

FACT



Future of Agriculture in Colorado Task Force



A Colorado Farm Bureau Project
March 2020

Letter from Task Force Chair

Like many aspects of our modern economy, agriculture in Colorado is at a crossroads. The industry continues to build on its progress over the last 30 years, increase its efficiency, safety, sustainability, and adaptability. At the same time, farmers, ranchers, and rural residents are working to protect their way of life, and ensure the history, culture, and character of rural Colorado is not forgotten, and can thrive in the coming decades.

To celebrate its 100th year, Colorado Farm Bureau (CFB) assembled a Task Force of dynamic and diverse professionals to assess how agriculture in Colorado can continue to thrive in ever-changing times.

The Task Force sought to facilitate discussion about agriculture, its role in Colorado's shared heritage, and how the industry and its people can be successful in the future. The Task Force members discussed many topics and forecasted many ideas about how the industry can continue to be successful in coming years.

Many of those ideas and topics are summarized here, with recommendations about what should be done to help realize this vision. However, the report is not exhaustive—it is not meant to be. Some readers will wonder why a topic is omitted, or why the Task Force did not have more to say about an idea. Members decided to focus on areas where they could provide the most input and insight.

In addition to specific areas of focus at the farm, local, and state level that are included in this report, several themes became evident in the Task Force's discussions. The reoccurring theme discussed most was interdependence. The Task Force felt one of the most important things to ensure the future success of agriculture was for rural and urban populations to keep in mind that their success depends on one another. Rural areas need urban ones as much as urban areas need rural ones.

Additionally, members of the Task Force thought it important for all Coloradans to recognize and value the contributions that agriculture makes to the state. Either through something as specific as the value of ecosystem services the industry provides, or appreciation and recognition of the important cultural heritage agriculture has given to the state.

Whether it is working to bolster the health of mid-sized farms and ranches or celebrating the successful future of rural renewable energy production, recognition of the industry and a shared focus on interdependence will serve us all well. With that shared understanding, Colorado can work to tackle the challenges and seize the opportunities the industry will face in the future.

On behalf of the members of the Future of Agriculture in Colorado Task Force (FACT), we thank you for your time and interest in the business and the people of Colorado agriculture.



James Pritchett, PhD
Dean and Director
College of Agricultural Sciences
Colorado State University

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Introduction

The 2019 Future of Agriculture in Colorado Task Force (FACT) convened in March 2019 to discuss the current state of Colorado's agricultural sector and what its future may hold.



Setting the Stage

In 2006, Colorado Farm Bureau (CFB), the state's largest agricultural advocacy organization, commissioned The Future of Agriculture in Colorado Task Force (FACT) to assess the outlook of Colorado agriculture economically, environmentally, socially and culturally. Based on these assessments, the Task Force evaluated the impact agriculture would have on the state of Colorado by 2025. Through these findings, FACT was able to define challenges, opportunities, and the importance of Colorado agriculture.

FACT 2019

To celebrate its 100th anniversary, Colorado Farm Bureau reconvened the FACT Task Force in March 2019 with the goal to reexamine the original FACT report, update, modernize and change it where necessary and to broaden the scope of voices contributing to the findings. To look at the future through a different lens, the membership of this new Task Force was expanded to include business, civic, and political thought leaders whose work impacts and is impacted by agriculture.



Tanner Ehmke, CoBank

****Note****

While the FACT met prior to the emergence of COVID-19 and the resultant shutdown of the U.S. economy, the findings contained in this report are even more important and relevant now than before this pandemic. Many of the underlying problems in agriculture and rural Colorado are more pronounced now and in a post-COVID-19 world. The findings in this report will be helpful to policymakers and may provide creative ideas to help the agriculture industry and rural communities recover from COVID-19 and the ensuing economic impacts.

The Process

The Task Force met in person three times between March 2019 and July 2019. The day-long meetings consisted largely of information gathering, analysis, and discussion; covering topics like the economics of agriculture, trends in the industry, and future demographic analysis and forecasting. The Task Force also heard from experts on various aspects of agriculture and rural communities. Between meetings, Task Force members conducted individual research and analysis. Task Force staff met with individual members to better understand their perspectives on the value of Colorado's agriculture sector, the relationship between agriculture and their industry, and what they foresaw in the years ahead.

Key topics

The key topics identified by the Task Force are approached on various levels: on the farm and ranch, in the rural community, and at the state level.

