SUSTAINABILITY IN NATURAL RESOURCE-DEPENDENT REGIONS THAT EXPERIENCED BOOM-BUST-RECOVERY CYCLES: LESSONS LEARNED FROM A REVIEW OF THE LITERATURE

by

Audrey Putz, Alex Finken, and Gary A. Goreham
Department of Sociology and Anthropology
North Dakota State University, Fargo

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1 Putz and Finken are graduate students and Goreham is professor and chair, Department of Sociology and Anthropology, North Dakota State University, Fargo.
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Executive Summary

- Natural resource extraction and development has resulted in “boom-bust” economic cycles for communities across North America. Communities in western North Dakota’s Bakken oil region have experienced similar cycles since oil extraction began in the mid-1950s.

- One purpose of this project was to examine the research literature regarding the conditions of natural resource-dependent communities that are experiencing “boom-bust” cycles. The second purpose was to assess the Extension Service’s and other agencies’ roles in addressing boom-bust community issues, as noted in the research literature.

- Research literature was reviewed for a wide range of regions in the United States and Canada, including Alabama, Appalachia, British Columbia, Colorado, Idaho, Louisiana, Minnesota, Montana, Nevada, Northwest Territories, Oklahoma, Utah, and Wyoming.

- The literature indicated that the population in most natural resource-dependent communities increased or stabilized during the “boom” phase, reached a plateau as the natural resource industry matured, decreased during the “bust” phase, and remained in a trough between the “boom” and “bust” phases. Population change was directly related to other community concerns such as housing, school enrollments, and demands for services.

- Natural resource-dependent communities experienced a lack of available, affordable, and adequate housing. Demands for and costs of housing increased during the “boom” phase of the cycle. Some communities reported excess housing during the “bust” phase.

- Primary economic impacts for communities during the “boom” phase included increases in new, natural resource-related jobs, retail purchases, and taxes; decreases in each were seen during the “bust” phase.

- High rates of employee turn-over were experienced among non-natural resource-related businesses; government agencies, schools, and other institutions faced challenges filling positions.

- Many communities faced infrastructural challenges, including road deterioration and lack of capacity for sewage and solid waste. Many communities also faced budgetary problems as they attempted to remedy their infrastructural problems.
- The number and rates of crime increased for index crimes, including domestic violence, both during the “boom” and “bust” phases of the economic cycle.

- Increased school enrollments and demands for social and medical services were noted during the “boom” phase of the economic cycle.

- There is very limited literature describing the programs and policies that were used to stabilize and sustain regions and communities affected by “boom-bust” economies. Some of the more outstanding examples included: (1) the Appalachian Regional Commission; (2) the Elko County Economic Diversification Association (ECEDA); (3) the Northwest Territories Infrastructure Workshop; and (4) the USDA’s Stronger Economies Together (SET) program.

- At least five lessons may be learned from this literature review that are applicable to the NDSU Extension Service’s work in Bakken oil region communities: (1) both regional and community efforts must be encouraged for community economic development programs; (2) local and state government officials must intentionally consider the pace and scale of natural-resource development; (3) continuing efforts must be made to diversify the community and regional economies; (4) although national and global factors have a particularly strong impact on resource-dependent communities and employment, local efforts cannot be discounted; and (5) research and education interventions may effectively be directed toward local officials, leaders, residents, and land owners.
Part 1. Introduction to the Project

Cyclical expansion and contraction of regional economies, or “boom-bust cycles,” have been experienced over time in many natural resource-dependent regions of North America (e.g., Pembina Institute 2008; Forbes 1939; Seydlitz, Jenkins, and Hampton 1995). Increased demand for development and extraction of natural resources, such as gas and petroleum, minerals, and forestry products, has resulted in economic growth (“boom”) in communities and counties. Growth in the number of laborers, overall population, infrastructure, tax revenues, and secondary economic sectors typically accompanied the natural resource economic boom (Freudenburg and Gramling 1998). However, declining demands for these natural resources resulted in economic decline (“bust”) in these communities and counties and a subsequent loss of labor, population, and revenues. Given the uncertainties in communities with boom-bust economies, private individuals and businesses have been reluctant to invest in housing, business ventures, schools, health care facilities, or recreational amenities. Governments are cautious about committing budgets to physical infrastructure, emergency services, and public facilities. The lack of private and public investment can result in minimal community development and planning, reduced maintenance of buildings and physical infrastructure, contraction of services, and a culture of risk aversion (Smith, Krannich, and Hunter 2001).

