

AGRICULTURE, BIOLOGY AND CONSERVATION

THE ABCS OF HOW NATURE SERVES THE NATION

The Importance of Ecosystems.

Ecosystems are communities of living things and the environmental features that support them. Ecosystems are essential to human life, providing us with innumerable and invaluable services. These Ecosystem services are the goods and services derived from natural and managed ecosystems upon which human welfare depends, and include everything from clean air and water to food and fuel.



Plants



Soil



Air



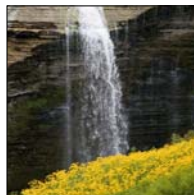
Pollination



Bacteria



Animals



Water

The Decline of Ecosystems.

Unfortunately, ecosystems are in decline around the globe. According to the 2005 Millennium Ecosystem Assessment, a report by the United Nations Environment Programme, some 60 percent of the ecosystem services that support life on Earth are being degraded and/or used up faster than they can be replenished. In addition, by 2050, the amount of per capita arable land in the US will have decreased from ~1.6 to 0.7 acres per person while simultaneously, the US population is projected to increase 25%.

Ecosystems and Agriculture. Until recently, the predominant view of ecosystems in this nation's agricultural regions was one that stressed commodity production. Broader perspectives encompassing the full range of ecosystems and ecosystem services were rare. That view is changing. Ongoing research, coupled with the effects of natural disasters, has increased awareness of the importance of ecosystems, the services they provide, and the ways in which we are dependent on them.

In order to protect our critical ecosystems and sustain the benefits, we must overcome several challenges.

DIVERSIFYING ECOSYSTEMS.

- Challenges: Intensively managed agricultural lands typically feature fewer species and habitat than native or unmanaged lands. This need not be the case.
- Proposed Solution: Recent studies at the Kellogg Biological Station Long Term Ecological Research Program in Michigan show that managing for environmental benefits does not necessarily mean managing for lower yields. For example, maintaining insect diversity can help repel pests such as the soybean aphid now invading the Midwest.

PRICING ECOSYSTEM SERVICES.

- Challenges: While ecosystems provide an array of critical services, these services typically do not pass through markets and hence have no market based prices. Consequently, owners of the ecosystems lack the incentive to protect them.
- Proposed Solution: Establishing markets for ecosystem services (e.g., carbon credits) gives owners the proper incentives to protect the ecosystems.

LACK OF POLICY SUPPORT.

- Challenges: While multiple programs exist to support the production of agricultural commodities, relatively few support other ecosystem services.
- Proposed Solution: Conservation Reserve Program (CRP) and the Wetland Reserve Program (WRP), have helped maintain and enhance ecosystems and their services. Because programs like these support farmer incomes while fostering ecosystem services with the potential for doing so without distorting trade, they possibly comply with World Trade Organization (WTO) constraints (i.e., they are potentially Green Box



compliant) and can become an important element in WTO negotiations. As such, governments are exploring the options for supporting farm income through payments for ecosystem services as opposed to traditional payments based on crops, yields, acres and prices.

PROTECTING ECOSYSTEMS

We can improve the flow of ecosystem services to support our health and welfare while providing food, fiber, and energy to an ever-growing world population. Options include:

1

Expanding interdisciplinary research that explores ways to increase diversity of agro-ecosystems without sacrificing yield;

2

Establishing markets through which ecosystem services or their proxies can be bought and sold (e.g., carbon credits, water quality credits) and thus giving owners a way to capture income and an incentive to protect the ecosystems; and

3

Supporting pre-existing conservation programs and crafting social policy that assigns ecosystem owners the responsibility of maintaining ecosystems and their associated services.

ECOSYSTEMS PROVIDE INVALUABLE SERVICES. AMONG OTHER THINGS, THEY

- ✓ Clean and store fresh water
- ✓ Maintain air quality
- ✓ Regulate climate
- ✓ Mitigate floods and runoff
- ✓ Prevent erosion
- ✓ Maintain soil productivity
- ✓ Store and recycle nutrients
- ✓ Abate noise
- ✓ Pollinate crops
- ✓ Maintain biological and genetic diversity
- ✓ Provide recreational opportunities
- ✓ Supply habitats
- ✓ Provide medicines and pharmaceuticals
- ✓ And, of course, provide food, fiber and energy



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