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Economic Incentives for Land Conservation

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Sustainable Development In a Land Use Context

In terms of ecological conservation, the concept of sustainable development rests on the notion that natural ecosystems, and the essential goods, "services" and spiritual values they provide (e.g., fish, clean water and biodiversity), will be sustained intact for future generations by a mutually supportive combination of regulatory constraints and market mechanisms.

The Tragedy of the Commons

Public goods, such as healthy fisheries or biologically diverse forests, are those which are in everybody's interest to have, but in no one's interest to provide. In such situations, the first reaction is frequently to legislate to try to ban the "externality," i.e., the activity that threatens the resource.

Missing Market Mechanisms

Because the owners of ecologically valuable land can generate liquid cash from more traditional land development, but are generally not paid for the public and private ecological services their land is providing, they have no economic incentive to preserve or enhance the natural functions of their land. Indeed, valuable environmental land features, e.g., wetlands and endangered species, have historically *reduced* the market value of land. This is a classic market flaw where service suppliers and service users lack needed information and connections.

Won't The Forces of Supply and Demand Eventually Solve the Problem?

- There is not yet a “market” for ecosystem services
- Positive externalities - beneficiaries do not pay for “free” ecosystem services, e.g., enjoyable nearby open space
- Negative externalities - parties who lose the benefits of converted ecosystem services are not compensated or notified in advance of the planned conversion
- Buyers and sellers lack key market information and useful connection mechanisms



- Clean Water - For Downstream City Reservoir
- Groundwater Recharge - For County Water District
- Habitat - For Hunters and Birders
- Scenic Enjoyment - For Nearby Subdivision

Can't Traditional Regulation Solve the Problem?

- Conflicts with private property owners; takings litigation
- Regulation is resource intensive, e.g., mitigation enforcement
- Jurisdictional boundaries are vexing, e.g., EPA, TCEQ, COE, TPWD, FWS
- Most environmental laws are not designed to achieve or promote ecosystem protection or enhancement, e.g., ESA, CWA

Philanthropic and Governmental Conservation Funding Are Not Enough

Governmental programs and foundation/NGO funding are insufficient. Over 2 million acres of rural open space are converted to urban sprawl each year. If current trends persist, by 2050, most intact ecosystems surrounding the nation's 280 metropolitan areas will be completely fragmented. If every state in the continental U.S. were to annually purchase, for long-term conservation, 1% of their privately-owned suburban/ ex-urban land base (a land base of approximately 200 million acres), at an average price of \$3000 per acre, the cost over ten years would be \$60 billion. This far exceeds government/ foundation budgets for conservation, which total about \$2.5 billion per year. Market mechanisms are clearly needed to supplement philanthropic and governmental conservation funding.

Valuing Ecological Services

Early attempts at valuation of ecological services generated impressive-sounding figures that were seized upon by environmental advocates and then, when discredited, were used by opponents to tarnish the whole idea. Things have improved.

Science is now producing abundant evidence that the natural environment provides a wide range of economic benefits beyond the obvious ones of timber and fish. The recent Millennium Ecosystem Assessment, the first global survey of ecological services, is the most comprehensive effort to date.

The only way markets for ecological services will develop is if such services have "sound, real (and realistic) values attached to them."
The Economist, April 23-29, 2005.

A New Perspective Securing Economic Value From Strategic Conservation of Private Land

While the valuation methods are not yet fully developed, the economic value of the “ecological services” provided by intact natural ecosystems:

- (1) can be substantial,
- (2) can be substantially greater than the "fair market value" associated with more conventional land uses
- (3) is not being captured by most landowners, and
- (4) can often be supplemented by traditional economic land uses such as limited residential development, oil and gas development, timber extraction or electricity transmission.



The Concept Applies Globally



- CDM - Carbon Credits
- Costa Rica Programs
- Hydroelectric Projects
- Panama Canal Initiative

New Scientific Analyses of Ecosystem Functions

As scientific understanding of ecological services improves, new financial opportunities emerge. For example, the importance of insect pollination to the quality and quantity of agricultural crops such as coffee, almonds and apples, has only recently become appreciated. Last year, a study in Costa Rica found that on one farm alone, the natural pollination of coffee by insects was worth \$60,000. "Simply having this kind of information could change the way that coffee farmers view areas such as forest and wild grasslands on or near their property." *The Economist*, April 23-29, 2005.

The Implications of Ecosystem Fragmentation Are Significant

- Habitat and Biodiversity Loss
- Reduced Wetland and Riparian Zone Services
 - Water cleansing
 - Groundwater recharge
 - Flood control
- Open Space Loss
- Climate Change Implications

Millennium Ecosystem Assessment Synthesis Report

Four Main Findings - Finding #1

Over the past 50 years, **humans have changed ecosystems more rapidly and extensively than in any comparable period** of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth.

