Environmental Sustainability based Budget Allocation System

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Introduction

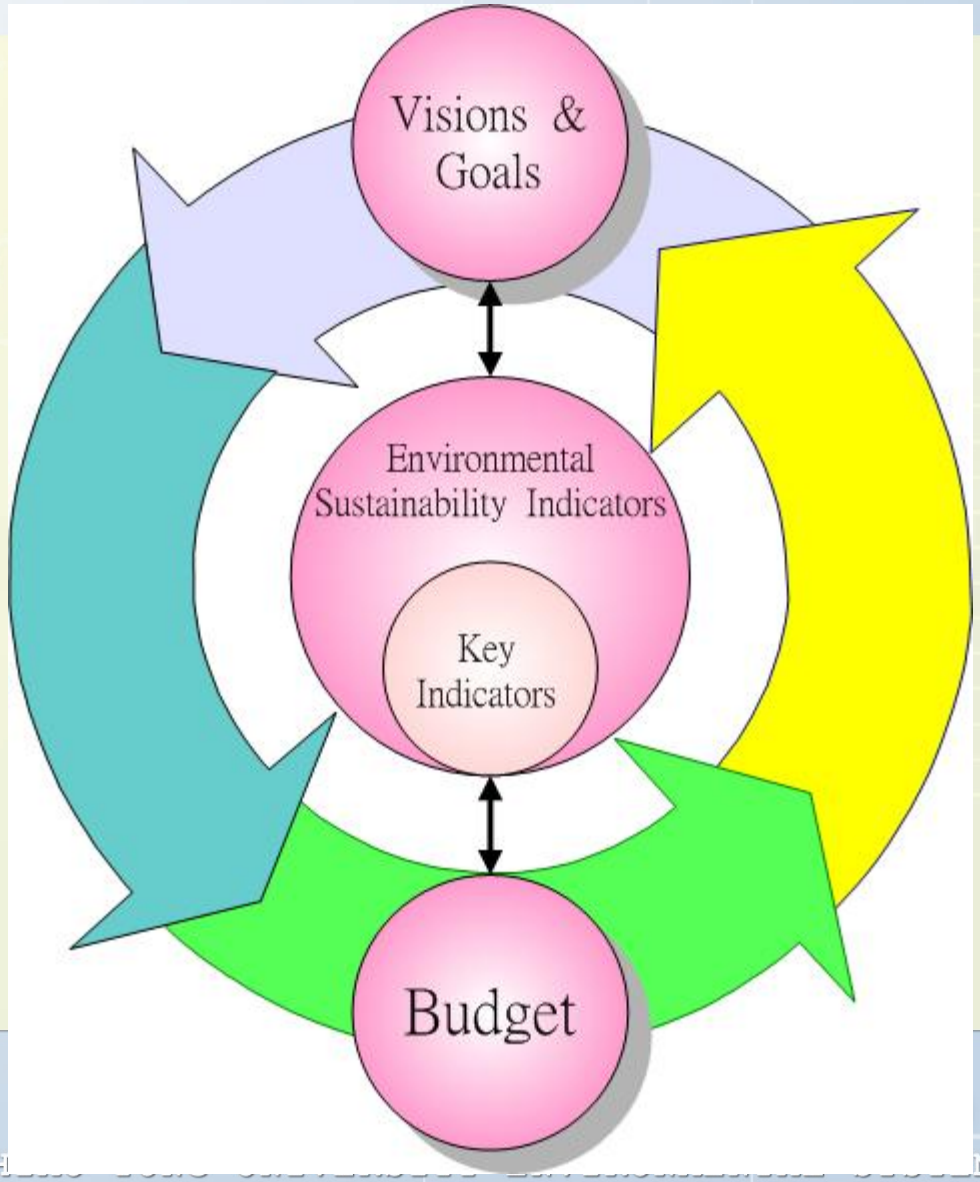
- Sustainable Development
  - Brundtland Commission (1987): Our Common Future
  - …
- Major national policy goal: Improving Sustainability.
- In Taiwan, each local government is encouraged to establish its own set of sustainable development indicators (SDIs).

