Creating Economies of Nature

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Ecosystems, Ecosystem Services & Biodiversity

- Why should we care?
- Why should business care?
- What is in it for us?

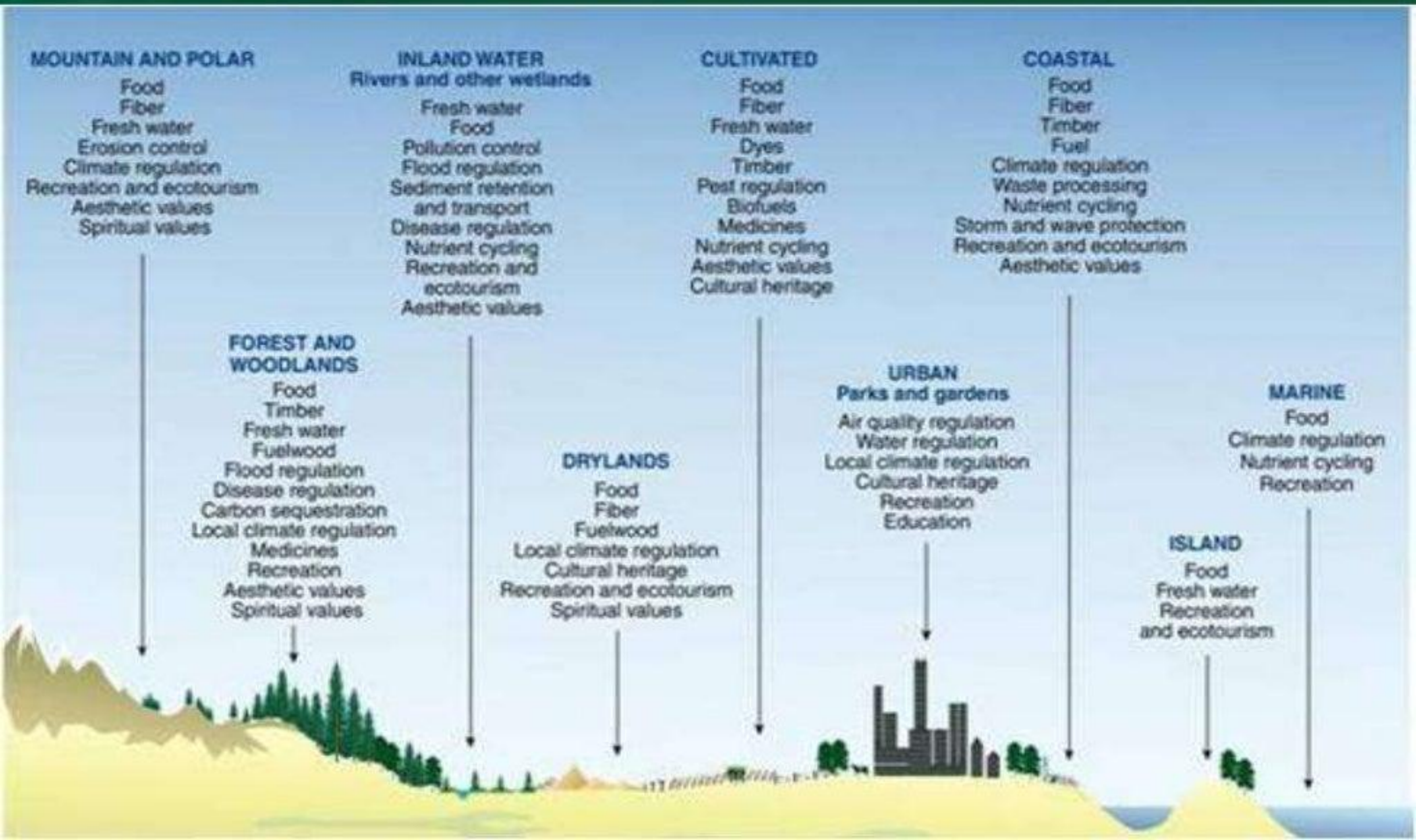
Overview of Ecosystem Services

Ecosystem services = *The benefits people obtain from ecosystems.*

"The degradation of ecosystem services represents loss of a capital asset."
Millennium Ecosystem Assessment (2005)

