LAND-USE CHANGE AND SOCIAL VALUES IN MICROPOLITAN COMMUNITIES IN THE UPPER MISSOURI RIVER BASIN

By

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PREVIEW

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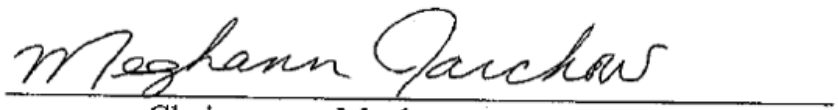

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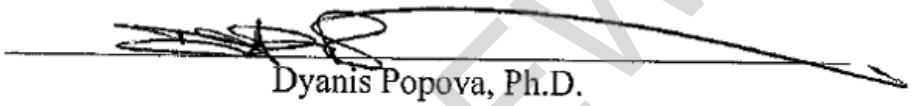

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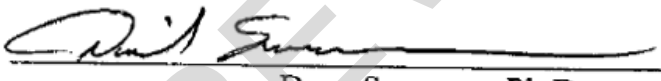

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Abstract

Agriculture makes up a significant portion of the United States economy and plays a defining role in the cultural identity of this country. Small farms, associated with rurality and small towns, are disappearing with the expansion of large farming operations and urban and industrial development. There are many cultural values that are associated with small towns, small farms, and the agrarian lifestyle. I used a multi-case approach to analyze four micropolitan communities in the Upper Missouri River Basin to discover the impact of development and increasing farm sizes and social values related to small towns and agrarian lifestyles. I conducted 34 semi-structured interviews in Bozeman, Montana; Gillette, Wyoming; Mitchell, South Dakota; and Williston, North Dakota. I analyzed this data using NVivo12 coding software with descriptive coding techniques. This research revealed many common themes, though the ten most prevalent are the focus of this chapter. These themes include family farming and ranching, the importance of using land for agricultural production, development, energy production, small-town spirit and Main Street, open spaces, hunting, policies and industries that support agriculture, and that the loss of small farms. This report explores the predominant themes in each individual case and then discusses the ways in which the cases compare and intersect. I then explore the origins of our country's ties to agrarian lifestyle and values. I briefly explore the history of settler-colonialism and settlement policies, such as the Homestead and Dawes Acts, which displaced Native Americans and encouraged European American settlement. This discussion of the history of settler-colonialism in this country helps to contextualize the roots of the values revealed in this research.

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Meghann Jarchow

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Chapter 1-Background

Agriculture in the United States

Much of the United States economy is related to agriculture; fifteen percent of all US jobs are related to this field (Sorensen, Freedgood, Dempsey, & Theobald, 2018). In addition to providing economic and livelihood benefits, agricultural landscapes provide many other services, including the aesthetic value of open space, the cultural value of agrarian or small-town lifestyle, the legacy of maintaining a family farm, and recreational opportunities such as hunting (Atwell, Schulte, & Westphal, 2009; Sorensen et al., 2018). In the past several decades, a shift has taken place, with a trend toward larger farm operations and urban and industrial development, both of which have negatively impacted the viability of small farms and those communities which surround and support them (Oliver & Thomas, 2014).

The shift from small-scale farms to larger consolidated operations in the US calls to attention a change which has impacted both the farm industry and rural communities traditionally supported by agriculture (Sharp, Roe, & Irwin, 2002). Aging farmer populations and out-migration of younger generations is contributing to steadily decreasing populations in rural towns (Carr & Kefalas, 2009). Another factor that has contributed to declining populations in rural towns is the change to large-scale row crop production, as larger operations have a smaller demand for labor than smaller operations (Turner, Gates, Wuellner, Dunn, & Tedeschi, 2013).

Although 90% of farms and ranches in the United States are classified as small by the USDA (earning ≤ $350,000 annually), they only make up 24% of total United States agricultural production value. Only 2.9% of farms are large-scale family farms with a gross cash farm

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income (GFCI) of over $1 million, but these make up 42% of total production value (MacDonald & Hoppe, 2017). Half of US farms make a net profit of $10,000 or less annually, meaning that these farmers are dependent upon other income for sustenance (USDA, 2018). Between the years 1982 and 2007, median farm size increased from 589 to 1105 acres. The per unit operating cost for corn production operations of less than 100 acres is almost twice that of farms over 1000 acres (Key, 2018). Large farms are able to purchase and operate larger equipment, making the farming process more efficient and cutting down on labor costs (Key, 2018).