Introduction

- Existing Environmental Sustainability Indicator (ESI) and budget allocation are generally two independent systems.

- Environmental Sustainability based Budget Allocation System
  - Assist a local authority with making appropriate budget allocations for improving environmental sustainability in an effective manner.

Introduction



ESI Frameworks

- General frameworks
  - Administrative division
  - Property
- Driving force-State-Response (DSR)
  - can not reflect regional characteristics.
- Strength-Weakness-Opportunity-Threat (SWOT)
  - Region-specific factors: visions & goals, geographical features; pollution patterns & characteristics, etc.

ESI Frameworks

- Strength-Weakness-Opportunity-Threat (SWOT)
  - Strength: Good value, positive trend, but sometimes difficulty to improve them further.
  - Weakness: Decreasing trend or hard to improve because local characteristics
  - Opportunity: Unacceptable value, negative trend, it is likely to improve by integrating available resources.
  - Threat: Unacceptable value or Good value, negative trend, possible to improve, but difficult.

ESIs vs. Budget items

- Linking all indicators with budget items is impractical.
  - Relationship: Multiple ↔ Multiple
  - Duplicate or Redundant links
  - Complex and hard to evaluate

- e.g. => River Pollution Index and BOD

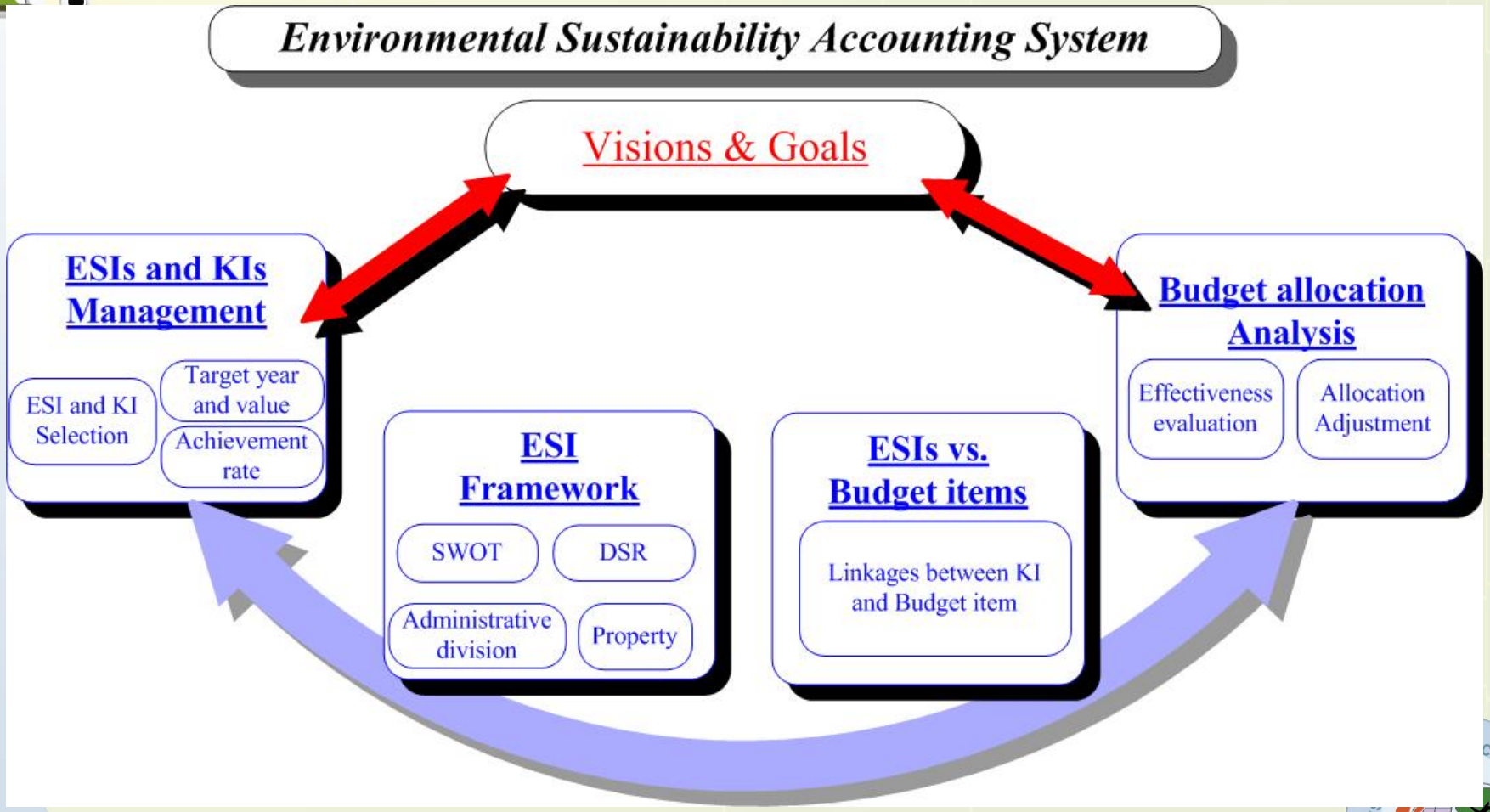
Key Indicators

- No duplication
- Reflect the progress for achieving visions and goals
  - The number of managed permitted dischargers →does not reflect the real improvement
- Easy to collect and calculate
  - Health risk is essential, but hard to assess.

Key Indicators

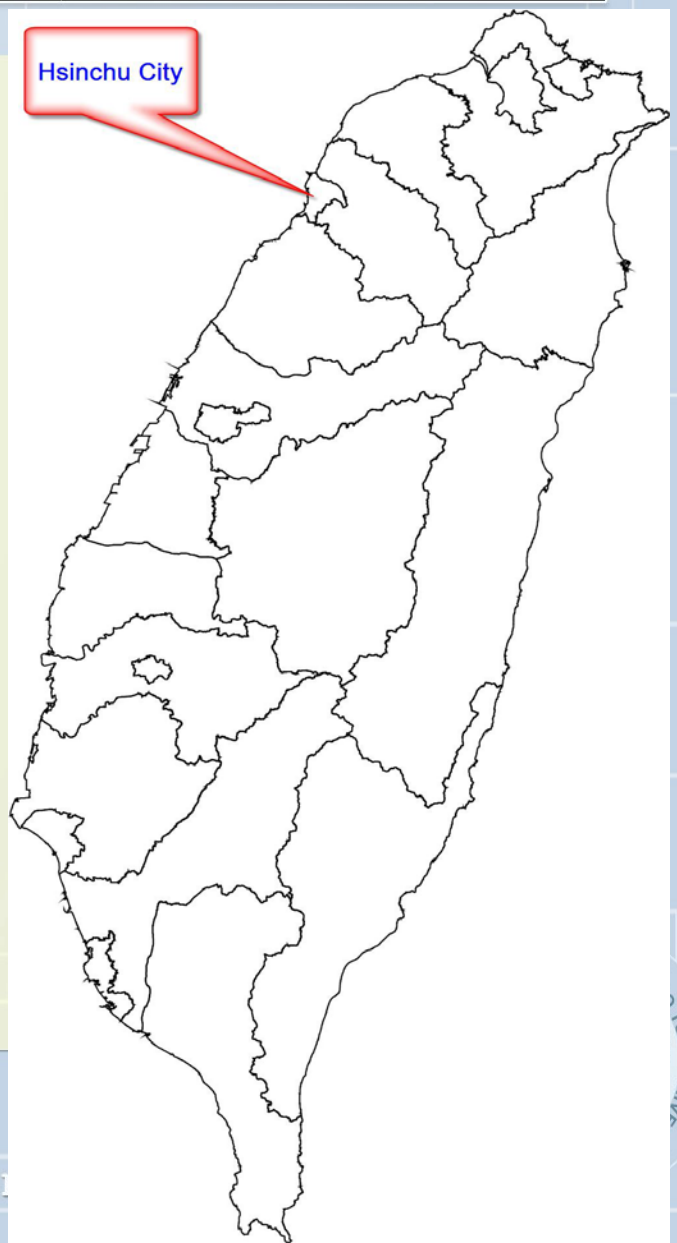
- Can be directly linked to specific budget items
  - e.g. the benthic index of biological integrity
    => most investments for improving this index are indirect
- Should not be strongly affected by external and background factors
  - The indicator for downstream suspended solid (SS) concentration is often affected by significant rainfalls upstream.

