



The Regional Training Workshop  
*Economic Valuation of the Goods and Services of Coastal Habitats*  
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# **Economic Concepts Underlying Valuation**

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# Outline

- Definition of Value and Benefit
- The Economic System and the Environment
- Consumption: Demand and consumer welfare measurement
- Production: Supply and producer welfare measurement
- The Environment and Social Welfare

# Definition of "Value"

Value is defined as "The contribution of an action or object to user-specified goals, objectives, or conditions" (The Millennium Ecosystem Assessment (2003), after Farber et al., 2002).

## Value in exchange vs. Value in use vs. Value of importance

- Value in exchange: the price of a good or service in the market (= market price)
- Value in use: the value that reflect "UTILITY" of a good or service, which can be very different from the market price
- Value of importance: the appreciation or emotional value we attach to a given good or service

# Definition of "Value"

*Cont.*

"Value" =>> ecosystem valuation

The three main scientific disciplines

- a) *Economics*: mainly concerned with measuring the exchange value or price to maintain a system or its attributes (Bingham et al, 1995);
- b) *Ecology*: measures the role (importance) of attributes or functions of a system to maintain ecosystem resilience and health (Bingham et al, 1995), and
- c) *Sociology*: tries to find measures for moral assessments (Barry & Oelschlaeger, 1996)

Ecocentric vs. Anthropocentric views

# Definition of "Benefit"

## Linkage between environment and economy

### Economic system

Household consumption  
(C)

Goods & services

Production inputs

Business firm Production  
(P)

### Environmental system

Goods & services from ecosystem

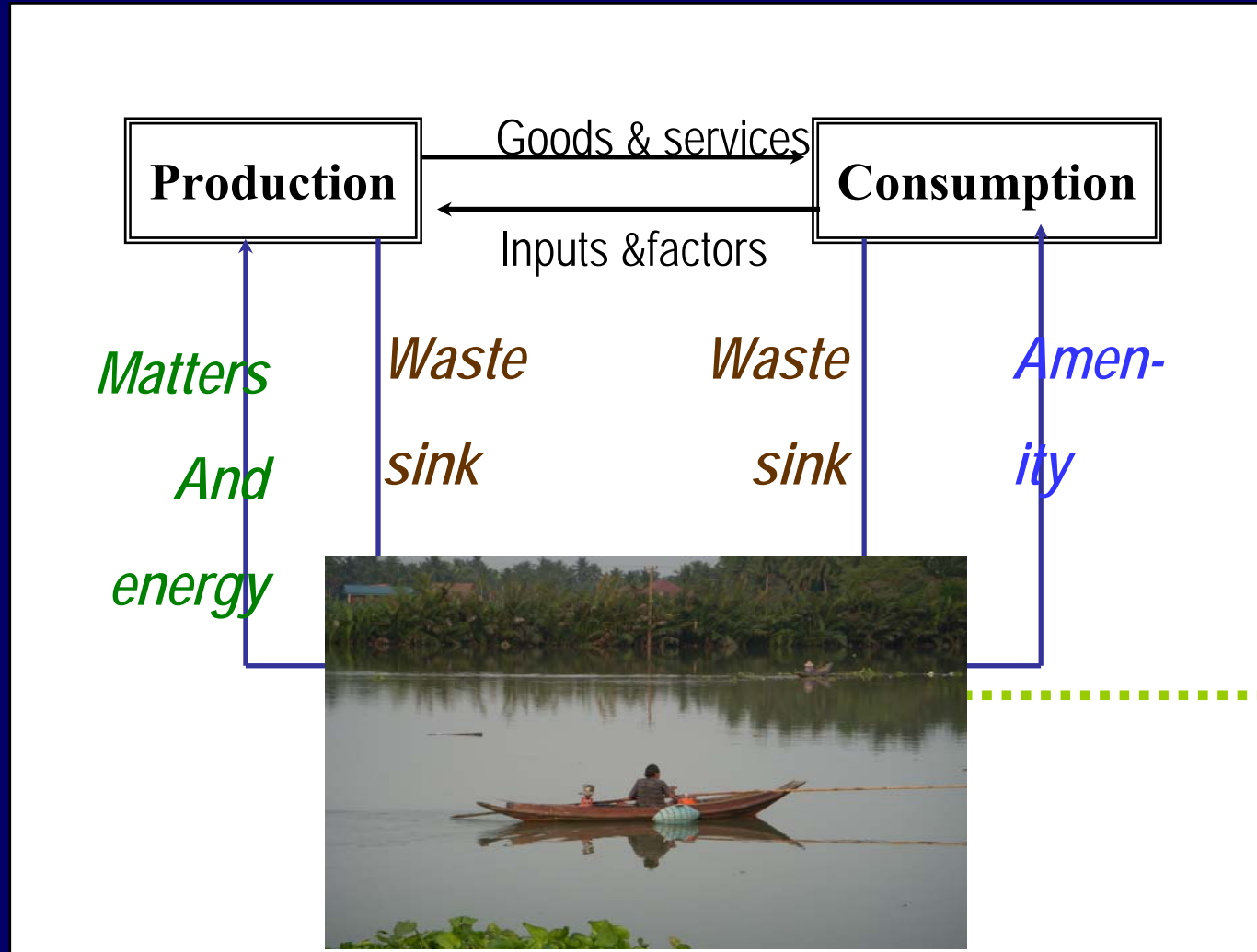
- matters and energy
- waste sinks
- amenity
- global support  
(E)

