



THE DIFFICULTY OF VALUING COMPLEX ECOSYSTEMS

CLIMATE CHANGE AND THE FLORIDA KEYS

FACT SHEET 5

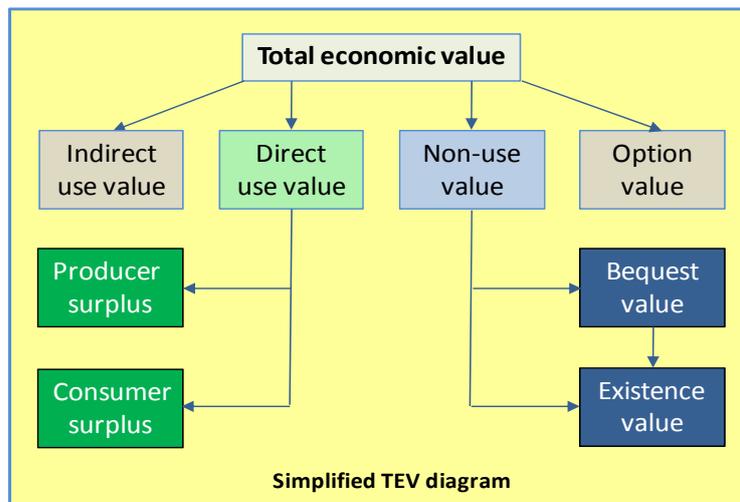
FKNMS/NOAA SOCIOECONOMIC RESEARCH AND MONITORING PROGRAM

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THE IMPORTANCE OF VALUING ECOSYSTEMS

Total economic valuation is a major objective in the effort by NOAA's Office of National Marine Sanctuaries to link the economy to the environment of the Florida Keys, and elsewhere. A successful valuation has yet to be achieved for any coral reef system, although an attempt was made for the Great Barrier Reef in 2009 to evaluate a totally bleached reef system compared with a healthy one. A significant part of NOAA's economic research is currently being directed towards improving the valuation criteria.

MARKET AND NONMARKET VALUES



Total economic value (TEV) can be defined in various ways, but whatever the detailed definition the basic aim is to identify the components needed for a complete valuation.

Direct use values and non-use values are the main concepts in the context of ecosystems. Direct use values, shown in green on the chart, are so-called producers' and consumers' surpluses, basically the producers' profit and the amount that consumers would be *willing to pay* over and above what they already pay to enjoy the ecosystem or other asset being analyzed.

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Non-use values are the crucial variables in the context of climate change and preservation of large ecosystems. The bequest value is based on willingness to pay to ensure that it is *sustained* for future generations to experience the resource in a certain condition and preserving its *existence value*, being willing to pay to simply know that a resource will be

protected or restored to a certain condition. For major ecosystems of global significance, the bequest value is determined, in principle, by the entire world population.

ISSUES RELATING TO “WILLINGNESS TO PAY”

Methods of surveying what people are willing to pay to preserve a particular asset were developed for commercial projects which do not have major ramifications beyond their own existence, and can therefore be viewed in isolation. Basically the choice became how much consumers and users were willing to pay to see the project preserved.

Ecosystems are in a different class from individual commercial projects because the importance of their sustainability and interconnections with other natural systems add a dimension that make them globally significant. But climate change has a long time frame and many people put a higher value on the present than on a future that may be decades ahead. So people tend to undervalue the future compared with the current scientific consensus.

NOAA is currently breaking new ground in addressing the issue of validity of measurements derived from willingness-to-pay surveys relating to marine ecosystems. There is much activity in the areas of damage assessment and restoration using valuation of ecosystem services. In parallel with this, as the next section shows, the conventional economic accounting approach is attacked for leaving out the depletion of natural resources and damage to ecosystems. As this research begins to bear fruit, and its results are widely publicized, people should be willing eventually to pay more for sustainable development, to the benefit of future generations. But that will take time.

LACK OF HARD DATA

The conventional approach to valuing economies through national accounts has come under criticism because of its failure to acknowledge the loss of resources through the productive processes. There has been no real attempt to measure the impact of atmospheric pollution through greenhouse gas emissions, and at a smaller scale very little attempt to evaluate the loss of non-renewable resources through the activities of highly profitable mining companies. Accounting for environmental damage due to loss of natural resources is at an embryonic stage, which does not augur well for the quick development of a comprehensive process of accounting for all use and non-use values.

In 2009, Nobel Prize-winning economists Joseph Stiglitz and Amartya Sen were commissioned by French President Sarkozy to lead a study of how best to improve the quality of economic statistics. They noted: “Climate change (due to increases in atmospheric concentrations of greenhouse gases) is also special in that it constitutes a truly global issue that cannot be measured with regard to national boundaries. Physical indicators of this kind can only be identified with the help of the scientific community.”

While this project reached similar conclusions, it also noted that even if experts are surveyed rather than randomly sampled consumers, the issue of valuation will still play into the political process. The project report also notes that, given that the assessments are based on the present value of a flow of future annual values, the discount rate chosen to determine ecosystem values should be low (1% or less, rather than 3%) to give proper weight to future generations. But that, again, is subject to political juggling.

POTENTIAL ROLE OF SCENARIO PLANNING

Setting up scenarios to compare different cases ranging from best to worst (all considered equally likely to become reality) may provide a basis for more precise assessment of what might be sensible valuation criteria given the possibility of particular global outcomes. The Florida Keys project may have provided a basis for exploring such an approach to valuing the Keys “super-ecosystem” through a series of expert meetings or other techniques for exchanging opinions.

HHG November 10, 2010

Further reading:

Florida Keys and Climate Change, Section 6.5.

Background Paper 2, *Limits to Economic Growth*.

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August. <http://www.oxfordeconomics.com/samples/gbrfoxford.pdf>.

Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi (2009), *Report by the Commission on the Measurement of Economic Performance and Social Progress*. http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf.

Peter Wiley (2003), *Valuing our National Marine Sanctuaries*.

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Pictured: West Harbor Key (HHG 2008)