Participatory ecology for 'Agriculture of the Middle': Developing tools and partnerships to bridge gaps among science, people and policy in landscape change

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Abstract
Based on findings of this project, the adaptive landscape changes needed to significantly incorporate perennial vegetation strategies into Iowa's Corn Belt-dominated agriculture are possible if a coordinated strategy of change is coupled across three scales: field/individual, landscape/community, and regional/institutional.

Keywords
Natural Resource Ecology and Management, Conservation practices, Policy, Watershed and ecoregion

Disciplines
Natural Resources and Conservation | Natural Resources Management and Policy | Water Resource Management

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What factors promote or hinder the adoption of perennial conservation practices by producers?

The project revealed constraints and opportunities in the Corn Belt social-ecological system, and has the potential to inform the development of conservation policies and markets that encourage the adoption of perennial conservation practices. This means more straightforward workable policies from the producer perspective.

Background
Emerging biofuel markets in the U.S. Corn Belt states are leading to increased production of row crops and removal of land from conservation programs. This comes at a time when regional research highlights the importance of perennial cover on key areas of the landscape to promote the continued delivery of societal goods and ecosystems services from agricultural lands. There has been little research done to date on the interplay among ecological restoration, individual values, socio-cultural context, and farm policy.

Project goals were to:
- Analyze how restoration of perennial vegetation in Corn Belt landscapes meshes with other aspects of rural socio-cultural, economic, and ecological contexts at multiple scales and
- Develop future scenarios to identify pathways and leverage points that bolster long-term resilience of communities and landscapes in the rural Corn Belt.

Approach and methods
Project investigators conducted a series of 33 in-depth interviews with farmers and other rural stakeholders living near Stanhope, Iowa, and held a participatory scenario development workshop with regional leaders in Iowa agriculture, conservation and policy. Analysis of interview and workshop data was integrated with the results of other social and ecological research and interpreted through the lens of resilience theory.

Results and discussion
While the interviewees generally knew which watershed they lived in and understood that conservation practices were associated with benefits for water quality and wildlife, these issues did not emerge as rural priorities. Farmers and rural residents perceived their “countryside” primarily in social terms, identifying strongly with the farming lifestyle and with networks of people across the landscape.
Most interviewees approved of landscape restoration practices on marginal land, but implementation of these practices was not a priority in rural culture, and rural people voiced little understanding of, or sense of control over, regional institutions. Interview data indicate that future adoption of conservation practices will be based not simply on immediate profitability, but on three key factors: compatibility with in-field farm practices, community-level reinforcement through social networks and norms, and consistent, straightforward policies and institutions.

The bioeconomy will spur reorganization and uncertainty, but regional leaders saw potential for long-term change in key system structures. They hoped that perennial conservation initiatives to achieve multi-objective societal benefits might be advanced during this time of transition.

Data and analyses from interviews and workshops were used to develop a model outlining interactions between key drivers and outcomes of regional landscape change. Three policy scenarios, also based on workshop data, were created and covered three possible approaches to the situation: tweak, adapt and transform.

**Conclusions**

Pressure is mounting on agriculture landscapes to deliver multiple social services—including food and energy production and ecosystem services—at the same time that quality of life and community vitality in rural systems are being put on life support. Rural stakeholders and regional leaders emphasized that social-ecological systems are currently trapped in a static configuration by the convergence of factors operating at several scales. These factors make system-level change—including the increased use of perennial cover on the landscape—difficult. The successful adoption of perennial conservation practices depends upon adaptation of socio-cultural and political structures at three scales within Corn Belt systems: field/individual, landscape/community, and regional/institutional. Initiatives that focus on achieving outcomes at only one scale are not likely to result in widespread adoption or in long-term change.

Regional leaders offered insights into how policy mechanisms might enable the incorporation of perennial conservation strategies into the agricultural lexicon. Successful policy options must build partnerships that blur distinctions between working lands and protected areas. These initiatives also must bridge gaps between local creativity and initiative and regional support and accountability. The scenarios showed that if top-down factors such as markets, technologies and federal farm policy are the chief determinants of farm owner and operator decision making, Corn Belt landscapes will be highly efficient at row crop production, but at the expense of ecosystem services and other societal goods.

**Impact of results**

The Upper Squaw Creek watershed, in which a portion of this work was conducted, is an important nexus for linked research and management efforts aimed at understanding and bolstering ecosystem services in agricultural landscapes. This watershed is of particular importance because of its proximity to Iowa State
University, and previous and ongoing research on landscape and land use change in the watershed. The project has built rapport and communication networks with 14 regional leaders who participated in the policy scenario workshop and its follow-up activities. These ties will be useful in sharing future research results, partnering in future practices and management, and identifying appropriate policy and agency guidelines.

Results from this project will add to a growing body of research on the ecological dilemmas presented by working agricultural landscapes in general and the U.S. Corn Belt in particular. The investigators plan to use the results to help prepare an Environmental Protection Agency 319 grant application.

**Education and outreach**

Results from the project were presented at local meetings with agency partners; at local, regional and national symposia and conferences; and directly through the participatory workshop. Research findings thus far have been shared in one research note and two peer review articles in scientific journals. An article is in revision for a peer-reviewed journal and another is undergoing review.

**Leveraged funds**

Several additional grants were obtained in connection with this project: USDA Sustainable Agriculture Research and Education, North Central Region, graduate student grant, $9,998; USDA Forest Service, Northern Research Station, $10,000; Iowa State University, Department of Natural Resource Ecology and Management, $15,000; and Iowa State University Graduate Program in Sustainable Agriculture, $11,000.

*Photos courtesy of U.S. Natural Resources Conservation Service.*

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