

International Congress
Ecosystem Services in the Neotropics
Presentation in Valdivia, Chile, November 2006

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Photo: http://www.catie.ac.cr/bancoconocimiento/N/NoticiaspublicacionEnfo queintegral/NoticiaspublicacionEnfoqueintegral.asp?CodSeccion=3



Recent use of the term "ecosystem services" (by the Millennium Ecosystem Assessment, for example) combines/lumps several very different values or benefits of wild species and ecosystems:

 Ecological processes that provide indirect, material services to humans

 Direct material uses of wild species

 Non-material psychological and emotional values of wild species and ecosystems

Sources (top to bottom): see previous for waterfall; ARD, Inc.; Microsoft, Inc.





- These three categories are very different <u>ecologically</u> and <u>economically</u>
- Therefore, mechanisms for their conservation will differ
- Emphasizing the differences, rather than lumping all together under the label "ecosystem services" may help foster the development of practical conservation mechanisms for each





International donors and aid agencies, like the U.S. Agency for International Development, and conservation organizations, like World Wildlife Fund, are more and more interested in "ecosystem services"





For example, in a recent request for proposals from USAID for a large contract with the theme of Integrated Landscape Management, "Provision of Ecosystem Services" was listed as one of five "Primary Natural Resource Management Categories"

- 1. Biodiversity Conservation
- 2. Sustainable Forestry
- 3. Ecologically Sustainable Agriculture
- 4. Sustainable Tourism
- 5. Provision of Ecosystem Services





This was the first time I have seen ecosystem services mentioned this prominently in a USAID natural resources management or biodiversity conservation project in my 15 years of experience in this sector





Source: http://www.infoplease.com/atlas/centralamerica.html

Requests for project designs that include mechanisms for "Payments for Ecosystem Services" have come up in several recent proposals from USAID missions in Latin America (for example, Nicaragua, El Salvador, and Panamá)





ARD, as a consulting company, is involved in the design, implementation, and evaluation of projects for USAID and other donors

- Although ARD has a reputation as a "think tank" among consulting firms, our business is practical and applied
- Thus, my interest in the issue of how we define "ecosystem services" is practical and applied, not semantic and theoretical







An example of ARD's work with USAID is the Biodiversity Guide, which we prepared for this Agency



BIODIVERSITY CONSERVATION: A GUIDE FOR USAID STAFF AND PARTNERS



SEPTEMBER 2005

This publication was produced for review by the United States Agency for International Development. It was prepared in cooperation with ARD, Inc., USAID technical staff, and partners.





The following references trace the history of the use of this concept

- Study of Critical Environmental Problems (SCEP), 1970 discussed "environmental services" that would decline if there were a "decline in ecosystem function"
- Ehrlich, Ehrlich, and Holdren, 1977 talked about "public services of the global ecosystem"
- Ehrlich and Ehrlich, 1981 discussed "ecosystem services," as did and many other references up until
- Daily, 1997 talked about "ecosystem services" in the book <u>Nature's Services: Societal</u> <u>Dependence on Natural Ecosystems</u>





So, for about 27 years (1970 - 1997), the term and concept "ecosystem services" was used to refer to ecological functions and processes, such as:

- Major biogeochemical and nutrient cycles (water, carbon/oxygen, nitrogen, phosphorus)
- Pest and pathogen control by predators in food webs (trophic regulation, natural pest control)
- Pollination by insects, bats, birds
- Seed dispersal by birds, mammals
- Decomposition of biomass, wastes, and detoxification of pollution
- Soil formation and retention, maintenance of soil fertility
- Climate regulation





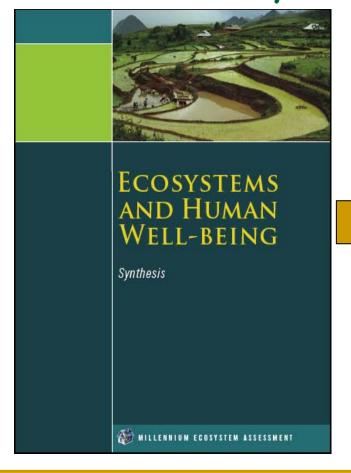


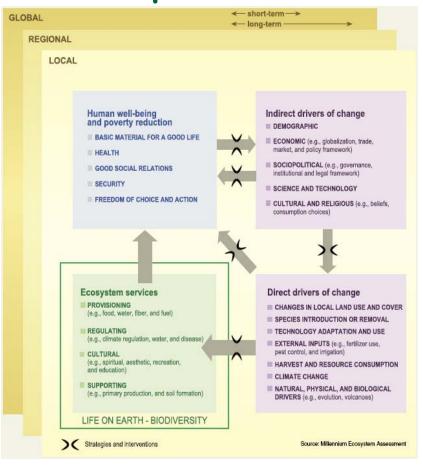


Source (top to bottom): ARD Inc.
http://www.catie.ac.cr/bancocongermiento/Ny/Nc
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As far as I can determine, it was the Millennium Ecosystem Assessment (2001-2005) that began the process of lumping the three different types of values of ecosystems and wild species