Waste

Waste

— Resource. flow  
— Waste flow

# Simple view: Function and uses of coastal habitat



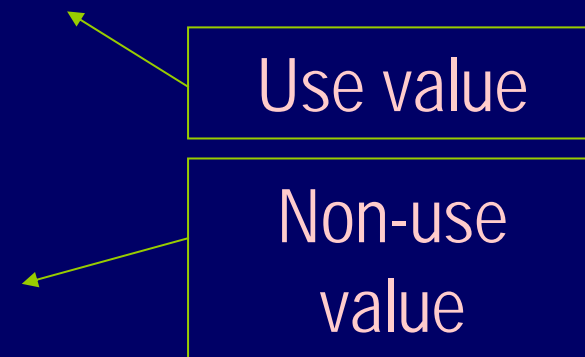
Source: adapted from Hanley, et.al (1997)

# Definition of "Benefit"

BENEFIT derived from G&S to be used by

- *Producers* in the production process (i.e., direct production input, substitute of marketed input, waste sink)
- *Consumers* in the consumption process (i.e., extractive and non-extractive consumption, waste sink)

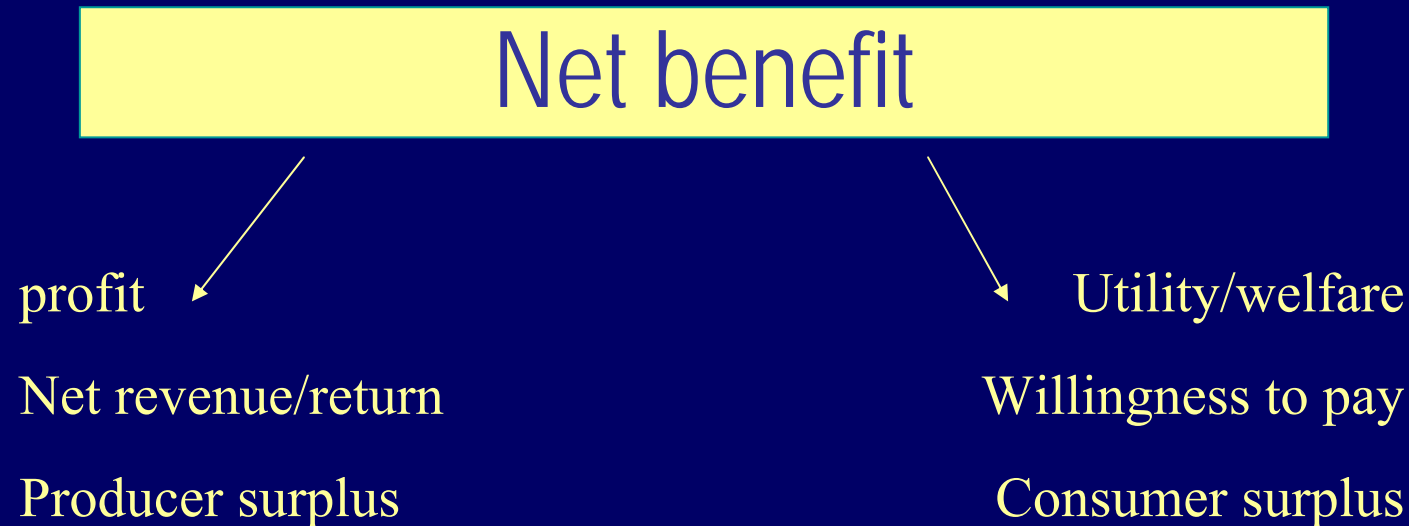
BENEFIT derived from not using G&S



"Benefit" =>> ecosystem value

"Benefit" derived from the use of G&S has be net of "associated cost" =>> NET BENEFIT

*NET BENEFIT* received from using G&S by people is considered "value of the environment"



*Q: do we always subtract "total benefit" by the associated cost of using the environment?*



# Benefit/Value

Total value  
\$/year

Average value  
= Total value / total unit  
\$/unit

Net value  
= total benefit – total cost  
\$/year

Marginal value  
Change in value / change  
in quantity  
\$/unit

*Example.....*

Change in the environment



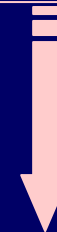
Impact on

- Productivity (income, cost)
- Health
- Other type of resources
- Change in global environment



How we measure the value of the environment

(a discrete change in this case)



Change in people's welfare



Change in environment  $\Rightarrow$  Change in Welfare  
= Measurement of environmental value

