12-10-2021

Decreasing Water Supply and Community Health in New Mexico: A Reason for Change

Chelsea Whitney

Decreasing Water Supply and Community Health in New Mexico: A Reason for Change

Chelsea Whitney

College of Population Health, The University of New Mexico

PH 460-002: Concepts in Climate Change and Public Health Preparedness

Dr. Heidi Rogers

December 10, 2021

Decreasing Water Supply and Community Health in New Mexico: A Reason for Change

New Mexico's rich agricultural history stretches as far back as 1540, when Spanish explorer Francisco Vásquez de Coronado founded the land. Upon his discovery, he described that the greatest concern of the local population was the need for water. While much has changed for the state and its population since it's discovery, one constant has remained: water is still scarce. Farming techniques have not changed drastically in present-day New Mexico, with irrigated farming remaining the primary form of agriculture (Beck & McNamee, 2021).

Today, the resources and systems in which New Mexicans depend upon are already strained, with the challenges of declining snowpack, an increase of downstream users, increasing sources of pollution, and with an unpredictable and increasing dry season (Shinn, 2020). While farmland is most likely the most well-known area that a decreasing water supply will impact, there exist many more; streams that feed much of New Mexico; recreational activities, such as fishing and swimming; dozens of threatened and endangered animals, as well as the habitats that shelter them; the replenishing of groundwater sources, which provide to the state's drinking water; grazing livestock; and other states affected by a decreasing water supply (Shinn, 2020).

Many factors play into an already bleak issue when it comes to the depleting water supply in New Mexico. New Mexico, with an already arid climate, is forecasted to see an annual temperature rise of another 3.5 to 8.5 °F by 2100 (Union of Concerned Scientists, 2016). Increasing temperatures are known to affect the main sources that feed the water supply in New Mexico. The Rio Grande River is directly impacted by the snowmelt of the mountains north of Albuquerque. A decrease in snowpack has already shown the negative effect on the river flow and the many tributaries it feeds. Snowpacks of late-winter and spring are projected to continue declining, and the resulting reductions in runoff and soil moisture will make the water supplies

for New Mexico's cities, agriculture, and ecosystems even scarcer. Researchers report that if steps are not taken to address the build-up of heat-trapping gases in the atmosphere, future droughts are projected to far outstrip those of the past 800 years (Union of Concerned Scientists, 2016).

The National Climate Assessment has projected that due to climate change, many parts of New Mexico will see less precipitation overall as well as an extended dry season. Regional and global warming trends are changing the precipitation patterns that many of New Mexicans have come to rely on; unpredictable patterns means that there will more intense droughts, a greater proportion of precipitation seen as rainfall rather than snow, and an earlier snowmelt (Union of Concerned Scientists, 2016). The impact on farmland will be severe; the water needs for crops and livestock will increase and the nutrient-rich soil needed to grow crops will rapidly dry out.

Changes in precipitation patterns have suggested that although total annual precipitation may decrease, annual rainfall events, such as monsoons, may become even more intense. The effect of severe precipitation fall on dry and hardened soil means a reduced ability for the absorption of moisture. This allows for the water run-off to hit the streams instead of percolating to the ground below, resulting in a decrease in ground water that New Mexico utilizes as the primary source to supply most of its drinking water. The projection of these flash floods to become more common also mean the impact of flooding on a community that is unprepared for such an extreme event. In an already poverty-stricken state, resources will mean an increase in costs to agriculture and a hit to the livelihood of taxpayers (Union of Concerned Scientists, 2016).

Expected Health Impact on New Mexican Farmers

Climate projections calculated to the year 2100 predict that increases in drought, extreme precipitation events, and elevated growing-season temperatures are to be expected, resulting in reduced agricultural productivity, degradation of soil and water resources, and financial challenges to rural populations (US Global Change Research Program, 2018). Farmers of the southwest have already felt the impact of climate change as they live in a state of constant worry about a future of water shortages and heat waves. With surface water supplies becoming increasingly unpredictable and vulnerable, many areas of the southwest have already depleted their supply of groundwater, further confirming the worries of farmers everywhere (Paskus, 2018).

