SUSTAINABILITY LINKAGES: Land and Ecosystem Services

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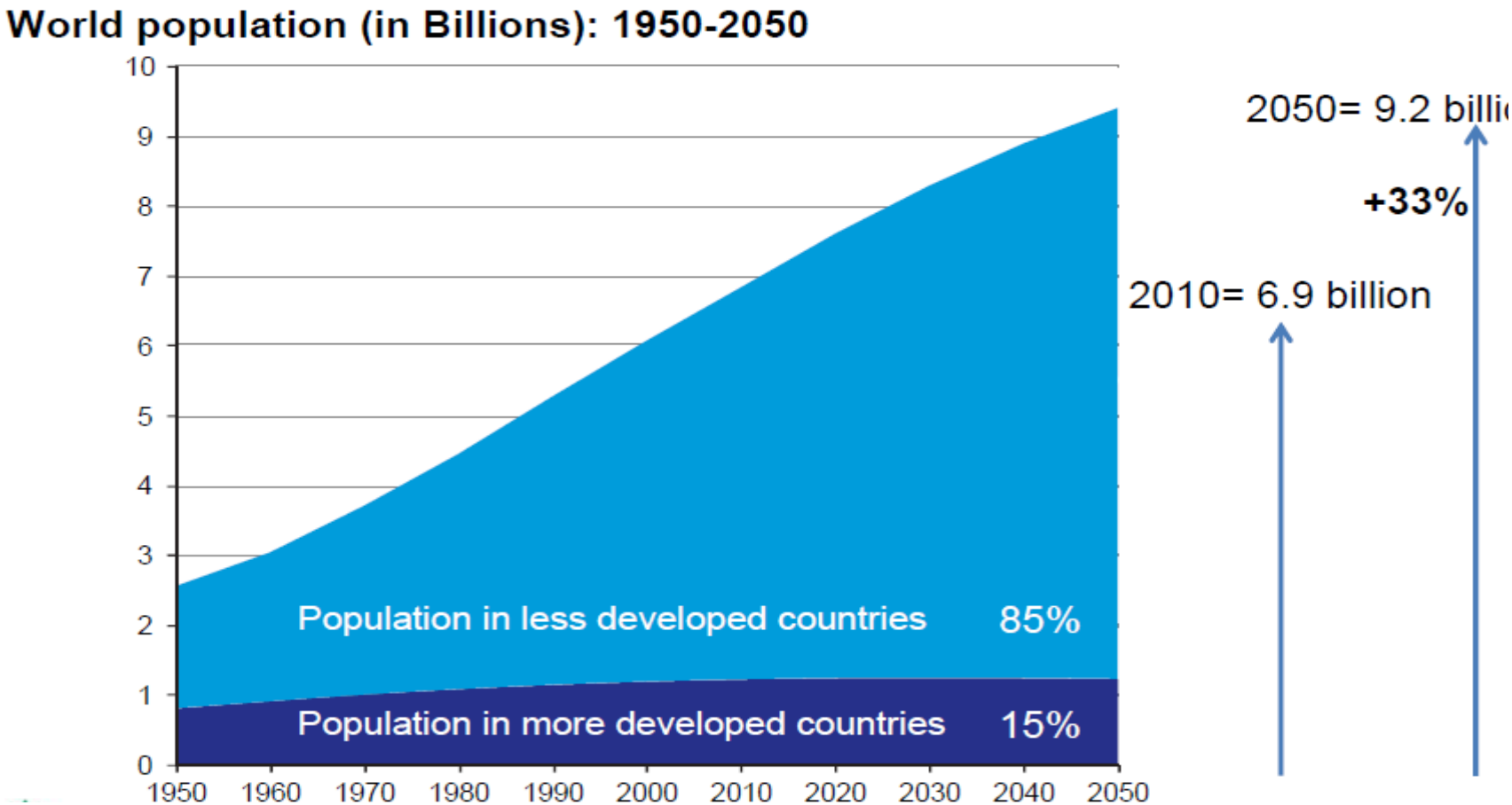
OUTLINE