North Dakota’s oil extraction has taken place in the northwestern region of the state in the Bakken shale formation, which also includes parts of Montana, South Dakota, Manitoba, and Saskatchewan (Figure 1). The North Dakota region consists of the following 17 counties: Billings, Bottineau, Bowman, Burke, Divide, Dunn, Golden Valley, McHenry, McKenzie, McLean, Mercer, Mountrail, Renville, Slope, Stark, Ward, and Williams (Figure 2).

Figure 1. Map of the Bakken Shale Formation in the Williston Basin of Montana, North Dakota, South Dakota, Manitoba, and Saskatchewan.

Source: Energy Information Administration
(Used with permission.)
North Dakota began to extract oil in the Bakken shale formation with its first well near Tioga in 1951. Oil exploration and drilling boomed until it reached a peak in 1982, at which point the bust began. However, technological improvements in oil extraction methods helped the oil extraction industry to rebound starting in the late 2000s (North Dakota Department of Mineral Resources 2010). What had been primarily an agricultural region prior to the 1950s with a steadily declining population experienced a “boom” between 1951 and 1982, a “bust” between 1982 and 2008, and another “boom” since 2008. The number of producing oil wells in North Dakota exceeded 5,000 wells in 2010, an increase of nearly 2,000 wells over the decade (Figure 3). Production exceeded 10 million barrels per month, a three-fold increase over the decade (Figure 4). Additionally, governmental and industrial reports suggest that the Bakken Formation and related reservoirs may produce oil for many years, thus extending the boom cycle in the region (U.S. Geological Survey 2008).

The explosive growth in oil production, particularly during the second half of the decade carries a range of implications. Concerns raised by residents, businesses, governments, and institutions include oil industry-related labor needs, labor needs in other sectors, housing, physical infrastructure, revenues, land use, schools, and crime. Various state and local agencies have been active in developing policies and programs to address the needs of community residents, plan for future growth (or decline), and promote economic stability in the region. Such action could potentially proceed more successfully by participating in and learning from programs that have been developed or are currently being utilized across the U.S. to address similar situations.
Figure 3. Number of Producing Oil Wells, North Dakota, 1951-2009.

Sources: North Dakota Division of Oil and Gas Production, Department of Mineral Resources (http://www.dmr.nd.gov/oilgas/stats/historicaloilprodstats.pdf)

Figure 4. Number of Barrels of Oil, North Dakota, 1951-2009.

Sources: North Dakota Division of Oil and Gas Production, Department of Mineral Resources (http://www.dmr.nd.gov/oilgas/stats/historicaloilprodstats.pdf)
Part 2. Purpose of the Project

The purpose of this proposal is to examine the experiences of other regions of the country that have faced boom-bust-recovery cycles. Specifically, we propose to conduct a literature review of scholarly, government, and industry sources to address the following questions:

1. What other regions of North America have experienced natural resource-related boom-bust cycles, particularly related to gas and petroleum extraction?

2. What have been the economic, demographic, social, and cultural impacts of boom-bust cycles on the communities in these regions?

3. What programs and policies have been implemented as a way to stabilize and sustain these regions’ and communities’ economies?

4. How successful have these economic stabilization programs been, and what lessons can be learned that are applicable to North Dakota?

This project seeks to find, within the available research, those experiences and lessons of regions that have faced similar situations to that of the Bakken region. From this information, useful direction may be found that could inform the policy decisions and practices that must be undertaken by those individuals who face economic change in the Bakken region. In order to accomplish this task and answer the above questions, the areas and studies are first identified, then the aspects of those studies are discussed; following that, these aspects are discussed again briefly in terms of the Bakken region. The project ends with a description of those projects which have been implemented across the U.S.

The economies of many states and regions across North America rely on natural resource extraction, management, and development. Although the types of natural resources vary from location to location, most have experienced boom-bust-recovery cycles to varying degrees. Studies have been conducted in several of these regions to determine the economic, demographic, environmental, technological, infrastructural, political, and social impacts of these cycles. Following is a select list of these studies organized by region or state and described by topic. This list of studies resulted from a search of academic, governmental, and industry publications available in print and/or online.

Alabama


Appalachian region

George Santopietro (2002) studied the cause of low income levels of Central Appalachian counties despite the extraction and development of coal. It was concluded that the natural resource boom-bust cycle has not provided sustainable economic growth to the area.

British Columbia

Tom Green’s (2001) report assessed whether a proposed reopening of a copper, gold, lead, silver, and zinc mine was compatible with the “requirements of sustainability” (p. 3). The mine closed in 1957, but a proposal to reopen the mine was introduced in 1998.

Colorado

BBC Research and Consulting (2008a) explored the impacts on natural gas development on the city of Rifle, Colorado. The report also details the city’s planning strategies due to these impacts.

