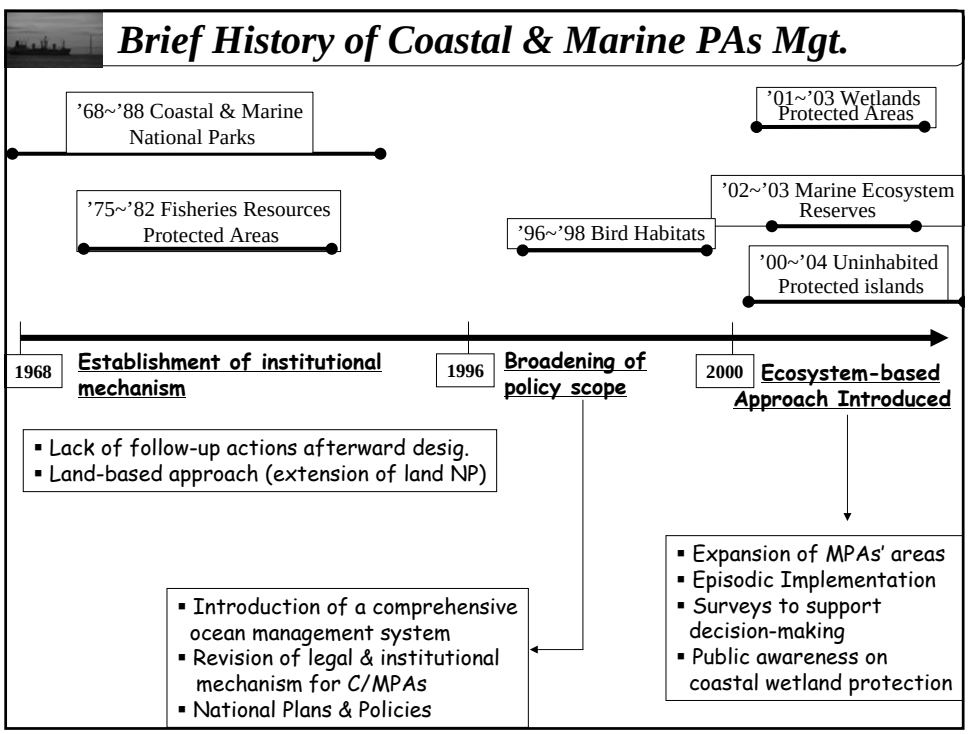
- Homer, 700 B.C.

Major Coastal Features And Brief History of the Management Regime

Brief History of Marine Environmental Mgt.



Brief History of Coastal & Marine PAs Mgt.



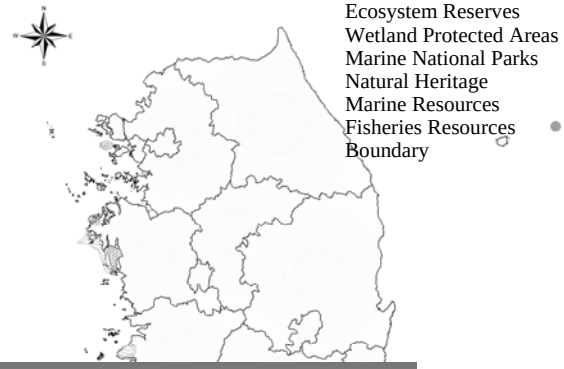
Coastal & Marine Protected Areas and Their Management Issues

Features of Coastal and Marine Protected Areas (1/4)

- **What is Coastal & Marine Protected Areas**
  - Any area of coastal waters and lands and associated flora and fauna, and historical and cultural features, that have been reserved by law or other effective means to protect part or all of the enclosed environment (modified from IUCN/UNESCO)

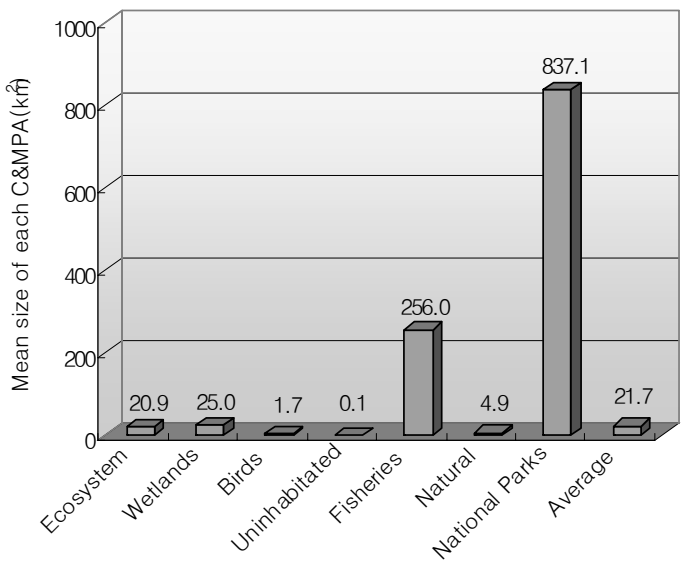
- **Coastal & Marine PAs of KOREA**
  - Wetland Protected Areas
  - Coastal and Marine National Parks
  - Fisheries Resources Protected Areas (Marine Resources Conservation)
  - Ecosystem Reserves
  - Birds Habitats
  - Uninhabited Islands for Special Protection
  - Natural Heritages
  - Underwater Landscape Sites

Features of Coastal and Marine Protected Areas (2/4)



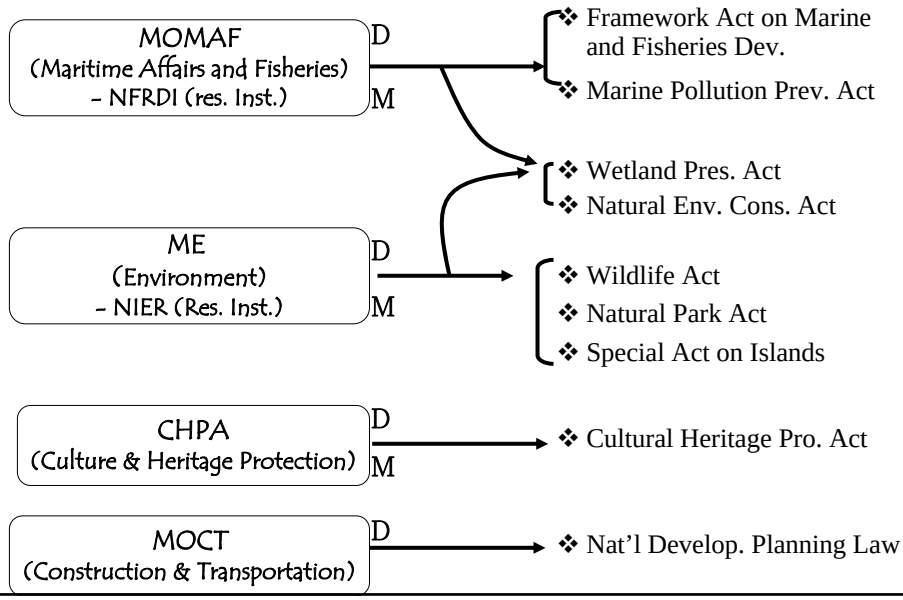
- **No. of designated areas : 423**
- **Coastal & Marine Protected Area: 9,274.0 km^2**
  - equivalent to 9.3% of national land area (99,514 km^2)
    2.1% of national sea waters (447,000 km^2)
    13.0% of national territorial sea area
- **Mean size : 22 km^2 (0.065 to 256 km^2)**
  - 10,000 km^2, minimum size for protection of ecosystem and species

Features of Coastal and Marine Protected Areas (4/4)



Legal and Institutional Frameworks (1/4)

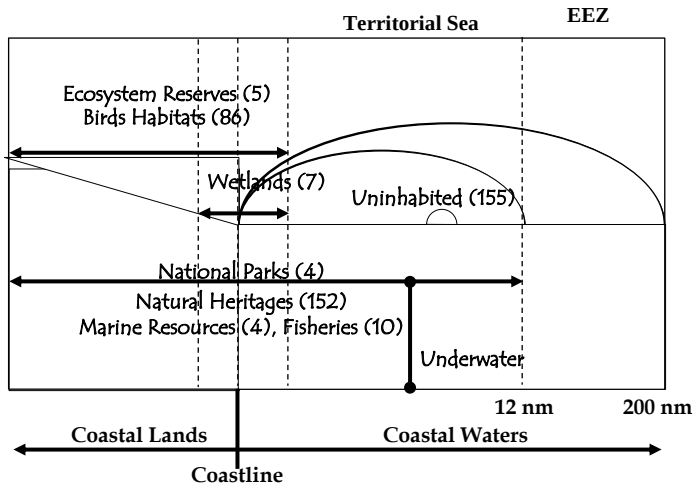
❑ **Legal and institutional mechanism : 4 ministries and 9 laws**



Legal and Institutional Frameworks (3/4)

Name	Number	Area(km^2)	Ministries	Acts
Ecosystem Reserves	5	104.6	MOMAF ME	Natural Environment Conservation Act(1997)
Wetland Protected	7	175.0	MOMAF ME	Wetland Preservation Act(1999)
Bird Habitats	86	149.6	ME	Wildlife Protection Act(2003)
Uninhabited Islands	155	10.2	ME	Special Act on the Ecosystem Preservation of Islands including Dokdo Island(1997)
National Parks	4	3,348.4	ME	Natural Park Act(1980, 2001)
Marine Resources	4	2,192.8	MOMAF	Marine Pollution Prevention Act(1977, 2001)
Fisheries Protected	10	2,556.0	MOCT MOMAF	Comprehensive National Territorial Development Planning Law(2002)
Natural Heritage	152	737.7	CHPA	Cultural Heritage Protection Act(1982)
Underwater	0	0	MOMAF	Framework Act on Marine and Fisheries Development(2002)
Total	423	9,274	**4**	**9**

Legal and Institutional Frameworks (4/4)



Issue identification on the Protected Areas (1/3)

❑ Strength and Opportunity for better PAs

- **Enactment and amendment of related laws**
  - Improved management system
  - Expansion of protected areas
- **Application of new institutional mechanisms and management tools**
  - ICM plans at local and national levels, Comprehensive Marine Env. Mgt. Plan
  - Zoning system
  - Stricter approval procedure for reclamation
- **Enhanced management capacity**
  - Establishment of new divisions in MOMAF
- **Increased surveys and researches**
  - Wetlands, coastal areas
  - Marine environmental monitoring
- **Increase of management budget for coastal and marine PAs**
- **Enhancement of public awareness and interest**
- **Partnerships at regional and global levels, bilateral cooperation**

KMI 한국해양수산개발원

Issue identification on the Protected Areas (3/3)

❑ Threat and Weakness (cont.)