- *LAND"* TRENDS WORLDWIDE
- LOSS OF LAND=LOSS OF ECOSYSTEM SERVICES
- MARKETS FOR ECOSYSTEM SERVICES
- SUSTAINABILITY LINKAGES: SOME FINAL THOUGHTS

POPULATION INCREASING IN THE DEVELOPING WORLD



Source: United Nations Population Division, World Population Prospects: The 2006 Revision (from Nilsson, 2010)

Our **Shrinking** Earth

YEAR

Hectares of Land Per Capita

DEMAND FOR FOOD TO INCREASE

- Demand for food will rise by 50% by 2030; meat by 85%
- But yields are showing diminishing returns (2% growth 1970-90; 1.1% 1990-2007)

DEMAND FOR ENERGY TO INCREASE

- Energy demand: 3-time increase by 2050
- Biofuels will require land too: Biofuels demand expected to lead to conversion of 18 to 44mHa of land for biofuels by 2030

HENCE….THE LAND GRAB

- 2008 commodity boom dramatically increased interest in agricultural land:
  - Pre-2008 sales of land annually about 4mHa/year
  - End of 2009 45m/Ha/year (foreign and domestic investors)
- Africa target of more than 70% of deals
- Expansion of agricultural land seems unlikely to slow

DEMAND FOR LAND: ENERGY, FOOD AND FIBER COLLIDE

Forests are being targeted because of their productivity, but …

- Forest conversion contributes to 15-17% of world's CO_2 emissions
- Worldwide forests and their soils absorb 25% of world's CO_2 emissions
- Forests hold more than 50% of the world's animals, plants, and insects
- Forests provide livelihoods for 400M of the world's poorest people.

Turning to the US: Drivers of ecosystem loss and degradation

- Habitat / Land use change and conversion
- Overexploitation e.g. overfishing
- Pollution, particularly nutrient loading
- Invasive species
- Anthropogenic climate change

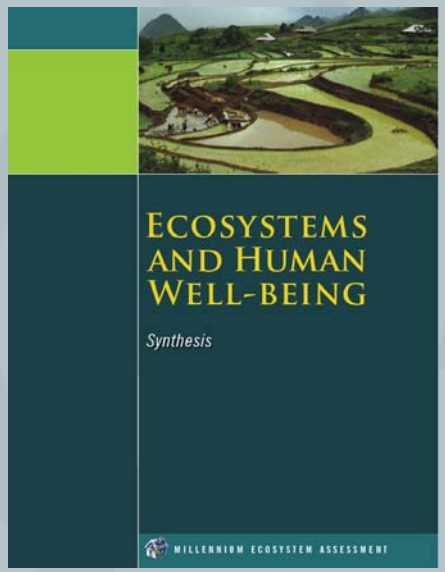
Ecosystem services… a conceptual framework

The benefits people obtain from ecosystems.

