Rural Design: Establishing the Research Foundation for a New Design Discipline

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Abstract

Rural areas in North America are undergoing profound demographic, economic, cultural, and environmental change, creating considerable challenges and stress for their residents and on the ecosystems upon which they depend for their livelihoods and quality of life. Critical global issues such as climate change, renewable energy, water resource protection, food security, and healthy human development will dominate international and local rural policy for years to come. The research issues are by nature interdisciplinary and require dialogue to understand them and respond with effective solutions. The research must recognize that human and natural systems are inextricably coupled and engaged in continuous cycles of mutual influence and response. This paper explains rural design and its differences from urban design; outlines its research foundation; and defines a rural design process that connects environmental, cultural, and social issues with educational, technological, and organizational research to help create a healthy and prosperous rural future.

Figure 1: Grain elevators on the Midwest prairie

Rural Design

The design professions and schools have generally ignored agriculture, rural communities, rural architecture and landscapes, and rural quality of life. Urban design and urban planning exist as subdisciplines of the design professions to address urban issues, but there is no rural equivalent. How will the landscape of rural regions adjust to economic, transportation, demographic, health, and social changes? What kinds of land use planning and policy are required to take advantage of renewable energy from wind turbines, solar collectors, and biomass in the agricultural landscape? What are the opportunities to design for a stable food supply and food safety while also considering human, animal, and environmental health? These issues will dominate international, national and local rural policy for years to come.

Urban design and rural design have many similarities in that both embrace those unique characteristics in design that acknowledges social and cultural values to enhance quality of life. Urban design has been taught in design schools for some time, but rural design is an emerging design discipline. Urban design uses the spatial arrangement, appearance and functionality of buildings and infrastructure to shape the public realm for living, working and playing in the urban landscape. Rural design seeks to understand and embody the unique characteristics of the open natural and cultivated landscapes where buildings and towns are objects in the rural landscape. This aspect of the rural landscape requires a different methodology for addressing rural issues.

Rural design is a rapidly emerging discipline for meeting rural needs and resolving rural issues. To be effective and relevant, this new discipline must be founded on solid research, and practice must be based on validated data that will result in transformational changes. Using the lens of spatial arrangement and methods of community engagement, rural design helps rural citizens manage change and organize rural landscapes and regions for recreational, agricultural, economic, and ecological purposes that enhance rural quality of life.

In the United States, according to the U.S. Department of Agriculture, rural areas contain twenty-one percent of the population and comprise ninety-seven percent of its land

area (USDA ERS, 2008). Although rural design, as practiced by the Center for Rural Design at the University of Minnesota, is currently focusing on the ecosystems that comprise the Midwest and extend into the South, the eastern United States, and across Canada, the principles and strategies of rural design can be utilized around the world.

The Center for Rural Design at the University of Minnesota was established in 1997 in response to the enormous changes taking place in rural areas in the United States. The Center is the first of its kind in the world and as a result of its work, its definition of rural design has evolved as it gained experience working with rural communities. Thorbeck and Streng (2009) outlined rural design issues in a White Paper thus:

> Rural areas are undergoing profound demographic, economic, cultural, and environmental change, creating considerable challenges and stress for its residents and on the ecosystems upon which they depend for their livelihoods and quality of life. Over twelve years ago architect Dewey Thorbeck noted these challenges, particularly in Minnesota and the Upper Midwest, and realized that the design and planning professions in the United States had generally ignored agriculture, rural communities, the character of the rural landscape, and rural issues. Although there were subdisciplines of the professions addressing urban issues (urban planning and urban design) there was no rural equivalent. In response, he founded the multi-disciplinary and intercollegiate Center for Rural Design and began to develop a new discipline: rural design.

Rural design is a methodology that can help bridge the gap between environmental science and public policy. Design is a common ground for scientists and practitioners to bring scientific knowledge into decision making about landscape change (Nassauer and Opdam, 2007). Rural design, as a problem-solving process can link science with society to resolve rural issues and assist rural communities to make wise land use, planning, landscape, and architectural decisions that promote economic development while protecting the rural environment and enhancing rural quality of life.