- **Lack of effective management system to achieve designation objectives**
  - Rigid top-down approach based on command and control, lack of plans or *in-situ* implementation projects for effective protection
  - Lack of effective countermeasures against development pressures (stress)
    → "paper parks", "plans on the shelf"

- **Limited public participation in the planning process, and lack of systematic support system for local residents**
  - Lack of institutional mechanisms to enhance public participation
    ↔ genuine participation based on sharing powers
  - Lack of site-specific supporting systems

- **Lack of integrated management system at national, ministerial & local levels**
  - Strengthening of sectoral approach, rather than integration
    → Separation of the marine environmental part in the Natural Environment Conservation Act as the Marine Ecosystem Conservation and Management Law

Lack of Integrated Management System (1/4)

❑ Sectoral approach at a national level, especially

- **No coordination of surveys and researches funded by different ministries**
  - Separate and duplicate surveys by each ministry, especially MOMAF and ME
    - Natural environment survey, national coastal wetlands survey, uninhabited islands survey, and the like (items, frequency, time, methods, etc)
  - Lack of integrated information management system to share different data-sets
    → waste of valuable resources by duplicate surveys

- **No consideration of ecological continuum between coastal lands and waters**
  - No efforts for spatial integration due to legal separation of coastal lands and waters into different management areas
    "It-is-not-your-business mindset"
  - Lack of cooperation and coordination in planning or decision-making processes
  - Lack of legal and institutional base toward integration
    - ineffectiveness of ICM as an integrative force for diverse coastal issues

Lack of Integrated Management System (2/4)

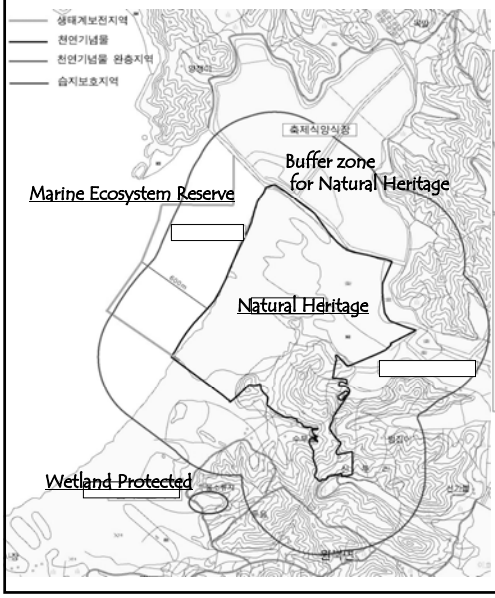
❑ Sectoral approach at a national level, especially

- **No national management priorities set for various coastal and marine protected areas**
  - Lack of national strategy (agenda) based on protection priority
    - collection of each policy regarding the protected areas (lack of integration)
  - Lack of investment priority to achieve protection goals
    - hard to overcome at a ministerial level (ex. among divisions in MOMAF)

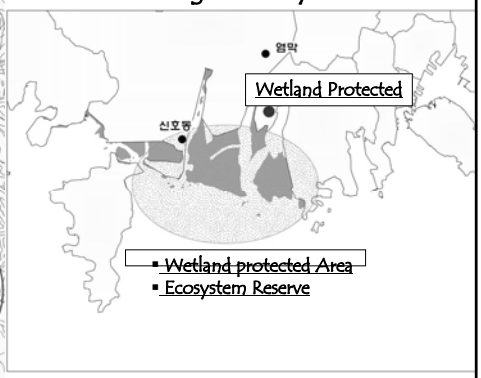
- **Duplicate designation of an area by different ministries**

Lack of Integrated Management System (3/4)

Shinduri sand dune



Nakdong Estuary Wetland



Lack of Integrated Management System (4/4)

Woosedo, Uninhabited islands for special protection

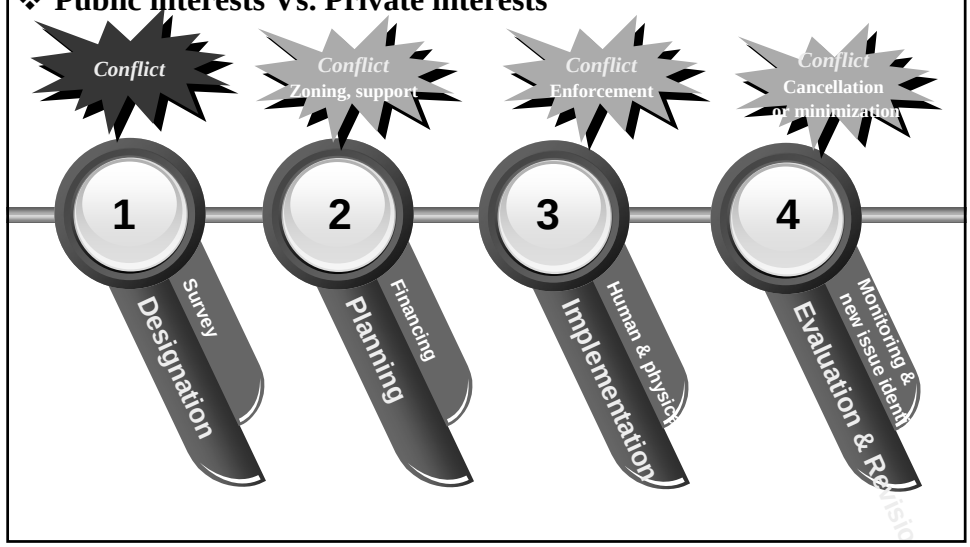
Managed by ME

Managed by MOMAF

How to wisely deal with MPA designation and conflicts

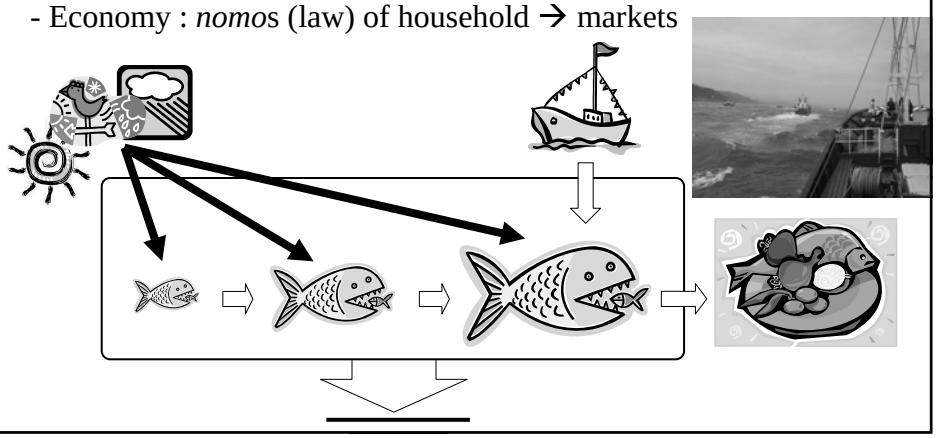
Intrinsic Cause of Conflicts regarding COMPAS

- **Regulation of socio-economic activities, present and potential**
- **Encroaches of free exercise of private property rights**
- **Public interests Vs. Private interests**



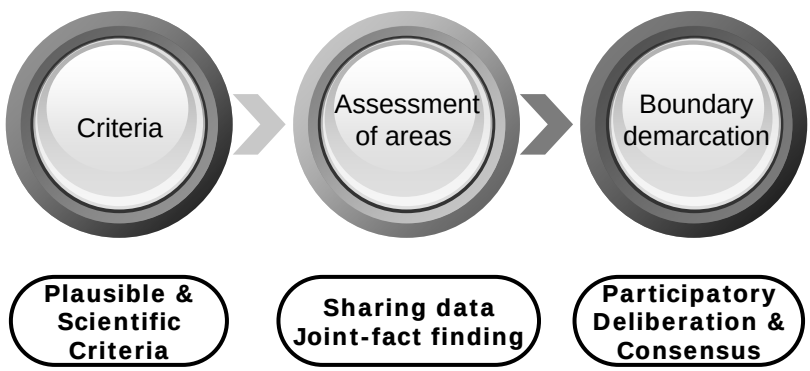
Conflict between ecological and economic processes