Land-use change in the Northern Great Plains

Conversion of grassland to annual row crop production is a land-use change that has been particularly prevalent the Northern Great Plains over the past two decades. A study conducted by Wright and Wimberly (2013) suggested that recent accelerated grassland conversion to cropland (particularly for corn and soy production) resulted in lost wildlife habitat and carbon sequestration opportunities. The research used mapping techniques to examine change over time in designated areas throughout the Western Corn Belt (South Dakota, North Dakota, Minnesota, Iowa, and Nebraska) region. The study identified a spike in grassland conversion between 2006 and 2011 (Wright & Wimberly, 2013). The researchers determined that grassland conversion was occurring at a rate not seen since the 1920s (Wright & Wimberly, 2013).

A study conducted by (Turner et al., 2013), found that the shift from pastureland to cropland was driven by many factors including farm subsidies and general profitability. The average age of farmers and ranchers has gone up, resulting in the desire for less labor-intensive agriculture (Turner et al., 2013). Row crop production is less labor-intensive than cattle

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production and has therefore become more profitable. As a result, row crop operations have become larger and grassland has been converted to cropland, meaning that the conversion from grassland to farmland is likely to either remain steady or increase depending on crop demand (Turner et al., 2013). Although there are short-term benefits to increased agricultural production, there are also several long-term costs, which include increased carbon emissions and decreased water quality (Turner et al., 2013).

Development

Although the largest land-use change in the Northern Great Plains is the conversion of grassland to cropland, the area is also impacted by urban development. Development, as defined by the National Resources Inventory, consists of large tracts of urban and built-up land, small tracts of built-up land of less than 10 acres, and areas built up for roads, railroads, and other transportation (USDA, 2009). Forty million acres in the United States were developed between 1982 and 2007, representing a 56% increase in development from 1982 (USDA, 2007). Between this period, 14 million acres of prime farmland was converted to development (USDA, 2009). Between 1992 and 2012, 62% of all development in the United States occurred on agricultural land, resulting in a loss of 31 million acres (Sorensen et al., 2018).

Although these numbers reflect national statistics, the Midwest and Northern Great Plains have also experienced these trends (Roger F Auch et al., 2013). Between 2001 and 2006, cropland in the Midwest experienced a 1% decline and 618,000 acres were converted for urban development (Emili & Greene, 2014). Rangeland is converted to cropland, but cropland is converted to development at a higher pace (Emili & Greene, 2014).

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The Upper Missouri River Basin

The Upper Missouri River Basin (UMRB) is a region encompassing an area of the northern Missouri River and its tributaries (figure 1.1). The main states within this region are Montana, North Dakota, Wyoming, and South Dakota. There are also several Native American reservations in each of these states. There are nine reservations in South Dakota, seven in Montana, one in Wyoming, and five in North Dakota (NCSL, 2018).

The region's land use contributes significantly to the US agricultural and power generation needs. Of all crops produced in the United States, 30% of wheat, 13% of soybeans, 11% of cattle production, and 9% of corn comes from the UMRB region (Stoy et al., 2018). All four states have experienced a decline in the number of farms between the years of 2007 and 2012, with a loss of 700-1500 farms per state (USDA, 2012). The Powder River Basin, covering parts of Wyoming and Montana, produces over 40% of coal extracted in the United States (Propp, 2017). Extraction industries such as fossil fuels and agricultural resource extraction impact the social, environmental, and economic factors in these communities.

Wyoming, North Dakota, South Dakota, and Montana all have the lowest population density in the contiguous United States (World Atlas, 2017). Montana has a population of just over 1 million people. North Dakota has a population of 750,000 residents, and South Dakota has a population of 850,000 residents. Wyoming has the smallest population of any state in the country at around 580,000 residents (U.S. Census, 2017). Montana has six cities that are classified as metropolitan. North Dakota has three metropolitan cities, while South Dakota and Wyoming have only two cities (Census, 2016; N.D. Hometown Locator, 2018).

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In North Dakota, the economy has historically been dominated by agriculture; however, during the 2014 oil boom in the Bakken formation, fossil fuel production surpassed agriculture (Guerin, 2014). The increase in fossil fuel extraction in western North Dakota has had significant impacts on many community, including driving up prices of basic services, concerns about pollution from the extraction process, and concerns about agricultural economic sustainability. Aside from the impact of oil extraction, North Dakota has also experienced a shift away from small farms due to both a need for higher yields and profit and out-migration from people in rural counties (Farhang, 2014).

South Dakota's number one economic industry is agriculture (SDSU Extension, n.d.). Between 2008 and 2013, the number of lower income farms ($1,000-$249,000 per year) dropped by about 1,500 while the number of farms with an income of over $500,000 increased by 900 (South Dakota Department of Agriculture, 2014). Small farms struggle to stay competitive with larger operations and many have begun to diversify into specialty markets. There have been periods of drought over the past several years which has caused a decline in agricultural production in South Dakota, with 62.5% of the state experiencing drought in 2017 (South Dakota Dashboard, 2018). This drop in agriculture resulted in slow economic growth for the state. Despite many challenges facing agriculture, South Dakota ranks sixth in the nation in ethanol production capacity, and this corn-based ethanol has made farming more viable in South Dakota (Atyeo, 2018).

