

Development and Application of Quantification Methods for Ecosystem Services

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Goals:

- Employ biophysical models and field data to improve and develop quantification and validation methods for ecosystem services.
- Understand perceptions and knowledge that Indiana agricultural producers have about ecosystem services to improve the application of an ecosystem service framework



Statement of Problem:

Land-use change has been occurring at a very rapid rate since the industrial revolution, due to increasing population growth. The rising global population needs more space to live, and more agricultural lands to feed it. Currently, over 40% of terrestrial biomes on Earth are classified as agricultural (Foley et al., 2005). When land-use is changed from natural landscapes to any other use, the ecosystem services provided by that landscape are changed as well. Ecosystem services are benefits that people receive from their environment (MEA, 2005) and are generally classified into four groups, namely: (1) provisional – e.g., food, fiber, fuel, medicines, genetic resources; (2) regulatory – e.g., climate regulation, air quality regulation; (3) cultural – e.g., aesthetics, education, spirituality; and (4) supporting – ecosystem functions that support the other three services, e.g., nutrient cycling, carbon sequestration. Food provisioning ecosystem services are greatly increased when natural land cover is converted to agricultural land, however, other ecosystem services, such as fresh water provision, erosion regulation, and genetic resource provisioning, can potentially be degraded or lost due to such land use changes. This becomes a problem not only because of the loss of ecosystem services, but because the loss of those services can impact the provision of food itself via a negative feedback loop.

Current Activities:

Current activities include (1) relating environmental variables to aquatic species data to understand genetic resource provisioning, (2) developing methods to employ the DayCent carbon model for examining climate regulation, and (3) working on developing focus groups with agricultural producers to examine understanding of ecosystem services.

Literature Cited:

Foley JA, DeFries R, Asner GP, Barford C, Bonan G, et al. (2005) Global Consequences of Land Use. *Science* 309: 570-574.
Millennium Ecosystem Assessment (2005), Washington, DC, Island Press.