- **Deep tension between Ecology and Economy**
  - even though natural environment is the source of economic production
- **Root meaning : *Oikos* (Household)**
  - Ecology : *logos* (reason) of household → global environment
  - Economy : *nomos* (law) of household → markets



Designation, crucial for successful COMPAS

- ✓ **<u>Criteria</u>, plausible or implausible**
- ✓ **Information & data, sufficient or deficient**
- ✓ **Building consensus or not**



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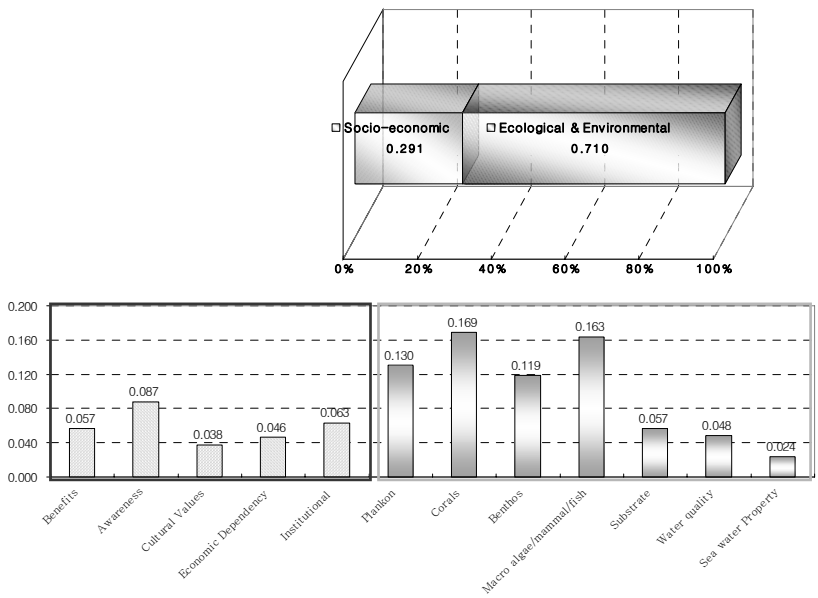
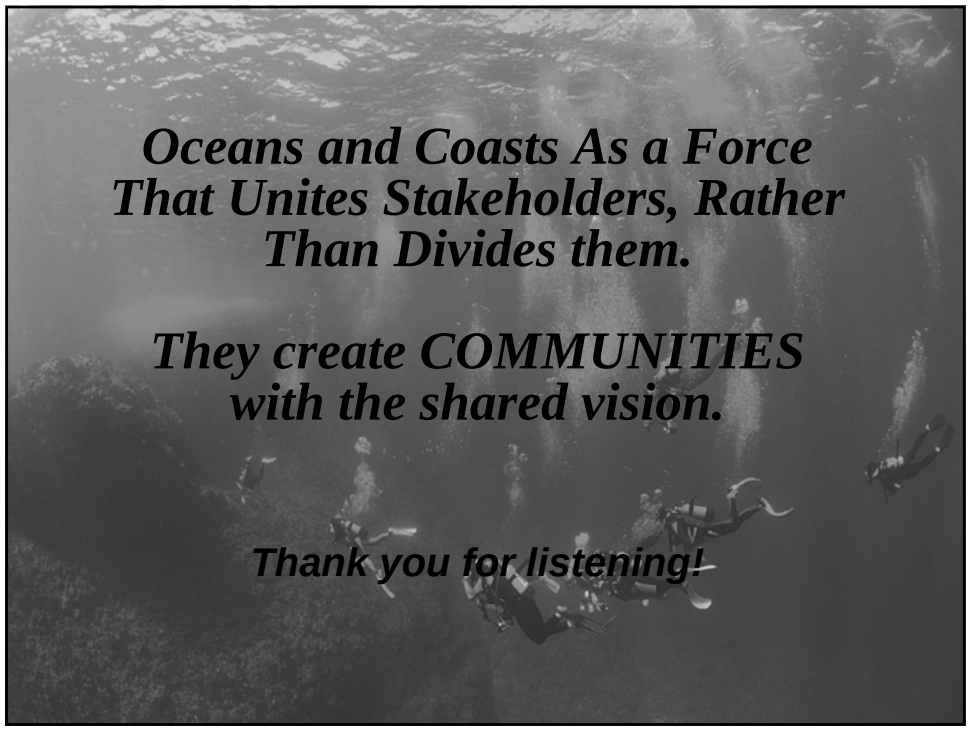
AHP aggregation from responses

❖ **Weighting factor for Ecosystem Reserves Designation**




Oceans and Coasts As a Force That Unites Stakeholders, Rather Than Divides them.
They create COMMUNITIES with the shared vision.
Thank you for listening!

Coastal Use Conflicts and Their Resolution for the Successful Implementation of ICM

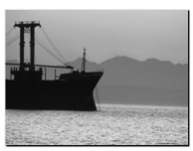
UNDP/GEF YSLME Training Workshop for Local Government Officers
26th September , 2006

Jungho Nam

Korea Maritime Institute

Modified from Kang & Nam (2002), Nam (2004), Nam & Jung (2005)






Contents

- **Introduction : Conflicts the Inevitable(?)**
- **Korean Experiences on Coastal Conflicts**
- **Implication on Conflicts Resolution**

INTRODUCTION

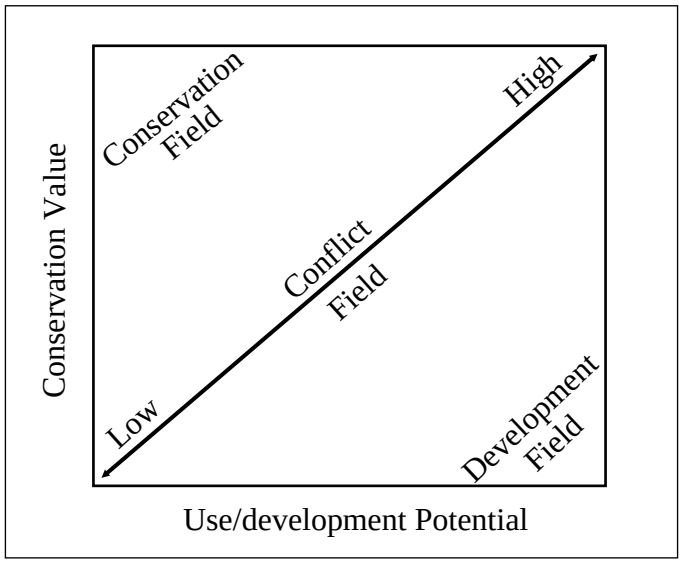
Introduction : Conflicts the Inevitable(?) – 1/4

- Toward the Dream of the Earth and its Inhabitants : World Summit on Sustainable Development
  - A Road Map for Better Oceans and Coasts
  - Time for Action : Plan of Implementation
- Conflict Resolution as a Central Function of Integrated Coastal Management
  - Coastal Use Conflicts, a Limiting Factor in Realizing Sustainable Development in the Marine Sector
  - Importance of Conflict Management in ICM Programs

    (Cicin-Sain and Knecht, 1998)
    - 86% of Developed Countries
    - 87% of Middle Developing Countries
    - 95% of Developing Countries

Introduction : Conflicts the Inevitable(?)–2/4

◁ Conflict Gradient ▷



Source : Cendrero et al. (1997)

Introduction : Conflicts the Inevitable(?) – 3/4

❑ Types of Conflicts (Cicin-Sain, 1992)

Types of Conflicts	Philosophical	Potential Interaction	Actual Interaction	Imagined Interaction
Roots of Conflict	Difference in values	Difference in facts, interests, possible values	Differences in facts, interests	Differences in facts
Parties Involved	Indirect users/ Direct users	Direct users/ Direct users	Direct users/ Direct users	Direct users/ Direct users

Most intractable **Tractability** **Most tractable**

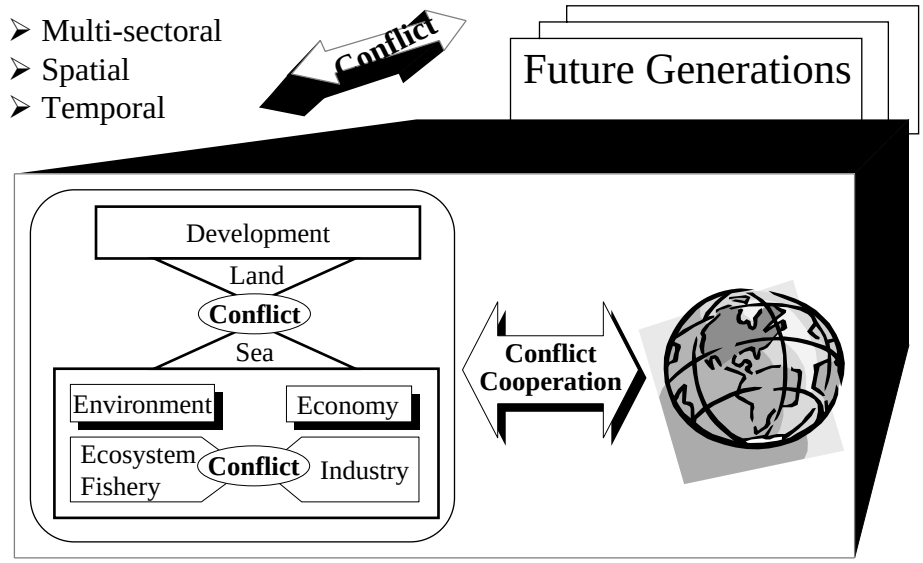
❑ Approaches for Conflict Resolution depend on

