

Ecosystem Services and Agriculture: IISD's Experience on Agri-Environmental Policy Research

Matthew McCandless

**CAES Workshop
October 24, 2008**

Better living for all—sustainably

Presentation Outline

- IISD
- SNRM Program
- Ecosystem Goods and Services (EGS)
- Recent IISD Agri-Environmental Policy Research
- Research Challenges
- Thoughts on Policy Research

International Institute for Sustainable Development

- Established in 1990
- Approximately 60 full-time staff, an additional 90 associates, interns and writers.
- Offices in Winnipeg, Ottawa, New York and Geneva, associates throughout the world.
- Our budget is 18 million (20% core operating grants and 80% specific project funding)

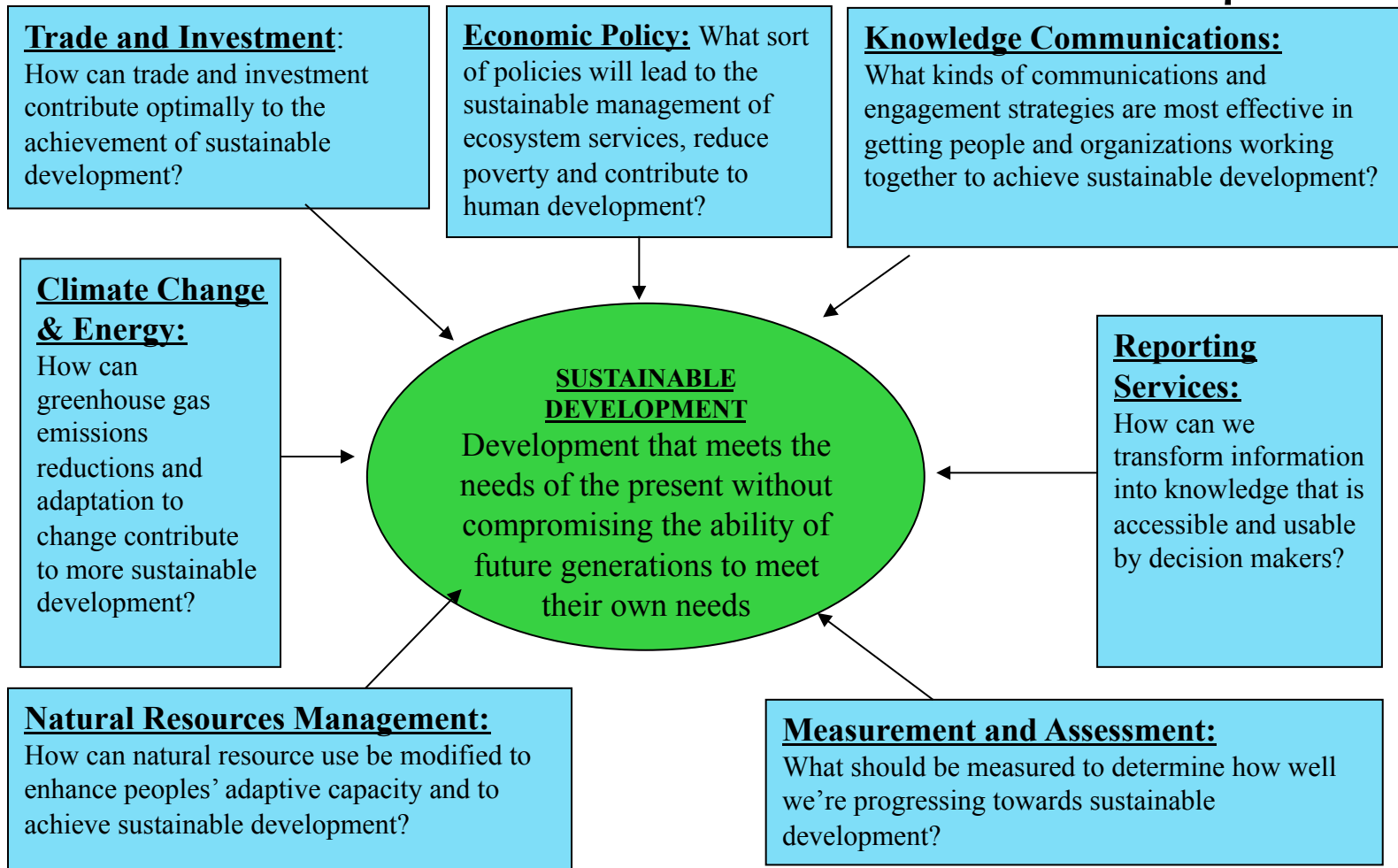


International Institute for Sustainable Development

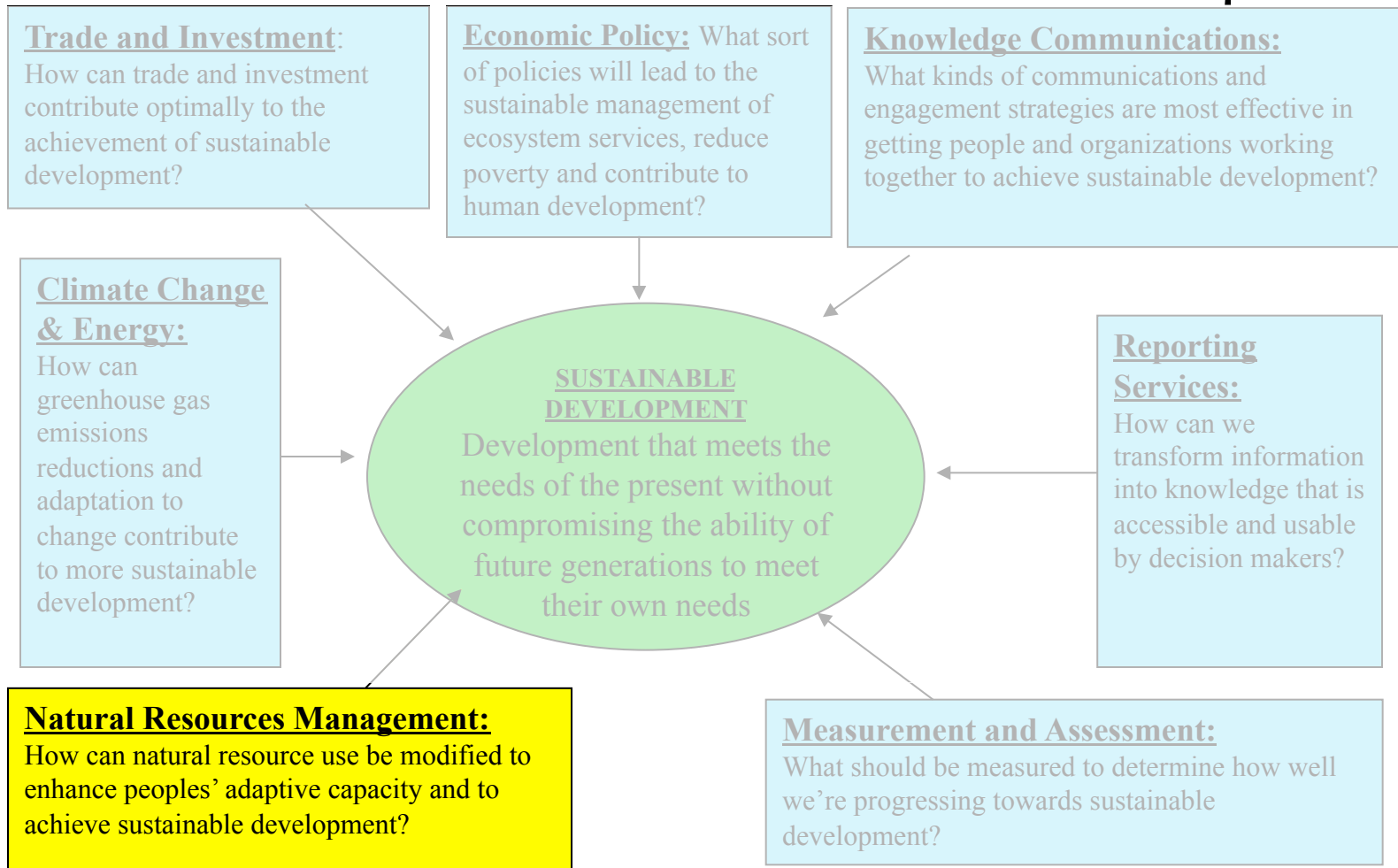
**SUSTAINABLE
DEVELOPMENT**

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs

International Institute for Sustainable Development



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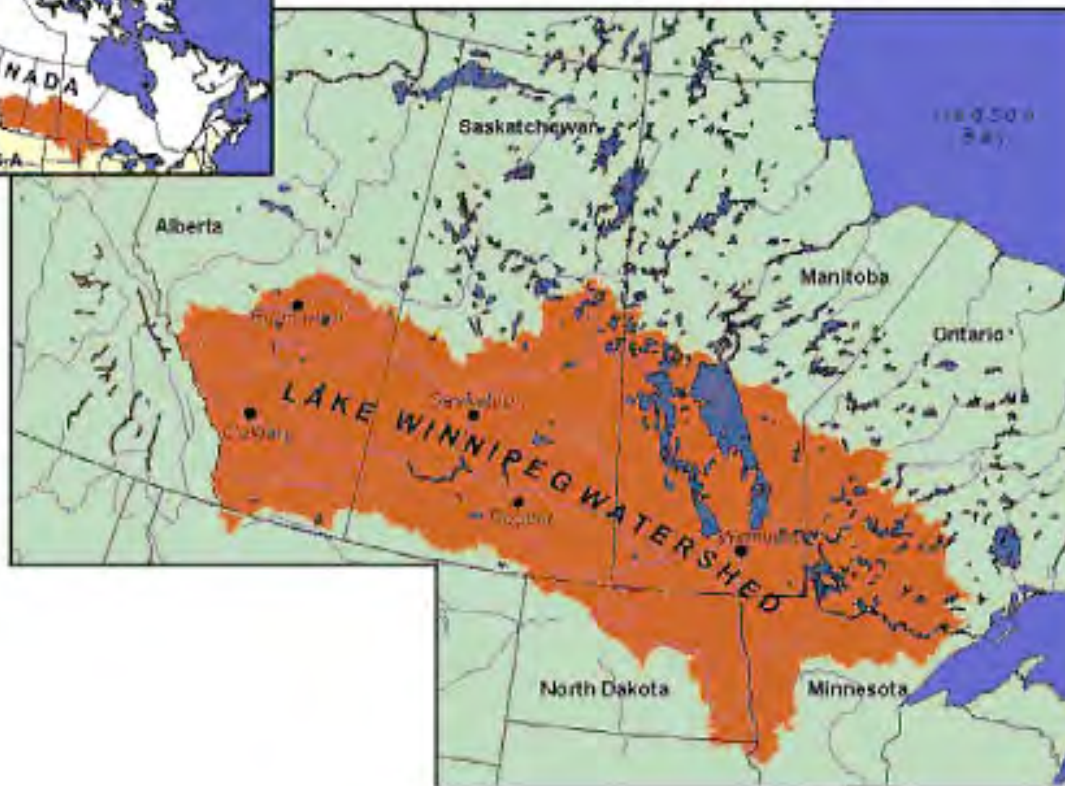
Sustainable Natural Resources Management Program (SNRM)