Reports and more information from the Millennium Ecosystem Assessment can be found at: www.maweb.org







The motivation of the MEA for combining all of the different values of wild species and ecosystems may have been to emphasize, in general terms, the full range of values... BUT this mixing of very distinct types of values is not useful for the development of practical mechanisms for conserving them





Returning to the original, more narrow, sense of the concept "ecosystem services," as used from late 1970s to about 1997, before the Millennium Ecosystem Assessment, might help emphasize the special challenges of conserving ecological processes that provide indirect, material services to humans





Another observation: biodiversity is not an "ecosystem service," as the Millennium Ecosystem Assessment calls it, but rather it is the source of:

Ecosystem services

Direct material uses of wild species

 Non-material, emotional/ psychological values of wild species and ecosystems





How do these three types of values differ, ecologically and economically?





Ecological processes are:

- Properties of whole systems
- Difficult to predict with accuracy due to scale and complexity
- Impossible or expensive to substitute with technology because of scale and complexity





- Direct material uses of wild species (ecosystem "goods" or products) are:
 - Properties of single species
 - The population dynamics of single species are more predictable than the behavior of whole systems
 - The substitution of one used species for another is often possible
 - The cultivation or domestication of wild species is sometimes possible





- Non-material psychological or emotional values:
 - Can be properties of either individual species or systems
 - Substitution is often possible
 - Are not generally fixed necessities of life
 - Are highly conditioned by culture





- Economic differences among the three types of values involve:
 - Valuation methods
 - Markets
 - Scale
 - Substitutability
 - Property rights and tenure



 The term Payments for Environmental Services (PES) is widely used (many pages of Google "hits")

 This phrase has been used almost exclusively to refer to payment mechanisms to conserve the hydrological cycle in watersheds and the ecosystem service of maintaining stable flows of clean water





In the watershed context, PES refers to mechanisms by which downstream water users pay upstream land managers to conserve natural forests or other natural vegetation, and for other land management practices, that reduce erosion, stabilize flows, and maintain water quality



Typical PES scheme for water/ watershed ecosystem services



Source: Wunder, Sven. 2005. Payments for environmental services: Some nuts and bolts. CIFOR Occassional Paper No. 42. Center for International Forestry Research, Bogor, Indonesia





- Mechanisms for conserving ecosystem services other than water-cycle services have been very rare, such as for conserving:
 - Major biogeochemical and nutrient cycles (water, carbon/oxygen, nitrogen, phosphorus)
 - Pest and pathogen control by predators in food webs (trophic regulation, natural pest control)
 - Pollination by insects, bats, birds
 - Seed dispersal by birds, mammals
 - Decomposition of biomass, wastes, and detoxification of pollution
 - Soil formation and retention, maintenance of soil fertility
 - Climate regulation













| Type of value | Mechanism |
|--|--|
| ecological processes that provide indirect, material services to humans | payments for ecosystem services from beneficiaries to land users and natural resources managers |
| direct material uses of wild species | natural resource-based enterprises |
| non-material psychological and emotional values of wild species and ecosystems | sustainable tourism/ecotourism; scientific & educational nature reserves; sacred forests or other sacred areas |









- Objective 1: Conservation of forests in upper watersheds to protect the quality and quantity of water used downstream
- Mechanism: payments by downstream water users







Objective 2:
 Conservation of predators of crop pests (e.g., ofcoffee, sugarcane)

Mechanisms:

- 1. Payments or activities to maintain forests and natural vegetation as habitat for birds, bats, and insect predators
- 2. Integrated Pest
 Management to reduce
 harm to predators



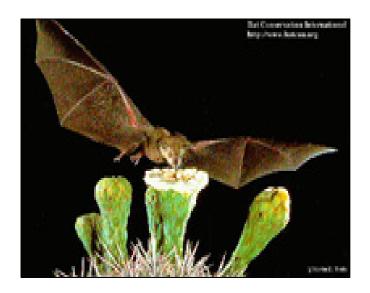




Objective 3:
 Conservation of agricultural pollinators (e.g., of coffee or fruits)

Mechanism:

- 1. Payments or activities to maintain forests and natural vegetation as habitat for birds, bats, and insect pollinators
- 2. Integrated Pest
 Management to reduce
 harm to pollinators







- Objective 4:
 Conservation of mangroves as nursery areas for shrimp, fish, and other shellfish
- Mechanism: tariffs on marine products paid by fishermen, used for protection and restoration of mangroves



Source: http://shiftingbaselines.org/blog/archives/2004_06.html





Mechanisms proposed in a recent project for USAID El Salvador

Objective 5:
 Conservation of coral reefs as tourist attractions and habitat for fish of commercial value

 Mechanism: tariffs or taxes on tourist operators (hotels, dive and sport fishing guides) and commercial fishermen





Integrated management of multipleuse landscapes



The same landscapes can produce some combination of all three categories of values

The challenge is to balance the three types of uses of the same area in order to optimize the total value in a way that is ecologically and economically sustainable