ECOSYSTEM SERVICES	
Supporting Services Nutrient cycling Soil formation Primary production	**Provisioning Services** Food (crops, livestock, wild foods, etc…) Fiber (timber, cotton/hemp/silk, wood fuel) Genetic resources Biochemicals, natural medicines, pharmaceuticals Fresh water
	Regulating Services Air quality regulation Climate regulation (global, regional, and local) Water regulation Erosion regulation Water purification and waste treatment Disease regulation Pest regulation Pollination Natural hazard regulation
	Cultural Services Aesthetic values Spiritual and religious values Recreation and ecotourism

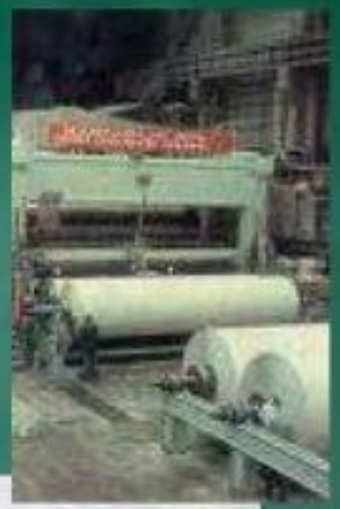
Sources of Ecosystem Services



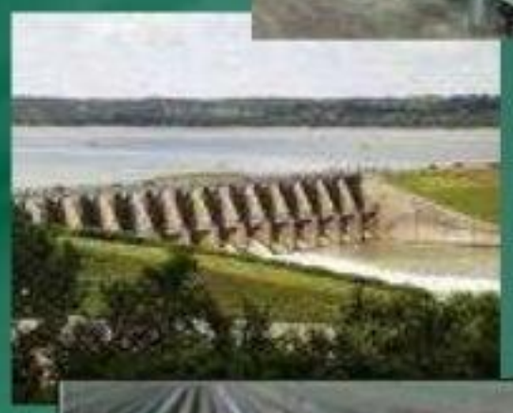
Ecosystem Services and Biodiversity Business Risks and Opportunities

- Ecosystem degradation and biodiversity loss is highly relevant to business because companies not only impact ecosystems and the services they provide but also depend on them.
- Can pose a number of risks to corporate performance as well as create new business opportunities.

Business impacts and dependence on biodiversity and ecosystems



Business has direct and indirect impacts on biodiversity and ecosystems



Ecosystem change creates business ***risks*** and ***opportunities***

Businesses depend upon biodiversity, ecosystems and ecosystem services

Ecosystem Services and Biodiversity Business Risks and Opportunities

- Operational
- Regulatory and legal
- License to operate (or expand) operations
- Reputational
- Financing
- New Revenue Streams (from ecosystem services restoration or enhancement)

Operational Risks and Opportunities

- Risks -- Higher costs for freshwater due to scarcity, lower output for hydroelectric facilities due to siltation, or disruptions to coastal businesses due to flooding
- Opportunities -- as increasing water-use efficiency or building an on-site wetland to circumvent the need for new water treatment infrastructure
- **Example:** ***DuPont Constructed Wetland Wastewater Treatment Case Study --*** Wetlands are known for their ability to clean water, absorb waste, and breakdown some pollutants. Recognizing this ecosystem service, DuPont built a wetland to help treat water coming out of its Victoria, Texas manufacturing plant after the local community started expressing concerns about the deep well injection process the company had been using. After being routed through an on-site biological treatment facility, wastewater is now released into the wetland for further cleaning before returning to the Guadalupe River.