- Socioeconomic, Political, and Cultural Environment
- Development Stage of the Society

Introduction : Conflicts the Inevitable(?) – 4/4

◁ Multiple Scales of Coastal Use Conflicts ▷

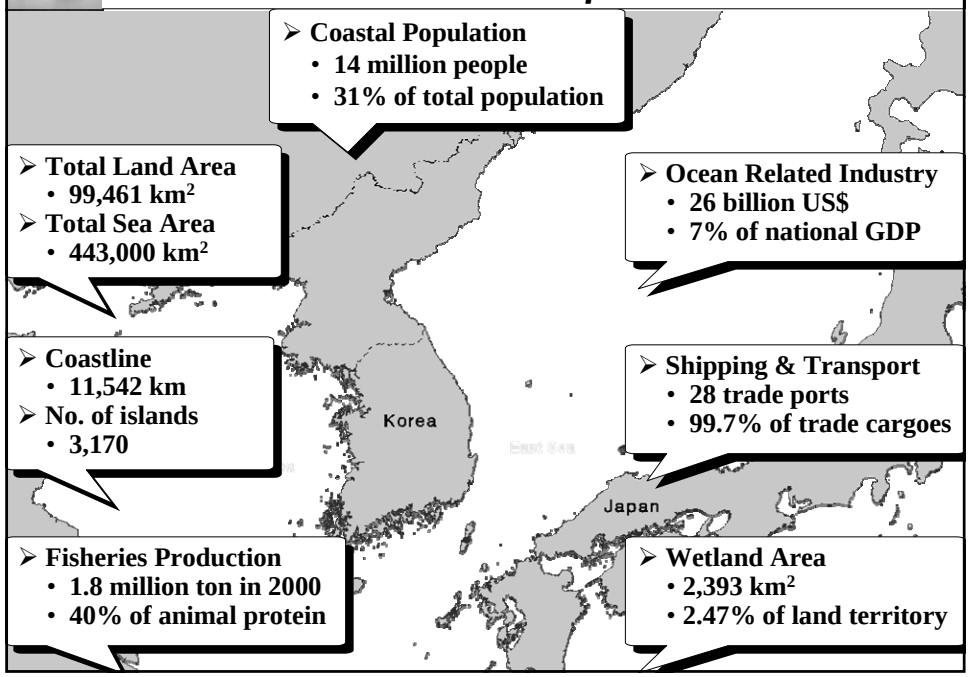
- Multi-sectoral
- Spatial
- Temporal



Source : Kang & Nam (2002)

KOREAN EXPEIRENCES

Marine and Coastal Areas of Korea – 1/2



Marine and Coastal Areas of Korea– 2/2

❑ Estimated Growth of Marine-related Economic Activities

Item	2000	2020
GDP contribution	7%	9.8%
Coastal Population	33.5%	37.3%
Fisheries Product Demand	2.6 million ton	4.6 million ton
Marine Tourism	84 million people	160 million people
Cargo Transportation	535 million ton	1,227 million ton

Increase in Demand on Coastal Resources
⇨ High Potential of Coastal Use Conflicts

※ 15% of Coastal Wetlands Lost during 1987~1998

Unfolding of Coastal Use Conflicts in Korea – 1/6

- Three Phases of Coastal Use Conflicts in Korea
- Dormant Phase ⇨ Explosive Phase ⇨ Dynamic Phase
- Dormant Phase : Before the late 1980s
  - Unilateral decision on the utilization of coastal resources by the government
    - No formal procedures for the stakeholders to participate in the decision-making process
    - Loss of private property due to coastal reclamation and power plants operation
    - Deterioration of human health by hazardous pollutants from chemical industries (e.g. Onsan coastal area)
  - Lack of institutional and social concepts on conflict resolution
  - Lack of public interest in the sustainable use of coastal resources

Unfolding of Coastal Use Conflicts in Korea – 2/6

- Explosive Phase : From late 1980s to mid 1990s
  - Enhancement of democracy; End of military junta
  - Increase in demands on protecting private interests from coastal development policy
  - Emerging institutional mechanisms for resolving coastal use conflicts
    - Enactment of the Environmental Dispute Adjustment Act(1990)
    - Formulation of the National Environmental Dispute Resolution Commission
    - Enhancement of functions and roles of the Fisheries Coordination Committee based on the Fisheries Act amended in 1990

Unfolding of Coastal Use Conflicts in Korea – 3/6

➢ Main features of use conflicts during the explosive phase

- Government & Industry vs. Fishermen
  - Protection of private property from coastal development activities such as reclamation and power plant construction
  - Loss and deterioration of fishing grounds
- Government vs. Government
  - Local vs. local governments on the fishing boundary designation
  - MOE & Fishery Agency vs. MOCT, MOCIE
- Fishermen vs. Fishermen
  - Trawl net fishing vs. Mariculture & other fishing activities

Unfolding of Coastal Use Conflicts in Korea – 4/6

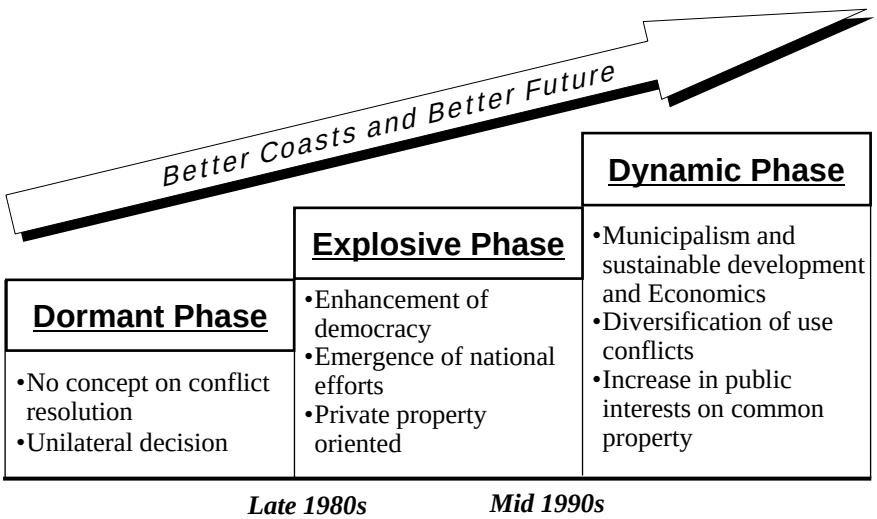
❑ Dynamic Phase : Since the mid 1990s

➢ Beginning of municipalism based on the Local Autonomy Act
➢ Incorporation of the concept of ‘Sustainable Development’ into national resources management policy
➢ Emergence of new ocean governance
  - Establishment of MOMAF
  - Enactment of new laws and amendment of existing laws to balance private and public interests in coastal areas
➢ Increase in public awareness on the importance of coastal resources as a common property
➢ Reduced coastal productivity due to intensive development, overfishing, and environmental degradation

Unfolding of Coastal Use Conflicts in Korea – 5/6

- Intensification of chronic conflicts
  - Government agencies vs. Coastal residents/Fishermen
  - Industry vs. Coastal residents/Fishermen
  - Fishermen Vs. Fishermen
  - Land vs. Waters
- Emergence of new conflicts
  - Conflict between national and local governments
  - Public interests vs. Private interests
  - Conflicts with neighboring countries
    - Delineation of fishing grounds (China and Japan)
    - Reduction of fishing quota in the Russian EEZ

Unfolding of Coastal Use Conflicts in Korea – 6/6



What has ICM done to Resolve Use Conflicts? –1/3

❑ Failures of Coastal Use Conflict Resolution in Korea

- Lack of legal instruments for coastal use conflict resolution
  - No clear measures in the Coastal Management Act(1999)
- Limited organizational settings
  - National Environmental Dispute Resolution Commission
  - Office for Government Policy Coordination
  - Presidential Commission on Sustainable Development
  - Fisheries Coordination Committee
- No systematic guidelines on coastal use conflict resolution
  - Lack of guidelines in the National Integrated Coastal Management Plan and other policies
- Lack of transparency and participation
  - Limited information access and lack of participation of stakeholders in planning and decision-making processes

What has ICM done to Resolve Use Conflicts? –2/3

- Socio-Cultural Aspect
  - Lack of awareness of people on long-term benefits from rational use of coastal resources
  - Might-makes-right mentality
- Scientific Aspect
  - Uncertainty : Lack of sound scientific information
  - Lack of problem-solving oriented researches

❑ No Established Mechanisms and Practical Experiences for Conflict Resolution

- Development-oriented government policy
- Most coastal use conflicts bought out in the past by the development side

Time for ICM to play THE major role in resolving conflicts, thereby realizing sustainable utilization of coastal resources

What has ICM done to Resolve Use Conflicts –3/3

❑ Principles for the Coastal Conflict Resolution

- Transparency
  - Ensure equal participation of every stakeholder in planning and decision-making processes on the coastal resources
  - Open all the relevant information on each use conflict
- Consistency
  - Institutional arrangements such as laws, authority, and guidelines
- Mutuality
  - Encourage voluntary participation and mutual understanding through programs on awareness raising and education
  - Building consensus
- Objectivity
  - Problem-solving oriented researches to overcome uncertainties surrounding use conflicts

Sprouting Hopes for the Way Forward – 1/6

❑ Can the Coastal Conflicts be Resolved in Korea?