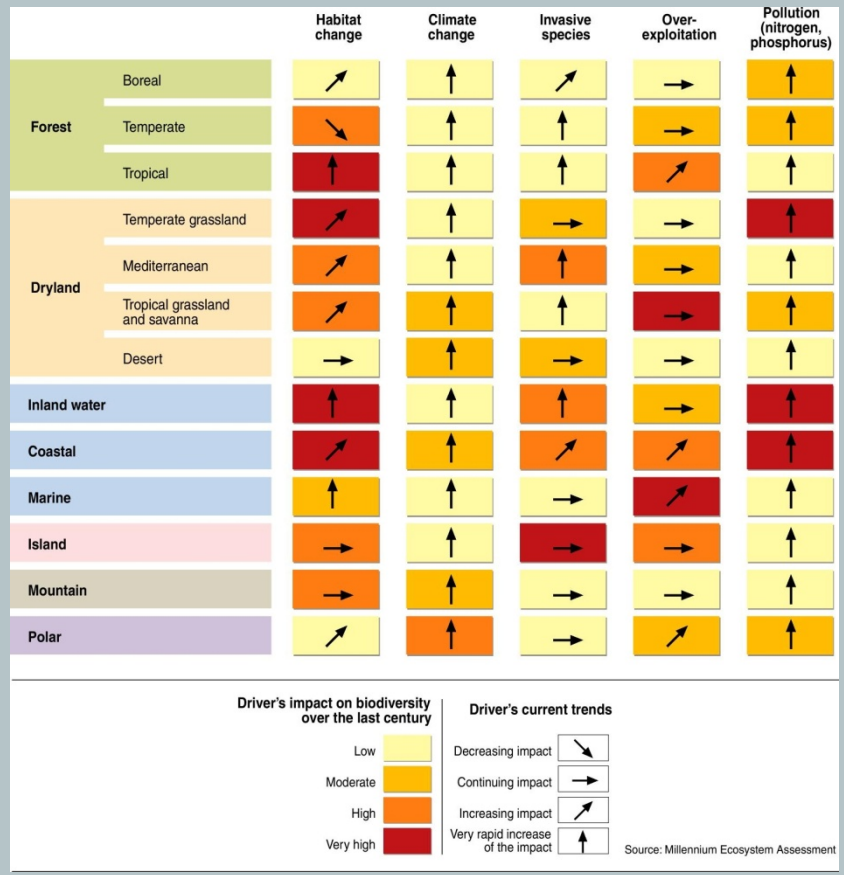
ECOSYSTEM SERVICES		
Supporting Services Nutrient cycling Soil formation Primary production	**Provisioning Services** Food (crops, livestock, wild foods, etc…) Fiber (timber, cotton/hemp/silk, wood fuel) Genetic resources Biochemicals, natural medicines, pharmaceuticals Fresh water	
	Regulating Services 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	

Source: Millennium Ecosystem Assessment, 2005

Millennium Ecosystem Assessment 2005



1360 experts, 95 countries



"Approximately 60% of the ecosystem services evaluated in this assessment are being degraded or used unsustainably."

Markets for ecosystem services…

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

Place economic value on natural assets currently "outside the market"

Compensate producers of environmental public goods and services

Types of markets

Payments for Ecosystem Services (PES)

Most prominent world-wide; traditional or new outcome-based incentives

e.g. NYC watershed payments to upstream landowners; USDA's Conservation Reserve Program

Voluntary, Over the Counter (OTC) exchanges

Usually in the absence of regulation; 1 to 1 deals – benefit and opportunity

e.g. OTC retail carbon, project-based

Compliance Markets

Regulatory standards or pollution caps; driven primarily by lower cost

e.g. carbon cap-and-trade; wetland mitigation banks

Laws & regulations for the environment

Adam Davis, Solano Partners

Environmental Harm	Regulation
air pollution	Clean Air Act
species endangerment	Endangered Species Act
overfishing	NOAA
wetland loss	Clean Water Act
sprawl, imp. surface loss	local land use regulation
nitrogen runoff	Clean Water Act
Ntl. Resource Damages	CERCLA
climate change	AB32, RGGI, voluntary

