EE475 Natural Resource Economics

Different Aspects of Natural Resources

By Ajarn Chol Bunnag

Faculty of Economics, Thammasat University

Outline

- Basic types of natural resources
- Resource system and Resource units
- Values of Natural Resources and Environment
- Modeling Resource Service
- Economic Typology of Natural Resources
- Property Rights governing the resources

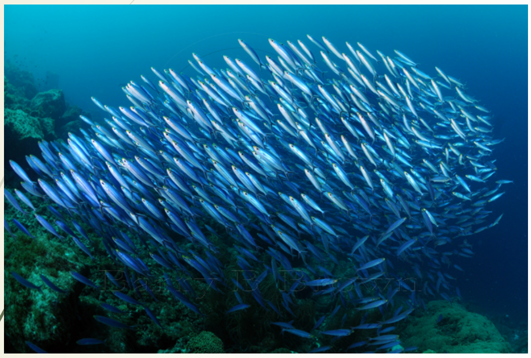
What do you see?

Resource System vs Resource Units

Resource System

Resource Units

Resource System vs Resource Units



Resource System

Resource Units

Resource System vs Resource Units

Resource System

หน่วยทรัพยากร (Resource Units)

What "goods and services" do you see?

Classification of Goods and Services from Natural Resources based on "Value"

- One way to classify is through **values of the natural resources** that human perceive.
- **3 types** of value (Tietenberg and Lewis 2011)
- **Use Value**: implying that some attributes of nature are being utilized in some sense.
  - **Extractive** / Active-use/ Consumptive Value
  - **Non-extractive** / Passive-use / Non-consumptive Value

Classification of Goods and Services from Natural Resources based on "Value"

- **Option Value** - reflecting values people place on **a future ability to use the environment.**
- **Nonuse Value** – reflecting value people willing to pay to improve or preserve environment or natural resources **even though they will never use it.**
  - **Existence Value** – Value people place on **existence** of the environment.
  - **Bequest Value** – Value people are willing to pay to **pass on healthy environment to the future generation**.

Classification of Goods and Services from Natural Resources based on "Value"

	Goods and Services from natural resources	
Type of resources	**Extractive**	**Non extractive**
Forest		
Land		
Plants		
Terrestrial animals		
Marine animals/ Fisheries		
Water		
Geological Resources		

Modeling resource services

- Natural resource management decisions are complex because they involve connections and trade-offs between the present and the future.
- In period 0,
  - There is a certain quantity of resource available
  - The resource is "used" in some amount.
  - The resource may replenish or increase in some amount (growth of the resource), which depends on the type of resource.
- These factors contribute to the availability of resource in period 1.

Modeling resource services

Amount of resource available in period 1 (S_1)	=	Amount of resource available in period 0 (S_0)	–	Amount of resource used in period 0 (Q_0)	+	Increment to the resource in period 0 (ΔS)

$$S1 = S0 - Q0 + \Delta S$$

What are the models for the following types of resources?

- Nonrenewable Resources ?
- Renewable Resources (non-accumulating) ?
- Renewable Resources (accumulating) ?
- Recyclable Resources ?

Typology of Goods and Services in Economics

	Excludability	Non-Excludability (or difficult to exclude)
Rivalry (Subtractability)	Private Goods	Common-pool resources
Non-rivalry (Non-subtractability)	Club goods (Toll goods)	Public goods

Property Rights

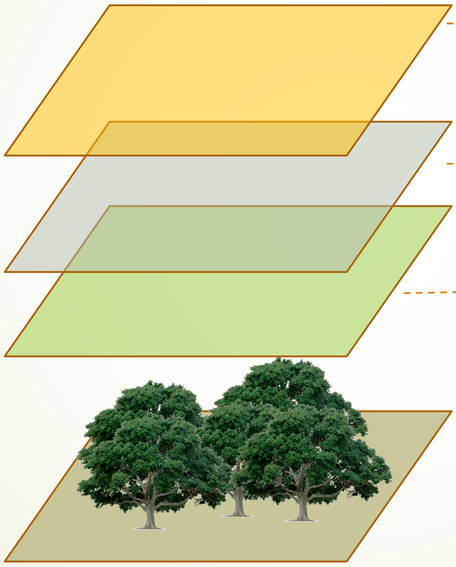
- *"… is a bundle of characteristics that convey certain powers to the owner of the right."* (Hartwick and Olewiler 1998, p.7)
- *"…property right refers to a bundle of entitlements defining the owner's rights, privileges, and limitations for use of the resource."* (Tietenberg and Lewis 2011, p.22)
- *Types of Property Rights*
  - **Private** Property Rights
  - **State** Property Rights
  - **Common** Property Rights
  - **Open-access** Property Rights

Property Rights vs Types of Goods in Economics

- *Types of Property Rights*
  - **Private** Property Rights
  - **State** Property Rights
  - **Common** Property Rights
  - **Open-access** Property Rights

Forest = Common-Pool Resources

Summary: Aspects of Natural Resources



Type of property rights

Typology of goods and services in Economics
(Private goods, public goods… etc.?)

ผลิตสินค้าหรือให้บริการใด ?
Extractive or Non-extractive Value

ทรัพยากร/หน่วยทรัพยากร ?