In 2018, New Mexico faced a severe drought that led some farmers to abandon their fields, while others looked to invest in a drought-stricken future with the planting of drought-friendly crops. Farmers that chose to continue growing crops affected by drought found themselves threatened by geographic shifts in crop production, resulting in their displacement as well as affecting the community they provided for. At the same time, drought forced the hand of ranchers to sell cattle in order to pay for supplemental feed. They saw a rapid decline in the abundance of natural grass, which was the primary source of food for many of the herds (McFall-Johnson, 2019). With a decline in surface and groundwater supplies, farmers will see increasing costs to access water for crop irrigation and for watering livestock. Simultaneously, increasing demands of crop water that exceeds supply will yield a loss in value as crop failure increases for specialty crops vulnerable to drought (NIDIS, 2021). These examples are but a small-scale representation of the negative effects of a decreasing water supply, as well as a predictor of the severity of economic loss that crop failure and pasture losses will have on the farming community.

As of 2019, the nation's farm debt was at $416 billion, with farm loan delinquencies continuing to rise. More than 100,000 farms were lost between 2011 and 2018, with 12% of those between 2017 and 2018 alone (Semuels, 2019). For many of those farmers, job loss came with ejection from their homes, as well as a loss of land that had been in the family for generations. Farm stress and loss, along with the volatile nature of the work, has historically led farmers to struggle with mental health, thus increasing their risk for suicide (Woods, 2021). A study conducted at the University of North Carolina found that agricultural workers were 34% more likely to die by suicide than the general working-age population, with the majority amongst rural farmworkers (Arif et al., 2021). As for New Mexico, the CDC reported that as of January 2021 suicide was the ninth leading cause of death in New Mexico; it was also reported that 87.1% of communities did not have enough mental health providers to serve residents (AFSP, 2020).

As farmers and ranchers make up much of the rural communities in New Mexico, they are also part of a community with higher percentages of people living in poverty than urban areas (US Global Change Research Program, 2018). The ability of these communities to adjust to adverse climate changes, take advantage of economic opportunities, and successfully cope with the consequences of these changes is affected by demographic and economic factors. For example, farmers often reside in remote areas with limited to no internet connectivity, decreasing their ability to participate in remote healthcare and to find mental healthcare providers (Woods, 2021). As climate change has already directly impacted the agricultural population and economy, there will inevitably be repercussions of a decreasing water supply on the mental health and economic dependence of the farming community (US Global Change Research Program, 2018).

Mitigation, Adaptation, and Resilience

Despite the existence of scientific evidence of a changing climate and its impact on human health, developing a plan for the prevention and preparation for these impacts can be difficult due to the unpredictable and complex nature of climate change. However, steps can be taken to attend to the cause of climate change and addressing its impact; these steps are otherwise known as mitigation and adaptation (Frumkin et al., 2008). As with climate change, any mitigation and adaptation measures taken will directly impact the lives and health of others and should be developed with solutions in mind in identifying disparities, reducing inequalities, and promoting equal protection.

Agricultural use of water for irrigation remains the primary source of use for farmland and increasing water efficiency remains a top priority to help meet water reduction goals. Irrigation districts could reduce water use by changing to less-water-intensive crop types, install greenhouses, reevaluate reservoir operations, increasing automation and record keeping, as well as establishing an open channel with other districts and improving infrastructure (Hedden, 2021). Farmers facing crop damage from flooding could take advantage of grants to improve wetland ecosystems, as seen with the Conservation Reserve Program (CRP). Farmers receive rental payments in exchange for converting some farmland to receive floodwaters, thus increasing flood storage capacity, and reducing crop damage (FEMA, 2020). Other resources are available in the form of grants in exchange for environmental improvement with the goal of reducing water use and improving water quality. Farmers are also encouraged to pursue debt relief when assistance is available, such as the American Rescue Plan provided by the USDA to help support farmers and ranchers of color during times of economic impact (Lujan, 2021). Further steps in improving water usage and slowing a decreasing water supply include education and outreach within the agricultural community, improving planning and regulation, modifying existing

structures and construction of new structures, and finding ways to preserve and restore natural systems (FEMA, 2021).

Despite the development of adaptation strategies to help cope with the adverse effects of climate change, agricultural communities are still facing the threat of economic loss, thus increasing the risk of suicide and depression. Mental health conditions are often stigmatized, and awareness begins with educating the community on the immediate, gradual, and indirect impacts of climate change on one's mental health. Farmers would benefit from learning what signs and symptoms to monitor their health for, as well as how to recognize depression and suicide within other members of the community. Awareness of mental health services, such as counseling and therapy, should be a priority when educating the public; this would also be a good opportunity to help identify what areas lack internet connectivity, or have other barriers such as lack of providers nearby, in effort to bridge the gap between farmers and the help they need.

