Regional Highlight: The Great Plains

The US Economic Impacts of Climate Change and the Costs of Inaction

A Review and Assessment by the Center for Integrative Environmental Research (CIER) at the University of Maryland

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Background

As science continues to bring clarity to present and future global climate change, policymakers are beginning to respond and propose policies that aim to curb greenhouse gas emissions. Although these policies are gaining momentum, their importance is not fully understood by many. All too frequently, inaction is motivated by the perceived high cost of reducing greenhouse gas emissions. The costs of not taking on the challenge posed by climate change are frequently neglected and typically not calculated. Throughout the United States, individuals and communities depend on sectors and systems that are expected to be greatly affected by the impacts of continued climate change.

- The **agricultural sector** is likely to experience uneven impacts throughout the country. Initial economic gains from altered growing conditions will likely be lost as temperatures continue to rise. Regional droughts, water shortages, as well as excess precipitation, and spread of pest and diseases will negatively impact agriculture in most regions.
- Storms and sea level rise threaten extensive **coastal infrastructure** – including transportation networks, coastal developments, and water and energy supply systems.
- Current **energy** supply and demand equilibria will be disrupted as electricity consumption climbs when demand grows in peak summer months. At the same time, delivering adequate supply of electricity may become more expensive because of extreme weather events.
- Increased incidence of asthma, heat-related diseases, and other respiratory ailments may result from climate change, affecting **human health** and well-being.
- More frequent and severe **forest fires** are expected, putting ecosystems and human settlements at peril.
- The reliability of **water supply networks** may be compromised, influencing agricultural production, as well as availability of water for household and industrial uses.

The Great Plains

Despite a predicted increase in precipitation, higher temperatures throughout the region are likely to result in net soil moisture declines because of water loss through evaporation. Competing uses for water could result in re-prioritization of land use and will greatly impact some economic sectors. Although the picture is incomplete because of data limitations, a valuable glimpse of the extent to which climate change will affect these economic sectors can be gleaned from the summary below.

Agriculture and Water

- The agricultural sector in the region contributes $22.5 billion annually in market value of products – 35% of which is attributed to crops and the rest to livestock. The consumptive demand for water for crops (especially grass and alfalfa) may increase by 50% by 2090, straining water resources in the region. One study estimated that net agricultural income will decrease by 16-29% by 2030 and by 30-45% by 2090 because of conflicting water uses around the San Antonio Texas Edwards Aquifer region. If similar trends hold for the entire region, the agricultural sector stands to lose $3.6-$6.5 billion annually until by and $6.75-$10.13 billion annually by 2090.
- A year-long drought in 1995 cost the Southern Great Plains agricultural sector $5.81 billion. Stressed ecosystems are more susceptible to invasive species; control costs and weed-associated losses due to invasives amount to $15 billion annually nationwide. The region is home to 23.4% of nation's crop and animal production. Under the assumption that costs to control invasive species are distributed evenly throughout the country, the region expends $3.51 billion in annual invasive species control costs. This figure may increase

dramatically, as damaging invasive species migrate north with warmer temperatures.

- The Southern and Plains regions are likely to experience a decline in productivity totaling as much as 70% for soybeans and 10-50% for wheat; although crops in other areas may temporarily increase their yields.

- An additional burden on the agricultural sector may be an increased resilience of insects to pesticides. Pesticide use and the associated costs are estimated to increase by 10-20% for corn; 5-15% for potatoes; 2-5% for cotton and soybeans; and 15% for wheat.

Other impacts

- **Water demand** for municipal uses will likely increase as regional temperatures continue to rise. A study of the San Antonio Texas Edwards Aquifer region estimates municipal water demand to increase by 1.5-3.5%. As supplies of freshwater diminish, quality of water is likely to suffer. Increased contamination of water has been estimated to raise the cost of water treatment by 27% from around $75 to $95 per million gallons in Texas.

- Higher incidences of severe weather events are likely to cause major damage to the region's **infrastructure**. For example, a 1999 outbreak of tornadoes in the Great Plains caused $1.16 billion in damages and 54 deaths; and an extreme flooding event in 1998 in southeast Texas inflicted $1.16 billion in damages and caused 31 deaths.

Nationwide

An assessment of the possible impacts of inaction is presented in the University of Maryland report, The US Economic Impacts of Climate Change and the Cost of Inaction. The range of climate changes anticipated in the United States will have real impacts on the natural environment as well as human-made infrastructure and its ability to contribute to economic activity and quality of life. The assessment suggests a need for immediate national policy to cut emissions, and a federally-funded set of region- and sector-specific studies to guide climate policy and investment.

Five key lessons from the complete report:

1. Economic impacts of climate change will occur throughout the country.
2. Economic impacts will be unevenly distributed across regions and within the economy and society.
3. Negative climate impacts will outweigh benefits for most sectors that provide essential goods and services to society.
4. Climate change impacts will place immense strains on public sector budgets.
5. Secondary effects of climate impacts can include higher prices, reduced income and job loss.

SOURCES

As documented in the full report, data sources for the Great Plains region include:

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For the complete report, The US Economic Impacts of Climate Change and the Cost of Inaction, see: http://www.cier.umd.edu/climateadaptation.

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