

# **Using the Analytic Hierarchy Process (AHP) in SWOT analysis: a hybrid model and its application to prioritization of estuary management options in Korea**

**Presented by  
Jongseong Ryu, PhD, MMA**

Assistant professor  
Department of Marine Biotechnology  
Anyang University, South Korea

**With the cooperation of coauthors,  
Jong Seong Khim and Chul-hwan Koh  
(Seoul National University)**

# Problem identification and research logic

## Problem

1. Decision makers would be inclined to rely on their own intuition and judgment, or common-sense arguments in priority decision (Low et al., 2003; Hajkowitz, 2008)
2. All processes cannot be addressed simultaneously nor invested in evenly with limited resources (Leach and Pelkey, 2001)

## Solution

**Scientific confidence in determining priority**



**Enhancing transparency in decision making process**



**Increasing success of policy**

# Objectives

1. To provide a (*scientific and transparent*) decision model to give a relative importance to several management options for the sustainable and well-functioned estuary in Korea.
2. To identify and compare collective expert preferences across three major estuaries in South Korea (Nakdong, Yeongsan and Geum River), based on the decision model proposed

# The Analytic Hierarchy Process (AHP)

- Invented by business school professor, T. Saaty, in early 1970s.
- Provide a framework for planning, priority setting and resource allocation
- Widely applied to a range of areas (business, resource management)
- 4 stages
  - 1) Develop a hierarchy of management options describing the problem
  - 2) Perform an objective-oriented pairwise comparison (survey)
  - 3) Compute individual scores of priorities and consistency, based on the eigen-value method
  - 4) Aggregate individual priorities
- Final output: Relative importance scores of decision objectives (0–1 scale). Total scores will be 1.

# Survey logistics of case study

- **Question**

In your opinion, what should be the relative importance of the management options towards the sustainable and well-functioned estuarine system, from the perspective of decision makers to allocate budgets and resources?