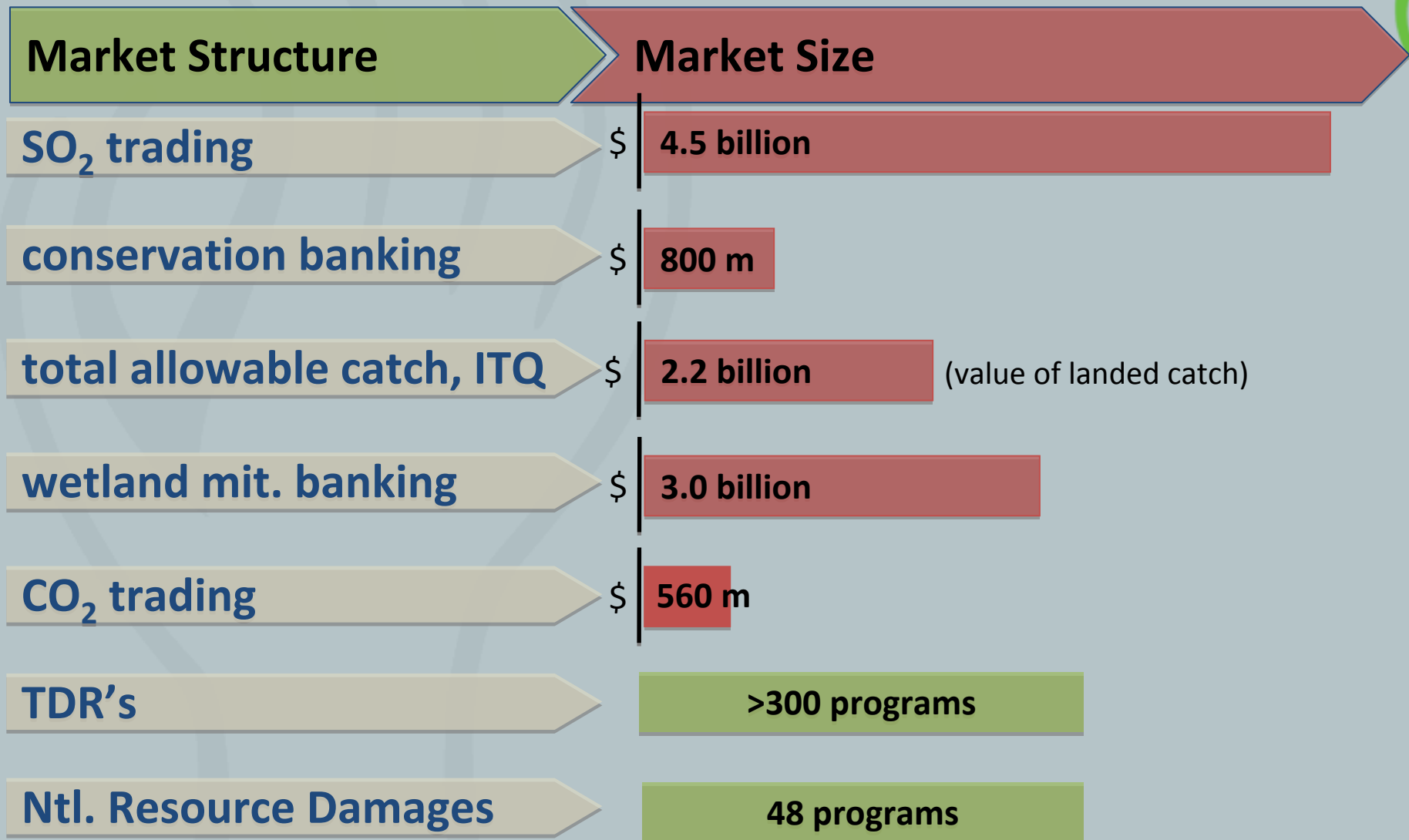
The government innovation of incentives

Adam Davis, Solano Partners

Environmental Harm	Market Structure
air pollution	SO_2 trading
species endangerment	conservation banking
overfishing	total allowable catch & ITQ
wetland loss	wetland mitigation banking
sprawl, imp. surface loss	TDR's
nitrogen runoff	TMDL's
Ntl. Resource Damages	DSAY's
climate change	CO_2 trading

E-Sector market activity is robust & growing

Adam Davis, Solano Partners



A pattern emerges from early innovations

Adam Davis, Solano Partners

LIMIT

- "no net loss"
- "cap and trade"
- "individual tradable quota"
- "total maximum daily load"

UNIT

- functional acres
- tons CO_2e
- lbs of fish landed
- lbs of N reduction

GEOGRAPHY

- service area
- historical range of species
- fishery
- watershed

TRANSFER

- mitigation bank
- conservation bank
- catch shares
- water quality trading

The portfolio approach to forest management

traditional products:
food and fiber

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green products: eco-labeling