Regulatory and Legal

- Risks such as new fines, new user fees, government regulations, or lawsuits by local communities that lose ecosystem services due to mining activities
- Opportunities such as engaging governments to develop policies and incentives to protect or restore ecosystems that provide services a company needs (water quality/supply comes to mind for coal-fired power facilities).

Formal License to Operate

- In certain situations, restoring or protecting an ecosystem can help a business make the case to regulators that it should be allowed to expand activities onsite or elsewhere.
- *International Paper Conservation Bank Case Study* – International Paper converted more than 2,000 hectares of its land in Georgia into a conservation bank for the endangered red-cockaded woodpecker (*Picoides borealis),* allowing the company to legally expand its operations in other forests of lower conservation value.

Reputational

- Risk -- retail companies being targeted by nongovernmental organization campaigns for purchasing wood or paper from sensitive forests or banks facing similar protests due to investments that degrade pristine ecosystems.
- Opportunity -- company implements and communicates sustainable purchasing, operational, or investment practices in order to differentiate corporate brands.

Ecosystem Services Revenue Opportunities

- Maximize ROI on transactions involving payments for ecosystem services (PES)/market-based opportunities derived from a company's natural resource assets.
- Receive new revenue streams to protect, restore and maintain a variety of ecological values, including clean air, clean and abundant water resources, fish, and wildlife habitat, and other ecosystem service offerings on corporate land holdings.
- Maximize value of underutilized corporate assets.

Payments for Ecosystem Services

- Payments for ecosystem services (PES) have emerged as a way to address growing environmental challenges through market-based mechanisms.
- PES transactions are created when certain parties are willing to pay to establish, enhance, or reduce impacts to a particular natural function, and other parties are willing or able to provide these ecosystem service benefits.

Core Elements of an Ecosystem Market

- Demand created by law or regulation
- Market infrastructure
  - market players (buyers, sellers, brokers/aggregators, verifiers, regulators)
  - institutions (exchange or meeting place, registry)
  - rules and standards: protocols for measuring, monitoring, verification
- Assurances that cover the inherent risks: credit quality, permanence, potential for reversal
- Accessible information for buyers and landowners