Policy/activity that affects the environment

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graph TD; A[Policy/activity that affects the environment] --> B[Producer welfare change]; A --> C[Consumer welfare change]; B --> D["Change in social surplus  
(social surplus)1 - (social surplus)0"]; C --> D;
```

Producer  
welfare change

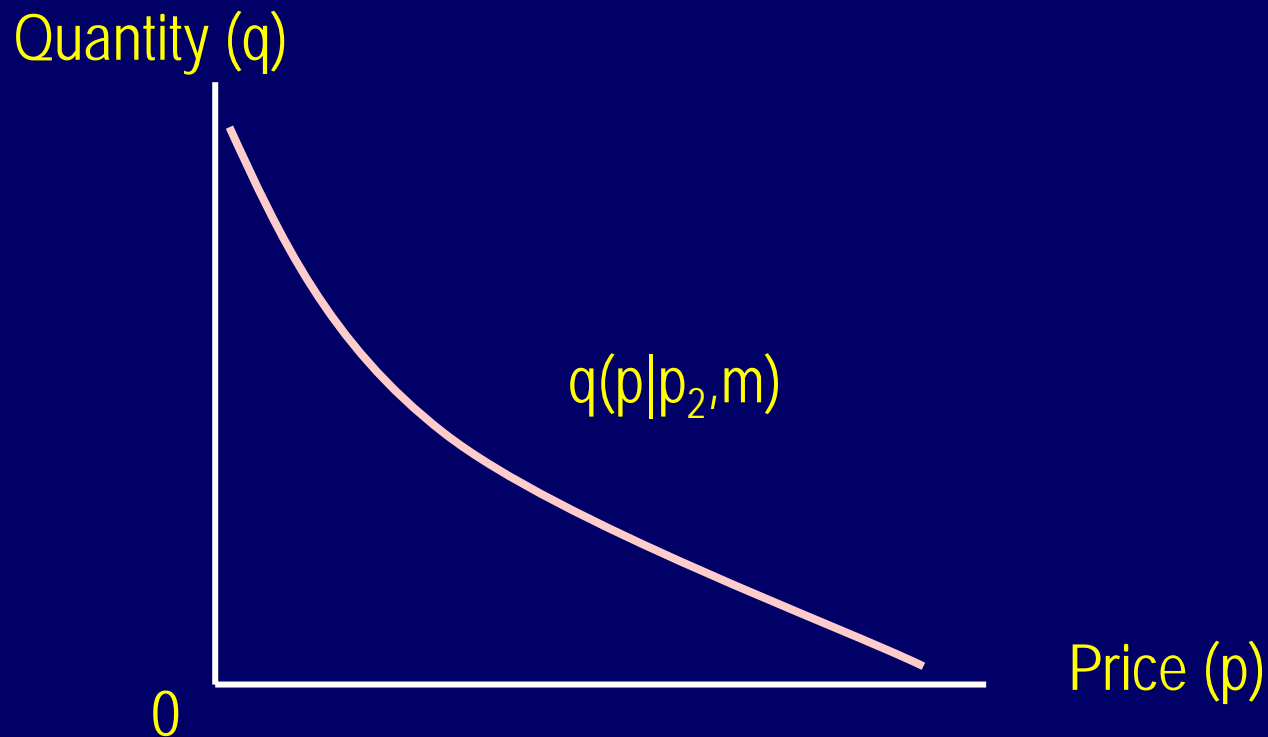
Consumer  
welfare change

Change in social surplus  
 $(\text{social surplus})^1 - (\text{social surplus})^0$

# Consumer Welfare Measurement

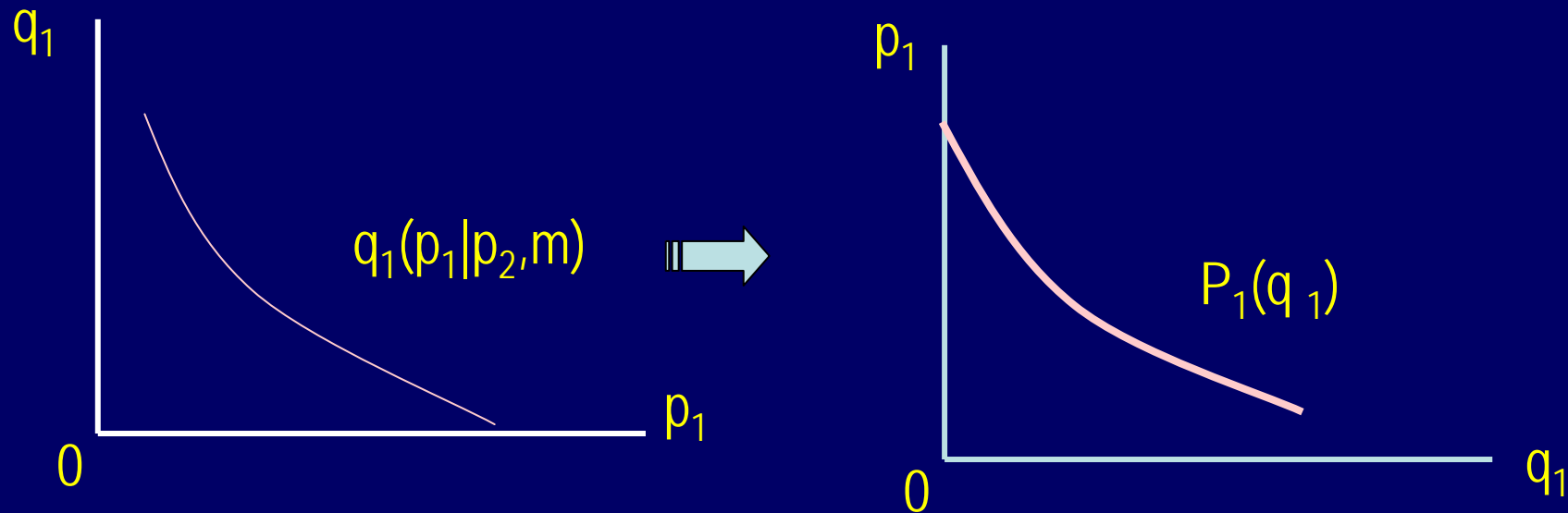
Demand function:

$$\text{Quantity} = f(\text{price} | \text{price of related goods, income, etc.})$$