Wyoming, also known as "The Cowboy State," has a history and culture that revolves around ranching since European-American settlement. Agriculture is the second largest

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economic industry in Wyoming, and fossil fuel extraction is the state's number one economic product (Farm Flavor, n.d.). Between 2001 and 2011, 205,000 acres of rangeland in the northeastern part of the state were removed from agricultural production and replaced with fossil fuel production (Gertz, 2016). Aside from the impact of fossil fuel production, there are other threats to Wyoming ranchland. A *Rangelands Journal* demographic trend report predicted that there will be no farmers or ranchers under the age of 35 by the year 2033, and none under 60 by 2050 (Gordon, 2015).

Montana's top economic industry is agriculture (USDA, 2018). Though Montana's top products are wheat, barley and beef, there has been a growing interest in local foods and specialty crops (USDA, 2018). Rapid growth in urban areas in Montana has resulted in greater urban development of cropland, including high productivity farmland (Kidston, 2017). As these areas become more densely populated, it becomes harder for farmers and ranchers to resist selling cropland, resulting in a decline in the continuation of multigenerational farming. One result of this change is a shift to smaller-scale organic production for farm-to-table business models, which help support urban areas where there is a demand for these services (Dietrich, 2016).

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Core-Based statistical areas and micropolitan communities

The United States Census first established statistical population areas in 1905 to describe large industrial cities such as Chicago and Boston (U.S. Census, 2018). As more areas became urbanized throughout the country, population designations required changes, resulting in multiple re-configurations of population statistical areas. The current definition of metropolitan

statistical areas dates back to the Census re-designation of 1930 when metropolitan areas were defined as having a population of greater than 50,000 (U.S. Census, 2018). While the terms of population statistical areas changed throughout the 1900s, the definitions of population districts remained the same.

In 2000, population statistical areas were re-termed "Core-based Statistical Areas" or CBSAs (U.S. Census, 2018). This term included a new category of population district known as "micropolitan" which included counties containing one "urban cluster," cities with populations between 10,000 and 50,000 (Census, 2016). These urban clusters are generally surrounded by rural areas that are dependent upon urban clusters for resources and services (Lofton, 2006). The micropolitan statistical area designation was created to acknowledge a population base between rural and metropolitan areas, as urban clusters represented growth not experienced by rural areas but not significant enough to be considered metropolitan (Oliver & Thomas, 2014).

Micropolitan areas contain the highest total population of all three CBSAs in the United States, with a combined population of roughly 175 million (Parker, Horowitz, Brown, Fry, & Cohn, 2018). A study by the Pew Research Center found that while most of the nation is made up of rural counties, roughly 46 million Americans live in rural areas (Parker et al., 2018). Urban areas comprise the smallest amount of physical space in the United States, but contain 98 million people. Rural counties throughout the United States are losing population, but the Midwest has experienced the largest loss of population in rural counties. Sixty-eight counties in the Midwest have experienced have experienced a loss in population since 2000 (Parker et al., 2018).

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Micropolitan areas are considered important because they create hubs away from urban centers and provide services available to people across large areas (Oliver & Thomas, 2014). Micropolitan areas are unique in that they offer residents a combination of the benefits provided by rural and urban areas (Vias, 2012). While family values, small-town lifestyles, and rural landscapes are often available, urban amenities such as entertainment, hospitals, and colleges also characteristic of these areas (Vias, 2012). Land-use change in micropolitan areas is considered distinct from urban and rural areas in that urban development is prominent but is not as quickly progressing as it is in urban areas and population growth continues steadily unlike the population loss often experienced in rural communities (Oliver & Thomas, 2014).

The social values of people in different CBSAs tend to vary, as communities considered rural and urban attract and retain populations with different values and lifestyles (Vias, 2012). Urban and rural communities provide different opportunities and amenities for residents (Vias, 2012). Values attributed to rural areas tend to relate to safety, community connectedness, and family (Jacquet, Guthrie, & Jackson, 2017). In a South Dakota study that compared rural and urban migration trends, Jacquet (2017) found that people in rural communities experienced a higher level of community attachment but a lower level of community satisfaction. Additionally, people in rural counties reported having strong support systems more often than those in urban counties (Parker et al., 2018).

Values that people associated with metropolitan areas tended to have different preferences for culture and lifestyle than those in rural areas. On average, people in metropolitan areas preferred more racial and cultural diversity (Parker et al., 2018). Additionally, people in

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