- Recent valuable experiences relevant to conflict resolution
  - Spontaneous fisheries management (community-based approach)
    - Establishment of no-fishing periods and Co-management of fishing grounds
  - MANGO (**M**arine **A**lliance between **N**GOs, **G**O**,** and research **O**rganizations)
    - National in scope
    - Protection of common properties
  - Civil Forum, Community Advisory Council, Management Council
    - Site-specific in scope

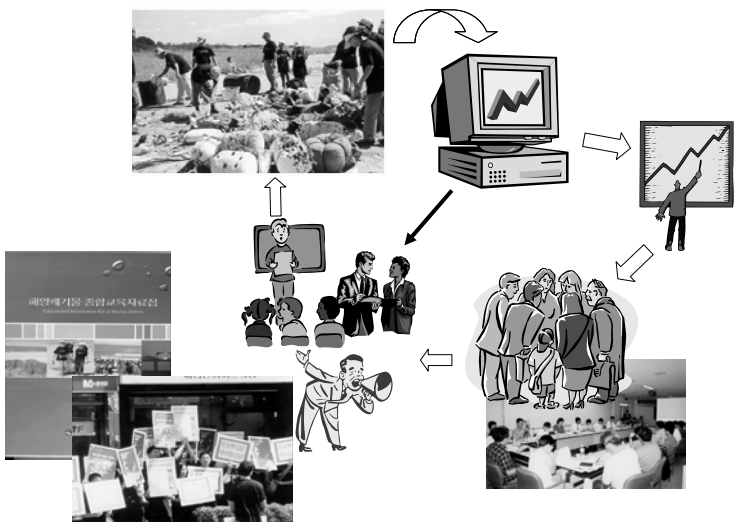
Sprouting Hopes for the Way Forward – 2/6

❑ MANGO Project : Nationwide Approach

- Strengthening of a nationwide base to resolve use conflicts between public and private interests
- Enhancement of public awareness on the protection of coastal common property
  - Transformation of lay people into informed people
  - Monthly monitoring and data analysis on marine debris
  - Education and training for marine-related NGO leaders
  - Distribution of various education and information materials
- Rational settlement of use conflicts based on actual data
  - Construction of a web-based DB on marine debris since 2000
- Establishment of a national network, “LOVESEA” (May 2002)

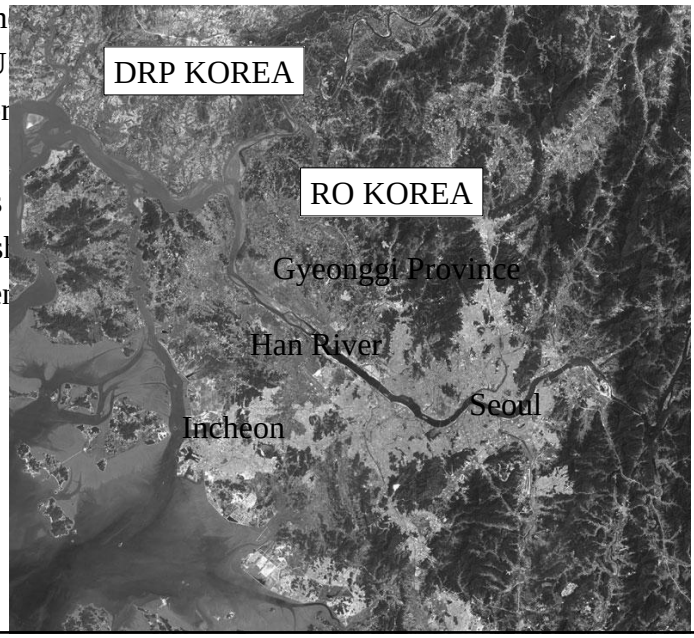
Sprouting Hopes for the Way Forward – 3/6

◁ Self-reinforcing Cycle of MANGO ▷



Sprouting Hopes for the Way Forward – 4/6

❑ Major arrangem
- Total budget : U
- Specified propor **(22.8%)**
- Maine activities
- Commitment : sl partnership, scier



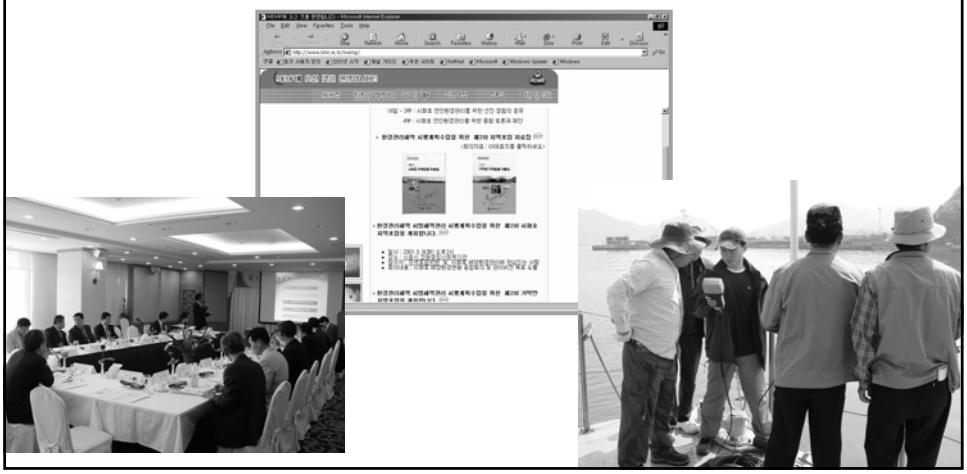
Sprouting Hopes for the Way Forward – 5/6

❑ Community Advisory Council for Masan Bay

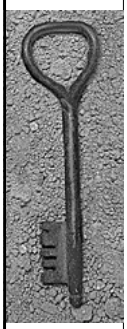
- A partner with the Masan Bay Management Committee
  - The Committee for the Masan Coastal Area formulated in 2005
  - Vice-minister of MOMAF chairs the committee
- An exemplary model for resolving use conflicts
  - Land vs. Waters, Waters vs. Waters
  - A proactive response to future use conflicts
- Enhancement of public participation in the decision-making process
  - Successful implementation of policies prepared through the Forum
  - A tool to avoid “Failure of Policy”
- Application of scientific data for rational decision-making
  - A tool to avoid “Failure of Science”
  - Beginning of trans-disciplinary approach

Sprouting Hopes for the Way Forward – 6/6

- All relevant data and information "Over the Table, and Joint-fact Finding"
  - A tool to achieve transparency in the process of decision-making and conflict resolution



IMPLICATION



Framework for Coastal Use Conflict Management

- Framework for Coastal Use Conflicts Management (Nam, 2004)

End-of-Pipe

To Institutionalize Participatory Education Program
To Achieve Transparency : co-sharing of data and information
To Develop and Implement cooperative projects

Front-of-Pipe

To Legalize a mechanism for settlement of conflicts
To Identify and categorize stakeholders or interest groups
To Integrate experts' and indigenous knowledge for joint fact findings
To Develop rational trade-off system

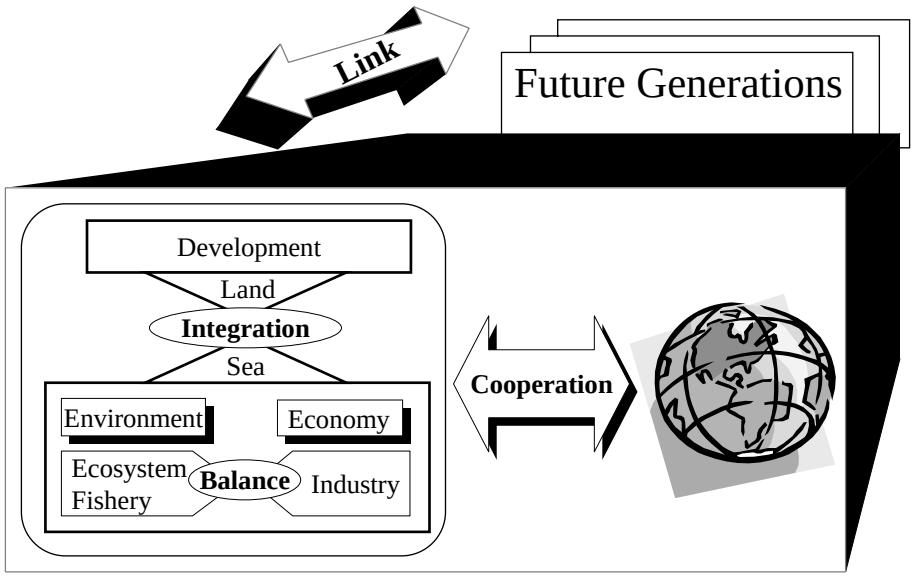
Arrangements to be Applied – 1/2

- ❑ A Small Step with A Great Leap in Mind
  - ➢ Integrated, Incremental, and Iterative Approach needed
  - ➢ Coastal areas as COMMON goods
- ❑ Enhancement of Policy Coordination
  - ➢ For conflicts on marine resources
    - Reinforcement of the Marine Policy Bureau of MOMAF
  - ➢ For conflicts between land and sea
    - Establishment of the coastal watershed management system
- ❑ Establishment of Guidelines for Conflict Resolution in Coastal Areas
  - ➢ Empowerment of the authorities involved in conflict resolution
  - ➢ Collaboration and coordination of government agencies and stakeholders

