



Conservation Lands' Economic Value Conference  
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## Economic Value of Ecosystem Services Provided by Agricultural Lands

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# Florida Public Survey (2008 – 2009)

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- ▶ How important are the following actions in protecting our water resources?

	<b>Not important / Somewhat important</b>	<b>No opinion</b>	<b>Important or Very Important</b>
Improving agricultural practices	9%	5%	86%
Preserving agricultural lands and open spaces	9%	5%	86%

Borisova, Brett, and Gardner. 2010. UF EDIS Publications #FE841 - FE842



Photo by [Carlton Ward, Jr.](#)

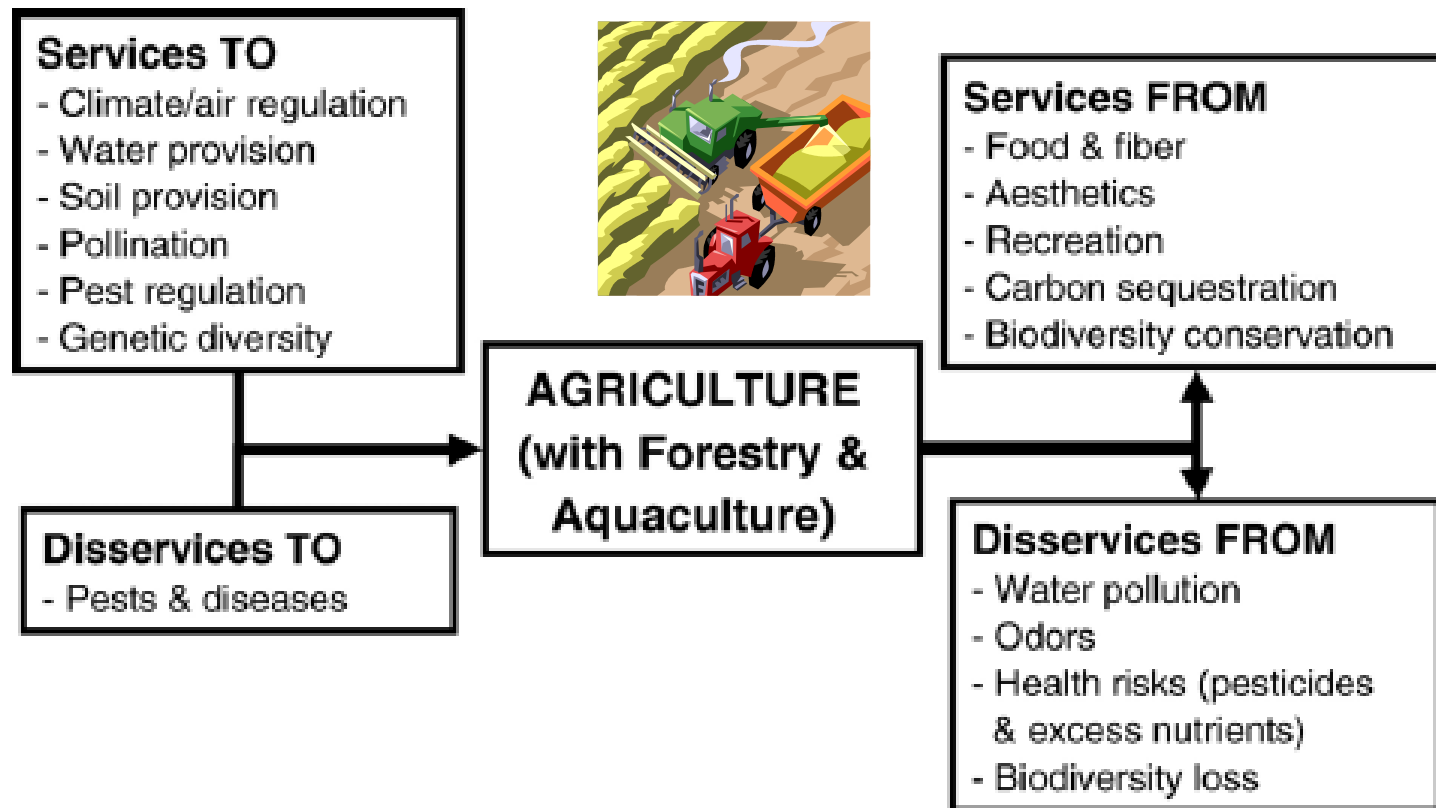
# Amenities, Services, and Products Provided by Agricultural Lands

Aspects	Amenity, service, or product
Agrarian cultural heritage	Maintenance of the “traditional” agricultural character of the land Continuation of farming as a way of the life in the rural community
New agricultural economy	Farm produce / organics and other niche products / added value farm food (cheeses, etc.) Local and regionally produced food Farm shops / farmers markets
Traditional agricultural economy	Food quality (taste and nutritional value) Adequate supply of food “Cheap” food Agricultural / relate employment Income from agricultural exports Farm incomes
Environmental	Farmland landscape Farmland habitats Biodiversity – species associated with agriculture
Rural leisure activities	Walks in pastoral settings Visiting local farms
Cultural / Amenity	Agricultural landscape Farm-based educational activities