Michelle Haefele and Pete Morton (2009) conducted research on the impacts of shale oil development in Mesa, Garfield, Rio Blanco, and Moffat counties in Colorado. The article explores how communities can learn from the previous boom-bust cycles in order to benefit in the short term and long term from development.
Idaho

Gary Machlis, Jo Ellen Force, and Randy Balice (1990) examined social change over 65 years in a mining-dependent community and a timber-dependent community in northern Idaho.

Louisiana

Asha Luthra (2006) conducted research on the relationship between crime rates and offshore oil development on the Louisiana coast. Longitudinal analysis was conducted based on a database that was made during the research and multivariate pooled time systems analysis from data sets of crime statistics.

Sarah Brabant and Robert Gramling (1997) explored the fluctuations in poverty during different cycles of the natural resource development cycle. The article looks at poverty through multiple lenses: rational underinvestment, bureaucratic power, rural restructuring, and moral restructuring.

Ruth Seydlitz, Pamela Jenkins, and Sallye Hampton (1995) studied the economic impacts of off-shore petroleum extraction during the boom and decline periods.

Ruth Seydlitz, Shirley Laska, Daphne Spain, Elizabeth Triche, and Karen Bishop (1993) examined homicide and suicide rates in relation to changes in and development of offshore oil and gas extraction.

Minnesota

Paul Landis (1934) conducted a classic study of social and economic cycles in northern Minnesota communities reliant on the taconite iron industry.

Montana

Ben Arnoldy (2009) reported on the impact of metal mining (molybdenum, platinum, nickel, and palladium) in Livingston, Montana.

Nevada

Elko County Economic Diversification Authority (ECEDA nd) provided an overview of the type of extraction and development taking place in Northeastern Nevada. The region is home to extraction and development in silver, copper, molybdenum, barite, and gold. ECEDA also discussed economic diversification the area has undertaken as to not be overly dependent on mining.
Northwest Territories, Canada

Northwest Territories Municipal and Community Affairs (MACA) and Infrastructure Canada (2005) collaborated to hold a workshop of community officials in the region to discuss impacts of past and potential natural gas development and subsequently release a report. The workshop looked to create strategies to mitigate impacts of a proposed pipeline.

Oklahoma

Gerald Forbes (1939) conducted a classic study of Oklahoma communities during the boom phase of the state’s oil development.

Utah

Michael Smith, Richard Krannich, and Lori Hunter (2001) published several reports on the social well-being of residents in the coal, oil, and natural gas producing communities of Vernal and Delta, Utah. The reports examined the communities’ “growth, decline, stability, and disruption” (p. 425) that took place over three decades starting in the 1970s.

Smith, et al. (2001) conducted a longitudinal study concerning various dimensions of social well-being in three Utah towns and one Wyoming town, three of which experienced heavy growth due to expansions in the energy industry, and one which was used as a benchmark.

Wyoming

The Pinedale Anticline Working Group (2005) assessed impacts of natural gas in Wyoming. This report was written because the 1999 Environment Impact Statement was outdated. The group worked to update this information as well as look at unanticipated changes in socio-economic arena.

The Ecosystems Research Group (2009) prepared a socioeconomic impact study for the commissioners of Sublette County analyzing the impacts of natural gas development in areas such as population, housing, employment, crime, infrastructure, and so forth. The report also looked at mitigation and monitoring efforts as well as the costs of these efforts.
Part 4. Impacts of Boom-Bust-Recovery Cycles in Natural Resource-Dependent Regions

A review of the literature on boom-bust-recovery cycles in natural resource-dependent regions shows that many aspects of communities are impacted. Seven of these aspects are described below: population, housing, the economy, labor and employment, infrastructure, poverty, and crime. The ways in which each of these aspects are impacted during the boom, bust, and recovery cycles will be described based on findings from the research literature.

Population

Nearly all of the research literature tied population change directly to the boom-bust cycles of the natural resource extractive industry. An upswing in resource extraction resulted in a population increase; a downturn resulted in a population decrease. Often, the population increase was the result of an influx of labor during the initial extraction phases. The influx of population influenced other impacts within communities in the regions of extractive industries, including but not limited to areas of housing, infrastructure, and emergency services.

The Ecosystems Research Group (2008) reported that in Sublette County, Wyoming there was an increase of population during initial drilling and the population was projected to climb until 2018. After 2018 to 2025, a decrease in drilling is expected with a corresponding drop in employment and population. Between 2000 and 2007, population in the Sublette County increased 34%, whereas previously the annual rate was around 2%. Much of the new population was employees and their family members of the oil and gas industry.

