

# Conceptual Framework for Economic Valuation of Ecosystem Services in the Kangchenjunga Landscape

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# Outline of the Presentation

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- Why Economic Valuation of ecosystem services is Important
- What are the economic methods available for monetary valuation of Ecosystem Services
- How to integrate ecological & economic approach to estimate the monetary value of the KLS
- Framework for assessing economic valuation of KLS

# Why Economic Valuation

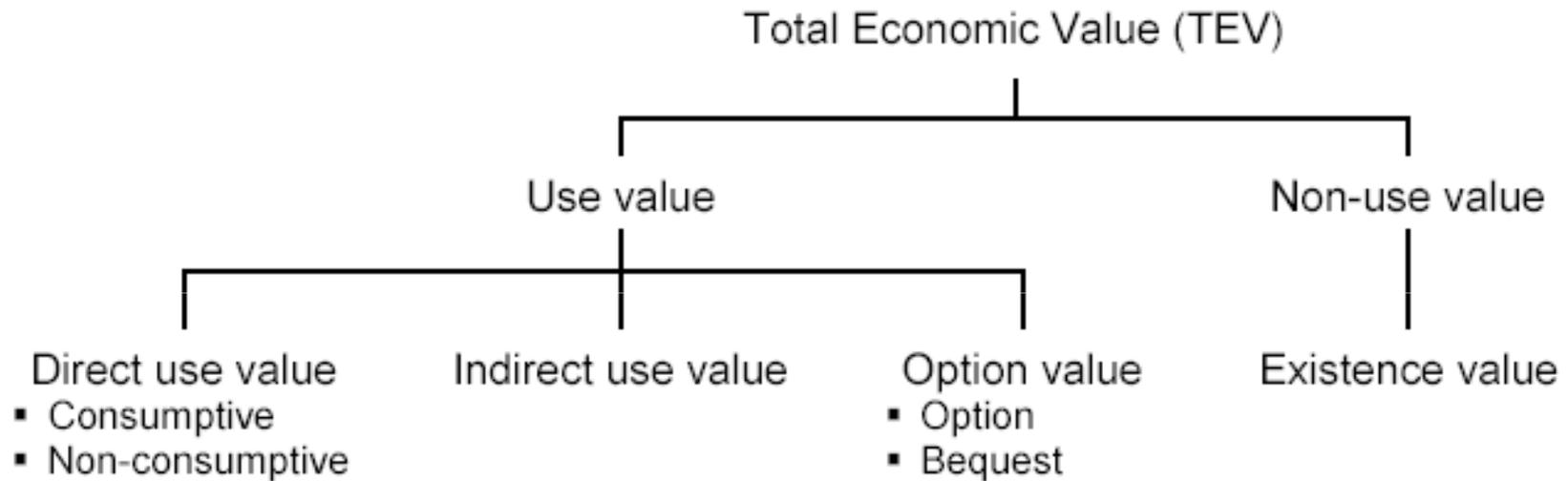
- **Kangchenjunga landscape (KLS) provide valuable ecosystem goods & services – which are not recognized or valued properly**
- **Because of poor management, some of its valuable Ecosystems are deteriorating & their capacities to generate goods & services are decreasing (Chetri et al. 2008)**
- **It affects the Lives & Livelihoods of people living there & downstream communities**

# Why Economic Valuation (2)

- Human beings care & conserve nature **when they value it**
- Economic Valuation of Ecosystem Services can help in
  - demonstrating that the conservation of KLS can provide tangible & non-tangible economic, environmental & social benefits
  - providing information that can inform & facilitate conservation policies
- Objective is to develop suitable framework to assess the economic valuation of ecosystem services of KLS

- What to value?
- Different views:
  - Anthropocentric: value of ecosystems lie in their ability **to serve human beings**
  - Eco-centric: all individual organisms have its **'intrinsic value' independent of their use/non-use by human beings**
- Economist: Total Economic Value framework that includes **both use & non-use values** of ecosystem goods & services

# Components of Total Economic Value



# Methodological Approaches (3)

- **Valuation methods**
  - Revealed preference
  - Stated preference
- Revealed preference methods infer values based on certain physical parameters, references or data
- Stated preference method: asking people how much they are **willing to pay** or **willing to accept** for a particular environmental service

