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Review: The answer is forty-two but, what was the question?

Economic values of watershed and other ecosystem services are often presented in the form of large numbers that represent total annual flows of the service, or, in one notorious case, that purport to represent all ecosystem services everywhere. These kinds of results tend to get the most attention, simply because they are easy to convey, and leave an indelible impression that the services are somehow important. In theory, this generates support for protecting ecosystem services. In practice, it provides little if any guidance for comparing choices people actually have among real trade-offs or even for understanding what the trade-offs are. It also tells us nothing about the willingness to make the trade-offs needed to protect ecosystem services.

Selection of appropriate methods starts by being clear about the objectives, and then asking the right questions as to how they can best be achieved. For example, asking how much specific ecosystem services contribute to national accounts is different from asking how a change in their flow may or may not benefit a particular hydropower facility, an irrigated farming area, or livelihoods in a particular community. It is also different from asking how these changes will effect the generation of revenue from tourists, damage costs from floods, or property values. Comparison of all of the costs and benefits may indicate the option that is most economically efficient given the costs and benefits that are considered, but does not tell us what costs and benefits to consider or resolve conflicts between multiple objectives. Although these are political decisions, a multi-criteria decision analysis can provide a starting point for negotiation by illustrating the implications, opportunity costs and potential conflicts associated with alternative courses of action. These may in be turn indicative of the level of payments necessary to create the appropriate incentives.

In the absence of site-specific assessment based on long-term monitoring data, a well-designed valuation study also serves to clarify assumptions necessary to link the level of services provided to management practices and payment amounts. For example, a case study conducted in Haiti which found that the benefits of protecting forests exceeded the cost of siltation on downstream irrigation, was based on impacts of past deforestation (World Bank, 1996). By making the assumptions on which a decision is based transparent, they can be more easily questioned, challenged, and replaced if and when new information leads to better estimates or to different conclusions.

When methods are inappropriate or flawed they are worse than useless, because they perpetuate misunderstanding of the concept of value. As is pointed out in a new report by Pagiola, von Ritter & Bishop (2004), among the common pitfalls is to use the cost of replacing a service as an indicator of it's value, without demonstrating that it represents the least cost option, and that there is an actual willingness to pay that amount. An example is the cost of building a filtration plant to replace lost watershed services in New York City, which also carries an unstated political cost, of siting the facility.

Another pitfall is the use of an answer to a one question, to answer another. In other words, to solve different problems in different places, at different scales, where stakeholders may also face different choices and opportunity costs. For example, the costs and benefits of increased flows of water and sediment as a result of deforestation is different for different hydropower facilities. Even when they are nearby, their capacity to store water and sediment, and therefore their vulnerability, can be very different (Aylward & Echeverria 2002).

To sum up, regardless of whether the actual value of a service is modest or infinite, and whether it supports human well-being or is intrinsic, people must somehow cover the costs of

protecting it. Valuation provides a tool with which to evaluate the advantages and disadvantages of various courses of action. A more detailed review of valuation methods and case studies, and common pitfalls, as well as some simple rules of thumb for avoiding them can be found in new and recent reports listed below. For example, as pointed out by Pagiola et al (2004) "submit results to sanity checks, and recognize that extraordinary results require extraordinary proof."

* "Forty Two" is the answer provided by a computer, after 7 ½ million years of performing calculations, to "The Ultimate Question of Life, the Universe and Everything" in the novel, "The Hitchhikers Guide to the Galaxy," by Douglas Adams (1979). In the novel, the computer then offers to design another computer with a 10 million year program that can calculate the question to this ultimate answer, in which organic life is part of the operational matrix, i.e., Earth.

References and further reading:

Aylward, B. (2004) [Land-use, Hydrological Function and Economic Valuation](#). In Bonnell, M. & Bruijnzeel, L.A. (Eds.) *Forests-Water-People in the Humid Tropics*. Cambridge, Cambridge University Press.

Aylward, B. & Echeverria, J. (2001) [Synergies between Livestock Production and Hydrological Function in Arenal, Costa Rica](#). *Environment and Development Economics*, 6, 39-382.