Millennium Ecosystem Assessment Synthesis Report

Four Main Findings - Finding #2

The changes that have been made to ecosystems have contributed to **substantial net gains in human well-being and economic development**, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risk of nonlinear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.

Millennium Ecosystem Assessment Synthesis Report

Four Main Findings - Finding #3

The degradation of ecosystem services **could grow significantly worse** during the first half of this century and is a barrier to achieving the Millennium Development Goals to improve the human condition.

Millennium Ecosystem Assessment Synthesis Report

Four Main Findings - Finding #4

The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the MA has considered but these involve **significant changes in policies, institutions and practices that are not currently under way**. Many options exist to conserve or enhance specific ecosystem services in ways that reduce negative tradeoffs or that provide positive synergies with other ecosystem services.

Growing Interest in Ecosystem Protection

- Growing pressure on natural resources, especially tropical forests, riverine systems and lands near urban areas
- Growing recognition of ecosystem value and public pressure for habitat and open space protection

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Traditional Government / Private Sources of Conservation Funding

- Federal
- State
- Local
- Private Foundations, NGOs and Family Foundations

Mitigation-Based Revenue for Conservation

- i. Compensatory Mitigation for Projects
- ii. Mitigation as a Regulatory Compliance Tool
- iii. Mitigation to Resolve Outstanding Liabilities
- iv. Reclamation - Based Mitigation

Purchase and Sale of Ecological Services

- Water Supply
- Water Quality
- Flood Control
- Open Space / Buffer
- Bioremediation





Conservation-Compatible Limited Development

- Limited Residential Development
- Sustainable Timber Harvesting
- Minerals, e.g. oil and gas

Cost Savings Associated With Conservation

- i. Reduced land maintenance costs
- ii. Avoiding loss of land and associated mineral rights
- iii. Reduced sediment dredging outlays
- iv. Brownfields strategies - "green brownfields"

Other Economic Motivations to Conserve Land

- Tax Savings
- Public Relations Benefits
- Enhanced Value of Adjacent Acreage

Important U.S. Domestic Policy Issues

- Streamlined Mitigation and Multi-purpose Conservation Banking Approval Processes
- Wider Mitigation Trading Service Areas
- Third-Party Audits of Mitigation Commitments
- An Articulated "Stacking" Policy (i.e., multiple value elements on a single parcel) that Includes Federal Conservation Funding
- New Cap and Trade Programs for Ecosystem Elements and Aggressive Pursuit of Water Quality Trading Initiatives
- More Robust Certification Programs for Products Generated Through Ecologically Sustainable Practices
- Careful Evaluation of Subsidies That Encourage Ecosystem Fragmentation
- Government-Sponsored Pilot Initiatives to Promote Market-Mechanisms
- Highly Focused User Fees
- Tax Credits for Conservation-Related Expenditures
- Improved Income Tax Deduction Policies

Millennium Ecosystem Assessment Synthesis Report

Recommendations

- Greater use of economic instruments and market-based approaches in the management of ecosystem services. These include:
 - **Taxes or user fees** for activities with "external" costs (trade-offs not accounted for in the market). Examples include taxes on excessive application of nutrients or ecotourism user fees.
 - **Creation of markets**, including through cap-and-trade systems. One of the most rapidly growing markets related to ecosystem services is the carbon market. The value of carbon trades in 2003 was approximately \$300 million. About one quarter of the trades involved investment in ecosystem services (hydropower or biomass).
 - **Payment for ecosystem services**. For example, in 1996 Costa Rica established a nationwide system of conservation payments to include landowners to provide ecosystem services.
 - **Mechanisms to enable consumer preferences to be expressed through markets**. For example, current certification schemes for sustainable fisheries and forest practices provide people with the opportunity to promote sustainability through their consumer choices.

Why Is This a "Sustainable Development" Topic?

Our current regulatory and economic systems are incapable of ensuring the sustainability of the nation's natural ecological systems. Ecosystem fragmentation reflects the economic decisions of hundreds of private parties—what Professor Odum calls the "tragedy of small decisions." A new approach is needed, one that employs a carefully considered combination of enforceable regulatory constraints on ecosystem destruction and meaningful economic incentives for ecosystem conservation. Economic incentives alone are insufficient because the absence of regulatory constraints destroys the demand side of the equation. Regulatory constraints alone are ineffective because the challenge does not lend itself to a purely regulatory solution.