- Rural Health Care
- Natural Resources
- Technology and Infrastructure
- Rural Economic and Social Change

The Task Force has adopted various recommendations based on their findings and key points of discussion. Some suggestions target agriculture producers and rural communities. Others focus on what policymakers, leaders, and influencers at all levels can do to help make agriculture and rural Colorado successful into the future.

Participants



Dr. James G. Pritchett, Chair

Colorado State University
Dean, College of Agricultural Sciences

Dr. Pritchett was named Dean of the College of Agricultural Sciences in April 2020. Prior to that role, Dr. Pritchett served as the Executive Associate Dean in the College of Agricultural Sciences at Colorado State University. His passion is contributing to agriculture as a steadfast and tireless supporter in all phases of the land grant mission. This work involves facilitating and implementing the shared strategic vision of the College of Agricultural Sciences, an organization that includes more than 225 full time employees, nearly 2,000 students and \$40 million of annual expenditures. On a day-to-day basis, Pritchett serves as the

chief internal administrator for the College of Agricultural Sciences overseeing budgets, capital investments, human resource management and advocacy for the college within and outside the CSU system. In this role, Pritchett works closely with farmers, ranchers, agribusiness, advocacy groups, government agencies, non-profit organizations, foundations and academic institutions.

Serving Agriculture means convening thoughtful discourse and supporting initiatives in areas of critical importance including: the present and future allocation of agricultural water resources; rural economic development and its reliance on agriculture as a base industry; fostering critical conversations about agricultural innovation; addressing critical challenges in agricultural policy and the local, state and national levels; finding strategies for financial resilience and capital investment in agricultural production; examining key components of the value chain; developing strategies for nimble adaptation to drought and climate change; advocating partnerships between consumers, business and agriculturalists; and addressing the needs for agricultural literacy. Pritchett has engaged in all these critical areas as a leader and professional.

James Pritchett is trained as an agricultural economist who enjoys working in a wide range of teaching, research and engagement opportunities. Originally from the southeastern Colorado town of McClave, he is a two-time alumnus of CSU, and he received his PhD from the University of Minnesota in Agriculture and Applied Economics. He has served CSU as a faculty member and extension economist since 2001. He became the Executive Associate Dean in 2015.





Matthew Barry

National Western Center Authority
Chief Development Officer

Matt Barry serves as Chief Development Officer at the National Western Center Authority leading new business development and building local, regional and global partnerships with organizations to deliver programming in service of its mission to advance global food solutions. Formerly, Matt served as Chief Impact Officer at Gary Community Investments where he was responsible for developing strategy and advancing a data-driven, impact investment strategy through the measurement of social impact and risk across philanthropic and

market rate investments. He also co-led the design of the organization’s innovation practice and supported the creation of a strategy to build an ecosystem to support entrepreneurs and ventures focused on addressing social issues.

More broadly, Matthew is committed to advancing social change by designing solutions, inventing, imagining, and innovating, ultimately leaving the world in a better place than when he arrived. Matt holds a master’s degree in Urban Planning and Regional Development from the University of Colorado-Denver.



Sara Blackhurst

Action22
President and CEO

Sara Blackhurst became President of Action22 in June of 2017. She came to the organization as a Development Professional with more than a decade of experience in program development, fundraising, grant writing and nonprofit administration. Prior to Action22, Sara was the ED of The Greenhorn Valley Chamber of Commerce. Next, she served as Director of Development in hospice care where she designed and was awarded funding for “We Honor Veterans” and a Caregiver Support system for primary caregivers. She went on to an adolescent treatment

facility as the Development Officer where she initiated an innovative program to provide care for minors who were victims of sex trafficking. Currently she is a Packard Foundation Fellow and is highly sought after for organizational consulting. Sara’s philosophy centers on the power of questions; her mantra is: “What matters most to those we serve?” and “What do our communities need from us?” Sara purposely lives rural in her hometown of Rye, Colorado with her Alaskan husband and their three very outdoorsy sons.





Alex Carter

Colorado Education Initiative
Vice President, Implementation

Alex Carter joined the CEI team in 2016. Alex leads the field implementation team to support districts, schools, and educators in their work to accelerate educational improvement and innovation across Colorado. Before joining CEI, Alex enjoyed an exciting 20 year career as a public-school educator. Alex served as the superintendent of schools for Montezuma-Cortez School District in Southwest Colorado. Before that, he was the principal of Telluride High School, a principal and assistant principal in two high schools in Northern Virginia, and taught

history as a high school teacher.