In the west, many energy focusing counties were losing population despite mining activity (Headwaters Economics 2008). Ten of 26 counties in Headwaters Economics report saw an increase in population between 2000 and 2007, while 16 counties saw population loss during that same seven year period. Six of the 16 counties saw a decrease in population, but saw an increase in jobs in energy related fields. The counties of Blaine, Richland, and Rosebud in Montana, Eddy and Lea in New Mexico, and Unita County in Wyoming added over 100 new energy related jobs between 2000 and 2005. One possible reason for a loss of population is rising cost of housing. Those who do not work in the energy field are not able to compete for housing or the increase in housing prices (Headwaters Economics 2008).

In the energy boom of the 1980s, the towns of Vernal, Utah and Evanston, Wyoming saw an increase of population during the boom period. Vernal, Utah saw an increase of population between 1970-1980, peaking in 1982 due to oil and gas exploration and development, construction of a coal plant, and the potential development of oil shale reserves (Smith, Krannich, and Hunter 2001). The population increased from approximately 3,900 in 1970 to 6,600 in 1980, with its 1982 peak of 7,900 residents. The population stagnated after the collapse of oil shale and “declines in other energy resource industries” (Smith, et al: 434). In Evanston, the population grew rapidly to 6,642 in 1980, peaking at 12,500 in 1982 (Smith, et al 2001). This population growth coincided with gas and oil exploration and development as well as construction of a number of large gas processing plants. After the peak the town went through a
period of “stagnation and decline” (Smith, et al: 435) and by 1990 the population was down to 10,000 with little change in population between that year and 1995.

In Northwestern Colorado, BBC Research and Consulting (2008b) projects that the population will double by 2035 due to oil shale production. The population in Moffat, Garfield, Mesa, and Rio Blanco counties as of 2006 was 210,000, by 2035 it is projected to reach 466,547. This figure is nearly 50,000 more than the baseline projection which does not include oil shale production. This increase in population will strain the communities within these counties greatly the counties were already being stretched to capacity by 2008.

**Housing**

To meet the housing needs of a community’s residents, the housing supply must be available, affordable, adequate, and accessible (the “4-As” of housing). Housing availability refers to the number of houses that may be occupied relative to the number of people seeking housing. Affordable housing pertains to the proportion of the householders’ incomes which must be devoted to paying for housing. Housing adequacy describes housing standards, such as how safe is the building, how well maintained is the building, how well does the building protect residents from the elements, and how much space and what facilities are in the building. Accessibility describes the degree to which the building meets any special needs of the residents, such as location of plumbing and electrical facilities.

The lack of available, adequate, and affordable housing was an issue for areas affected by oil and gas development. Sublette county, Elko county, and northwest Colorado were areas that experienced this impact. In Sublette County between 2003 and 2007 saw a 28% increase in their population, but a 20% decrease in housing (Ecosystems Research Group 2008). Whereas housing decreased, housing prices increased $21,207 annually. In Northwest Colorado, housing costs rose to as high as or higher than those Denver. Before the boom, housing prices were 35% lower than the Denver metropolitan area (BBC Research and Consulting 2008a). To deal with the housing shortage, Sublette county businesses began to supply housing. Buildings were converted, additions were built, and houses were bought by businesses. Residents responded to the housing need by converting garages into apartments and allowed campers to park in front of their homes. In Sublette and Elko counties, many oil workers who could not find homes to rent or apartments to buy stayed in hotel and motels (Ecosystems Research Group 2008; Pinedale Anticline Working Group 2005; and ECEDA n.d.). Hotels and motels filled quickly which left employees without housing sleeping in their or company vehicles or outdoors (Ecosystems Research Group 2008).

**Economy**

For many communities, the hope associated with natural resource extraction and development is economic prosperity. Research has shown, though, that resource development is often associated with poverty for some. According to Jacquet (2009), research on the economic impacts in communities has varied, two trends have emerged. First, the impacts are mixed depending on the community, individuals, and sector. Second, the impacts are smaller than the
members of the community expected. Natural resource development will provide primary and secondary benefits in a community. The economy is impacted primarily through new jobs, material purchases, taxes, and profits. Though the community will experience these primary benefits, some of it will felt more by the “broader regional economy” (17), than the rural community itself. Secondary impacts include a stimulus of the economy through goods and services provided to employees of the industry.

In Sublette County, Wyoming, communities saw the economy taken over by gas extraction related businesses (Pinedale Anticline Working Group 2005). Despite the gas extraction industry and its related businesses in the county, it has seen little revenue.