Source:  
Based on  
Hall et al. /  
*Journal of  
Rural  
Studies*  
(2004)



# Ecosystem Services to and from Agriculture



Source: Swinton et al. / Ecological Economics (2007)

# Producers' actions can increase or decrease the provision of ecosystem services



Environmental Service	Farm-Level Management Option
Carbon sequestration in soils	Manage soil organic matter
Carbon sequestration in perennial plants	Convert cropland to grassland or forest
Methane emission reduction	Capture and destroy methane from animal waste storage structure
Water quality maintenance	Reduce agricultural use, establish vegetable buffers, and improve nutrient management
Erosion and sediment control	Manage soil conservation and runoff, and increase soil cover
Flood control	Create diversions, wetlands, and storage ponds
Salinization and water table regulation	Grow trees and manage
Wildlife	Protect breeding areas and wild food sources, improve timing of cultivation, increase crop species / varietal diversity, and reduce use of toxic chemicals

# Ecosystem Services to and from Agriculture

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- ▶ Markets for most ecosystem services have generally not developed
- ▶ Hard to measure the total value of ecosystem services to the society
- ▶ No reward for agricultural producers to provide ecosystem services





# Methods for Valuing Ecosystem Services

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- ▶ **Travel cost method:**
  - ▶ Our travel plans to a sight (and our travel expenses!) depend on the site's ecosystem service provision
- ▶ **Contingent valuation:**
  - ▶ surveying people about their willingness-to-pay / accept payment for changes in ecosystem services
- ▶ **Hedonics:**
  - ▶ changes in property prices due to changes in ecosystem service provision
- ▶ **Replacement costs methods:**
  - ▶ costs of mitigating / replacing the service
- ▶ **Factor-income approach:**
  - ▶ link ecosystem services to the incomes from agriculture



<http://www.kylandsales.com/StanfordFarm/StanfordFarm.html>



# Example: Value of Agricultural Easement in Howard and Calvert Counties, Maryland

Description	Howard County	Calvert County
[1] Sum of total housing within 1 mile of each easement	41,631	29,526
[2] Average housing price	\$227,963	\$134,245
[3] Expected housing value (= [1] • [2])	\$9,490,251,998	\$3,963,690,359
[4] 1% increase in open space	181 acres	148 acres
[5] Estimated elasticity from spatial model	0.5869	0.7118
[6] Expected housing value increase for a 1% increase in open space (= [3] • [5])	\$55,695,442	\$28,214,618
[7] Additional property tax collected on increased value	\$579,233	\$251,674
[8] Average easement price per acre	\$5,274	\$2,855
[9] Additional acres of easement that could be acquired (= [7] ÷ [8])	110 acres	88 acres

- Geoghegan et al. / *Agricultural and Resource Economics Review* (2003):
  - Hedonic price method



<http://www.maineFarmlandTrust.org/>

# ***Example: Recreational benefits from conservation tillage (Corn Belt)***

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- ▶ Conservation tillage reduces erosion-based pollution => greater enjoyment of water-based recreation
- ▶ Travel cost method
- ▶ 2 levels of adoption of conservation tillage (based on 2002 Farm Bill projections)
- ▶ Water-based recreational benefits:  
**\$175.5 – 242.6 million / year**



[http://nfrec.ifas.ufl.edu/programs/impacts\\_conservation\\_tillage.shtml](http://nfrec.ifas.ufl.edu/programs/impacts_conservation_tillage.shtml)

# Incentives for Ecosystem Service Provision

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- ▶ Range of approaches traditionally used by government agencies
  - ▶ Financial and technical assistance
  - ▶ Regulations
  - ▶ Education
- ▶ Market-based mechanisms can be more efficient
  - ▶ Farmers have the flexibility to choose the practices to supply ES based on their private information and price signal



# Existing markets for supplying ecosystem services from agriculture

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- ▶ **Emission trading**
  - ▶ Greenhouse gas trading
  - ▶ Water quality trading
- ▶ **Wetland mitigation**
- ▶ **Eco-labeling**



# Market-based Policy Mechanisms: *Challenges*

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- ▶ Measuring the performance of agricultural management practices
- ▶ Lack of cost of information
- ▶ Transaction costs of bringing together buyers and sellers
- ▶ Coordinating federally- and state-funded conservation programs with market-based programs



<http://www.nevadacountylandtrust.org/index.php/lands/working-land-easements/agriculture-easements/>

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# Conclusions

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- ▶ Agriculture provides a range of ecosystem services that are valued highly by society
- ▶ Policy mechanisms are needed to provide incentives to the farmers to provide ecosystem services
- ▶ A range of policy instruments can be used, each with advantages and disadvantages
- ▶ Research needs for Florida:
  - ▶ Value of ecosystem services
  - ▶ Determinants of the farmers' decisions to “supply” ecosystem services
  - ▶ Policy instruments and producers' level of participation

# Thank you!

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## Questions?



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