Economics of soil “ecosystem” services: Roadblocks and possible solutions

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When did we start talking about ecosystem services?

Some say in 1997, with papers by Costanza and Daily...

The idea they popularized is that if we do not associate dollar amounts to the services that the environment provides to human societies, these services will be ignored by economic and financial markets, and the environment will continue to suffer
Costanza et al. (1997) argued that the total monetary value of ecosystem services exceeded the GNP at the time.

What really launched the ES Movement is the Millenium Ecosystem Assessment (2005)
MEA proposed a useful classification of ES
One should not forget the fact that part of the ES program includes valuation, and often what is required is **monetary** valuation.
A couple of the talks at this conference suggest that we are on track, and “with the program”…

But are we, really?

To answer this question, we need to go back in history a little bit, and first of all, realize that the idea of assigning monetary values (= $$$) to ecosystem services is old
In the 50s already, the topic of pricing of non-market goods and services attracted attention.

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Use values | Non-use values
Westman (1977) reached the conclusion that associating prices with ES would be impossible…

How Much Are Nature’s Services Worth?

Measuring the social benefits of ecosystem functioning is both controversial and illuminating.

Walter E. Westman

To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.—William Wordsworth (I)

How much was this mean flower worth to a poet like Wordsworth? What is the value to societies, present and future, of the inspirations that flowed to others from Wordsworth’s poetry, and indirectly from nature? These questions seem safely relegated to the realm of the answerable because they deal with qualities upon which our society has not placed a quantitative value. And yet, in the inexorable quest to rationalize the activities of the civilization, policy-makers in Western societies have increasingly asked the monetary value of items and qualities formerly regarded as priceless: clean air and water, untamed wildlife, wilderness itself. Behind this search has been the hope that, by weighing the benefits to society of nature in the undeveloped state against the benefits of resource development, an objective basis for decision-making will be achieved. Commonly, policy analysts further seek to estimate the equivalence in currency of the values lost by damaging ecosystems. The assumption is often made that decision-makers will reach socially equitable decisions when they choose the alternative whose costs in terms of damage to the ecosystem are exceeded most by the benefits to be obtained from resource use (2).

In this article, I attempt to illustrate both the importance of accounting for the benefits of nature’s “services” in such decisions and the difficulties in doing so. It is important at the outset to recognize some of the corollaries inherent in assuming that decisions that maximize benefit: cost ratios simultaneously optimize social equity and utility (3). (i) The human species has the exclusive right to use and manipulate nature for its own purposes (4). (ii) Monetary units are socially acceptable as means to equate the value of natural resources destroyed and those developed. (iii) The value of services lost during the interval before the replacement or substitution of the usurped resource has occurred is included in the cost of the damaged resource. (iv) The amount of compensation in monetary units accurately reflects the full value of the loss to each loser in the transaction. (v) The value of the item to future generations has been judged and included in an accurate way in the total value. (vi) The benefits of development accrue to the same sectors of society, and in the same proportions, as the sectors on whom the costs are levied, or acceptable compensation has been transferred. Each of these assumptions, and others not listed, can and have been challenged (5–7).
In parallel, in the soils literature, various people started discussing the multifunctional nature of soils…

- Roy Simonson (1966) wrote an article on the “uses of soils”… He comments on the fact that soil surveys are used for many purposes, other than to help agriculture…
- In 1972, the Council of Europe issued a document on soil protection, where the fact that soils have many functions is explicitly mentioned.
- Blum (1988) classifies the different functions of soils, and his classification has been used in the subsequent “Soil Directive” of the EU
Blum (1988) classification of soil functions:

- **Filtration** of solid and liquid compounds (mechanical)
- **Buffering and storage** through adsorption and precipitation (physico-chemical)
- **Transformation** through alteration and decomposition (microbiological/biochemical)

**INPUT** of solid, liquid, and gaseous inorganic and organic compounds

- **Solubilization** in soil water
- **Uptake** by plant roots
- **Percolation** to groundwater

**Groundwater**
The key question is:
Why did it take more than 25 years for anyone to associate prices with soil ecosystem services and even then, do it timidly?

There are probably several reasons:
• We don’t understand soils sufficiently (fewer than 1.5% of soil organisms have been identified)
• Some important services cannot be monetized
• Ecosystem services are scale-dependent
• We don’t trust what some people might do with the numbers if we make them available
This last reason might be one of the most compelling……
The good news is that we don’t have to price soil ES if we think that is not a good idea…
We can explore the use of methods like Multi-Criteria Decision Analysis

And then, once decisions are made, determine what values of soil ES they emphasize...
Another approach is to look at soils as a natural heritage or matrimony, a treasure to be preserved...
Does that mean that thinking of soil ES is not useful… No, they can be useful in different ways, if only in terms of education of the public.
Any question?