The Multiple Benefits of Agriculture

Analysis and Policy Development for Social, Economic, and Environmental Benefits in Agriculture

Issue #3, October 2000

Coordinator's Notes

Greetings. As summer has shifted to autumn, we've watched the leaves change, the days grow shorter, and high yields of corn and soybeans come in from the fields. However, these high yields have been met with low prices. Further, we are hearing direct accounts of excessive erosion, higher than seen in recent memory, in farming areas across the state. In southeast Minnesota, home of the Wells Creek watershed, we are seeing high levels of water-borne erosion, exacerbated by soybean crops and higher than average rainfall throughout the year. In southern, central, and western Minnesota, we are seeing high levels of wind-borne erosion, exacerbated by the same high levels of soybean planting as well as early tillage due to a dry summer. The drought in central and western Minnesota is causing greater erosion, and showing us the vulnerability of the land under intensive row-crop production.

We have been busy working to build the baseline for the analysis. The baseline represents the current state of the watershed: we are looking at physical outputs (sedimentation and nutrient losses), economic factors (purchases, sales, and the flow of agriculutral goods through and outside the watersheds), and social factors (organizations, government institutions, and others involved in watershed work).

In this newsletter, we outline the models we are using to calculate the environmental outputs under both the baseline and alternative scenarios, share the names of the scenarios we plan to use in the analysis, and provide an update on the Conservation Security Act as introduced in Congress.

-- Mara Krinke, Project Coordinator

Biophysical Modeling: The Basics

The biophysical modeling for the project links two major components: 1) modeling using the Agricultural Drainage and Pesticide Transport (ADAPT) model and 2) supplementary modeling linking ADAPT outputs to additional environmental outcomes such as wildlife populations. John Westra in the Applied Economics Department at the University of Minnesota in St. Paul conducts the ADAPT modeling and is supervised by Frances Homans. Bruce Vondracek and Julie Henry of the University of Minnesota's Department of Fisheries and Wildlife conduct the supplementary modeling.

The ADAPT model allows us to estimate the physical effects of drainage of nitrates and phosphates into surface and subsurface waters. When surface waters contain elevated levels of these pollutants, several costs are imposed on communities and the environment such as increased drinking water treatment costs, decreased recreational opportunities, and impaired ecological health. ADAPT also allows the user to predict the impacts of drainage, which is important because much of Minnesota's farmland is tiled. ADAPT can also be used to simulate the physical effects in a watershed from livestock grazing and confinement practices.

In order to estimate additional environmental outcomes under the different scenarios, supplementary modeling will link ADAPT outputs of erosion and nutrient loss, supplemental data on pesticide use in the watershed, and estimates of the types of land cover to estimate . One example of the additional environmental results we will analyze are changes in bird and fish habitat. In addition to being indicators of a healthy environment, thriving bird and fish populations are important to local communities for recreation and tourism.

Policy Update: The Conservation Security Act

The Conservation Security Act was introduced into the U.S. Congress by Representative David Minge of Minnesota and Senator Tom Harkin of Iowa during October. The Conservation Security Act emphasizes the environmental benefits that sustainable management of farmland can provide, rather than focusing on land retirement and payments for massive production of a handful of commodity crops. It rewards farmers for producing societal benefits such as clean air and water, improved soils, carbon storage and restoration of wildlife habitat.

Under the Conservation Security Act, farmers could enter into contracts with the USDA and choose from one of three "conservation classes." Farmers who achieve positive environmental results by implementing such practices as conservation tillage or improving water quality by controlling runoff would qualify for one class of conservation payment. Farmers achieving the most environmental benefits through the use of whole farm planning would qualify for the highest class of payments. The legislation sets the top level of payments at $50,000 per farm operator. Dave Serfling, a farmer in southern Minnesota, says, "This legislation is based on the idea that good farming can produce a wide array of benefits like clean water, soil conservation and strong rural economies."

Scenarios: The Modeling In Context

We propose to analyze five main scenarios for each watershed. We will calculate the differences in environmental and social benefits that accrue under each scenario. The scenarios are:

* Community and Economic Diversity
* Extension of Current Trends
* Full Scale Industrial Agriculture
* Adoption of Recommended Best Management Practices
* Permanent Crops and Permanent Cover

In addition to the scenarios above, we will conduct sensitivity tests on the resilience of the different systems to changes in weather, particularly temperature and rainfall.

This is a publication of
The Land Stewardship Project

Need more information? Contact
Mara Krinke at (612) 722-6377
Email: mkrinke@landstewardshipproject.org
Web: www.landstewardshipproject.org

This project is made possible by the generous support of the Joyce Foundation.

This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, and the Nebraska Agricultural Experiment Station, University of Nebraska - Lincoln, under Cooperative Agreement number 99-COOP-1-7686. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture.

Funding for this project approved by the Minnesota Legislature, 1999 Minnesota Laws, Ch. 231, Sec. 15, Subd. 7(n) as recommended by the Legislative Commission on Minnesota Resources from the future resources fund.

News and Notes from the Multiple Benefits of Agriculture Project

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The Land Stewardship Project
2200 Fourth Avenue
White Bear Lake, MN 55110

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