The curve represents the demand function, not the demand curve

The function is inverted =>> the *demand curve*



We can estimate the “demand function/curve” if we have the data on quantity ( $q$ ) and PRICE ( $p$ )

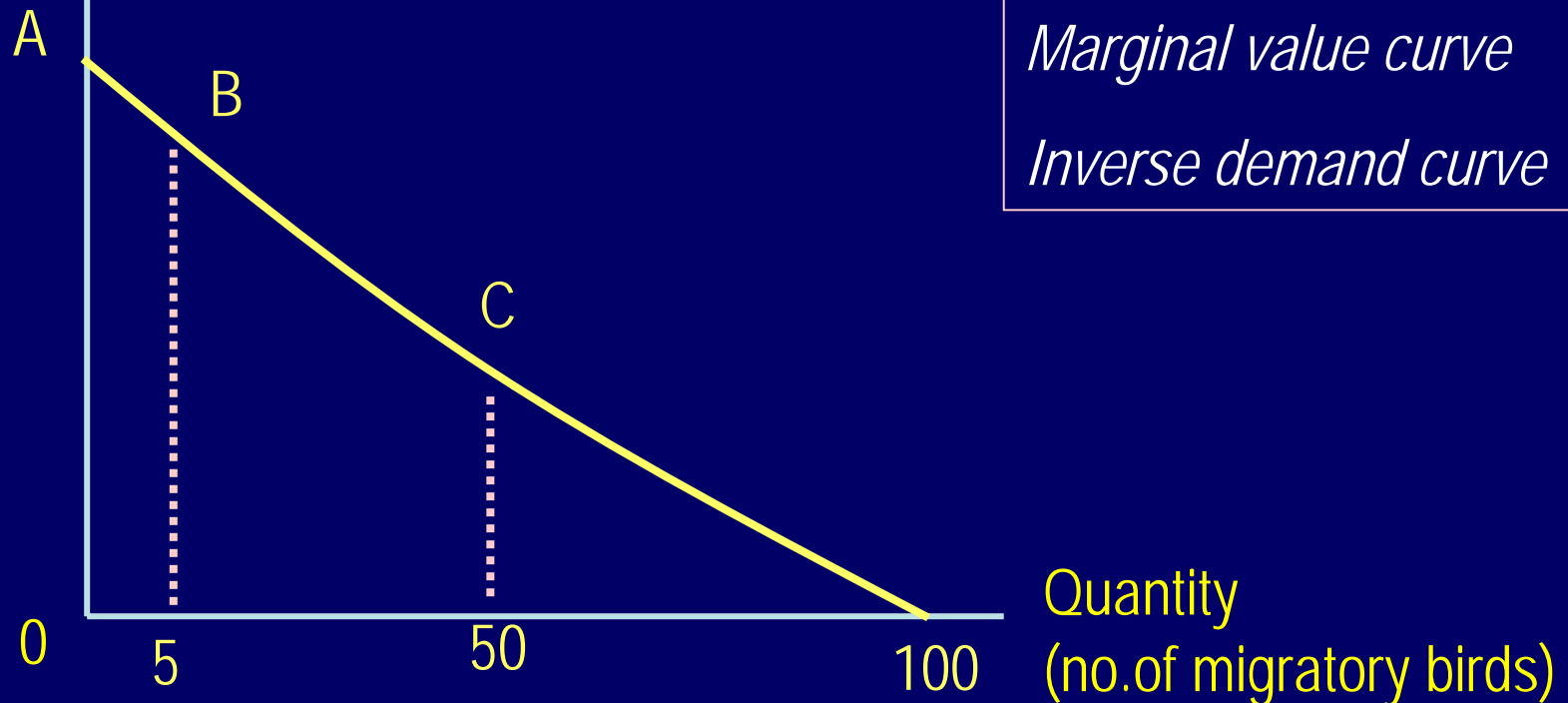
Q: what can we do if we do not have the data on price (i.e., goods is used for free)?

*Remember the value in use???*

## The *marginal benefit/ value/ willingness to pay* curve

Marginal value/benefit/WTP

(\$/bird)



*Marginal benefit curve*

*Marginal WTP curve*

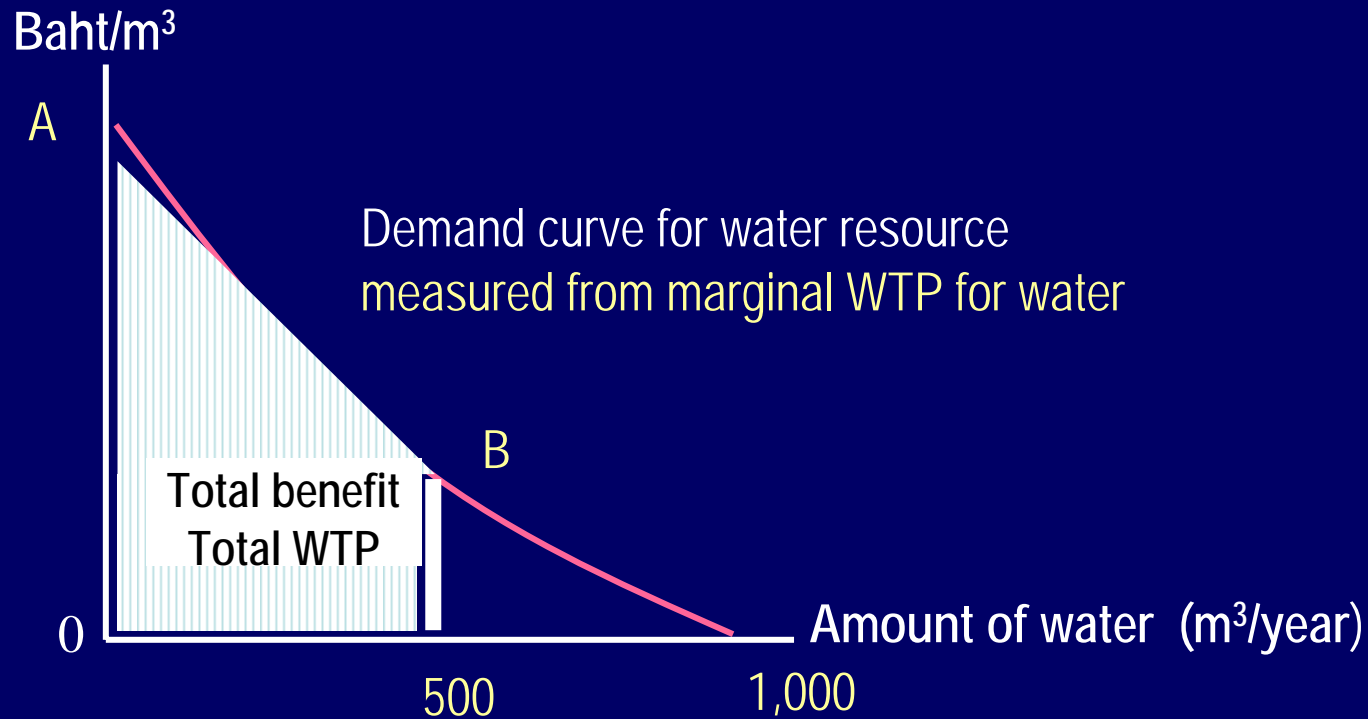
*Marginal value curve*

*Inverse demand curve*

The area under this curve represents the "total benefit/WTP"

Example: The demand for water extracted from wetland