Emerton, L. and Bos, E. 2004. Value. [Counting ecosystems as an economic part of water infrastructure](#). IUCN, Gland, Switzerland and Cambridge, UK. 88 pp.

Johnson N.L. & Baltodano M.E. (2004) [The economics of community watershed management: some evidence from Nicaragua](#) (pdf, abstract only) *Ecological Economics*, 49, 57-71.

IIED 2003. [Valuing Forests: A review of methods and applications in developing countries](#). Environmental Economics Programme, International Institute for Environment and Development.

IIED Environmental Economics Programme, Series of case studies on [Markets for Environmental Services](#)

Echavarría, M., Vogel, J., Montserrat, A. & Meneses, F. (2004) [The impacts of payments for watershed services in Ecuador: Emerging Lessons from Pimampira and Cuenca](#).(pdf) International Institute for Environment and Development, Environmental Economics Programme, London

Miranda, M. Porras, I. T. & Moreno, M. L. (2003). [The social impacts of payments for environmental services in Costa Rica. A quantitative field survey and analysis of the Virilla watershed](#). International Institute for Environment and Development, London

Rojas, M., and Aylward B. 2003. [What are we learning from experiences with markets for environmental services in Costa Rica? A review and critique of the literature](#). (pdf) Environmental Economics Programme, International Institute for Environment and Development.

Rosales, R. M. P. (2003) [Developing pro-poor markets for environmental services in the Philippines](#). Environmental Economics Programme, International Institute for Environment and Development, London

Pagiola, S. von Ritter K. and Bishop J. (2004). [Assessing the Economic Value of Ecosystem Conservation](#). Environment Department Paper No. 101. The World Bank, Washington DC.

Porras, I.T. [Valorando los Servicios Ambientales de Protección de Cuencas: consideraciones metodológicas](#). (pdf) IIED, Presentado en el III Congreso Latinoamericano de Protección de Cuencas, Arequipa, 9-13 de junio de 2003.

[Socio-economic opportunities and hydrological response to land use change in tropical montane cloud forests in Arenal](#), Costa Rica. A study being carried out by the Center for Land

Use and Water Resources Research, in collaboration with the Universidad Nacional de Costa Rica and the International Institute for Environment and Development.

Turner K., Georgiou S., Clark R., Brouwer R. & Burke J., [Economic valuation of water resources in agriculture from the sectoral to a functional perspective of natural resource management](#) (pdf), FAO water reports 27, Rome, 2004.

Water and Nature Initiative – [Integrating environmental economics in river basin management](#) – Series of case studies of wetlands valuation

World Bank. 1996. *Haiti Forest and Parks Protection Technical Assistance Project: Staff Appraisal Report*. Report No.T-6948-HA. Washington: World Bank

Comments

It was pointed out that, in the last issue of Flows, we neglected to include what is regarded as the “Bible” on cloud forests:

Hamilton L., Juvik J.O. and Scatena F.N. 1995. *Tropical Montane Cloud Forests*. Springer – Verlag, New York

Resources

[New reports from RUPES:](#)

Van Noordwijk, M. Chandler, F. & Tomich, T.P. (2004) *An Introduction to the Conceptual Basis of RUPES: rewarding upland poor for the environmental services they provide*. ICRAF-Southeast Asia, Bogor

Boquiren, (2004) *Rewards for Environmental Services in the Philippines Uplands: Constraints and Opportunities for Institutional Reform*. World Agroforestry Centre (ICRAF), Bogor

Salas, J. C. (2004) *Case Study of the Maasin Watershed: Analyzing the Role of Institutions in a Watershed-Use Conflict*. World Agroforestry Center (ICRAF), Bogor

Kallesoe, M. & De Alvis, D. (2004) *Review of Developments of Environmental Services Markets in Sri Lanka*. World Agroforestry Centre (ICRAF), Bogor

[African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa](#). An international workshop co-organised by: the International Water Management Institute (IWMI), the Natural Resources Institute (NRI) of the University of Greenwich, the Faculty of Law of the University of Dar-es-Salaam, and the South African Department of Water Affairs and Forestry. Johannesburg, South Africa 26-28 January 2005. (The workshop papers are available online).

Dialogue on Water Food and the Environment [Newsletter](#)

About the Flows Bulletin

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