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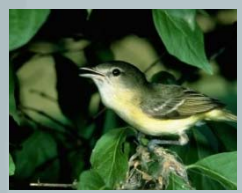
woody biomass
alternative energy

Ecosystem Markets:



species habitat

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standing carbon

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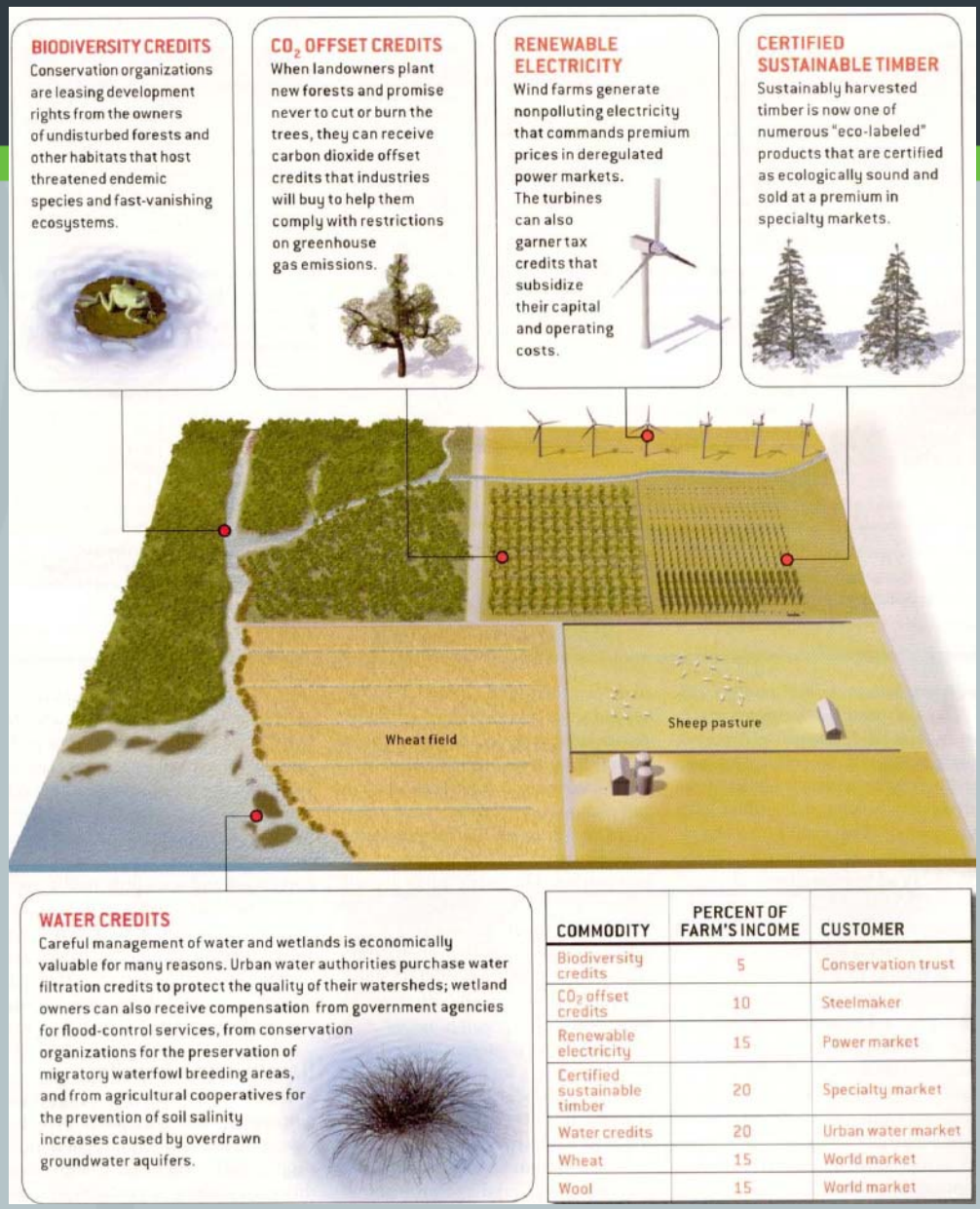
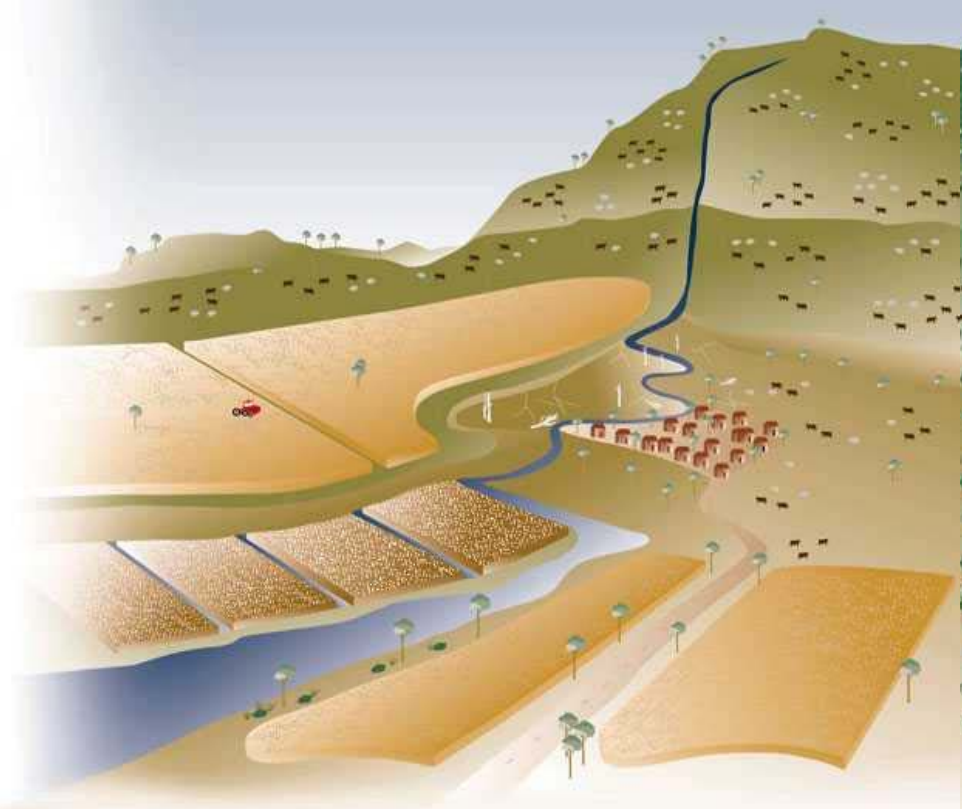
water quality/wetlands