Community involvement is important in terms of mental health, as having a close support system is crucial in identifying and supporting those in need of help; local support groups include the National Alliance on Mental Illness (NAMI) of Santa Fe and Albuquerque. Other resources available for helping those suffering from depression or having thoughts of suicide can call the National Suicide Hotline or for a more agricultural specific avenue, Farm Aid. Additionally, being able to provide support to the rural population by extending the reach of medical specialists can help to increase identification and treatment of mental illness, as well as promoting medication compliance. Project ECHO, a telehealth program initially started to provide services for patients suffering from hepatitis C, has set a goal to expand mental health care to rural populations via a new community mental health care program called ECHO Access (SAMHSA, 2019). With the ability to bring specialist-level knowledge to meet the needs of

farmers and of those residing in rural areas, ECHO Access can make a difference in their care and in their lives.

Conclusion

New Mexico's rich agricultural community is the foundation of much of the state's culture and history; unfortunately, rural country may find itself an endangered community as climate change continues to threaten the very livelihoods of many New Mexicans. Action must be taken to help those most affected by decreasing water supply, financial loss, and mental illness, and the strong community that helped to build New Mexico must be supported to help keep the very foundation of which they built together.

References

American Foundation for Suicide Prevention. (2020, March 2). *New Mexico suicide fact sheet*. https://afsp.org/state-fact-sheets

Arif, A. A., Adeyemi, O., Laditka, S. B., Laditka, J. N., & Borders, T. (2021). Suicide mortality rates in farm-related occupations and the agriculture industry in the United States. *American Journal of Industrial Medicine*, *64*(11), 960-968. https://doi.org/10.1002/ajim.23287

Beck, W. A., & McNamee, G. L. (2021, April 1). *New Mexico*. Encyclopedia Britannica. https://www.britannica.com/place/New-Mexico

Frumkin, H., Hess, J., Luber, G., Malilay, J., & McGeehin, M. (2008). Climate change: the public health response. *American journal of public health*, *98*(3), 435–445. https://doi.org/10.2105/AJPH.2007.119362

Hedden, A. (2021, October 22). *Study shows southeast New Mexico water gets scarcer in coming decades*. Carlsbad Current Argus. https://www.currentargus.com/story/news/local/2021/10/22/study-shows-southeast-new-mexico-water-gets-scarcer-coming-decades/8521164002/

McFall-Johnsen, M. (2019, August 7). *New Mexico faces extreme water scarcity on par with the United Arab Emirates*. Business Insider. https://www.businessinsider.com/new-mexico-faces-extreme-water-stress-2019-8

National Integrated Drought Information System. (2021). *Agriculture*. https://www.drought.gov/sectors/agriculture

Paskus, L. (2018, November 25). *Federal climate report shows how climate change will impact U.S. economy, infrastructure and more*. The NM Political Report. https://nmpoliticalreport.com/2018/11/26/black-fridays-climate-report/

SAMHSA. (2019, July 31). *Expanding care and training the workforce in rural New Mexico.* https://www.samhsa.gov/homelessness-programs-resources/hpr-resources/expanding-care-rural-new-mexico

Semuels, A. (2019, November 27). *Small American farmers are nearing extinction*. Time. https://time.com/5736789/small-american-farmers-debt-crisis-extinction/

Shinn, L., (2020, May 13). *New water worries in climate-stressed New Mexico.* NRDC. https://www.nrdc.org/stories/new-water-worries-climate-stressed-new-mexico

Talukder, B., Van Loon, G. W., Hipel, K. W., Chiotha, S., & Orbinski, J. (2021). Health impacts of climate change on smallholder farmers. *One Health*, *13*(1), 258-266. https://doi.org/10.1016/j.onehlt.2021.100258

Union of Concerned Scientists. (2016, April). *Confronting climate change in New Mexico*. www.ucsusa.org/NewMexicoClimateChange

U.S. Environmental Protection Agency. (2017, February). *Saving water in New Mexico.* https://www.epa.gov/sites/default/files/2017-02/documents/ws-ourwater-new-mexico-state-fact-sheet.pdf

U.S. Global Change Research Program. (2018, April). *Chapter 10: Agriculture and rural communities.* https://nca2018.globalchange.gov/chapter/10/

Woods, L. B. (2021, May 28). *Health & prevention report: Drought conditions align with high suicide rates among local farmers*. KSJD. https://www.ksjd.org/news/2021-05-27/health-prevention-report-drought-conditions-align-with-high-suicide-rates-among-local-farmers