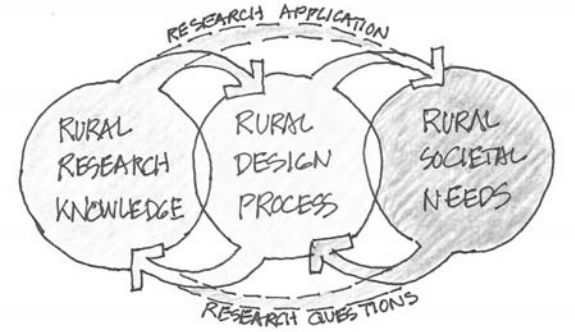

Figure 2: Rural Design as a link between research and society

Rural design is based on a rural land use philosophy that seeks a balance between quality of life, economic growth, and preservation of the natural and cultivated landscape. It recognizes the importance to all people, urban as well as rural, of respecting the unique landscape character of where one is living and working. A building on the flat prairie of the Midwest should be different than one in the rolling hills and forests of the Southeast

When making choices about using the land and constructing buildings in the rural landscape it is important to think and act holistically. What is the impact on the visual appearance of the rural landscape? What are the issues that need to be considered? Rural design can help define the kind of architecture that links traditional barn building, farming practices and fit with the landscape, with the latest technological and economic methods of producing food, fiber and renewable energy.

Rural design is most often the understanding and visualization of large open spaces with farmsteads, buildings and towns as objects in the rural landscape. It is a process to assist rural citizens to protect, create and enhance the beauty and diverse ecology of their landscape for future generations to appreciate and enjoy. Rural design is a way to connect economic, environmental and social issues for public good—and a way to ecologically view the world.

Research Base

Based on the experience of the Center for Rural Design, areas requiring additional multi-disciplinary research that can form the research base rural design needs include:

Livestock facilities: Improving livestock facility design to consume less energy, emit less greenhouse and hazardous gases, and reduce the ecological footprint remains largely unresearched (Jacobson, 2009). The same holds true for improving worker safety and animal health, site and landscape design, social acceptance, and the use of more environmentally friendly building components.

The location, design, construction and management of commercial buildings for animal production has changed little over the past 50 years, yet the way people think about their rural environments and concerns about animal agriculture has changed significantly, leading to conflicts between new rural residents regarding the consolidation of livestock into larger operating units (Schmidt, Jacobson, 2007). The commercial confinement-type buildings being constructed today for animal agriculture have been largely designed by engineers. The resulting wood, post-framed, metal skinned structures look and operate the same regardless of where they are located, because the sites are leveled and utilize building systems that are identical regardless of where constructed.

Traditional farm buildings and landscapes that were shaped and constructed by immigrants in the United States remain the "ideal" in most people's minds. This contributes to their unease about commercial livestock production practices and their concern for animal welfare and sustainable land use. Little research has been conducted on the design of contemporary farm buildings constructed for animal agriculture and their important role in maintaining a sustainable healthy food system for a rapidly expanding world population.

Research that could develop integrated performance metrics for sustainable commercial animal buildings (rather than using prescriptive standards) will provide industry professionals and producers, processors, regulators, communities and other stakeholders a key tool in evaluating appropriate locations, site and facility design, construction, and management of animal production facilities. As developed by the Center for Sustainable Building Research Center at the University of Minnesota (Carmody, et al, 2009) these measurable performance metrics for environment and human health include:

- Building Metrics: including energy, water, wastewater, solid waste, materials, and indoor environmental quality
- Site Metrics : including transportation, physical activity, education, stormwater, soils, heat island, night sky, and food

Although these metrics were developed for human habitation they are very similar to what could be used for commercial animal agriculture. Today there is a significant gap in available science-based information about animal production facilities and this research will help all segment of society cope with the issue of what is good for animals, people, and society.