Director: Dr. Henry David Venema

- Environment and Security
 - Examining how better environmental management can contribute to human security.
- Water
 - Integrated Water Resources Management
 - Natural Capital/Ecological goods and services
 - Climate Change Impacts
- Agriculture
 - Climate Change Mitigation/Adaptation
 - Aimed at re-envisioning a sustainable system of prairie agriculture resilient to environmental and economic shocks and stresses.



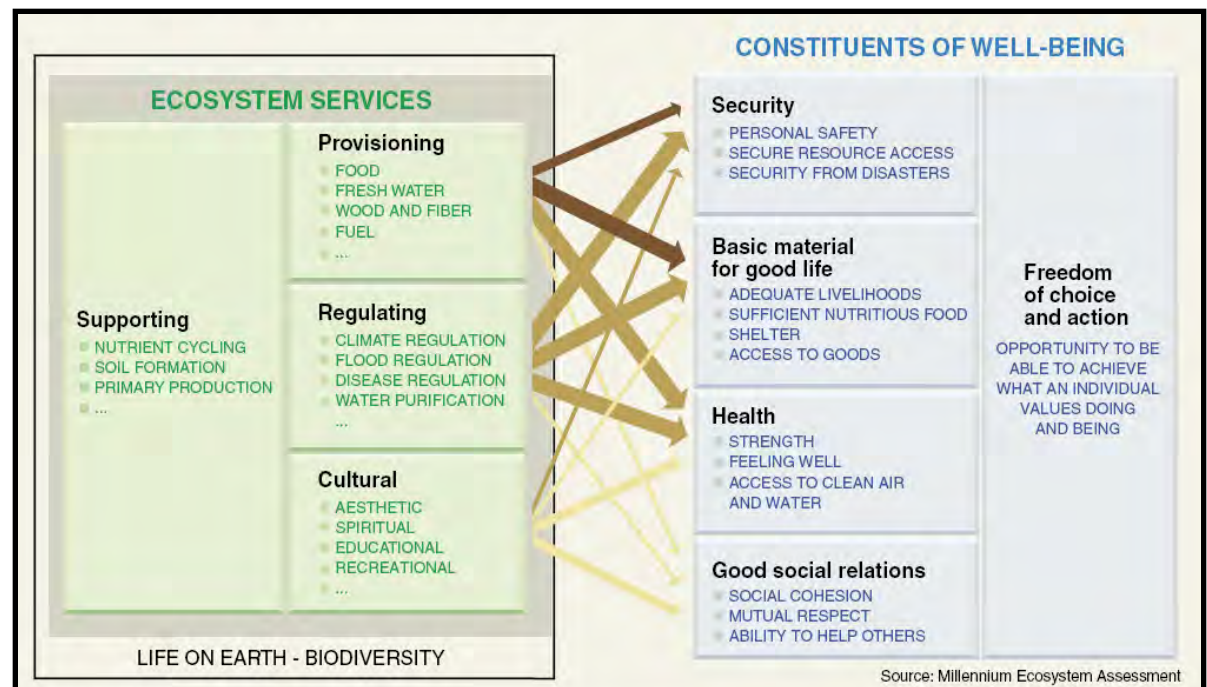
Lake Winnipeg Watershed



Source: McCollough et. al. CWRA 2006

Millennium Ecosystem Assessment

- Launched in 2001
- \$24M in Funding
- Released 2005



State of Food and Agriculture

- Agriculture is Multifunctional
(Agenda 21)
- Demand for EGS will increase
- Agriculture can provide a better mix of ecosystem services to meet changing needs
- If farmers are to provide a better mix of ecosystem services, better incentives will be required. Payments for environmental services can help.
- Cost-effective PES programmes require careful design based on the characteristics of the service and the biophysical and socio-economic context

(UN FAO State of Food and Agriculture 2007)

State of Food and Agriculture

The New York Times
nytimes.com

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April 9, 2008

THE FOOD CHAIN

As Prices Rise, Farmers Spurn Conservation Program

By [DAVID STREITFELD](#)

Out on the farm, the ducks and pheasants are losing ground.