- **Number of respondent**

General: 8

Nakdong River: 8

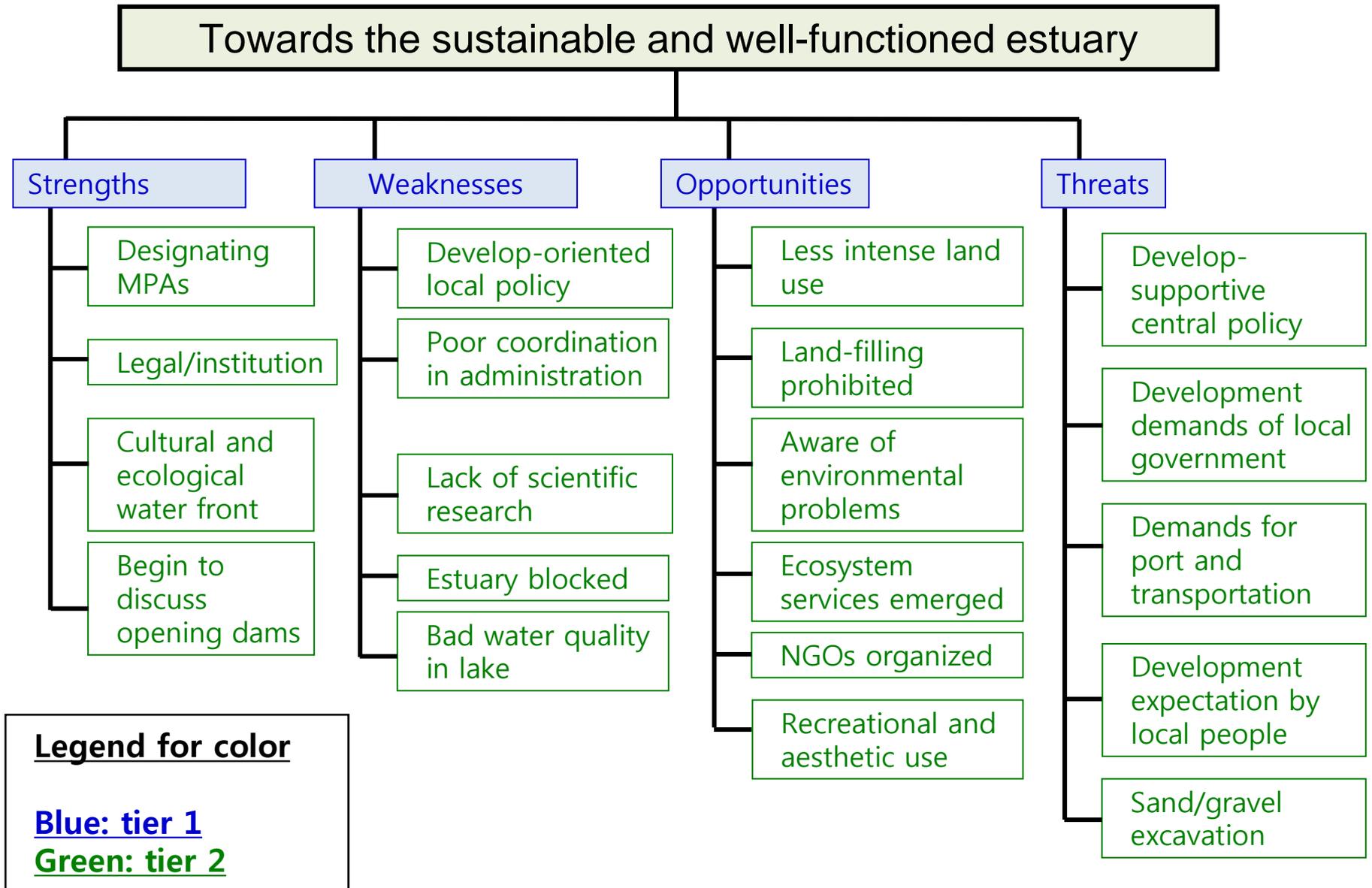
Yeongsan River: 3

Geum River: 3

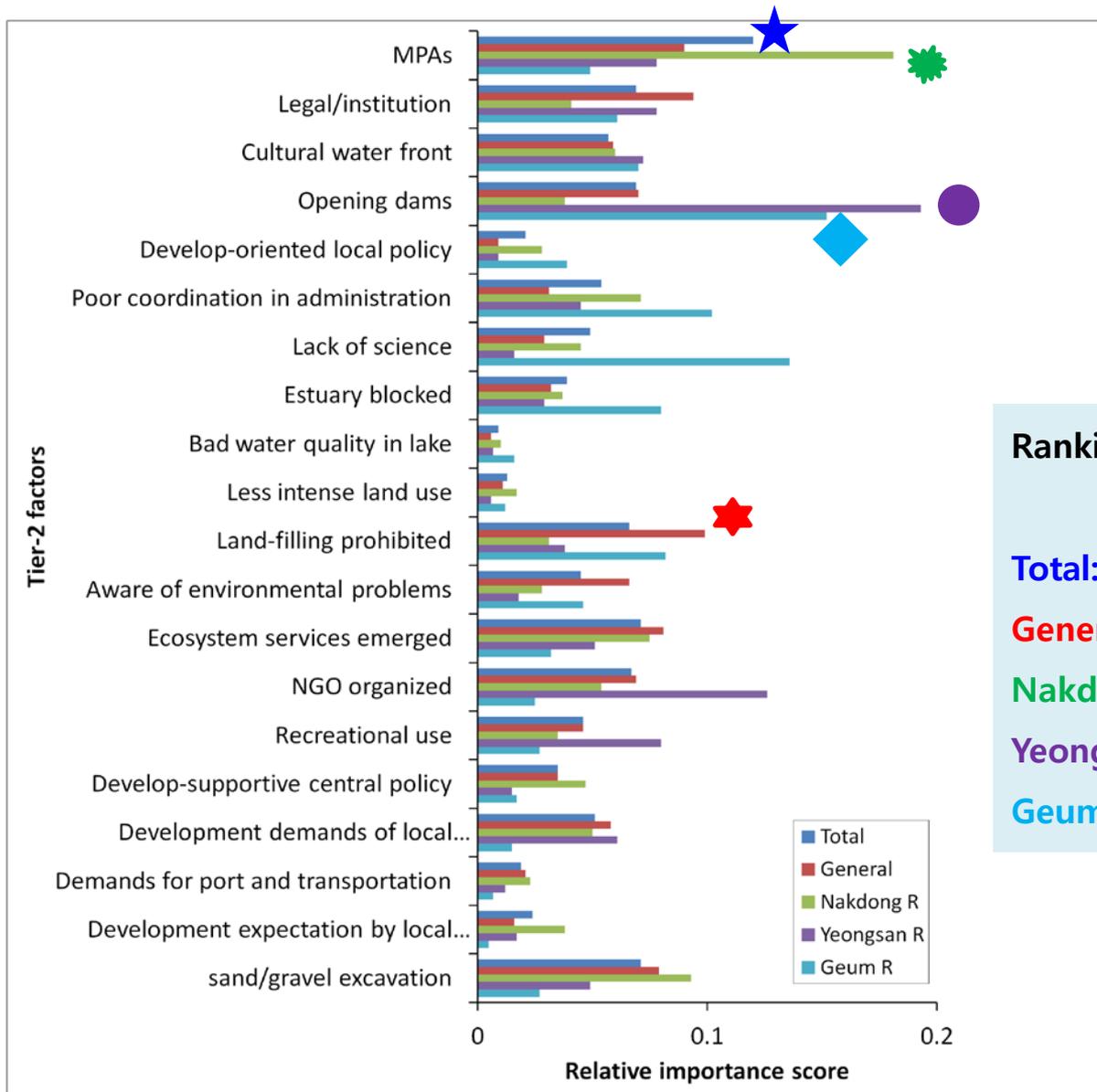
- **Who (respondent) is surveyed?**

Scientists and managers who are familiar to estuary science and management.

# Decision model to evaluate expert preferences of management options (SWOT-AHP hybrid model)



# Relative importance of tier-2 factors (management options) by AHP



**Ranking no.1 option in areas/ivers**

**Total: MPAs** ★

**General: Land-filling prohibited** ★

**Nakdong R.: MPAs** ★

**Yeongsan R.: Opening dams** ●

**Geum R.: Opening dams** ◆

## Take home messages

- Determining relative importance of management objectives is important for successful management in terms of the following:
  1. A powerful tool for evaluating current policy regarding what needs to be done to establish more sustainable policy
  2. A key to develop appropriate strategies in case of conflicting multiple objectives in coastal management
  3. Reflecting various viewpoints of multiple stakeholder groups
- The method used here is to be effective in elucidating expert preferences, and thus possibly applied to estuarine management,
- and, particularly helpful for policy makers to have a confidence in their decisions, creating credibility and legitimacy from various stakeholders