Arrangements to be Applied – 2/2

- ❑ Promotion of Problem-solving Oriented Researches
  - ➢ Better information and knowledge base
  - ➢ Decision support system for rational decision making
- ❑ Awareness and Education
  - ➢ Conflict resolution based on
    - Better understanding of problems
    - Mutual understanding among stakeholders (e.g. Civil Forum)
  - ➢ Voluntary participation
- ❑ Balance in Policy Priority between the Current and the Future

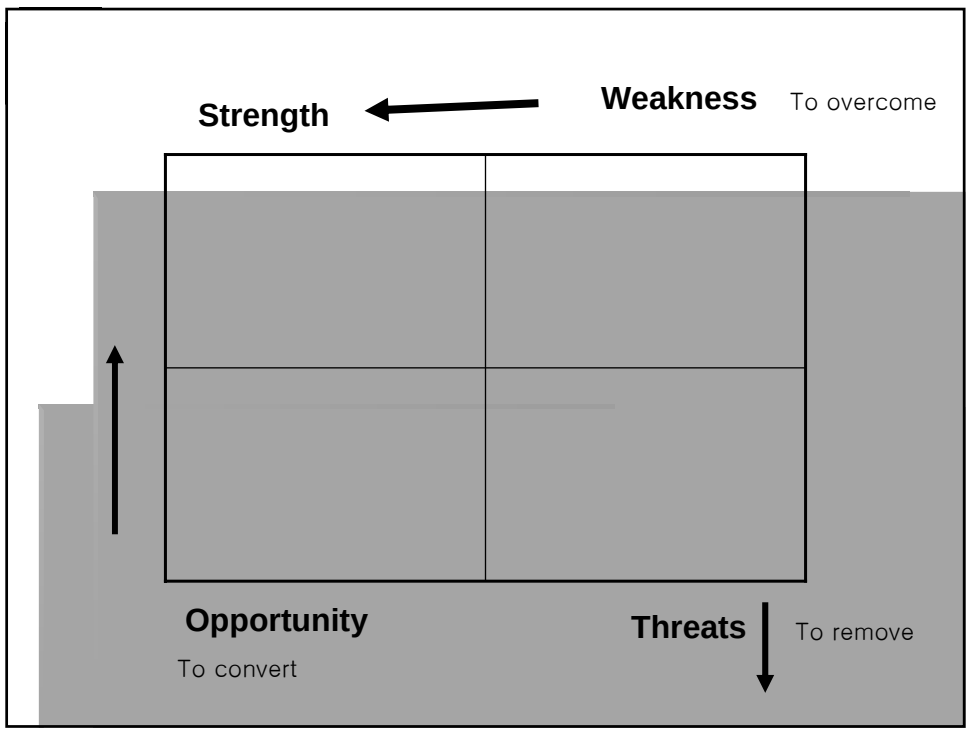
Conflicts the Inevitable, but ***Soluble & Motive Power***



Web of Life

Dreaming of the Web of Coexisting Stakeholders

Goal Setting



Concepts I want to Share with You

- **3E Framework and Conflict Resolution for Sustainable Development**
  - → **Environment (Ecosystem), Economy, Equity**
- **Two-Way Approach in this Program**
  - → **We are All Learners as Well As Tutors**
- **PSR Framework, and SWOT Analysis**
  - → **Application to Marine Environment Management**
  - → **Application to Coastal & Marine Protected Areas**
- **Stewardship & 3I Approach**

Introduction to Group Work

Integrated Planning Process and Decision-making

Procedures

- Introduction to Group Work
- 4-5 persons in a Group
- Analysis on natural and socio-economic conditions (features)
- Identification of present and potential conflicts
- Classification of conflicts, soluble or not : prioritization
- Coastal Planning Mechanism including goal setting, strategies for conflicts resolution etc

Who you are?

- Assignment of a role in each group

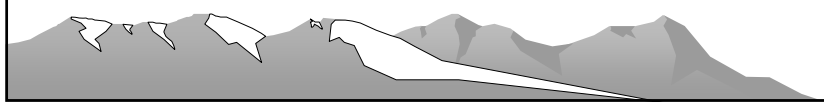
① Governmental sectors

② Entrepreneurs sectors (industries, tourism)

③ Fishermen

④ Citizens

⑤ Representatives from environmental groups



Coastal Features 1/2

- Natural environmental characteristics

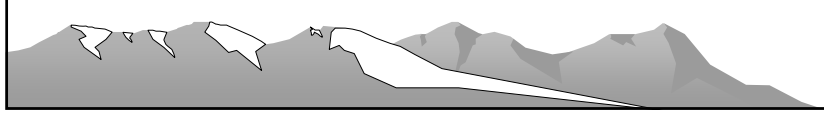
① Several uninhabited islands in coastal area

② Coral reefs or coastal wetlands, valuable

③ High fisheries productivity

④ Beaches, famous to inland residents

⑤ Water quality is very good, recently deteriorated by pollutant load from tourism facilities



Coastal Features 2/2

- Socio-economic characteristics

① GDP per capita is 60% of national average

② Fisheries and tourism are major industries of the community

③ Population has decreased

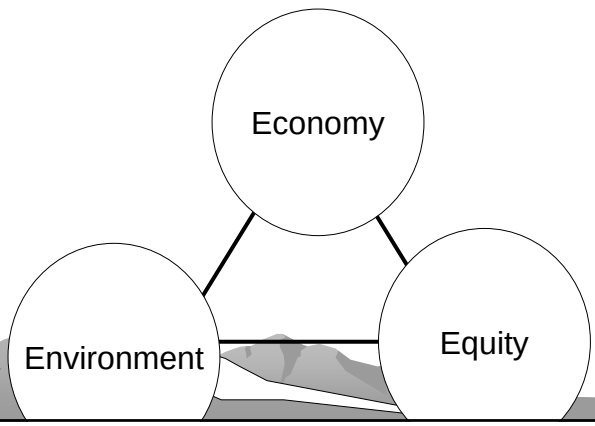
④ Not enough lands for large-scale industrial complex

⑤ Inferior (poor) SOC, roads, trains etc

⑥ Not much budget to public treatment facilities and SOC construction

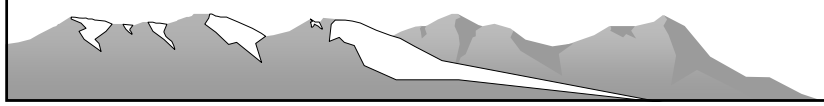
Problem identification & goal setting

- Absolutely economic growth?
- Allocation of policy interests between Eco and Env. (ex. 6 to 4, 5 to 5, 10 to 0 etc)



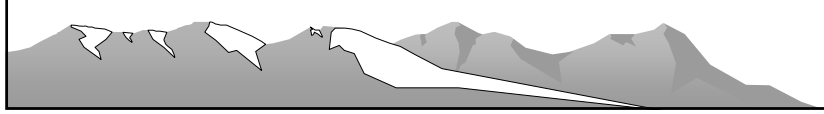
Preparation of planning

- Identification of conflicts
- Organization of planning entities
- How to involve stakeholders
- Identification of knowledge gap and how to address



What are feasible strategies?

- Need to build social consensus or not
- Coastal zoning
- Financial support/compensation to fishermen or other stakeholders
- Regulation of tourism industries and activities



Annex III

Group Presentation

沿海经济发展规划

第一组

The Development Plan of Coastal Economy

Team 1

分工

- 政府管理者：王
- 渔民
- 旅游业（魏），工业（孙）
- 市民：孙玉增，姜
- 环保主义者

Role assignment

•Government official: Mr. Wang
•Fisherman
•Tourism: Ms. Wei; other industries: Mr. Sun
•Citizen: Mr. Sun, Mr. Jiang
•Environmentalist

目标-发展经济

- 以旅游经济，渔业经济为主导产业，GDP平均增长10%；
- 相关产业经济：交通，工业，公众服务初具规模，生态环境得到有效保护。

Goal – Economic Development

•Take tourist and fishery industries as key industry, and fulfill a 10% increase in GDP

•Other related industry: develop transportation, industry and public service into a certain scale with the eco-environment effectively protected

问题

- 水质污染，水产品质量下降。
- 渔业区减少导致渔业减产，渔民减收；
- 局部生态环境遭受破坏。

Problems

•Pollution of water, and decrease of the quality of fishery products

•Decrease of fishery outputs and fisherman income due to the reduction of fishing areas

•Damage of the eco-environment in some areas

规划组织

- 冲突：旅游业与渔业；
- 潜在冲突：养殖业与水上交通冲突；生态保护与开发冲突。
- 组织规划的团体：海洋科研机构
- 利益相关者：旅游，渔业，环保，交通，工业等部门，渔民，公民。
- 公共宣传。

Planning organization

•Conflicts: tourist industry and fishery

•Potential conflicts: fishery and maritime transportation; ecosystem protection and marine development

•Parities involved in the planning organization: marine related scientific and research institutions

•Stakeholders: agencies related to tourism, fishery, environment protection, transportation, and other industries, fisherman and citizens

•Public awareness

规划组织

- 争取社会的理解：开展公共调查，召开协调会议。
- 海岸带区划：委托科研机构做设计规划，组织论证，实施区划。
- 金融支持：招商引资与财政支持及社会投资相结合。
- 补偿方案：评估相关者利益，安排补偿，争取广泛支持。
- 规范旅游业，工业及其它开发活动

Planning organization (continued)

•Obtain understanding from the society: launch public surveys, hold co-ordination meetings

•Coastal zoning: entrust related scientific and research institutes to design the zoning plan, assess and implement the plan

•Financial support: introduce outside capitals, give government financial support, and attract social investment