# Methodological Approaches (4)

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- Commonly used Revealed Preference methods are:
  - Replacement costs: service could be replaced by human e.g., replacing soil nutrient, artificial water purification
  - Avoided cost : costs that would have been incurred in absence of those services. e.g., pollination services, flood control,
  - Change in Productivity: e.g., decrease in agri. productivity, fisheries due to reduced water services
  - Hedonic pricing: e.g., higher/lower property prices due to env. quality, scenic beauty, landscape
  - Travel cost method: travel cost reflect the implied values of particular ecosystem services

# Methodological Approaches (5)

- Commonly used Stated Preference method is **contingent valuation method (CVM)**
- CVM: willingness to pay (WTP) & willingness to accept (WTA)
- Eliciting Techniques for CVM
- Four techniques are used commonly:
  - bidding game
  - payment card
  - open-ended
  - dichotomous choice (also called 'referendum format')
    - Single bounded
    - Double bounded

# Methods, Approaches, Application & Limitations



Methodology	Approach	Applications	Data requirements	Limitations
<b>Revealed preference</b>				
Change in productivity	Trace the impact of change in ecosystem services in production e.g., pollination services on fruits production	Any impact that affects produced goods	Change in service, impact on production	Data on change in service & consequent impact on production
Replacement cost	Use cost of replacing the lost goods/services, e.g., replacement of soil nutrient due to soil erosion	Any loss of goods/services	Extent of loss, cost of replacing them	Tends to overestimate actual value
Hedonic pricing	Assess effect of environmental factors/ quality on price	Scenic beauty, air quality, etc.	Prices and characteristics of goods	Requires vast quantities of data
Travel cost	derive demand curve from data on actual travel costs	Recreation, tourism, valuation of religious important places	Survey to collect monetary & time costs of travel to destination, distance travel	Limited to recreation, cultural services

# Methods, Approaches, Application & Limitations



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Methodology	Approach	Applications	Data requirements	Limitations
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## Stated Preference

Contingent Valuation Method (CVM)	Ask respondents their WTP/WTA for particular ES	Any services	Survey that elicits WTP/WTA for specified services	Potential sources of biasness in responses. In hypothetical question, respondent do not face actual situation , so their stated preference may be different from the real situation
Group valuation or discourse-based valuation	Ask a group of stakeholders to assess the value of ecosystem services	Any services	Several round of consultation	Difficult to reach convergence value

# Choice of valuation methods & approach

- The valuation methods & approach depend on the nature & type of service are being studied
- In general:
  - Direct use value – Market analysis,
  - Indirect use value— Revealed & Stated Preference Methods, **surrogate market**
  - Non-use value: contingent valuation methods
- Some cases: both revealed & stated preference methods are combined to get better estimate

# Integrating Ecological & Economic Approach (1)

- In the last decades there have been attempts from economics & natural sciences for developing common interdisciplinary approach to value ES
- The MEA is the most important attempt in this line
- Although MEA made significant contribution in enhancing the awareness about the value of ecosystem, it creates ambiguity by categorizing ecosystem goods & services in one category “**Services**” – as it deviates from economic nomenclature “**goods & services**”

# Integrating Ecological & Economic Approach (2)

- **ES: MEA four categories:**

- Provisioning services
- Regulating services
- Supporting services
- Cultural services