Thousands of farmers are taking their fields out of the government's biggest conservation program, which pays them not to cultivate. They are spurning guaranteed annual payments for a chance to cash in on the boom in wheat, soybeans, corn and other crops. Last fall, they took back as many acres as are in Rhode Island and Delaware combined.

Environmental and hunting groups are warning that years of progress could soon be lost, particularly with the native prairie in the Upper Midwest. But a broad coalition of baking, poultry, snack food, ethanol and livestock groups say bigger harvests are a more important priority than habitats for waterfowl and other wildlife. They want the government to ease restrictions on the preserved land, which would encourage many more farmers to think beyond conservation.

Kerry Dockter, a rancher in Denhoff, N.D., has about 450 acres of grassland in the program. "When this program first came about, it was a pretty good thing," he said. "But times have definitely changed."

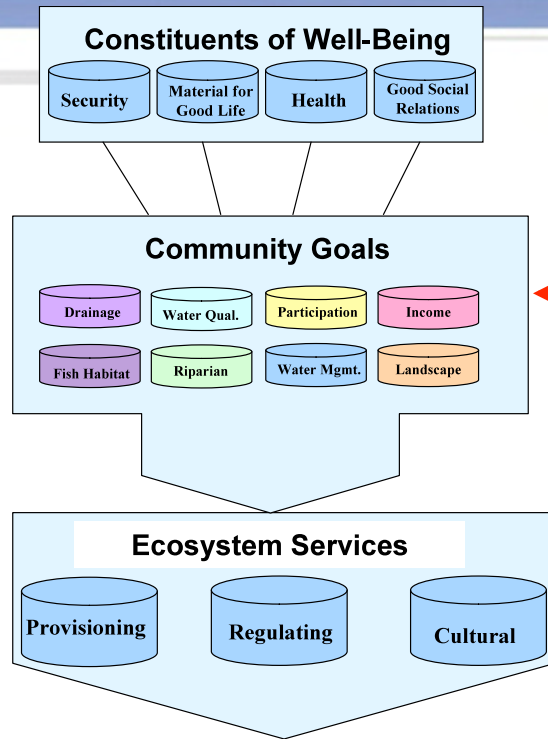
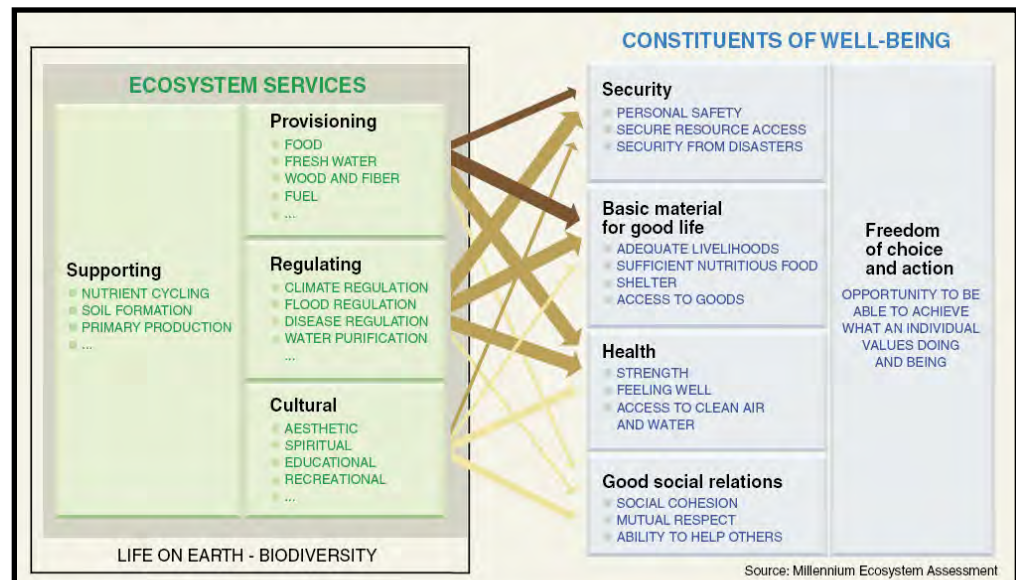
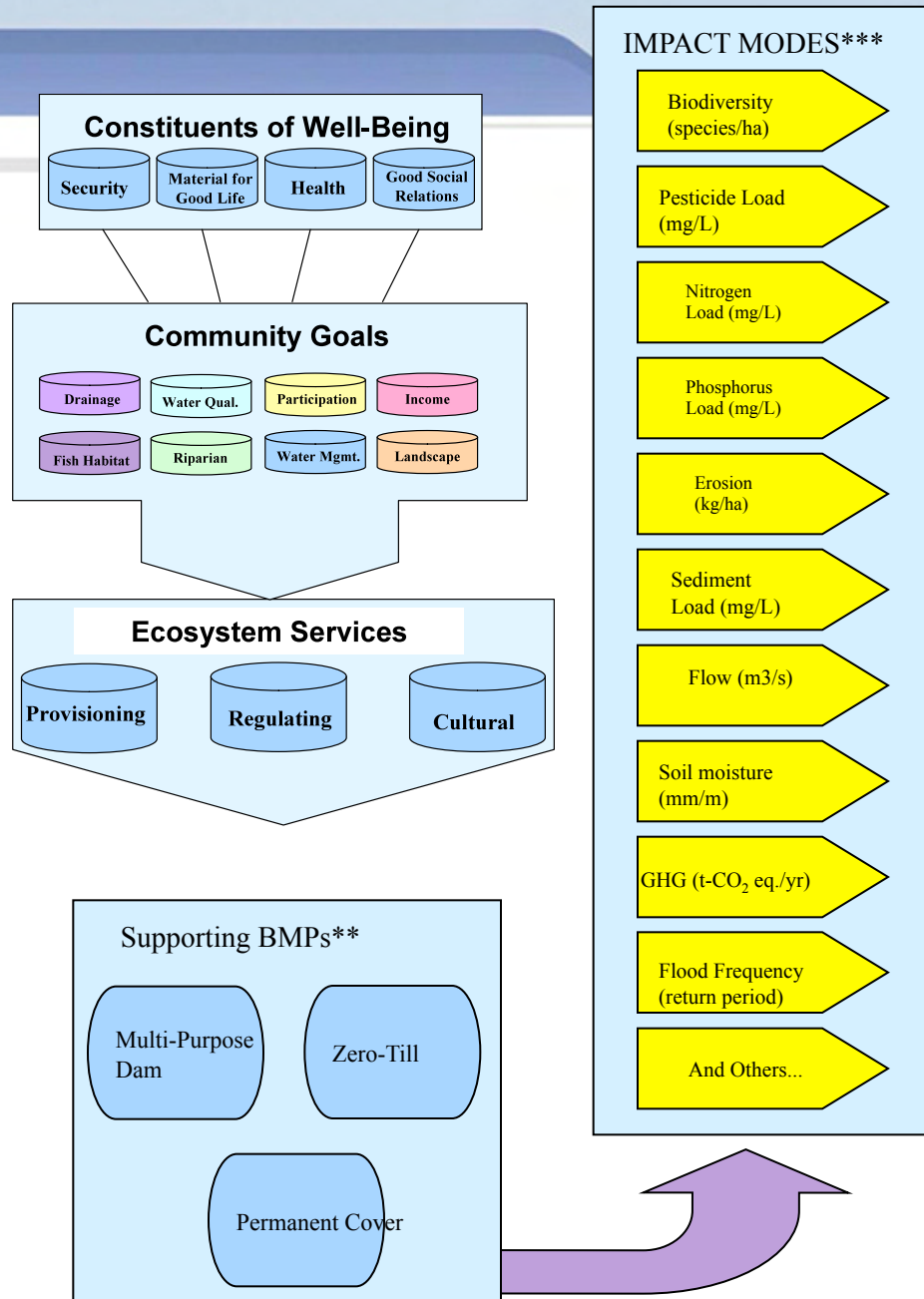