Examples of Markets for Ecosystem Services and Biodiversity Preservation

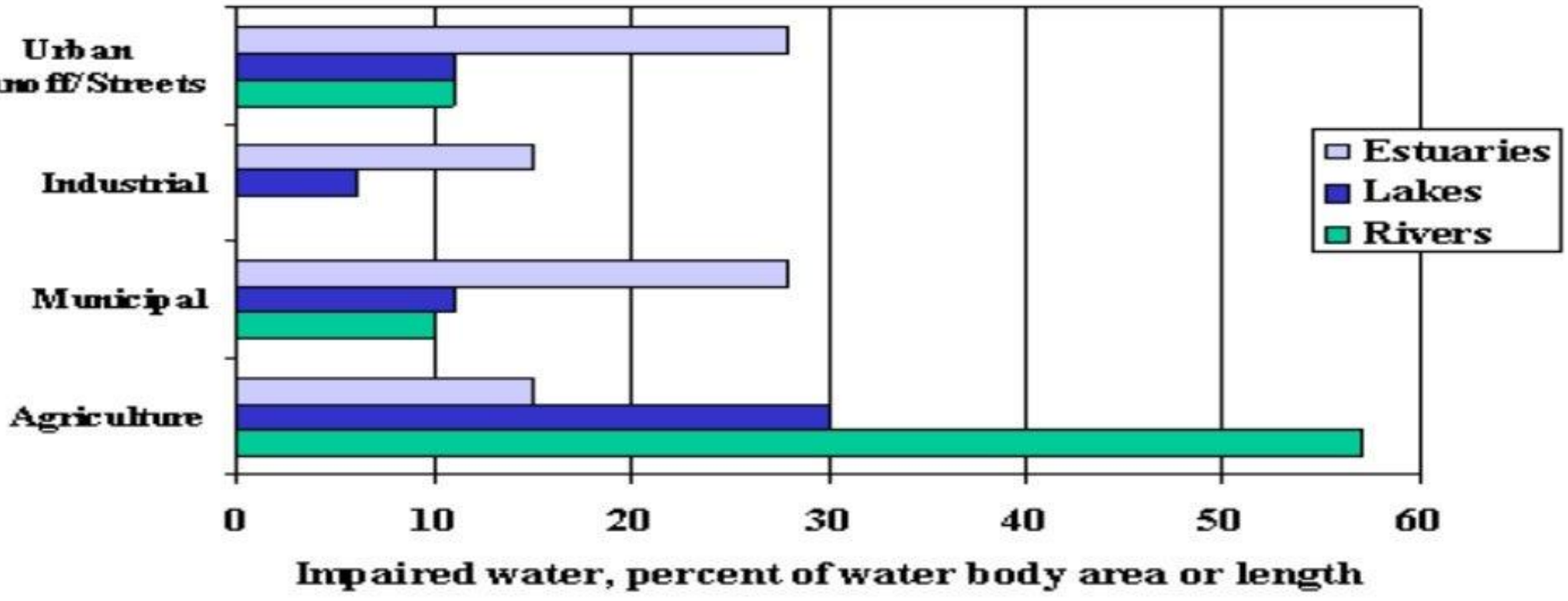
- Carbon storage and sequestration
- Wetlands mitigation banking
- Watershed protection services
  - non-point source/point source water quality trading,
  - stream bank restoration
  - soil protection
  - water supply preservation
  - flood and hurricane mitigation)
- Water rights trading
- Biodiversity offsets/conservation banking
  - Endangered or threatened plant and animal species mitigation offsets
- Natural resource damage (NRD) offset credits/supplemental environmental projects (SEPs)
- Non-carbon forest ecosystem services/sustainable forestry
- Sustainable agriculture
- Water temperature offset trading
- Land development rights/offsets

2008 Farm Bill: Section 2709

- Authorizes USDA to create a federal framework to facilitate markets for environmental services…
  - Guidelines and protocols for measuring environmental benefits
  - A registry to collect and record environmental benefits
  - Verification guidelines to ensure benefits are real

Water Quality and Agriculture

Agriculture is a leading source of water pollution in rivers and lakes



Watershed Scale Water Quality Trading Programs

Portfolio Approach to Ecosystem Management = Multiple Revenue Streams

traditional products:
food and fiber

+

green products: eco-labeling

+

woody biomass
alternative energy

Ecosystem Markets:

