Ecosystem services, such as coastal protection or water supply, form an integral part of ecosystem-based adaptation to climate change. However, preserving and restoring ecosystems and their services relies on the economic system that supports these efforts. Ecosystem services will not be best protected by the classic market framework, new research suggests.

Market framework not appropriate for most ecosystem services

This study questions the suitability of classical economic frameworks for the protection of ecosystem services by considering three desirable goals of economic activity: sustainability, justice and efficiency.

1. **Sustainability.** To achieve sustainability, humans should not degrade ecosystem services faster than they can be restored. Thresholds exist, above which ecosystems can flip into an irreversible state where they can no longer produce services. The economic concept of 'marginal value' suggests that the nearer the system reaches its threshold, the greater the rise in the value of the ecosystem service, which would automatically protect it. However, this assumes that society is aware of this threshold, and views natural capital as critical, which will depend on both global and local values assigned to that ecosystem service.

2. **Justice.** The fair allocation of resources among groups and individuals is important in economics. In the case of ecosystem services, there is potential for conflict between groups in accessibility to services, for example, one group’s right to have timber provided by a forest may conflict with another's right to enjoy the water purification and recreational opportunities provided by the same forest. It is likely that the poor will stand to gain more from ecosystem services than the rich, especially at a local level. However, using the economic concept of market demand, if an ecosystem service becomes diminished, then its price will increase, which means the rich are more able to access it than the poor. A good example of this is the price of wheat. When an increase in biofuel demand led wheat prices to triple between 2006 and 2007, wealthy nations barely noticed because it accounted for a very small cost in a loaf of bread. However, grain is a direct source of food in poor nations, so the impact was felt more severely in these countries. A market demand approach may seem fair for some goods and services, but this may not be the case for ecosystem services.

3. **Efficiency.** At a very basic level, efficiency implies maximising output and minimising costs. Conventional economists focus on ‘pareto’ efficiency, which involves valuing nature in monetary terms, weighing up the financial gain or loss, and making a decision based on the final figure. However, a more appropriate approach may be ecological-economic efficiency (EEE), which suggests that an overall figure cannot be put on ecosystem services. Instead, the trade-offs and ethical choices between ecological protection, human health and obligation to future generations must be considered. EEE does not rule out the use of tools such as green taxes or ‘cap and auction’ schemes (in such schemes the ecosystem is protected from degradation by capping the amount it can be altered by use of services, and the rights to sustainable use are then auctioned off), as long as the revenue is dedicated to the common good.

The study concludes that most ecosystem services cannot be integrated into the classic market framework. Instead, frameworks must be applied that consider the local and global value placed on ecosystem services, in order to provide a sustainable, fair and efficient system.