Image: Deerwood Soil and Water Management Association





Zero Till

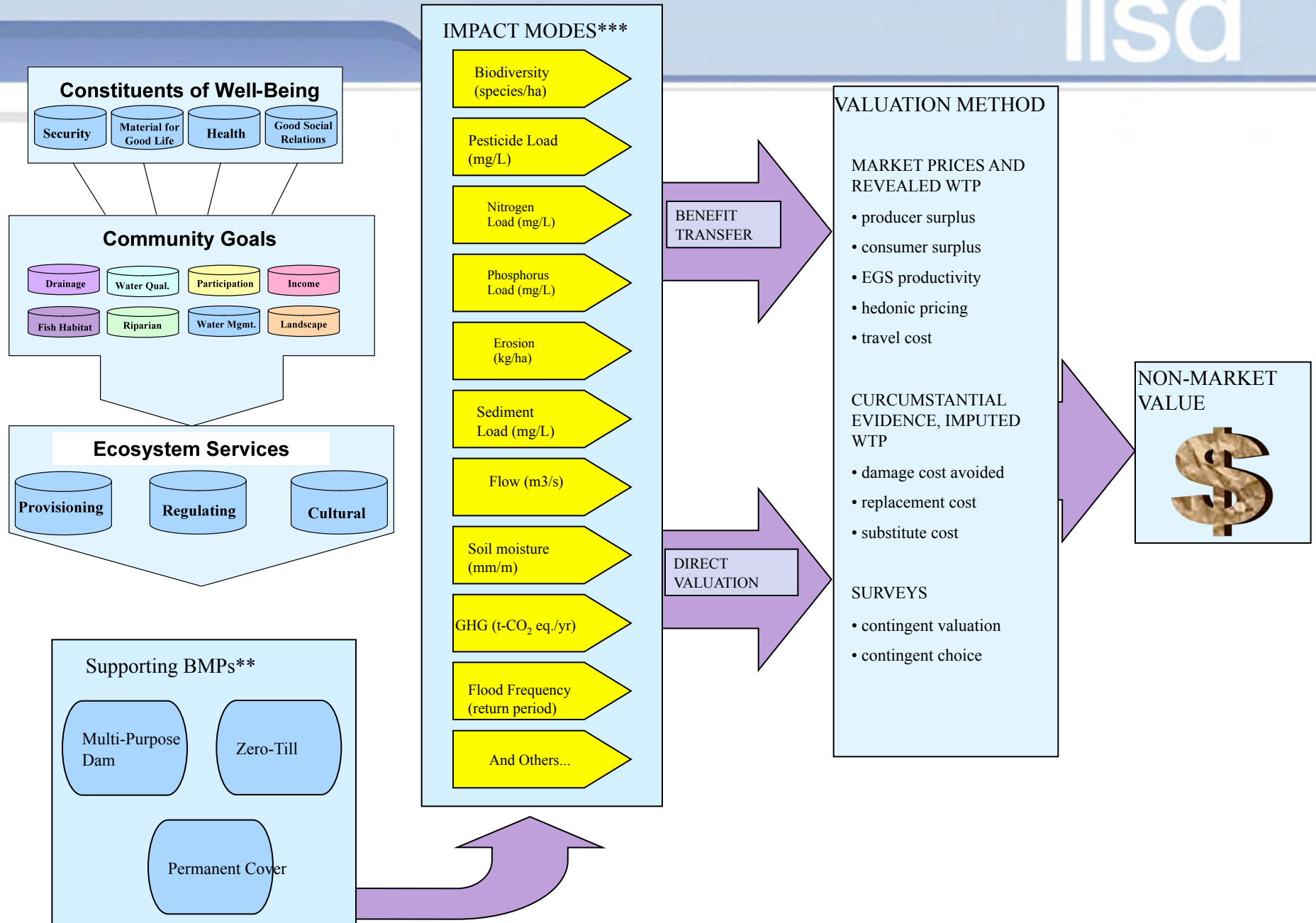
Image: Deerwood Soil and Water Management Association