- *no price revealed in the market*
- *assumed that cost of using water is negligible*
- *estimated by using data from "water users"*

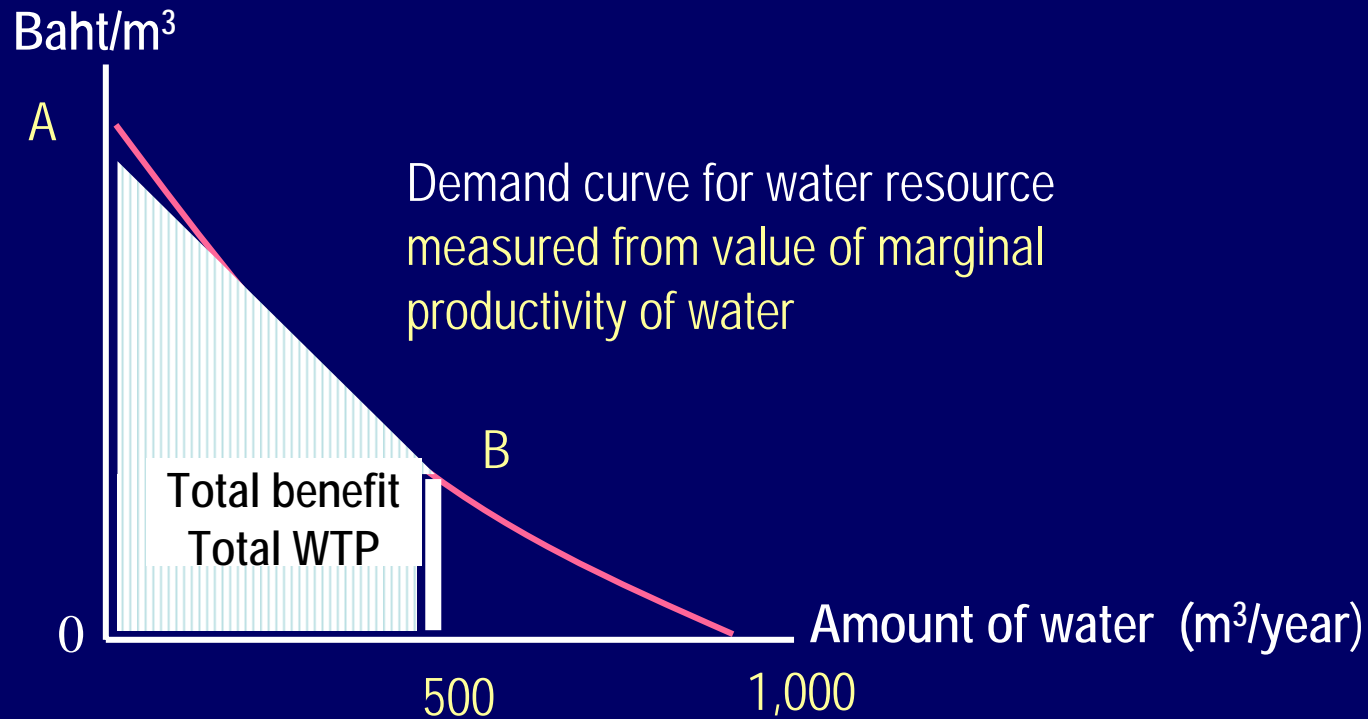


Water is used for household consumption

Q: If cost of using water is positive, we measure the "net benefit".

Example: The demand for water extracted from wetland

- *no price revealed in the market*
- *assumed that cost of using water is negligible*
- *estimated by using data from "water users"*



Water is used as an input for crop production

Note: we call it the "derived/input demand" for water resource

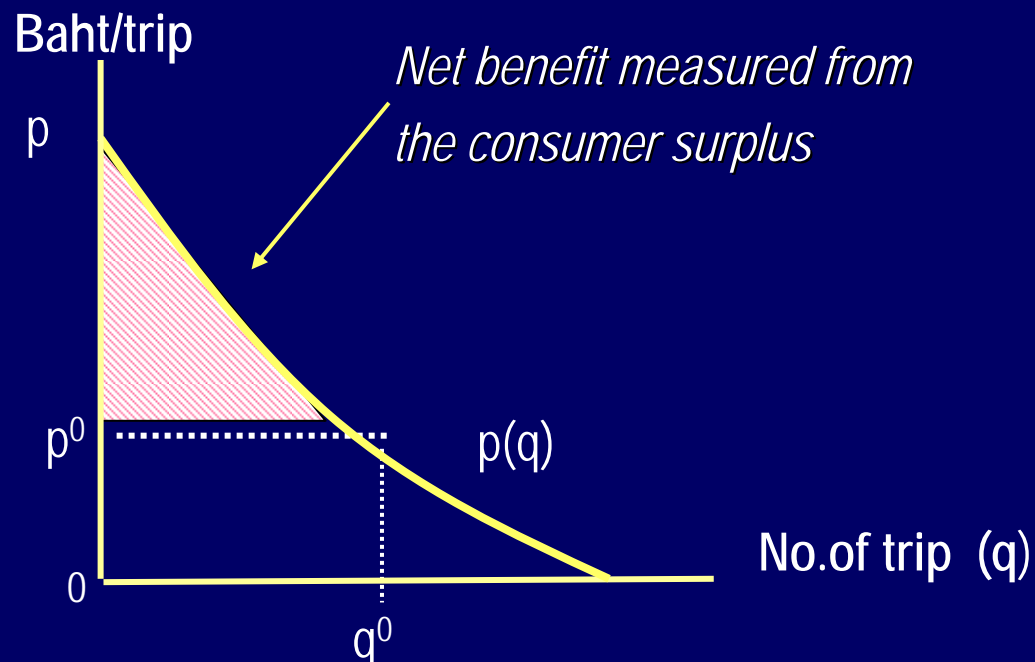


Example: The recreational benefit of the mangrove conservation area