The economic history of energy focused counties in the West has been a volatile one (Headwaters Economics, 2008). The energy boom of the 1970s was followed by a decade long bust period. This bust was followed by another period of fossil fuel extraction which began in the 1990s and continued into the 2000s. From 1990 to 2005, energy focused counties saw a decline in the growth of real personal income, employment, and population, but a rise in average earnings per job and per capita income compared to their peer counties. According to Headwaters Economics (2008: 2), peer counties are “the remaining 254 western counties of similar size (57,000 or less).” The pattern for energy focused communities in the West has changed. Before 1990, the pattern was for these counties to do well during a bust and poorly after a bust. After 1990, energy focused counties did not “outperform their peers” (Headwaters Economics 2008: 11). Since 1990, the economy of the West has become one that is more service industry based, rather than natural resource extraction dependent. As of 2005, mining (including oil, natural gas, and coal) was 1 percent of the West’s person income. In non-metropolitan areas of the West, mining was less than 5 percent of total personal income and 2 percent of employment (Headwaters Economics 2008). Energy focusing counties have been diversifying their economy, but the economies of energy focusing counties are still less economically diverse than their non-energy focusing peer counties. Between 2000 and 2005, the principle growth in energy focusing counties was in direct energy-related occupations, which is comprised of “energy, mining, support activities for oil and natural gas operations” (Headwaters Economics 2008: 21), as well indirectly energy related occupations such as “manufacturing, construction, transportation, warehousing, and professional and scientific services” (21). These counties also saw growth in other sectors as well, such as retail trade, health care, and food services.

Since 2000, Northwest Colorado has seen an increase in the part oil plays in their economy. According to BBC Research (2008a: 7), “In 2006, these industries accounted for 15 percent of total direct and secondary employment in the overall region but a far more concentrated proportion in various subareas of the four county region.” This region has seen a significant increase of wages in occupations that are related to or in direction competition with the oil industry (BBC Research and Consulting 2008a).
Labor and Employment

Outside market forces can have a larger impact on employment in communities with boom-bust economies than do local efforts. For example, Gramling and Freudenburg (2010) examined employment in two coastal parishes in Louisiana that were dependent on offshore oil and gas development. They found that over 90% of total employment and over 70% of employment change was accounted for by commodity-related variables outside of local community control.

In Sublette County, oil related employment increased during 1999 and 2002 (Pinedale Anticline Working Group, 2005). It has been projected that 7,000 more rigs will drilled within the next decade before the projected peak drilling year of 2018. By the time drilling peaks, it is estimated 2,000 workers will be employed in the oil field. After 2018, employment in the oil and gas industry will decline during the production phase, as it will require less workers. It is estimated that 250 production employees will remain in the county after drilling is completed, with continued declines in employment during the reclamation phase (Ecosystems Research Group, 2008).

Infrastructure

The infrastructure of a community in the midst of natural resource development can become overused which may lead to its degradation. Roads, water, and sewage that were designed for residential use in a community also support industrial traffic, the influx of its employees, and secondary industries (Northwest Territories Municipal and Community Affairs - MACA and Infrastructure Canada 2005). The introduction of natural resource industries into a community not only necessitates maintenance and updating existing infrastructure, but also expansion (Northwest Territories MACA, et al 2005). Often communities were solely responsible for the costs of maintaining, updating, and expanding the local infrastructure. The costs to the community include administrative as well as employment costs (Northwest Territories MACA, et al 2005). The extent to which a natural resource extraction industry may affect the infrastructure varies depending on the state of the existing infrastructure. For example, Norman Wells had a sufficient water treatment plant before the introduction of the oil industry, thus the community was able to adequately provide services to employee camps as well as to their residents (Northwest Territories MACA et al 2005). But, for those who do no have adequate infrastructure in place preceding oil and gas development, it can quickly cause streets and roads to fall into ill repair and stress water and sewage systems.

For Sublette County, increased oil and gas activity led to the need for costly repairs and upgrades of their streets and roads, as well as water and sewage systems. In 2009, the count including the towns of Big Piney, Marbelton, and Pinedale, spent $60.6 million on infrastructure, but $160 million was still needed. The infrastructural burden will grow as population continues to increase.
Crime

Between 2001 and 2004 Sublette County saw a rise in index crimes, while the state of Wyoming saw a decline during this time (Pinedale Anticline Working Group 2005). This rise in index crimes includes crimes against people as well as property. The county also saw a rise in indicators of domestic violence. Arrests reported by the sheriff’s office and orders for protection doubled since 2000.

Seydlitz et al. (1993) found that “suicide and homicide rates are higher during periods of greater oil industry activity and when the amount of oil activity is rapidly changing, especially in the highly involved parishes” (pg. 103-104).