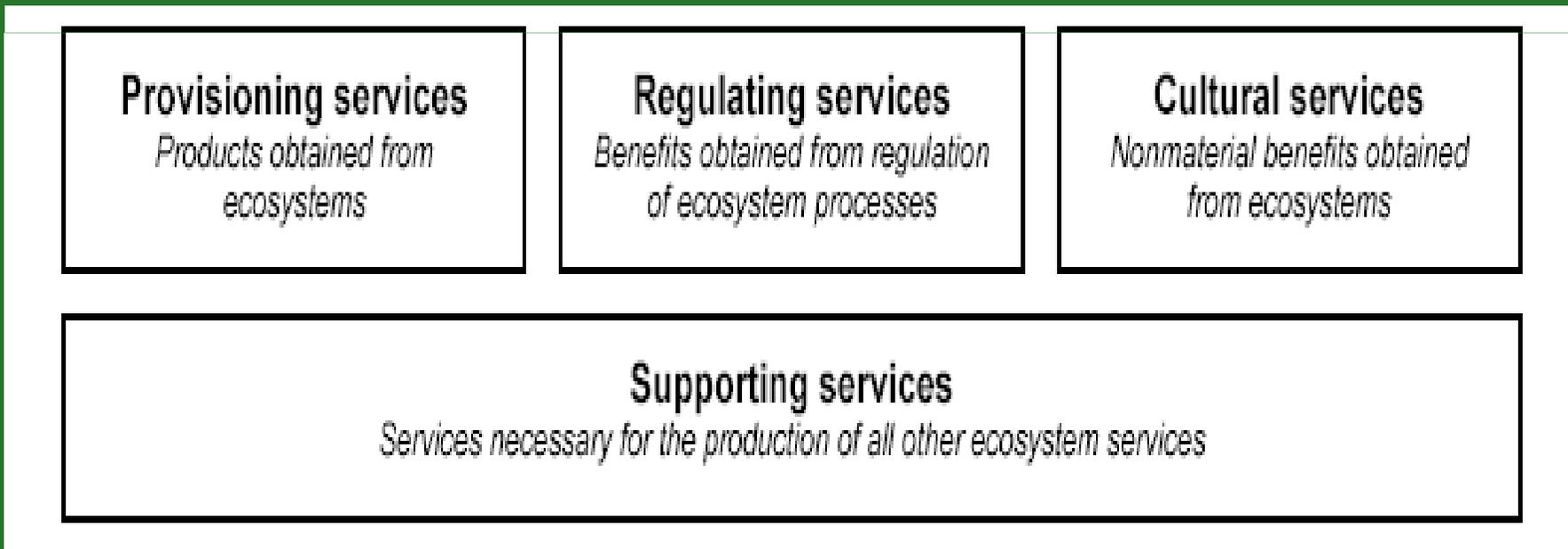
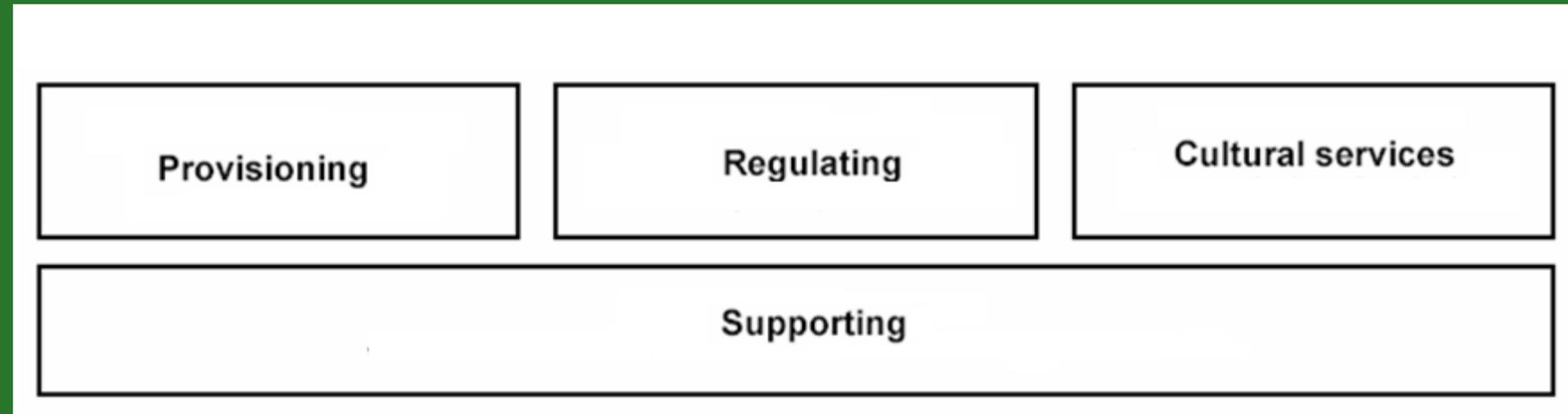
- **ES: Economic five categories**

- Production of goods
- Regeneration services
- Stabilizing services
- Life-fulfilling services
- Preservation of options

