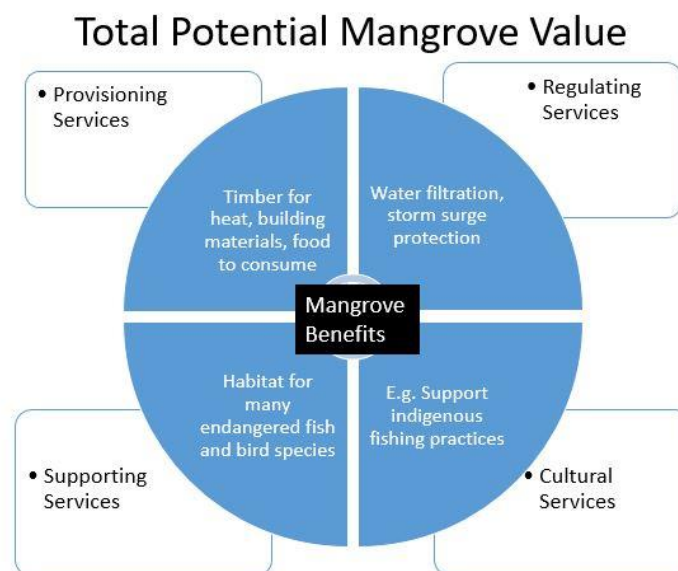


Ecosystem valuation

Ecosystem valuation is an economic process which assigns a value (either monetary, biophysical, or other) to an ecosystem and/or its ecosystem services. By quantifying, for example, the human welfare benefits of a forest to reduce flooding and erosion while sequestering carbon, providing habitat for endangered species, and absorbing harmful chemicals, such monetization ideally provides a tool for policy-makers and conservationists to evaluate management impacts and compare a cost-benefit analysis of potential policies. However, such valuations are estimates, and involve the inherent quantitative uncertainty and philosophical debate of evaluating a range non-market costs and benefits.

Economic Models: Values, Costs, and Value Methodology

Ecosystem valuation attempts to capture the range of benefits and costs contained within a complicated natural web with a range of economic methodologies. Ecological systems provide four general categories of services: provisioning (e.g. fish to eat, timber to sell), regulatory, supporting, and cultural (e.g. ecosystems supporting indigenous gathering techniques, or supplies for traditional clothing). See Figure below for a mangrove-specific example of this complex subject.



These four types of services can then provide two basic categories of value: the use and non-use categories. Environmental economists have further separated categorizes for which individuals are willing to pay:

❖ Direct-use value

The simplest form of ecosystem valuation for orthodox environmental economists, this translates the direct ecological yield as it would be on commodity markets: e.g. the value of water, timber, fish, or other commodities if immediately developed and sold at market price. Thus, an exchange value or 'price' is associated with the objects of value, regarded as natural capital, associated with ecosystems and this may be based on the ability of a system to produce yields each year that are exchangeable in operating markets and have existing exchange prices.

- ❖ Indirect use value attributed to indirect utilization of ecosystem services, through the positive externalities that ecosystems provide.
 - The World Bank explains that these values are "derived from ecosystem services that provide benefits outside the ecosystem itself. Examples include natural water filtration which often benefits people far downstream, the storm protection function of mangrove forests which benefits coastal properties and infrastructure, and carbon sequestration which benefits the entire global community by abating climate change
 - Option value attributed to preserving the option to utilize ecosystem services in the future
 - Existence value attributed to the pure existence of an ecosystem.
 - Altruistic value based on the welfare the ecosystem may give other people.
 - Bequest value based on the welfare the ecosystem may give future generations.

Given these types of potential ecological values, economists utilize a variety of methods to calculate those market values and measure non-market values. Standard environmental economic methods are used to place a monetary value on ecosystem services where there are no market prices. These include "stated preference" methods and "revealed preference" methods. Stated preference methods, such as the contingent valuation method ask people for their willingness to pay for a certain ecosystem (service). Revealed preference methods, such as hedonic pricing and the travel cost method, use a relation with a market good or service to estimate the willingness-to-pay for the service. Applying such preference based approaches has been criticized as a means of deriving the value of ecosystems and biodiversity and for avoiding deliberation, justification and judgment in making choices. The monetary value society attaches to ecosystem services depends on the income distribution.

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