•Compensation measures: assess the interests of stakeholders, arrange compensation, and obtain wider support

•Regulate tourism, industry and other development activities

接上页

- 发展污染小的原生态旅游业
- 补偿渔民损失（填海，旅游业开发占有水面）
- 通过增加渔业科技开发含量（开发名优品种，与产品加工），增加渔民收入。（转移养殖区，开发远洋渔业）
- 工业开发以轻污染产业为主要考虑目标（投资者要给渔民适当经济补偿）
- 在珊瑚礁，湿地集中地带设立保护区。

Continued

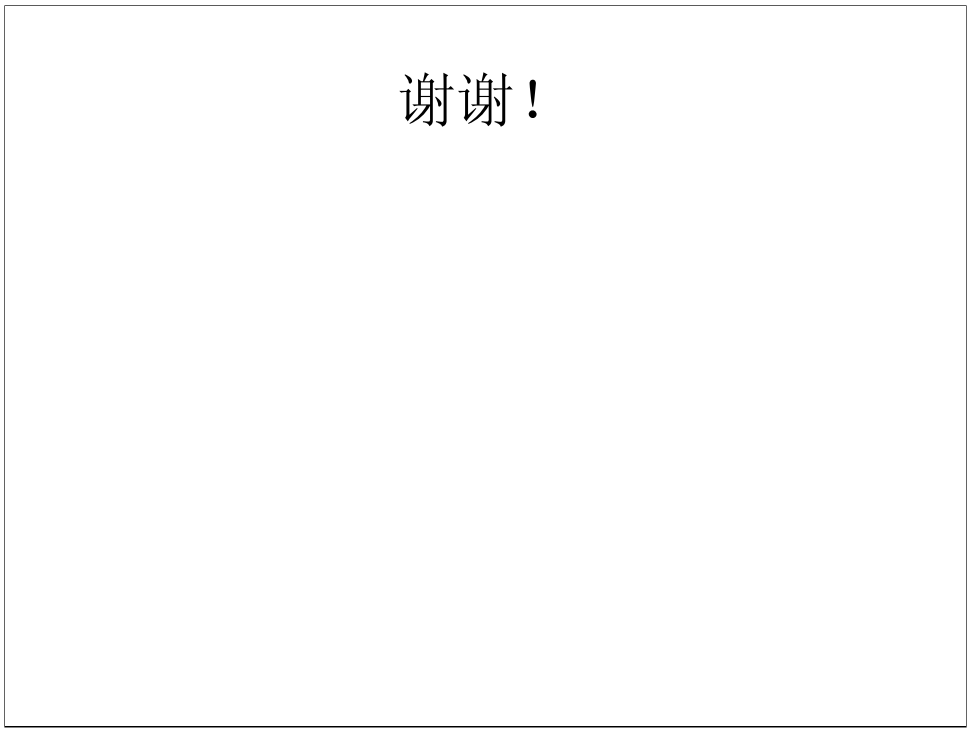
•Develop ecotourism which causes less pollution

•Compensate the losses of fishermen (loss of fishing zones caused by reclamation, tourism)

•Increase the income of fishermen by developing hi-tech fisheries (develop high value and high quality products, and processing of fish products). (transfer the mariculture zones, and develop off shore fishing)

•Industry development focused on light pollution ones (investors need to give reasonable compensation to fishermen)

•Set up protected areas around coral reefs and wetlands concentrated areas



Thank you!

매립을 통한
어촌지역관광호텔 신축

3 분임

(김원순, 이동욱, 신종식, 김금만, 나정미)

발표자 : 김금만

Building a hotel on reclaimed land near fishing villages

Team 3

(Ms. KIM Won Soon, Mr. LEE Dong Ug, Mr. SHIN Jong Sik, Mr. KIM Gum Man, Ms. N A Jung Mi)

Presenter: Mr. KIM Gum Man

◎ 매립지 현황

✱ 자연환경

▷ 청정해역, 갯벌지역, 자연경관이 화려한 해안가

✱ 사회 경제적 환경

▷ 1인당 GDP 우리나라 GDP의 60%
어업 및 관광업이 주요 소득원
사회 기반시설의 미비

Reclaimed area status

•Natural environment

Marine protected area, foreshore, beautiful beach

•Socio-economic environment

Fisherman's GDP per capita is 60% of that of average Korean.
Main income source is fishing industry and tourism.
Social infrastructure is defective.

◎ 어촌지역관광호텔 신축으로 인한 영향

✱ 경제적 측면 vs 환경적 측면

7 to 3 으로 경제적 측면에서 더 이익
(AHP 프로그램으로 얻은 가정)

↓

해상관광호텔 신축으로 결정

Impact of building a hotel on reclaimed land near fishing villages

Economic aspect vs environmental aspect

Economic aspect is superior to environmental aspect with the ratio of 7 to 3.

→ Decision is made for building a hotel on reclaimed land near fishing villages.

◎ 어촌지역관광호텔 신축에 따른 이해관계자의 의견(찬성)

❋ 정부관계자

▷ 의견 없음, 중재자 역할

❋ 개발업체(적극 찬성)

▷ 어촌해상관광으로 인한 소득 증가

▷ 일자리 창출

Opinions of stakeholders about building a hotel on reclaimed land near fishing villages (agreement)

•Government officer

No opinion, play a role of mediator

•Commercial company

Income will increase from tourists visiting fishing villages.

Employment will also increase.

◎ 어촌지역관광호텔 신축에 따른 이해관계자의 의견(반대)

❋ 어업인

▷ 호텔 건설로 인한 각종 오염원 산재로 주변 양식장 파괴를 초래

▷ 어업활동의 위축으로 수입원 감소

❋ NGO

▷ 오염정화작용을 갖는 습지(갯벌)의 파괴

▷ 철새 서식지 파괴

▷ 매립으로 인한 생태계 파괴

▷ 관광객 증가로 오염원 증가 및 주변 환경파괴

❋ 시민

▷ 관광객 증가로 인한 소음 및 주변환경 오염

Opinions of stakeholders about building a hotel on reclaimed land near fishing villages (disagreement)

•Fisherman

The plan:

Will harm neighboring mariculture due to pollution from hotel construction

Will decrease income for fishermen due to decreased fishing activities

•NGO

The plan:

Will destroy wetland that purifies pollutants

Will destroy habitat for migratory birds

Will destroy ecosystem due to reclamation

Will increase pollutants and destroy neighboring environment due to increased tourism

•The public

The plan:

Will increase noise and contaminate neighboring environment due to increased number of tourists

◎ 해결방안

❋ 어업인
▷ 소규모바다목장 및 해조장 조성
▷ 자원 조성(치어방류), 인공어초 투하
▷ 호텔 상가 우선 분양권
▷ 낚시어선을 이용한 부수익 창출

❋ NGO
▷ 인근 보리경작으로 먹이 이용
(경작비 지급 등 보조)
▷ 소하성 어류를 위한 어도 설치

❋ 시민
▷ 친수공간 조성

Solutions

•Fisherman

Develop mariculture sites and stopovers for seabirds.
Secure breeding sites (fish juvenile discharge), artificial leaves.
Give fishermen a priority to sell their products at the hotel.
Generate side income using fishing boats.

•NGO

Use barley produced nearby as fish feed (assistance for cultivation).
Construct fish-way for breeding.

•The public

Develop a water park for recreation.

서천장항지구 매립면허검토

4조

(김도순,김호일,김만규,김양금)

Seochun Janghang Area Reclamation License Review

Team 4

(Mr. KIM Do-Soon, Mr. KIM Ho Il, Mr. KIM Man-gyu, Ms. KIM Yang-Geum)

➢ 검토배경

- 충남 서천군 장항읍 공단 100만평부지 조성을 토지공사에서 신청함에 따라 이의 허가 여부 검토
  - 신청자 : 한국토지공사

Background

Korea Land Cooperation requested to develop an industrial complex on 1,000,000-pyung land in Chungnam Seochungun Janghangeuo.

Proponent: Korea Land Cooperation

➢ 신청지역의 자연 및 사회경제적 환경

- 자연환경 : 어획고는 높으며, 아름다운 해변을 가지고 있으나 최근에 관광시설의 영향으로 악화되는 단계
- 사회경제적 환경 : 1인당 국민총생산이 일반인의 60%의 낙후한 지역이며 인구가 점차 감소하며, 사회기반시설 열악

Natural environment and socio-economic status in the area

-Natural environment: The fish-catch rate is high; the beach is clean; however, the condition has been deteriorating recently due to increased tourism.

-Social economic status : The area lags behind with its GDP per capita accounting for 60% of the average, with population decreasing, and with social infrastructure degrading.

➢ 매립면허 신청에 따른 검토결과

- 매립에 따른 어업보상 피해(대학교 및 연구기관)용역의뢰
  - 1인당 피해액 (어선, 어장면허 등) 5천만원
- 용역결과에 따라 피해보상 및 공사시작
  - 어민,시민,개발업체 합의에 3000억 보상 및 공사시작

Review result of the request for reclamation license

•Calculate compensation to fishermen for loss of income due to the construction of reclaimed land (universities, institutes)

Compensation payment per fisherman (boats, fishing licenses, and so on): $50,000

•Compensation and construction will start after the calculation is complete.

Compensation payment, worth 300 billion won, and construction will start based on the agreement among fishermen, residents, and the company.

- 우리 4조에서 채택한 전략
  - 이 지역이 경제적으로 낙후된 지역임을 감안하여 이해관계자들의 합의를 이끄는 전략을 채택
  - 개발과 환경의 비율은 6:4

Strategy made by Team 4

•Secure agreement among the stakeholders, considering their economic status.