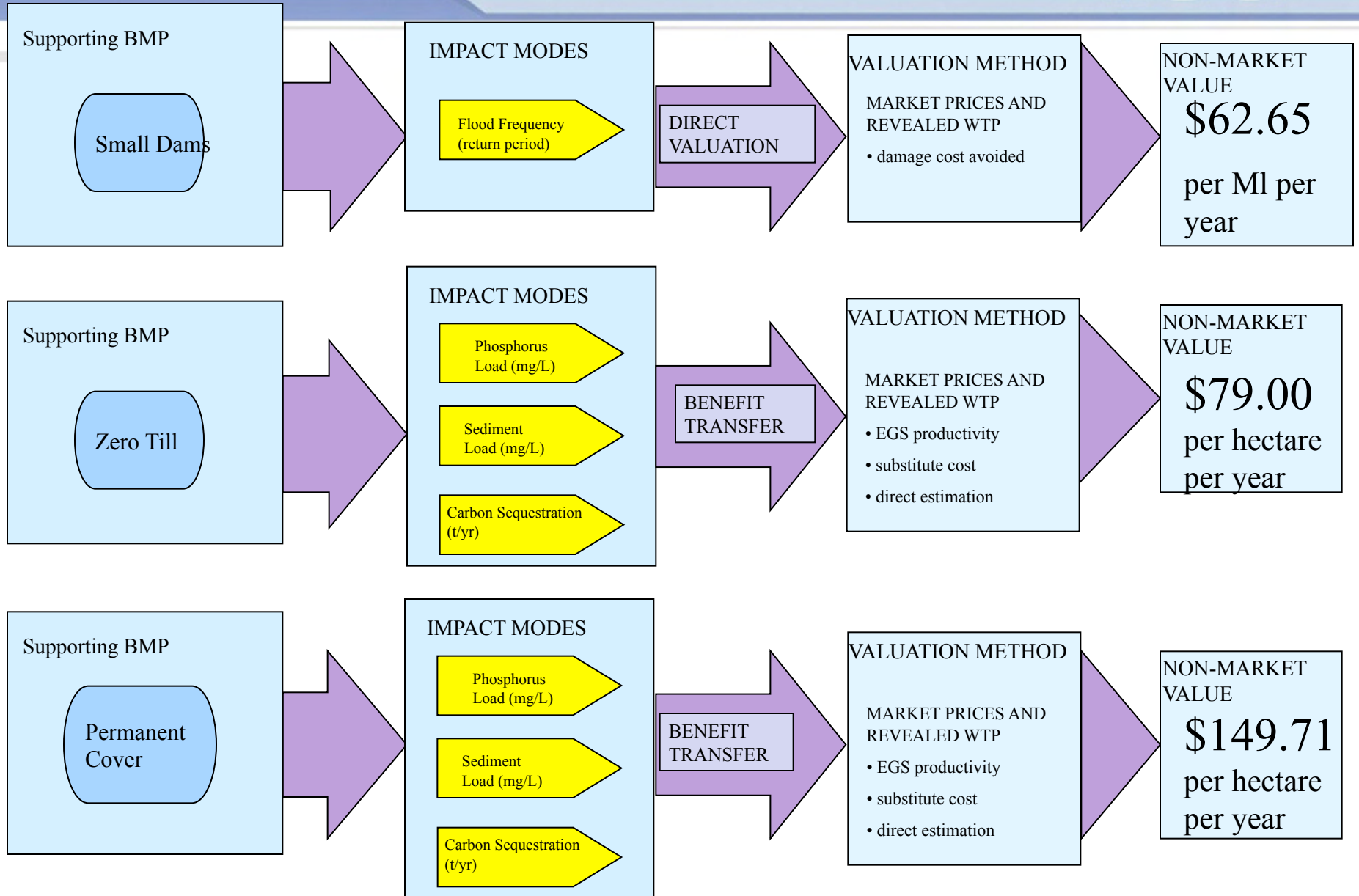


Permanent cover

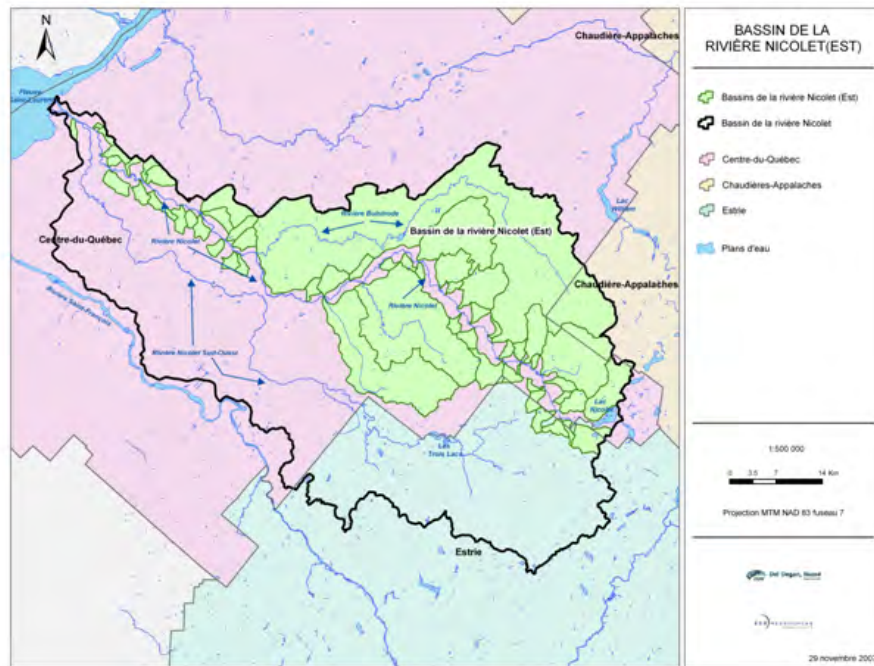
Multi-Purpose Dam

Image: Deerwood Soil and Water Management Association