Education

In energy focusing counties in the 1990s, 24 percent of the population did not have a high school diploma. A decade later, those who did not have a high school diploma was 19 percent. Even though energy focusing counties saw a decrease in the percentage of people who do not have high school diplomas, this statistic was higher than their non-energy focusing peer counties. Peer counties in 1990 and 2000, had 23 percent and 17 percent of their populations without high school diplomas (Headwaters Economics, 2008).

After 2001 Pinedale, which is in Sublette County School District Number One, saw a slight increase in enrollment which coincided with an increase in gas development (Pinedale Anticline Working Group, 2005) in Pinedale. In Sublette County School District Number Nine, saw their enrollment increasing in 2003, which correlated with an increase in oil development in the schools of Big Piney.

Bakken Region

The following section briefly compares the research literature with the experiences of communities in the Bakken oil region of North Dakota. The section is NOT intended as a complete or definitive description, but only as a beginning point to compare the Bakken oil region’s concerns with those noted above in the research literature. Five years ago, many of the towns in northwest North Dakota seemed to be on their way to becoming ghost towns (Hagen, 2010). The towns in the Bakken oil region that faced extinction are now growing rapidly in size due to influx of oil workers. Some residents are also becoming “overnight millionaires” from selling the mineral rights to oil companies. Although the boom has been positive in some areas, negative impacts have been seen in the areas education, housing, employment, and infrastructure.

Population

Officials in Bakken oil counties reported an increase in the area’s population due to an in-migration of oil-related employees and, in some cases, the relocation of worker’s families. In Stanley, as oil workers have moved into the region, some long term residents have left due the rise in housing costs and rent (Gunderson 2010).
Education

Schools in the Williston area have seen a decrease in funding due to economic growth related to the boom. The funding has decreased because fewer students qualify for free or reduced priced meals. The schools have seen the end of their Title 1 stimulus money, which provides funds for instructors, development courses for professionals, and materials needed for math and science. It is based on the numbers of students who receive free or reduced priced meals. The school district had to lay off three teachers and in the fall of 2011 will end free pre-school and other programs at the middle school level (Stelzer 2011).

On the college level, programs are being created at Bismarck State College. The College created two associate degree programs in addition to their process plant technology program: petroleum engineering and petroleum production technology (Van Ormer 2011).

Housing

In a state that once promised free, new homes in an attempt at population growth (Hagen 2010), now has a housing shortage. With the increased number of laborers there has been a greater demand for housing, which has in turn resulted in higher housing and rental prices. According to those interviewed in the area, given the high demand and prices, owners have less incentive to maintain their properties, which results in some houses and apartments falling into ill repair. Additionally, there is a reluctance to construct new buildings during the boom/recovery phase of the cycle for fear that a bust would result in a housing industry collapse.

With the projected increase of oil development in the Bakken region, housing will continue to be an issue in the Bakken in North Dakota. It is projected by North Dakota Housing that 9,000 new households are expected to be added to the area in the next eight to ten years (Teklak 2011). In the town of Ray, homes were being built rapidly in order to meet the area’s needs (Hagen 2010). With the expected increase of housing, the affordability of housing also becomes a concern. In the region, those who are able to find rooms to rent or apartments are paying rents comparable to those in New York City and Washington, D.C. (Hagen 2010) (see Figure 5, 4, and 5).

Individuals and families unable to find houses or apartments had to look for alternative living arrangements. Hotels have been one such alternative for those fortunate enough to find vacancies as rooms fill quickly (McDonald and Davey 2011). One hotel was completely filled within two weeks after opening (Haslett and Carol 2011). Employees who have had to wait for approval to move into man camps have taken to living in their cars (Hagen 2010). Others have also found residence in RV parks, but vacancies have also been difficult to find (Gutierrez 2008, McDonald and Davey 2011).
Figure 5. Median Apartment Contract Rents, North Dakota Bakken Oil Counties, 1950-2000 (in 2000 dollars).


Figure 6. Fair Market Rent, North Dakota Bakken Oil Counties, 2001-2011 (in 2010 dollars).

Figure 7. Median Household Values, North Dakota Bakken Oil Counties, 1950-2000 (in 2000 dollars).