**Demand for bird watching:**  $q = q(p, inc, x_1, x_2)$

$q$  = no. of trip/person,  $p$  = cost/trip,  $inc$  = income/person, etc

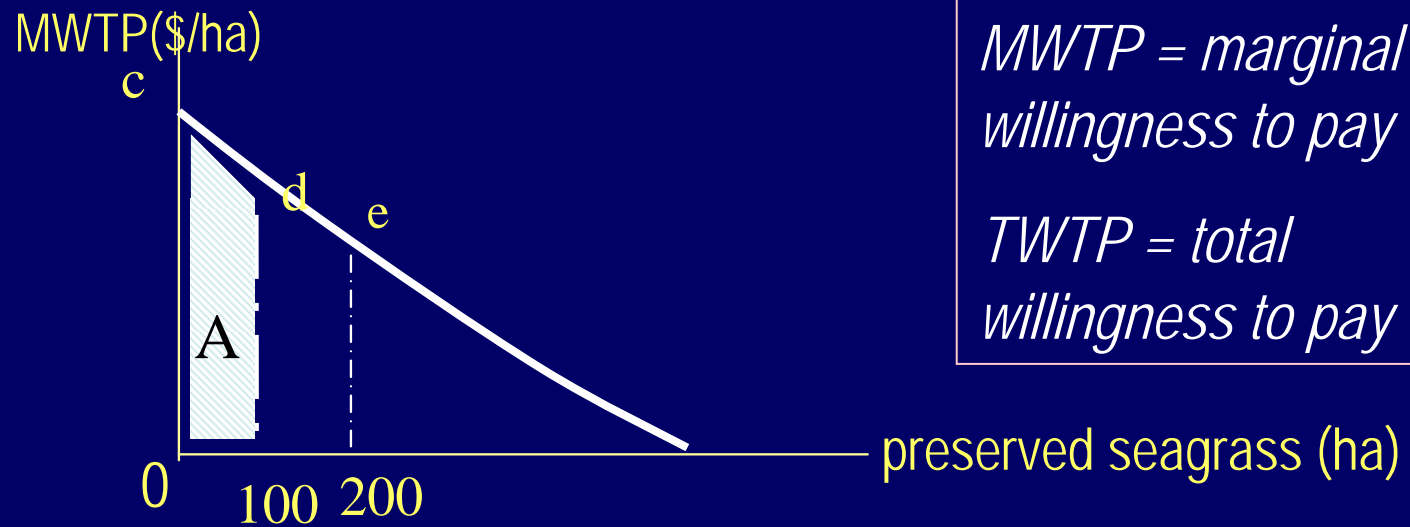
=> estimate the recreational demand for bird watching by using the information from "visitors/users"



Recreational demand for bird watching and benefit measurement

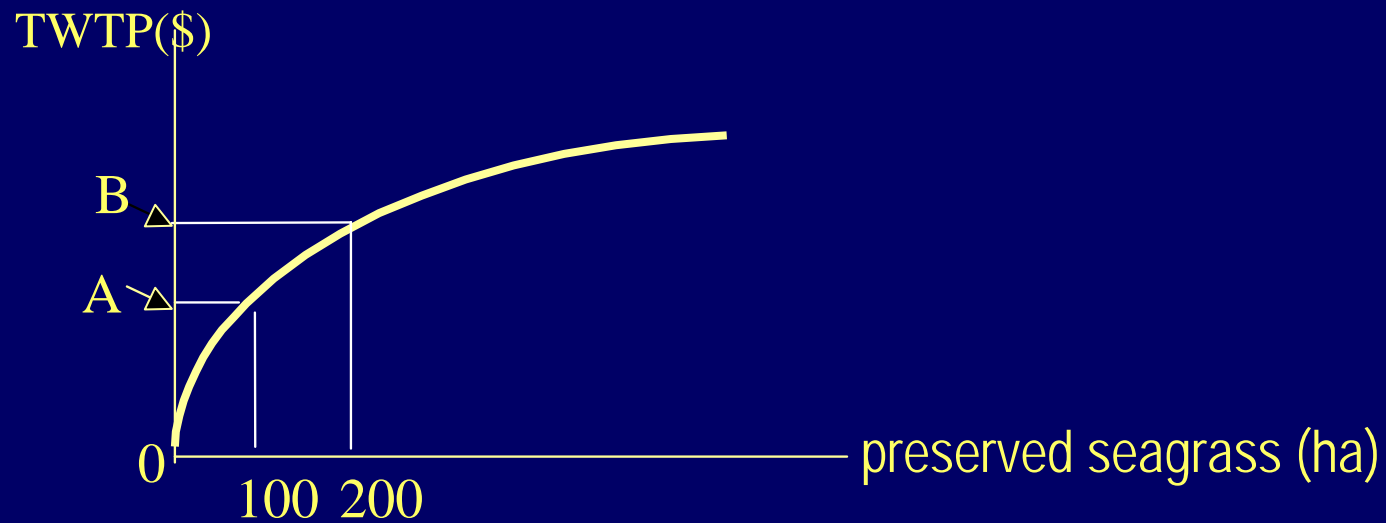
Q: what are the variables  $x_1, x_2$  you can think of?

# Marginal Value and Total Value Curves



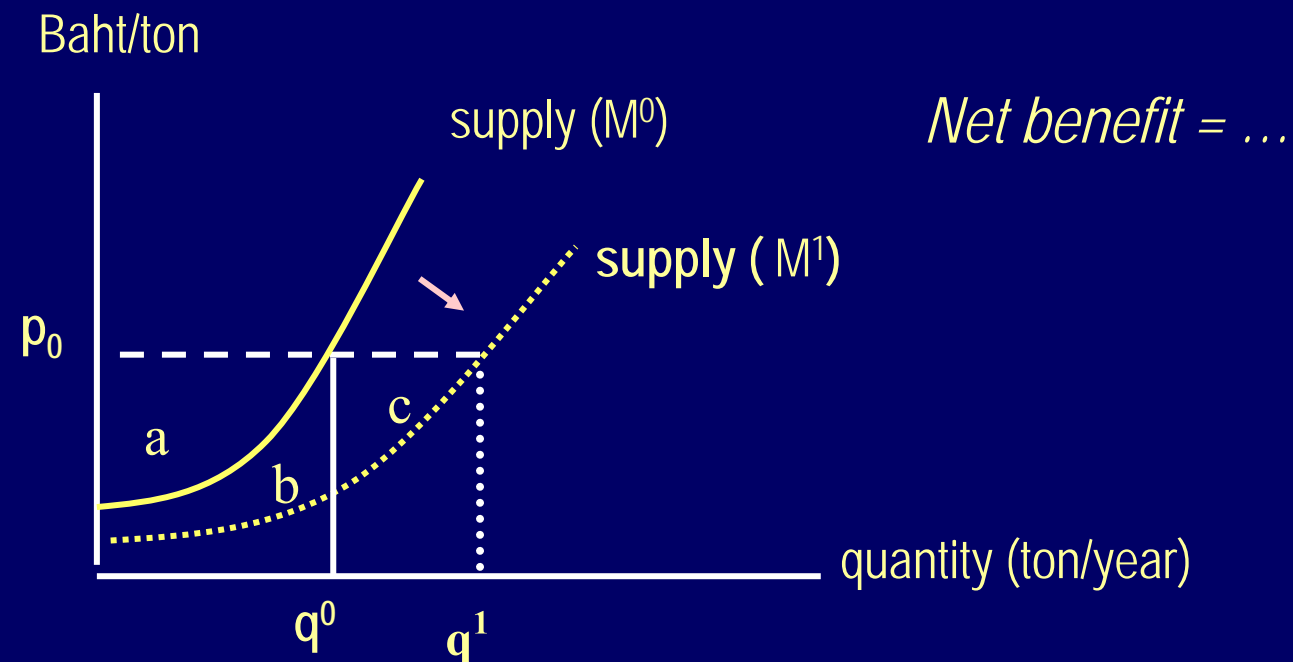
*MWTP = marginal willingness to pay*

*TWTP = total willingness to pay*