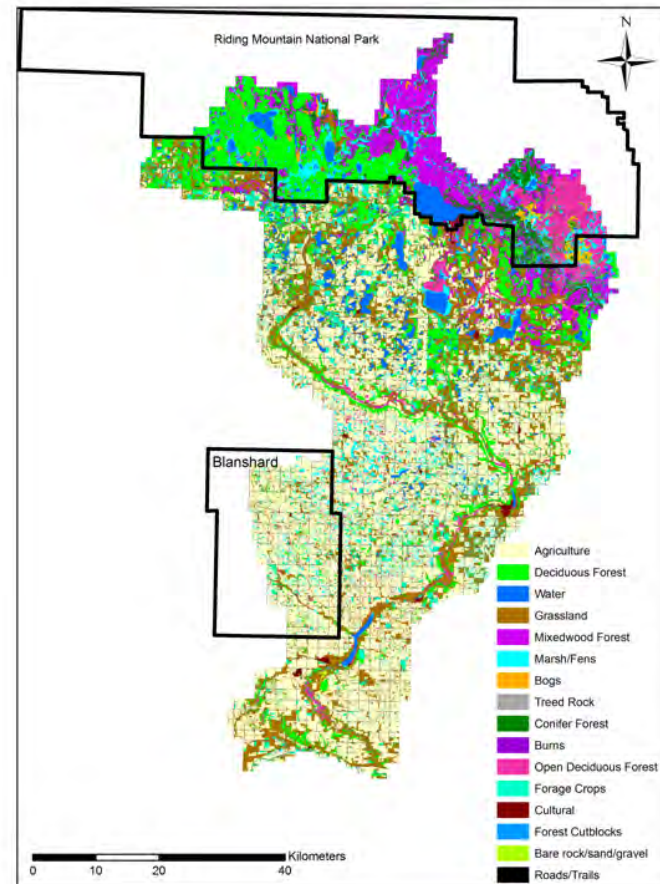


Agricultural EGS Cost Effectiveness



Generated by Del Degan Massé
Source data: Ministère des Affaires municipales, du Sport et du Loisirs du Québec