Use value

Non-use value

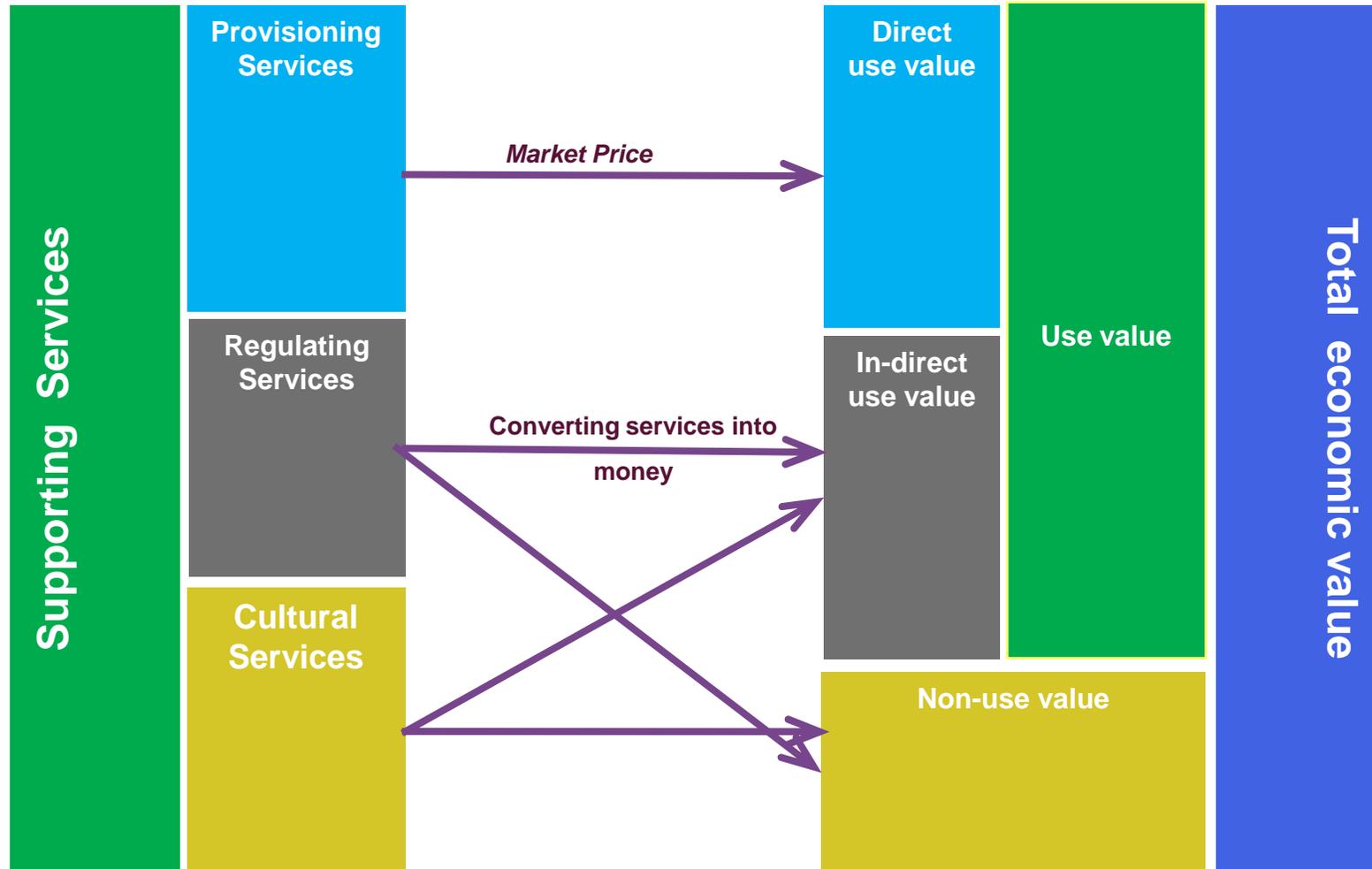
# Integrating Ecological & Economic Approach (3)