A FARM of the FUTURE...



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



PRESENT

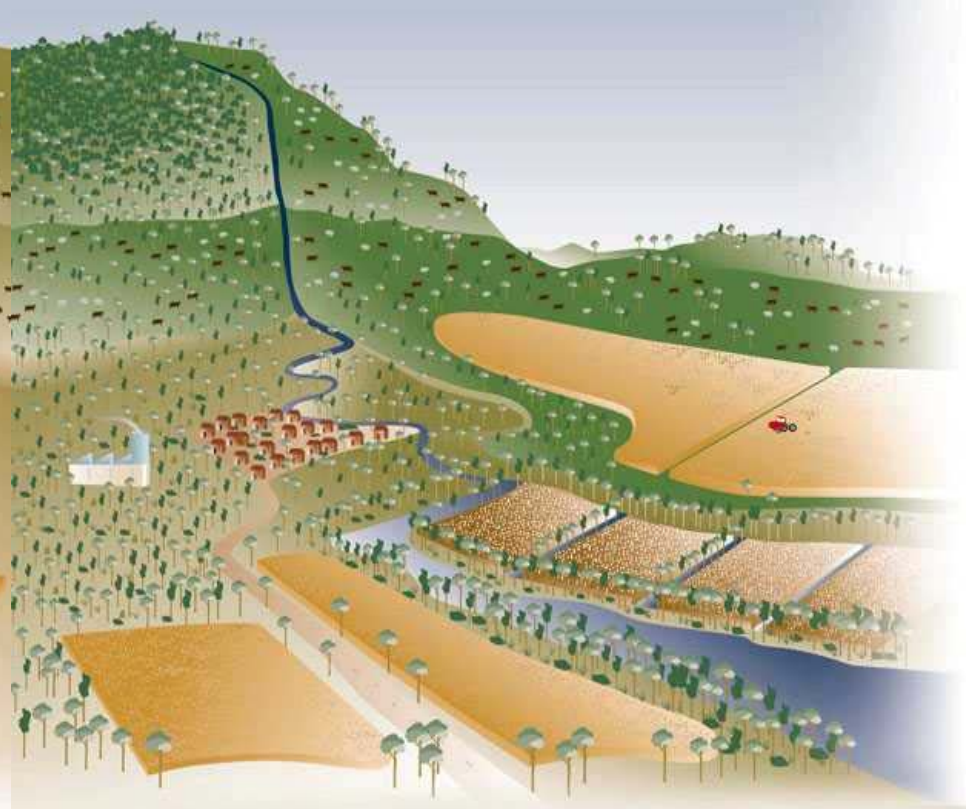
The existing rural landscape.

LAND USE

OUTPUT	AREA (ha)	REVENUE (000's)
Sheep	250,000	25,000
Cattle	200,000	40,000
Wheat	250,000	118,000
Canola	150,000	112,000
Cotton	150,000	490,000
TOTAL	**1,000,000**	**785,000**

ENVIRONMENTAL PROBLEMS

- Dryland salinity increasing
- Rising water tables and saline discharge
- Nutrients leaching into waterways
- Low biodiversity
- Soil erosion and turbid waterways



FUTURE

Planted forests in the landscape create a more diverse economy and a healthier environment.

LAND USE

OUTPUT	AREA (ha)	REVENUE (000's)
Sheep	150,000	18,000
Cattle	120,000	28,000
Wheat	200,000	94,000
Canola	120,000	90,000
Cotton	150,000	490,000
Timber	26,000	12,000
Bioenergy	117,000	9,000
Charcoal	117,000	14,000
Carbon credits		41,000
Salinity credits		26,000
TOTAL	**1,000,000**	**822,000**

ENVIRONMENTAL BENEFITS

- Dryland salinity reduced
- Lower water tables and clean discharge
- Nutrients retained on farm
- Biodiversity increased
- Soil erosion reduced

NewForests

THE POWER OF THE ES FRAMEWORK

- Forces the *Linkages* by its very nature
- Places conservation squarely in the marketplace, giving it *Value*
- Markets: introduce new level of accountability for results
- Introduces a new vocabulary for conservation of resources—enough to support a cultural shift?

"Culture Eats Strategy for Lunch"

Molly Jahns, University of Wisconsin

SUSTAINABILITY LINKAGES

- Forest Loss is being driven by agriculture and energy expansion
- Solutions to land conservation require policy work across sectors: Agriculture, Energy, Forestry…
- Ecosystem Services Creates A New Framework For Addressing Linkages
- Science will be critical in supporting (driving) this
  - NEW *Millennium Ecosystem Assessment*
  - *Natural Capital Project*—Stanford
  - CSU's Collaborative Conservation Center

FINAL THOUGHTS

Markets are just one tool, one idea, among many

Ecosystem Services brings in new thinking, information:

- not just restoring ecological function, but
  - restoring ecological function for …

Introduces a new vocabulary for conservation that broadens thinking, expands perspectives