Employment

While the rest of the nation has been facing high rates of unemployment, the Bakken region has 14,000 jobs waiting to be filled as of March, 2011 (Haslett and Carroll 2011). The oil industry has lured many away from other non-oil related jobs. According to interviews which took place with individuals in the Bakken region, high oil wages have lured laborers from companies within communities and companies cannot compete with high wages. Some employers have implemented large sign on bonuses in order to attract new employees. McDonald’s in Dickinson offered a $300 sign-on bonus (Casselman 2010), while a nursing home in the region offered $1,000 for housekeepers (Stone 2008). Employment potential is great in the region with 14,000 jobs left unfilled as of March, 2011 (Haslett and Carroll, 2011). According to interviews that took place with individuals in the Bakken region, high oil wages have lured laborers from non-energy industries within communities and these companies cannot compete with high wages.

Infrastructure

Roads in the Bakken region of North Dakota are in disrepair due to transporting oil equipment. The need for more funds was recognized by the North Dakota legislature in 2009 when they approved $27 million which will be dispersed to the cities, towns, and townships in the Bakken area (KXMCTV 2009). According to Lynn Helms, Director of North Dakota Department of Mineral Resources, the repairing infrastructure is a great need in the region in order to for oil production to grow (Van Ormer 2011), a sentiment echoed by Minot's police and fire departments (Boughton, 2011).
Crime

In initial interviews, it was reported that crime had been a problem in the “man camps,” but upon implementation of new rules, the crime was reduced (see Figures 6 and 7).

**Figure 8. Property Crime Rates, North Dakota Bakken Oil Counties, 1980-2005**
* (number per 100,000).

http://www.disastercenter.com/northdak/crime/

**Figure 9. Violent Crime Rates, North Dakota Bakken Oil Counties, 1980-2005**
* (number per 100,000).

http://www.disastercenter.com/northdak/crime/
Part 5. Examples of Programs and Policies Used to Stabilize and Sustain Regions and Communities

This literature review provided information on the impacts of natural resource extraction and development on communities and regions. However, research and information regarding programs, policies, or initiatives to aid these communities has been less readily available. Whether this is because such programs, policies, and initiatives do not exist or because there has been little research done is uncertain. Despite the lack of information, the following four programs serve as examples of programs or policies that have been used to stabilize and sustain regions and communities. At this time, no information regarding the success or effectiveness of these programs has reported.

Appalachian Regional Commission

The Appalachian Regional Commission (ARC) was created in order to assist counties in the Appalachian region that have higher rates of poverty. ARC promotes “faster, sustainable economic growth and enable them to catch up” (Santopietro 2002: 1). The Commission receives funds appropriated from Congress with which it awards grants to agencies and governmental entities on state and local levels, local governing boards, and non-profit organizations. Awards are given based on research that directly impacts the economic development in the region (Appalachian Regional Commission n.d.).

One theory for low levels of income in the Appalachian region is that isolation, both geographically and culturally, has led this area to fall behind the rest of the nation economically (Santepietro 2002). This theory is the basis for ARC’s policies. ARC has funded highway construction as one way to combat the areas isolation. One program is the Appalachian Development Highway System (Appalachian Regional Commission n.d.). This highway system is 3,090 miles and connects highways to the Interstate Highway System. ARC also funds initiatives that promote tourism. According to the Appalachian Regional Commission, “Many Appalachian communities have developed successful tourism strategies based on the Region’s cultural heritage, history, and natural beauty.” In 2002, ARC created a Tourism Advisory Council “to help leverage regional collaboration to increase tourism in the Appalachian region.” The council is comprised of representatives of all 13 Appalachian states.

Elko County Economic Diversification Association

Elko County Economic Diversification Association (ECEDA) is a non-profit economic development association whose mission is to diversify the economy and create economic growth of Elko County (ECEDA 2009). ECEDA members include elected officials from participating communities and the county and representatives of local businesses.
Northwest Territories Infrastructure Workshop

In the 1970s, communities within the Northwest Territories of Canada saw an increase in economic activity when the Mackenzie Valley Pipeline was proposed due to exploration in that region. When this proposal fell through, these communities experienced “adverse effects of industry withdrawal” (Northwest Territories Economics 2008 and Infrastructure Canada 2005: 5). Three decades later, the Mackenzie Valley Pipeline was being proposed again. In response to the proposal of the pipeline and the understanding of the impacts development would have on the Communities of the Northwest Territories, especially on infrastructure, a workshop was created. This workshop took place November 15-17, 2005. The purpose of the workshop was to discuss with various Northwest Territories community leaders strategies to mitigate infrastructural problems, as well as other strategies communities employed to reduce adverse impacts of natural resource exploration, development, and extraction that many of the communities had experienced in the past.