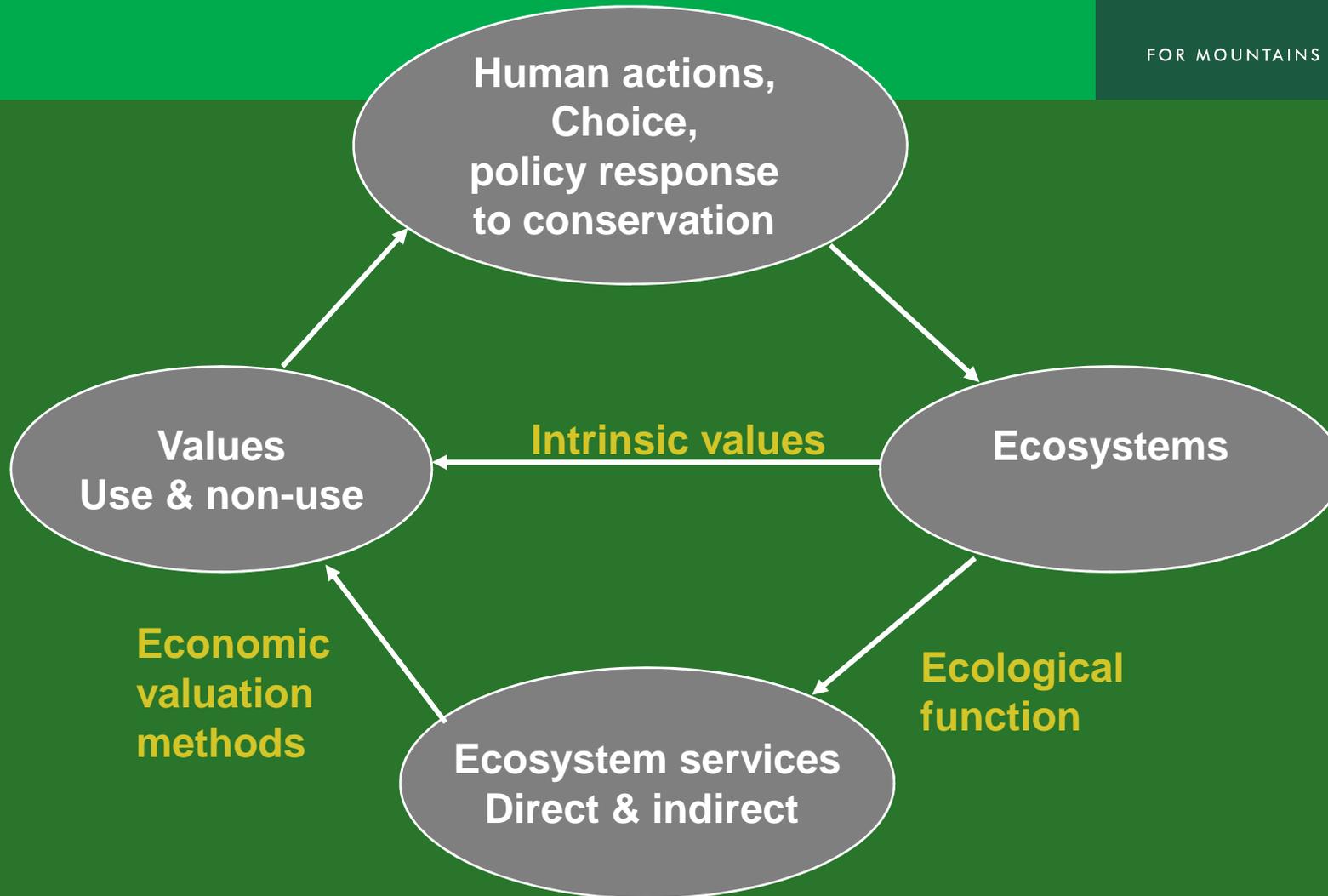
# Integrating Ecological & Economic Approach (4)

## Ecosystem Services

## Economic Value



# Framework for Valuation (1)



Ecosystems, values & human choice, Action

# Framework for Valuation (2)

## Linkages : Main ecosystem types & their 'services'

<i>Ecosystem service</i>	<i>Ecosystem</i>									
	<i>Cultivated</i>	<i>Dryland</i>	<i>Forest</i>	<i>Urban</i>	<i>Inland water</i>	<i>Coastal</i>	<i>Marine</i>	<i>Polar</i>	<i>Mountain</i>	<i>Island</i>
Freshwater			•		•	•		•	•	
Food	•	•	•	•	•	•	•	•	•	•
Timber, fuel, and fiber	•		•			•				
Novel products	•	•	•		•		•			
Biodiversity regulation	•	•	•	•	•	•	•	•	•	•
Nutrient cycling	•	•	•		•	•	•			
Air quality and climate	•	•	•	•	•	•	•	•	•	•
Human health		•	•	•	•	•				
Detoxification		•	•	•	•	•	•			
Natural hazard regulation			•		•	•			•	
Cultural and amenity	•	•	•	•	•	•	•	•	•	•