Our
Investments
04/18/2008 10:33

Our Investment Managers


Our Dividends
09/09/2010 03:11

Our Dividends


Our Community
04/30/2009 05:17


Our Portfolio
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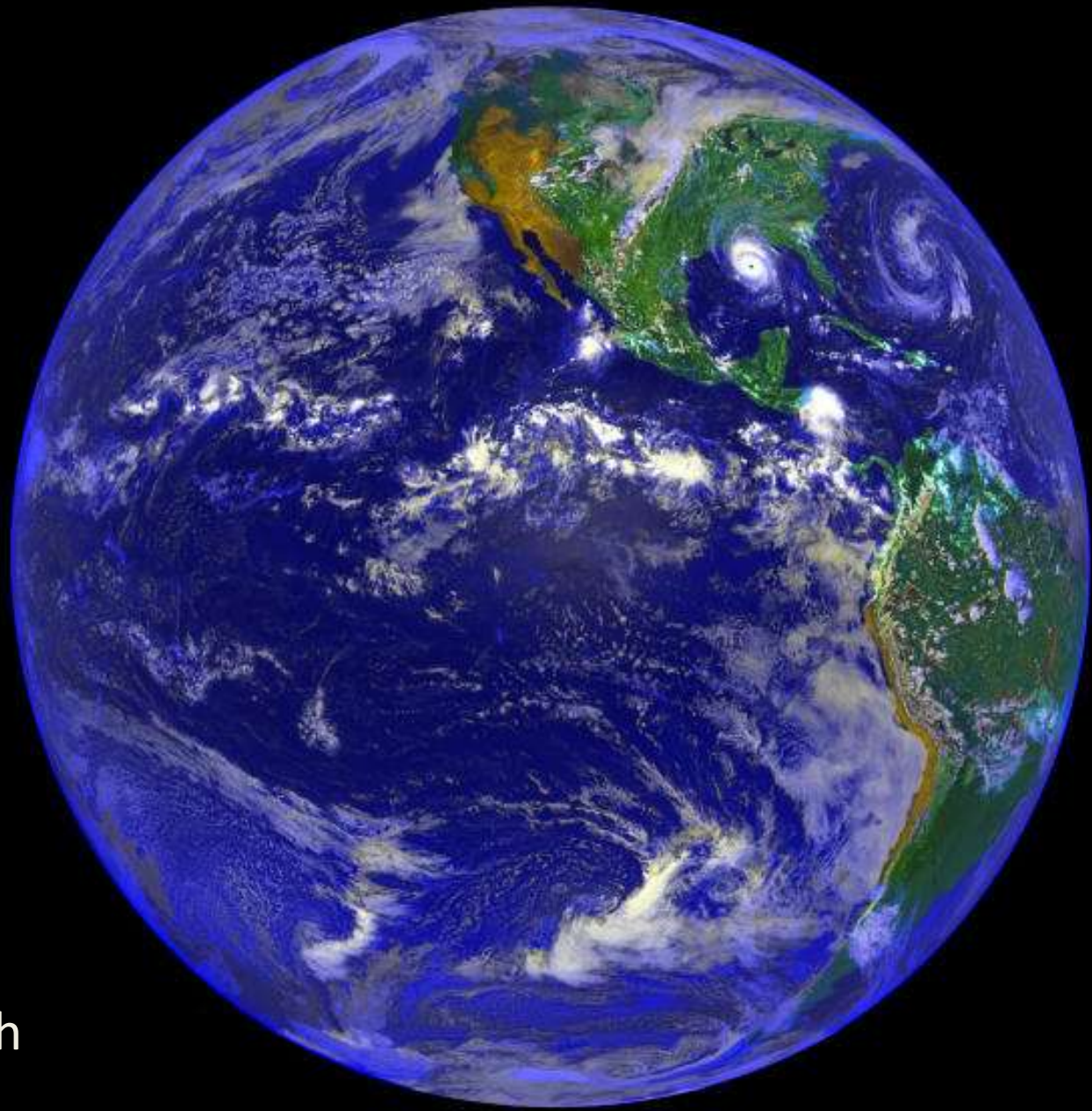

Our Wealth

Rights and Resources is a global coalition to advance forest tenure, policy and market reforms.

The mission is to promote greater global action on pro-poor forest policy and market reforms to increase household and community ownership, control, and benefits from forests and trees.

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