System Configuration

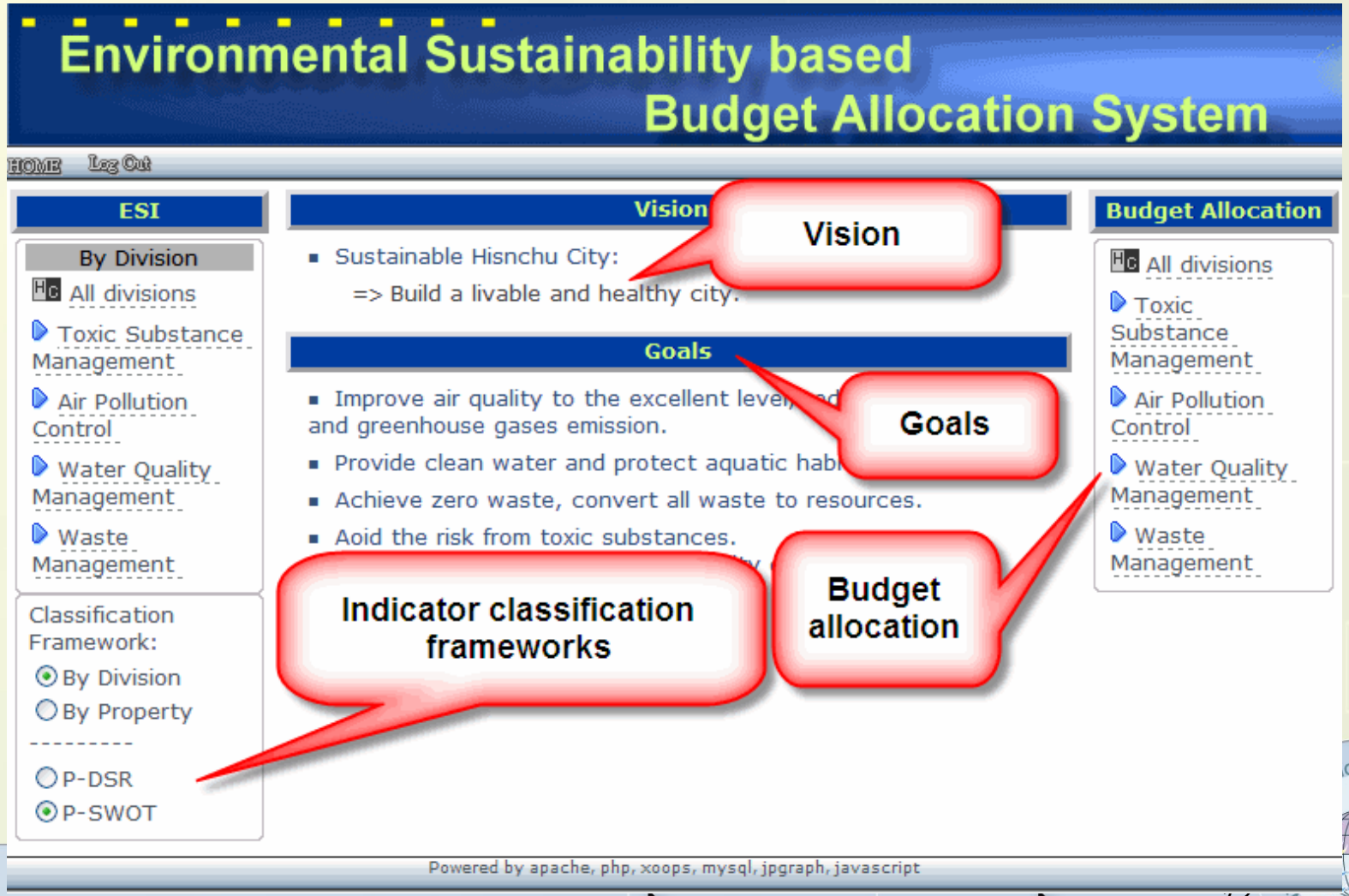


Case Study – Study Area

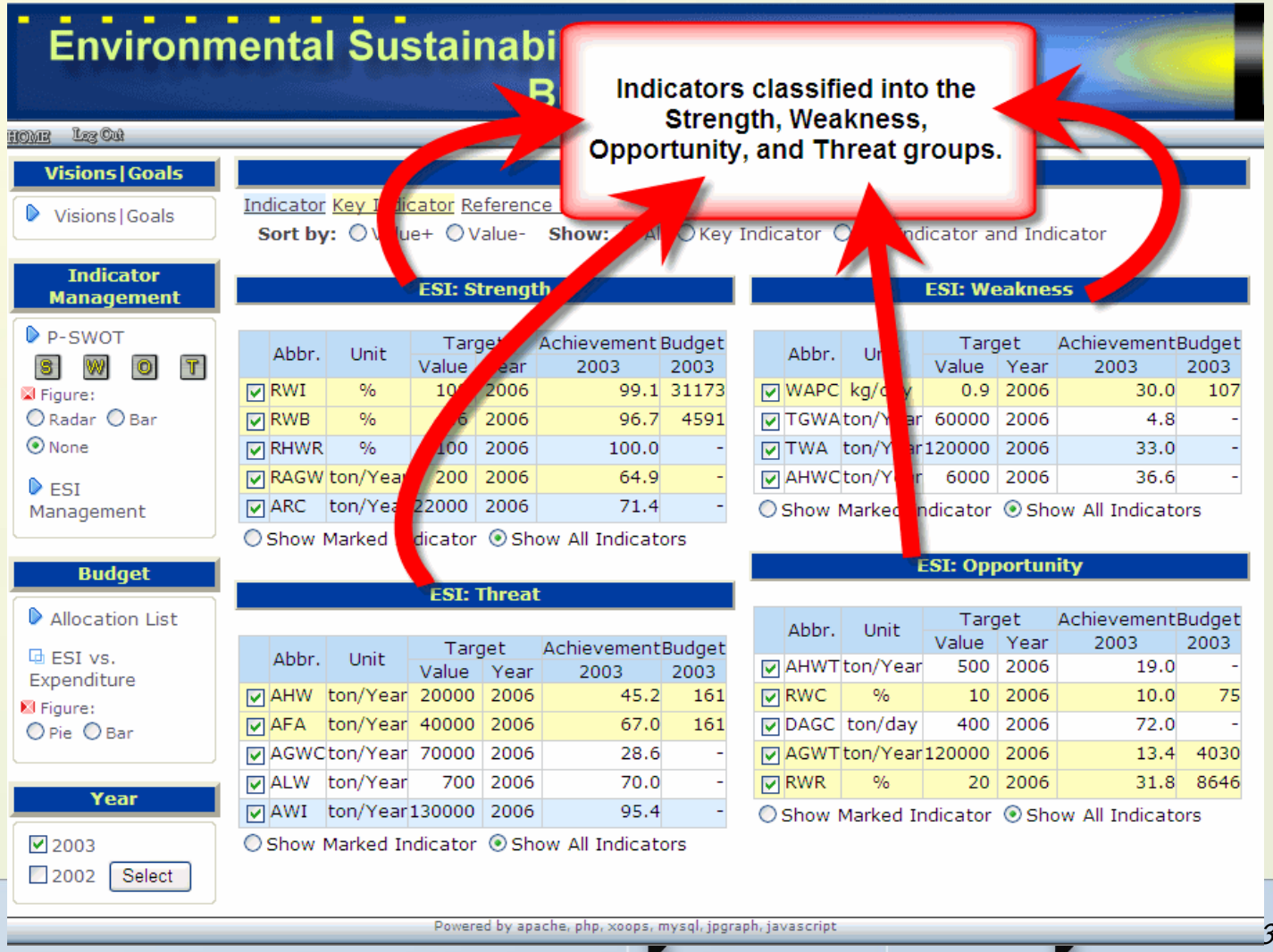
- Hsinchu City in Taiwan, Republic of China.
- About 103 km^2 with three major rivers passing through it.
- Population: 403,638