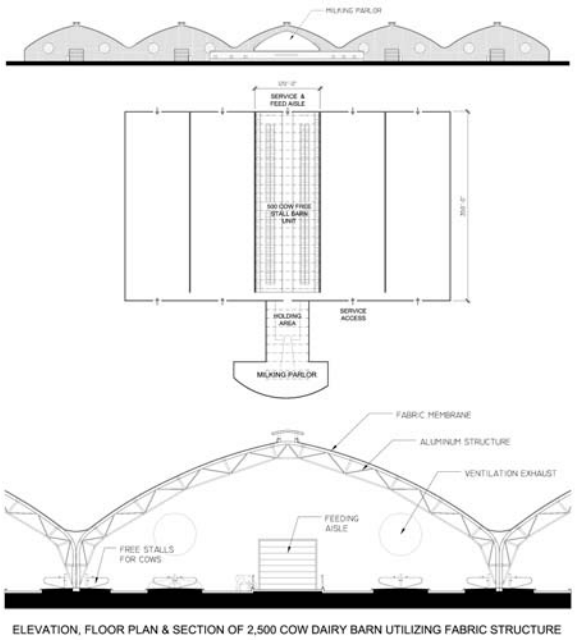

Figure 3: Proposed fabric dairy barn for 2,500 cows

Rural built environments that support human, animal and environmental health: Rural residents suffer higher mortality, disability, and chronic disease rates than urban residents (Jones et al., 2009). A critical need exists to study rural built environments' health effects, including their ability to support active living, finding ways to make health care more accessible, reduce social and cultural isolation, and enhance contact with nature. The emerging global One Health idea looks at human, animal, and environmental health as one integrated phenomenon. It is defined as "the collaborative effort of multiple disciplines working locally, nationally, and globally, to address critical challenges and attain optimal health for people, domestic animals, wildlife, and our environment." (Cohn, 2010). This concept had not previously recognized the role of design as a way to help

accomplish its directive, but the emergence of rural design and its problem-solving methodology has started to gain broad support from veterinary and human medicine at the University of Minnesota as environmental health and disease control has become an essential part of the One Health movement.

Designing landscapes for active living is a way to shape the outdoors and how people live and work within it to promote exercise as a way of life. Rural design can address this issue by redesigning how small towns and surrounding farms interact and communicate in the future. Through a research project (sponsored by the Robert Woods Johnson Foundation) with Isanti County in Minnesota, near but outside the Twin Cities metropolitan region, the Center for Rural Design worked closely with a community group to define and locate a trail system that connects residential, industrial, schools and commercial areas together to maximize active utilization of the trails while diminishing the need for the automobile.

Research observations from a project with the Minnesota Milk Producers Association indicates that when human, animal, and environmental health are interrelated, then rural design can be a very effective means of making synergy happen to achieve higher levels of environmental awareness and stewardship (Roos, et al., 2003). How the land is utilized for food production affects the transmission of disease from wildlife to domesticated livestock and is, thus, a food safety and health problem just as built environments that discourage active living are a health issue.

Design is a methodology to help clarify and organize connections between issues in the problem-solving process. Rural design can help shape rural environments in a way that recognizes the relationships between human, animal and environmental health, and offers an exciting new research opportunity.

Rural character perception: Rural character varies depending on the geology and climate of place and is differently defined by different communities. Perceptual research has been conducted on specific landscapes (e.g., Ervin Zube's work), and some have analyzed rural character that includes architecture (e.g., Brabec, Kaplan, Halfacree, Nelessen, Ryan). However, the research is immature and conclusions are limited in transferability, especially for which interventions do or do not harm rural character.

Figure 4: Rapidly changing rural landscapes in the Midwest

A new research framework for rural design is necessary that is more holistic and applicable to large, anthropogenic landscapes. It is crucial to understand the human sense of place and the meaning that sense provides to its inhabitants. If rural design is to be effective it must recognize the unique characteristics of place, including the natural characteristics of climate, seasons and vegetation, as well as the cultivated landscape and cultural and social history of place.

The architecture that responds to place can be contemporary, but is probably more understandable if it is based on historic precedents that reflect its location, geography, and climate. For example, a new agricultural building near the Minnesota River in the gentle, rolling landform of western Minnesota might have more sense of place if its architectural design reflects the glacial history that created the landscape and rivers of that region rather than an abstract or engineered design that looks and feels like it could be built anywhere.

Sustainable design, based on net zero-energy and carbon neutrality, will most likely become the standard in the near future as the world fights to diminish the impact of global climate change. To reach that goal, contemporary landscape and architectural design must be rooted and responsive to the uniqueness of place, and utilize performance metrics appropriate to that place. In addition, rural design, through rural character perception can help create synergism, collaboration, and cooperation across academic as well as political boundaries to improve rural quality of life.