•The ratio between development and environment should be 6 to 4.

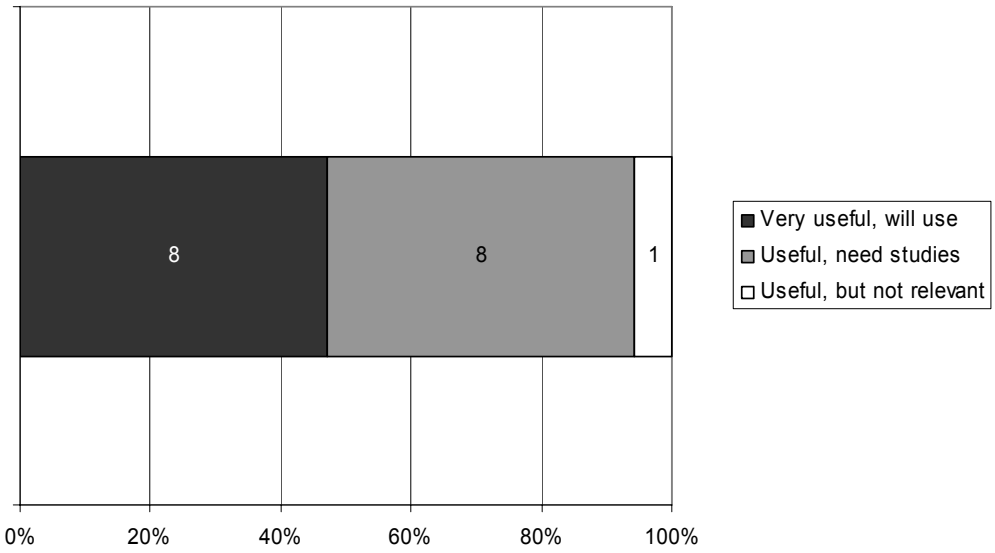
Annex IV

Questionnaire Survey Results

A questionnaire survey was conducted for those who participated in the First Training Workshop for Local Government Officers. Each participant received a questionnaire with three questions in English, and staff members of the Project Management Office explained those questions in two local languages: Chinese and Korean. The questionnaire is attached below. All 16 participants answered the questions in writing respectfully. The following summarises the provided answers.

1 *Were those information and techniques useful for your work in coastal development and marine environmental protection? Please tell us what information was useful and how you plan to use them in your work? (Multiple answers allowed)*

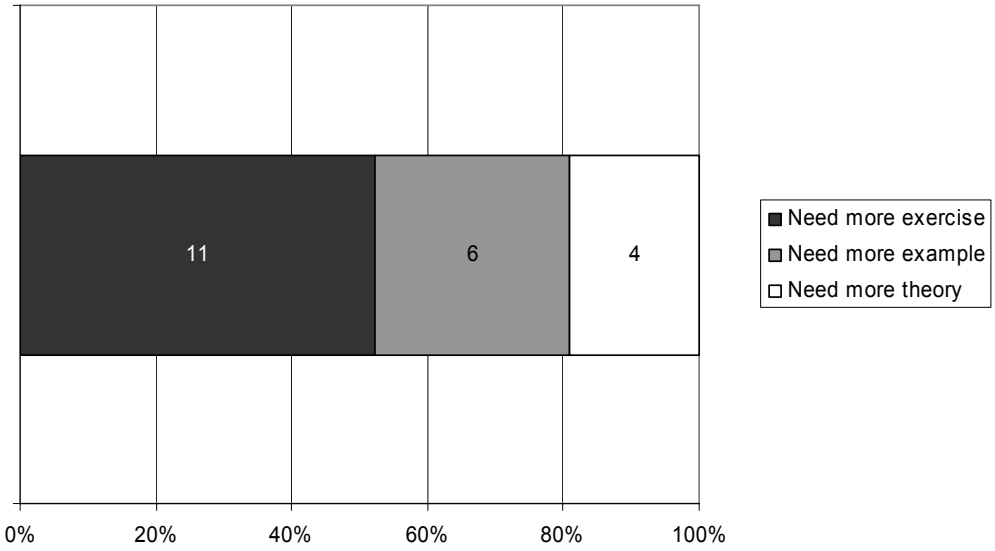
How useful was the workshop?



Half of the respondents replied that the workshop was very useful, and will use the techniques they learned. Another half of respondents answered that they would study the techniques in more detail, and put them into practice.

2 *Was the time allocation for each section appropriate? Were the lecture materials useful and easy to understand? Please tell us what section(s) (instruction method) you think was the most effective. (Multiple answers allowed)*

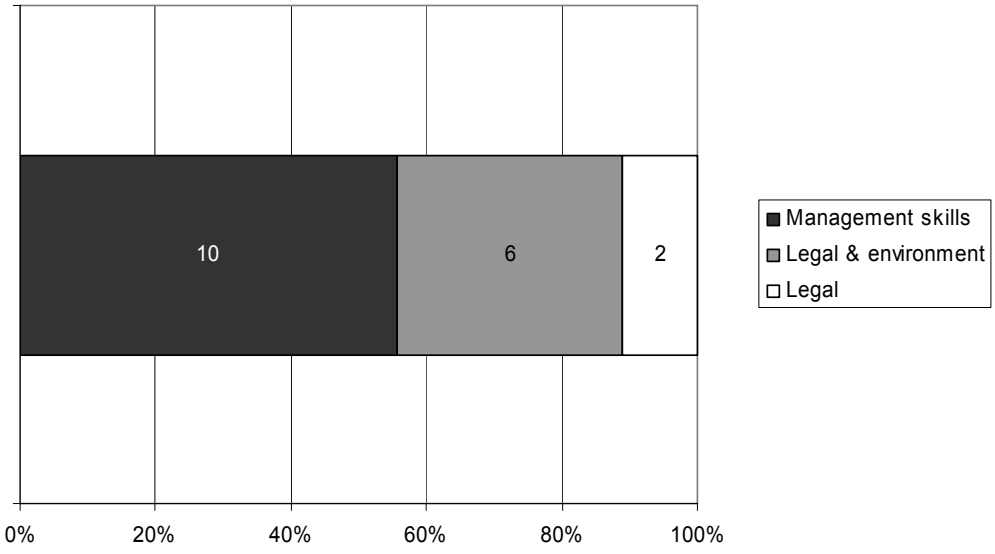
What section was useful?



Many respondents answered that it would provide better understanding of the process, and effective use of methodologies provided in the lectures if more exercises and examples could be applied; while a few people thought more theoretical lectures would be necessary.

3 *To design the next workshop, we would like to know the needs of local governments. What issues or problems do you face to protect the coastal and marine environment? Would you please recommend a few topics you think local government officers would like to learn more about for the next workshop? Please be as specific as possible about the topic and what you would like to learn about the proposed topic. (Multiple answers allowed)*

What topic is good for next workshop?



Many respondents felt that the information on management skills relevant to “Marine Environmental Legislation and Enforcement” would be beneficial.

Training Workshop for Local Government Officers

Questionnaire

Thank you for your participation in the First Training Workshop for Local Government Officers. To improve future similar workshops, we would like to ask for your comments and suggestions. Please take a few moments to answer questions below. There are three questions. Thank you for your kind co-operation.

Your name (optional): _____

1. This First Workshop provided the information and techniques to consider various aspects to make decisions for better coastal development and marine environmental protection.

For example, the Workshop discussed:

- Decision-making process,
- Multi-Attribute Decision Analysis approach,
- Conflict resolution of coastal use, and
- Integrated approaches for marine protected areas.

Were those information and techniques useful for your work in coastal development and marine environmental protection? Please tell us what information was useful and how you plan to use them in your work?

[PLEASE CHECK (√) THE ANSWER WHICH REFLECTS YOUR OPINION]

☐ Very useful, and will try to use the techniques

☐ Useful, need further studies

☐ Useful, but not directly relevant to my work

☐ Not useful

☐ Other Comments, please give details:

[ ]

2. The First Workshop consisted of several sections: lectures, computer exercise, group work, presentation, and discussion. The lecture materials are provided to each participant in hard copy.

Was the time allocation for each section appropriate? Were the lecture materials useful and easy to understand? Please tell us what section(s) (instruction method) you think was the most effective.

[PLEASE CHECK (√) THE ANSWER WHICH REFLECTS YOUR OPINION]

☐ Need more theoretical lectures

☐ Need more practical exercises

☐ Need more examples

☐ Other Comments, please give details:

[ ]

3. The Yellow Sea Project is planning to organise a similar workshop in 2007 for local government officials. This second workshop will be designed to provide the officials in China and Korea with an opportunity to obtain practical knowledge and skills to address the environmental issues.

A tentative overall theme for the second workshop is "Marine Environmental Legislation and Enforcement." Detailed topics will be determined in consultation with government officials and regional experts in the relevant field.

To design the next workshop, we would like to know the needs of local governments. What issues or problems do you face to protect the coastal and marine environment? Would you please recommend a few topics you think local government officers would like to learn more about for the next workshop? Please be as specific as possible about the topic and what you would like to learn about the proposed topic.

[PLEASE CHECK (√) THE ANSWER WHICH REFLECTS YOUR OPINION]

☐ Legal aspects

☐ Legal aspects and environment

☐ Management skill

☐ Other Comments, please give details:

[ ]

This is the end of questionnaire. Thank you very much for your opinion.