Stronger Economies Together (SET)

SET is a regional development program sponsored by the USDA, in partnership with the Regional Rural Development Centers (RRDCs). Starting in 2009, the pilot program began with 23 counties across nine states. “The purpose of SET is to strengthen the capacity of communities/counties in rural America to work together in developing and implementing an economic development blueprint that strategically builds on the current and emerging economic strengths of their region” (Southern Rural Development Center – SRDC 2011). SET is currently in Phase II and has added eleven new states; Phase III will begin in late 2011.

The SET program consists of training sessions, database tools and technical assistance, and economic analyses, all of which are tailored to the region’s strengths and needs. The materials presented are built upon the expertise of federal and state agencies, land-grant university Extension programs, and others. The training follows nine modules (SRDC 2011):
Module One: A Snapshot of the SET Program
Module Two: Regional Economic Development 101
Module Three: Building a Strong Regional Team
Module Four: Your Regional Vision & Goals
Module Five: Exploring Regional Assets & Barriers
Module Six: Examining Current Demographic Features of Your Region
Module Seven: Exploring the Region’s Economic Foundation & Development Opportunities
Module Eight: Planning for Success
Module Nine: Measuring for Success
Part 6. Lessons Learned from the Research Literature Applicable to the NDSU Extension Service’s Work in Bakken Oil Region Communities

This review of the literature on “boom-bust” economic cycles in natural resource-dependent communities examined some of the concerns that communities experience and programs and policies that have been formulated to address these concerns. The purpose for the review of literature was to allow the NDSU Extension Service better prepare to meet the needs of residents and communities in western North Dakota who currently are experiencing a booming oil economy. At least five lessons may be learned from this literature review that are applicable to the NDSU Extension Service’s work in Bakken oil region communities.

Regional Efforts

First, both community economic development programs must be encouraged at both the community AND the regional levels if these efforts are to be effective. Areas that were most successful in addressing the concerns brought about by “boom-bust” economic cycles were those that used regional programs. For example, the Appalachian Regional Commission united communities, counties, and states to address residents’ concerns brought about by coal extraction. Sublette County, Wyoming formed a county-wide organization to study the issues and their potential solutions that emerged during the energy boom in that region (Ecosystem Research Group 2009). And the USDA’s Stronger Economies Together (SET) program (in many ways similar to the North Dakota Horizons program) employed regional training methods to help communities create a strategic plan and implement components of that plan.

Intentionality

After a period of decline, many communities in examined in this literature review found a “boom’s” growth invigorating. They were afraid that if any limitations or regulations were placed on the energy development companies, those companies may close and move elsewhere. However, government leaders in other communities interacted with company officials to control the pace and scale of natural resource development. Sublette County, Wyoming and the development of natural gas was particularly well-documented as requests were made to intentionally regulate the pace at which extraction took place (Pinedale Anticline Working Group 2005). Haefele and Morton (2009) noted that shale oil development in Mesa, Garfield, Rio Blanco, and Moffat counties in Colorado needed to be paced in order to maintain both short- and long-term benefits to the counties. Merrifield (1984) made a similar recommendation in his study of impact mitigation in the energy boomtowns of the western U.S.

Diversification

Several studies highlighted the need for continuing efforts to diversify the community and regional economies in order to make them more sustainable (e.g., Pinedale Anticline Working Group 2005 and Haefele and Morton, 2009). Although not touted as a panacea, some studies noted that tourism could be one component of a development strategy to offer a degree of
community development potential (Limerick, Travis, and Scoggin 2002; BBC Research and Consulting 2008a).

Local Strategies

Studies found that national and global factors have the overall greatest impact on resource-dependent communities and employment than do local factors (Force, Machlis, and Zhang 2000; Gramling & Freudenburg 2010). However, these same studies quickly point out that local efforts cannot be discounted. One reason for a strategy to work at the local level is that community impacts and problems vary in how the “boom,” “peak,” “bust,” and “stagnation” phases affect them (Haefele and Morton 2009; Pinedale Anticline Working Group 2005; ECEDA nd). Thus, there is no one approach to address local needs; each must be addressed for its own idiosyncratic uniquenesses.

Educational Interventions

Research and education interventions may effectively be directed toward local officials, leaders, residents, and land owners. For example, leaders in Sublette County, Wyoming maintained an on-going research agenda to determine how energy development affected the county and to offer recommendations to address emerging concerns (Pinedale Anticline Working Group 2005; Ecosystem Research Group 2008, 2009). Out of this research may come educational programs and materials for those in the community able to influence quality of life concerns (e.g., county commissioners, local/regional development leaders, school and health care officials, residents, and land owners).
Research Literature Used in the Study


Forbes, Gerald. 1939. “Southwestern Oil Boom Towns.” Chronicles of Oklahoma 17(4):393-400.


(www.prairiebizmag.com/event/article/id/11605/).