Multifunctional landscapes: The costs to the environment and rural communities of large-scale monoculture farming (Cochrane, 2003; Mitsch et al., 2001) have generated alarm and a search for landscape patterns that produce wider benefits and less damage. Creating multifunctional landscapes is an emerging and promising area of inquiry (Jordan et al., 2007; Meyer et al., 2008), but their aesthetic and cultural dimensions remain unexamined. Their successful implementation and acceptance cannot happen without this design research.

Architecturally, multifunctional landscape issues might not seem to be important. Looking more closely, however, one might find that the design of buildings can have a big impact on public perception and understanding of the differences. As discussed above, contemporary livestock facilities that look the same regardless of where they are located reinforce monocultural imagery in the eyes of the public. If these buildings were designed and managed to reflect uniqueness of place, then animal production facilities would reinforce the imagery of the multifunctional landscape. It is this integration of issues that rural design research addresses.

These research directions and others will enable rural design to connect social, cultural, technological and educational issues to define rural place; integrate research and practice across the many disciplines involved in rural issues (e.g., agronomy; applied economics; community development; forestry; rural sociology; rural and veterinary medicine; tourism); and apply it to meet rural needs, provide new data, and provoke new research questions.

Design Methodology

The purpose of rural design is to work with rural landscapes, cultures and communities utilizing innovative design strategies for dealing with rural land use issues that include these research tools and technologies as currently used by the Center for Rural Design:

- Envisioning alternative physical scenarios for rural community response by working with citizen committees and community-based design workshops to engage residents. By collecting data and research pertinent to the issue and then preparing and presenting alternatives based on that evidence the community becomes part of the process. Through visualization techniques, scenario alternatives educate stakeholders so they can understand how their choices could impact rural environments.

- Presenting a systemic and holistic point of view from an unbiased rural perspective using an interdisciplinary and collaborative design approach. Experts from within the academic community as well as agricultural industry representatives can provide knowledge to help ensure a more positive impact on the rural economic, social and environmental issue being studied. This integrated design process also can identify new research necessary to fully understand the issue.

- Working with interactive media, both electronic and tactile, such as communicating with geographic information systems (GIS) imaging, 3-D models and kits of parts, drawings, web-based social networking and print publishing to provide multiple methods for communicating information to educate rural citizens about possibilities and opportunities for economic and community vitality.

- Partnering with communities and organizations as a whole to find the linkages and connect the dots between local and regional opportunities to identify stakeholder issues and their participation in the design process.

- Identifying regional land assets, characteristics, and relationships that large scale communities may have in common to encourage collaboration and cooperation for economic development and environmental protection that cross jurisdictions at multi-township, multi-county and multi-state scales.

Rural design provides a process that connects environmental, cultural, and social issues with educational, technological, and organizational research to help formulate concepts for a healthy and prosperous future for rural areas. To accomplish this, its research foundation must be based on multidisciplinary evidence that can inform the rural design process.

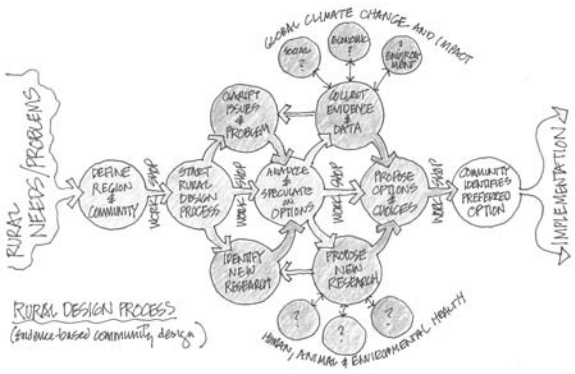

Figure 5: Rural design process

In January 2010, the First International Symposium on Rural Design was held at the University of Minnesota with nearly 70 researchers from around the Midwest landscape, Canada, and the South. This symposium and the experience of the Center for Rural Design have identified potential new research areas that can inform and enhance the potential of rural design as a problem solving design process, such as:

- Sustainability: Identifying and clarifying the sustainable relationships between small scale farming and large scale farming in providing food for a growing population; and expanding research to link human, animal, and environmental health and there ecological impact on the design of landscapes and buildings in rural areas.