# Producer Welfare Measurement

$$\begin{aligned} \text{Supply of fish} &= f(\text{fish price, mangrove area, others}) \\ Q &= f(P, M \mid \text{others}) \end{aligned}$$



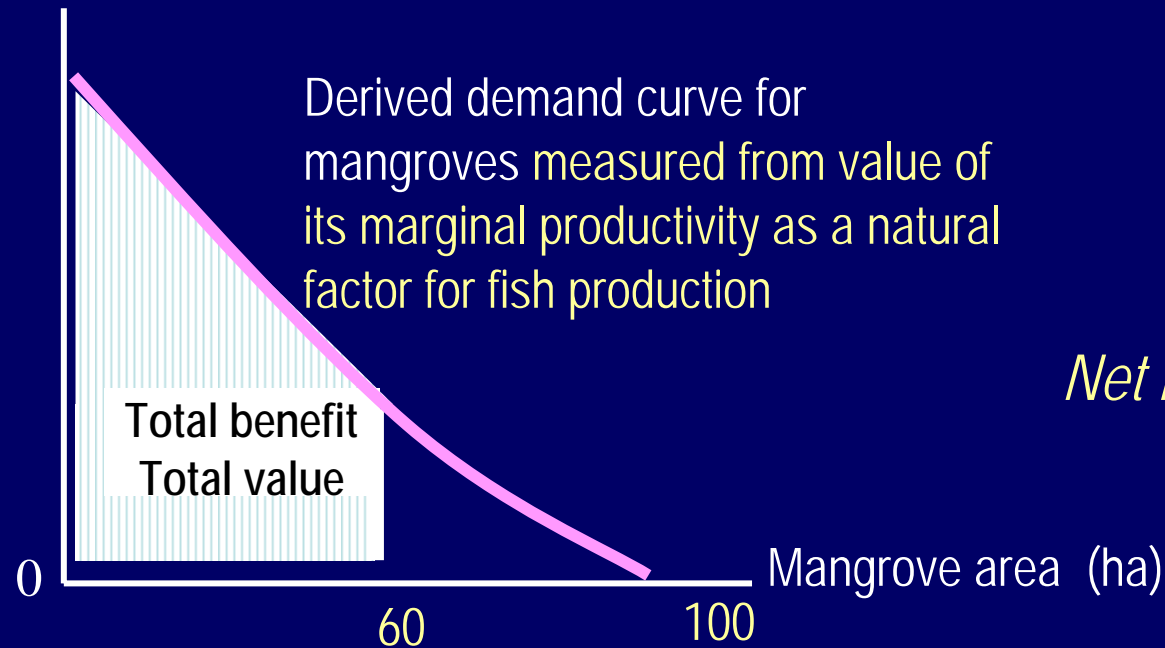
Q: *With a large increase in supply, output price might decline.  
How do you measure the welfare change?*

# Producer Welfare Measurement

(Derived) Demand for mangroves =  $f(\text{MV of mangroves, fish price, others})$

$$M = f(\text{MV}_M \mid \text{fish price, others})$$

$\text{MV}_M(\text{Baht/ha})$



Mangroves are used as a natural factor (eg., nursing ground, food, etc.) for fishery production

Q: What are the alternative methods in measuring the "MV" of mangroves?

When G & S of nature contributed to consumption side:

**Change in the environment**

⇒ change in quantity demand for marketed goods

⇒ change in consumer's net benefit

⇒ change in, i.e., consumer surplus (\$\$)

When G & S of nature contributed to production side:

**Change in the environment**

⇒ change in quantity supply of marketed products

⇒ change in producer's net benefit

⇒ change in, i.e., producer surplus (\$\$)

# SCALE UP

from individual to society

Net benefit from natural resource to the individual

```
graph TD; A[Net benefit from natural resource to the individual] --> B[Value of natural resource to the individual]; B --> C[Value of natural resource to the society];
```

Value of natural resource to the individual

Value of natural resource to the society