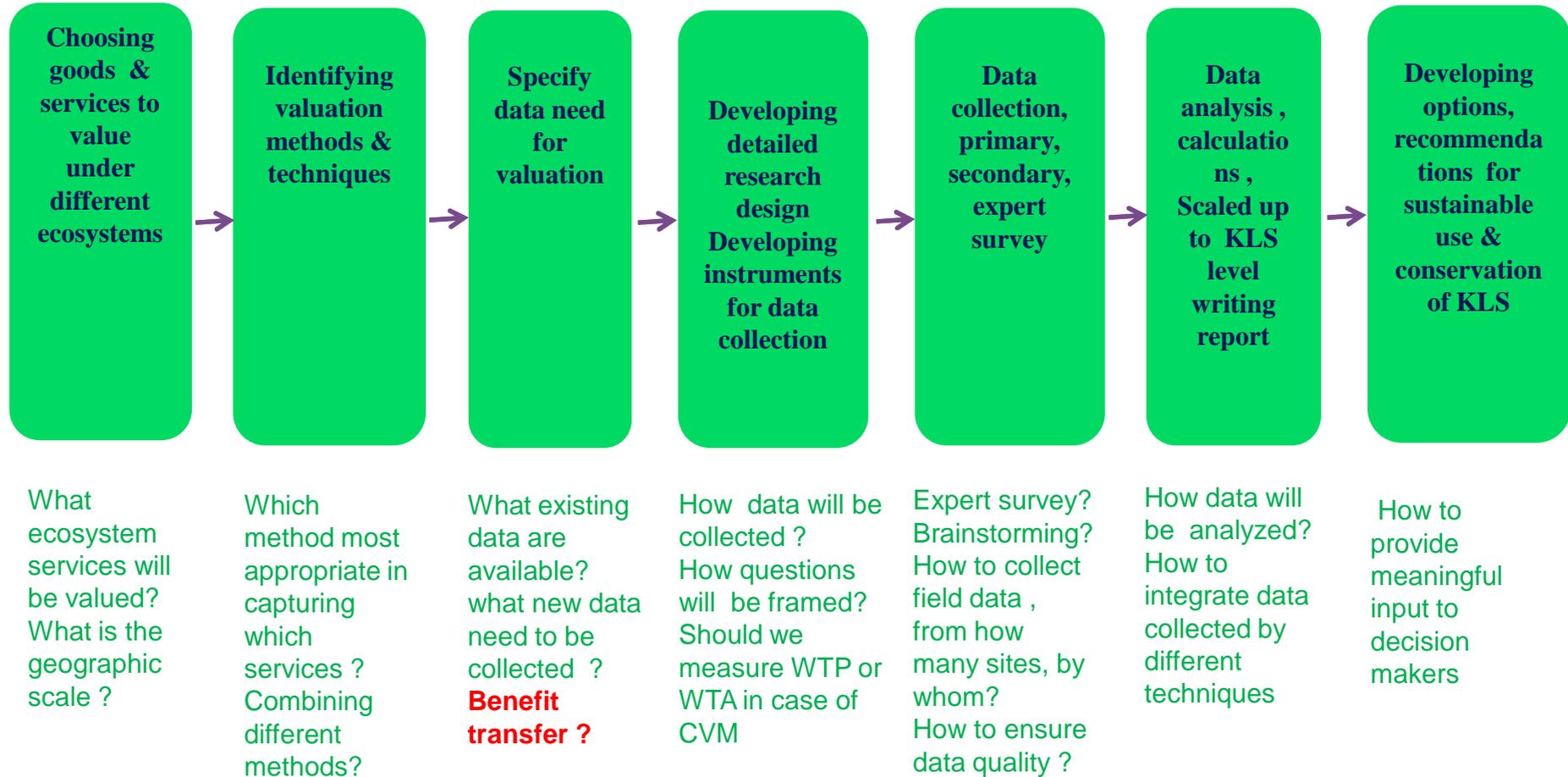
Source: Millennium Ecosystem Assessment,

# Total Economic Value Matrix



Ecosystem categories	Use value			Non – use value	TEV of per ha of particular ecosystem	TEV of a particular ecosystem
	Direct		Indirect			
	Consumptive	Non-consumptive				
Agricultural land	\$	\$	\$	\$	\$	TEV of Agri .land = \$ /ha x area under agri. land
Large cardamom						TEV of large cardamom =
Tropical forest						TEV of tropical forest
Shrub land						TEV of shrubland
....	....	...	...	...	...	TEV of other Ecosystems
TEV of			Use value	Non-use value	TEV per ha	<b>KLS = Sum the values of ES from 1 through n</b>

# Framework for Valuation (4 )



## Key Steps in the Valuation Process

Thank you

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