species habitat

+

standing carbon

+

water quality/wetlands

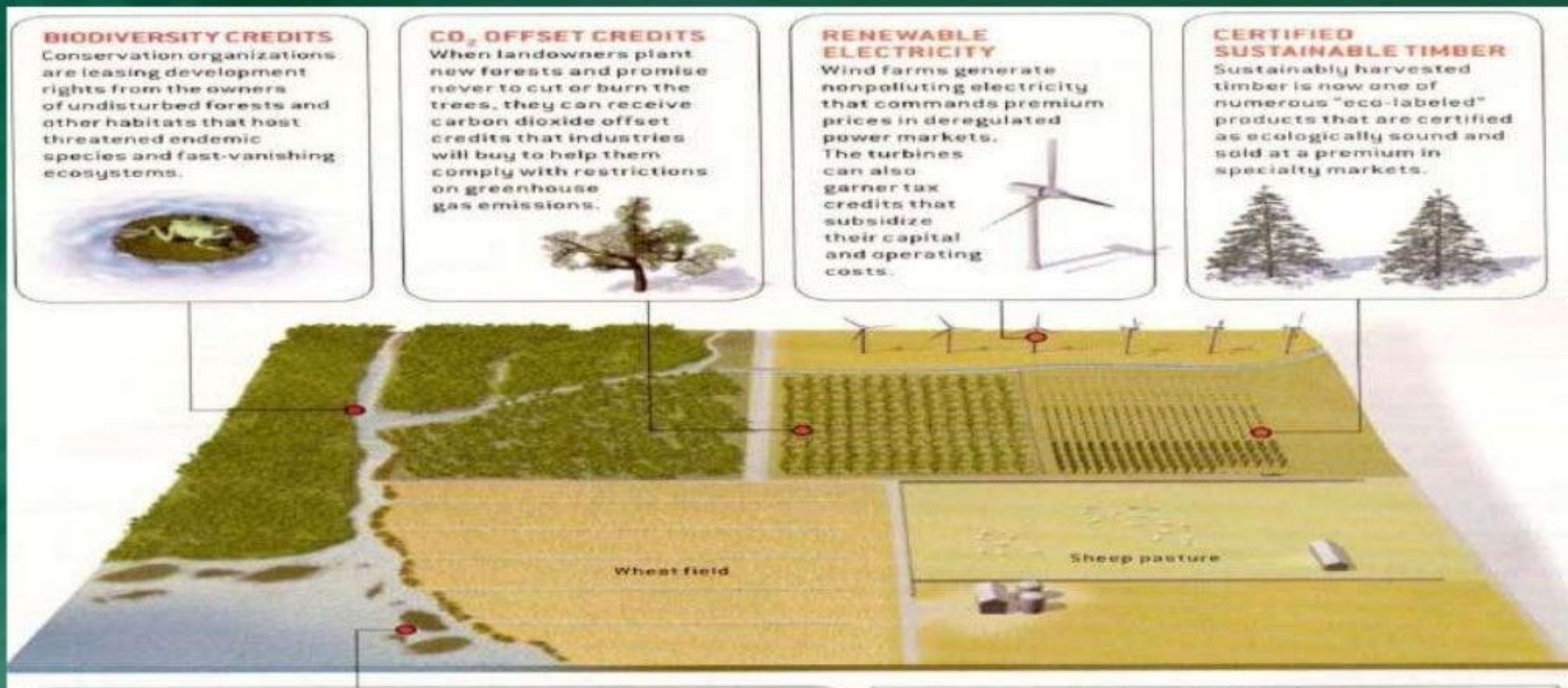
Farm of the Future??

BIODIVERSITY CREDITS
Conservation organizations are leasing development rights from the owners of undisturbed forests and other habitats that host threatened endemic species and fast-vanishing ecosystems.

CO_2 OFFSET CREDITS
When landowners plant new forests and promise never to cut or burn the trees, they can receive carbon dioxide offset credits that industries will buy to help them comply with restrictions on greenhouse gas emissions.

RENEWABLE ELECTRICITY
Wind farms generate nonpolluting electricity that commands premium prices in deregulated power markets. The turbines can also garner tax credits that subsidize their capital and operating costs.

CERTIFIED SUSTAINABLE TIMBER
Sustainably harvested timber is now one of numerous "eco-labeled" products that are certified as ecologically sound and sold at a premium in specialty markets.



WATER CREDITS
Careful management of water and wetlands is economically valuable for many reasons. Urban water authorities purchase water filtration credits to protect the quality of their watersheds; wetland owners can also receive compensation from government agencies for flood-control services, from conservation organizations for the preservation of migratory waterfowl breeding areas, and from agricultural cooperatives for the prevention of soil salinity increases caused by overdrawn groundwater aquifers.

COMMODITY	PERCENT OF FARM'S INCOME	CUSTOMER
Biodiversity credits	5	Conservation trust
CO_2 offset credits	10	Steelmaker
Renewable electricity	15	Power market
Certified sustainable timber	20	Specialty market
Water credits	20	Urban water market
Wheat	15	World market
Wool	15	World market

Source: Scientific American (2005)