Case Study – Web-based System



Case Study – SWOT framework



Case Study – Budget allocation

2003 Allocation Table for a Budget Item			
Code:1810046-02-02-71		Status:Allocated	
Budget Item: Project to inspect air pollution sources		Budget allocated: 155 Unit:NT$1000	
Basic Expense	10	%	15.5
Planning	10	%	15.5
SOX Emission		%	
NOX Emission		%	
NMHC Emission		%	
CO Emission		%	
Greenhouse Gases Emission		%	
PM10		%	
Number of Days with PSI Exceeding 100		%	
Violation Ratio of Industrial Sources	39	%	60.45
Violation Ratio of Construction Sources	15	%	23.25
Violation Ratio of Mobile Sources	26	%	40.3
New KI:		%	
Total	100%		155
Reset	Allocation		

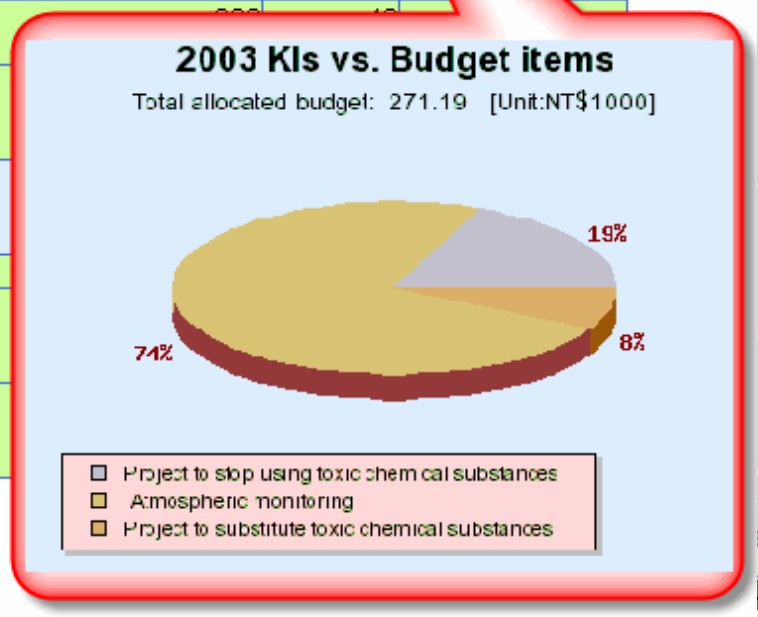
KIs

Budget allocated

Case Study – KI vs. Budget items

KIs vs. Budget items

Name	Code	Item Name	2003 Budget			Note
			Achievement Rate [%]	Budget [Unit:NT$1000]	[%]	
Concentration of Toxic Chemical Substance in Air [TI2]	Sum		50.0	271.19	2.4	--
		Project to stop using toxic chemical substances	50.4		5	
		Atmospheric monitoring				
		Project to substitute toxic chemical substances				
Storage of Toxic Chemical Substance [TI4]	Sum		22.2			
		Overtime				
		Project to stop using toxic chemical substances				
		Project to substitute toxic chemical substances				



Summary

- Selecting an appropriate set of long-term measurable ESIs with an appropriate framework is essential.
- A system to integrate the ESI and the budgetary allocation systems.
- The system can facilitate the analysis of the relationships between expenditures and ESIs.

Summary

- With the proposed system, the local authority can evaluate the budget allocated to each KI and make the necessary adjustments to improve regional environmental sustainability.
- The complete system is still under development… (to be continued)

Thank you for your attention