Eastern Case: Nicolet River (east arm)



Generated by Matt McCandless
source data: Manitoba Land Inventory

Western Case: Little Saskatchewan River

Agricultural EGS Cost Effectiveness

EASTERN CASE	One-time payments	Annual payments	Mixed one-time/annual payments	Auctions	Tradable permits
	(Million \$)	(Million \$)	(Million \$)	(Million \$)	(Million \$)
Total benefits	4.40	4.40	4.40	4.08	-
Total costs	2.17	5.85	2.11	1.19	-
Benefit/cost ratio – water & habitat	2.03	0.75	2.08	3.43	-

WESTERN CASE	One-time payments	Annual payments	Mixed one-time/annual payments	Auctions	Tradable permits
	(Million \$)	(Million \$)	(Million \$)	(Million \$)	(Million \$)
Total benefits	0.53	0.53	1.52	1.52	1.52
Total costs	2.82	7.46	0.68	0.394	.400
Benefit/cost ratio – water & habitat	0.19	0.07	2.24	3.86	3.81

Agricultural EGS Cost Effectiveness

WQ BMPs – Eastern Case	Cost of P reduction (\$/kg P)
Cover crops	209
Grassy riparian buffer zones	275
Reduced tillage and no-till	539
Wooded riparian buffer zones	1,127
Intercrops	3,101

WQ BMPs – Western Case	Cost of P reduction (\$/kg P)
Wooded Riparian Buffer zones	224
Grassed Riparian Buffer Zones	19
Wetlands (one time payment)	416
Wetlands (annual payment)	519
Cover Crops	262
Manure Storage	41

The City of Winnipeg Intends to reduce P loading at the North-End Water Treatment Plant at a cost of **\$112/kg**

Policy Implications

- Costs of policies are governed to a large extent by the BMPs included in their portfolio
- BMP assistance levels should be based on BMP effectiveness, not on private cost
- Market based mechanisms (auctions and nutrient trading) are the most cost effective means of achieving environmental benefits by BMPs
- It is difficult to determine the public benefits of environmental goods and services due to the paucity of research that values changes in specific environmental parameters

Challenges for Policy Research

- One size does not fit all
- Don't let the perfect be the enemy of the good
- Timing



Future Challenges

- Bioproducts and biofuels will require considerable analysis to ensure appropriate application
- Agricultural GHG offsets are a way by which EGS is being enshrined in agriculture and traded as any other commodity



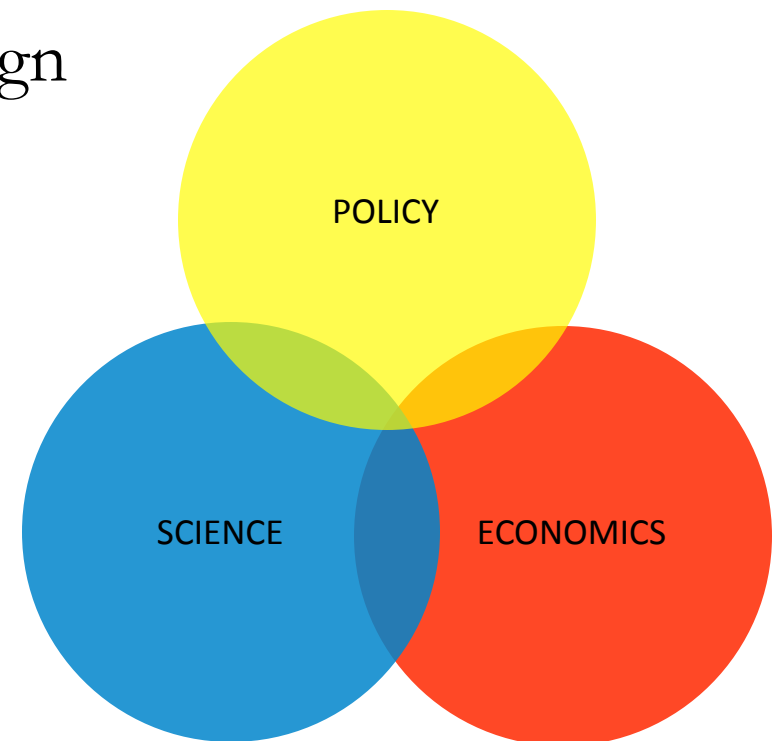
Measuring Success

- Using economic indicators to gauge the success of economic policy introduces a circularity problem (Krugman 2004)
- Biophysical indicators can help to convince sceptics of the value of economic actions



Conclusion

- Policy directions are often dictated by science
- Responses should be based on science
- Economics is critical for design of effective policies



Thank you!



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