- Climate change: Linking ecosystem health with issues of net-zero energy and carbon neutrality and carbon sequestration with food systems and safety, ecological restoration, green infrastructure, water quality, multifunctional landscapes, and human animal and environmental health. This issue of global warming is more likely to be addressed by citizens when the research issues are linked.

- Community vitality: Linking cultural, social, and artistic opportunities with economic development, and tourism. People seem to like to visit and area as tourists for the same reasons people like to live there. Quality of life relates to all of those issues and is the bottom line of rural design.

- Practice of rural design: Linking economic opportunities, entrepreneurship and economic development through cross-jurisdictional cooperation and collaboration based on common geographic relationships and principles of rural design. “To compete in the global economy regions must create partnerships, prioritize investments, and spur innovation.” (Drabenstott, 2009)

- Indigenous people: Seek to understand native peoples’ values and spiritual connections with the land and the relationships and impacts of immigration and how both have changed over time as a way to enhance quality of life and meaning in shaping future rural landscapes for all people.

- Policies: Explore reasons and opportunities to cross boundaries in the resolution of rural issues to have positive economic impact on rural communities at the state, federal and local levels as well as with regulatory bodies.

- Education: Utilize all forms of communication, community workshops, rural design in schools, rural design camps, etc., to inform citizens, particularly young people, about the power of rural design in resolving rural problems.

Summary

Rural design is the analysis, planning and design of rural environments, including small towns and cities. It uses design as a problem-solving process to communicate knowledge about the natural and man-made environments within which people live and work, and create opportunities to improve economic development and rural quality of life. Rural design can bring a regional perspective to the rural issue by illustrating the advantages of exploring and utilizing regional assets.

Rural design as an interdisciplinary and participatory design process can take many shapes, but its largest impact will be through examples of data-based rural design that promote economic development, improve the environment, and enhance quality of life. Rural design as an integrated design process can help academia and its research with rural communities to analyze and resolve issues for a healthy and prosperous future.

Rural design has been practiced by peoples around the world in a number of ways for better or worse over the

centuries. It just has never been called rural design. As a new design discipline it will continue to evolve, particularly as multidisciplinary research and data-based evidence is accumulated to inform the practice of rural design and its process. Although the work of the Center for Rural Design has focused primarily on the State of Minnesota, the principles and methodologies it is developing can be utilized anywhere because they are by definition rooted in the nature and culture of place.

The Center for Rural Design believes the emerging new discipline of rural design, through research connected to place, provides:

- information to policy makers of the spatial, ecological, and ethical impact of various alternatives and the choices they make;
- a methodology to resolve rural land-use issues at a variety of scales crossing boundaries;
- a process for geographic information systems (GIS) and other communication technologies to enhance rural citizen knowledge to enhance economic development;
- a community-based design process to empower rural citizens;
- an opportunity to create synergism and entrepreneurship through systemic and holistic linkages and connections;
- an understanding of regional quality of life and unique sense of place in the rural landscape; and
- a way to connect with the world.

Establishing the research foundation for effective rural design is a continuous and rigorous search for ecological, social, cultural, economic, and political and health meaning connected to place, while responding to climate change and a global economy.

These global problems require new approaches to resolving issues resulting from climate change such as new invasive species, diseases and pests; different crop and livestock yields; new compositions of native flora and fauna communities; water sources; and demands for carbon sequestration and reduced greenhouse gas emissions along with low polluting biofuels. The resolution of these issues will fundamentally alter the economic and social foundations of rural areas and the relationships between urban and rural areas.

Figure 6: Machu Pichu as the epitome of integrated architecture and landscape

A critical need exists for an innovative and creative means to resolve these problems, challenges and opportunities at the scale at which they operate. Rural design is a means to engage these issues and the author hopes that this paper will enhance rural design as a new design discipline in three ways:

- By promoting discourse about rural design and its multidisciplinary research base to effectively resolve rural issues with all of the knowledge and tools available—without regard to disciplinary or jurisdictional boundaries;
- By creating a graduate level rural design curriculum program (similar to urban design programs) to train leaders to address design issues impacting rural regions in North America and worldwide; and
- By creating an international organization for rural design dedicated to understanding rural issues globally with strategies to resolve these issues while focusing on human and landscape culture related to climate and place.

Credits:
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