In 2003, Alex’s work as a classroom teacher was recognized with a National Milken Educator Award. Originally from Woodbridge, Virginia, Alex holds a doctorate in educational leadership from Walden University, a master’s degree in public school administration from the University of Virginia’s Curry School of Education, and a bachelor’s degree in history and secondary education from James Madison University.



Carlyle Currier

Rancher
Vice President – Colorado Farm Bureau

Carlyle Currier is a fourth-generation rancher at Molina, CO, raising beef cattle, alfalfa, grass hay, and small grains. A graduate of CSU, Carlyle is involved in many agriculture and community organizations. He is currently serving as Vice President of Colorado Farm Bureau, Board Chairman of the Colorado Agriculture Water Alliance, represents the Colorado River Basin on the State’s Interbasin Compact Committee, and is a board member of the US Meat Export Federation.

He also serves as Treasurer of his church and of a church youth camp. He and his wife, Dawn, have two children who are also both CSU grads.





Tanner Ehmke

CoBank
Manager, Knowledge Exchange Division

Tanner Ehmke is manager of CoBank’s Knowledge Exchange that provides market and industry research on sectors affecting the rural economy, including grains, oilseeds, biofuels and farm supply; animal protein; dairy; specialty crops; and power, energy and water. Prior to joining CoBank in 2015, Tanner farmed and marketed seed for his family’s seed company in western Kansas where his family homesteaded in 1885. He previously was a commodities analyst at AgResource Company in Chicago, a markets reporter for Dow Jones at the Chicago

Board of Trade, and an agricultural journalist covering crop production and farm business management. Tanner holds a bachelor’s in Agricultural Economics and a master’s in Agricultural Business, both from Kansas State University.



Karen Gerwitz

World Trade Center Denver
President and CEO

Karen Gerwitz brings 30 years’ experience in international business to the organization in the private, public and non-profit sectors. Her enthusiastic vision for how Denver can become a more globally conscious city is what is driving the organization to its new development in the RiNo neighborhood near downtown. With business development, strategic growth and marketing as her main functional expertise, Karen has served overseas in Ghana and Austria, and in Colorado in multiple sectors including IT, Aerospace, Lumber, Science,

Mining, and Government. Her protocol and international cultural expertise prepared her well to host the official visits of the Emperor and Empress of Japan, the G8 Summit, the Western Hemisphere Ministerial Summit, and hundreds of other delegations. She earned her Bachelor of Science Degree in International Business and her Master of Public Administration from the University of Colorado.





Mike Kopp

Colorado Concern
President and CEO

Mike Kopp is the President and CEO of Colorado Concern, an alliance of top business executives with a mission of enhancing the Centennial State's business climate.

Mike's career began as a paratrooper in the 82nd Airborne Division. In Ranger School he seized upon and never let go of the Ranger Creed's line, "Surrender is not a Ranger word." He often notes that this phrase has shaped him like none other. Mike also served as a hot shot firefighter.

After his undergraduate work he spent several years in executive leadership positions in ministry and nonprofit work. Mike put his experience to work as a businessman and for nearly a decade he provided organizational development consulting services around the U.S.

Mike served on the senior management team of Colorado's largest electric cooperative where he oversaw the Corporate Affairs Division which provided leadership for its professional development, legislative and regulatory affairs, corporate communications, public affairs and member relations functions.

He won a highly competitive race for a Colorado state senate seat and was re-elected to a second term. During his tenure he was chosen by his peers to serve as Caucus Chairman and Senate Minority Leader. He later won his party's state convention in a bid to become Governor in 2014.

Mike thrives on cycling, running, hunting, reading and fishing. He loves endurance sports having recently become an Ironman 70.3 racer. Mike and his wife Shannon live in Golden with two of their five children whom they are crazy about. Mike and his family enjoy spending time on their small ranch near the Black Hills where their focus is on conservation.

Mike earned a Master of Public Administration at CU-Denver and serves on several nonprofit boards including the Griffith Centers for Children, EPIC (Executives Partnering to Invest in Children), Rose Community Foundation Healthcare Committee and the Barton Institute for Philanthropy and Social Enterprise at The University of Denver.





Shawn Martini

Colorado Farm Bureau
Vice President of Advocacy

As the Vice President of Advocacy for the Colorado Farm Bureau, Shawn works to cultivate relationships with community, political and business leaders to achieve CFB’s public policy goals. Shawn previously worked as a consultant in communications and issue advocacy for oil and natural gas industry clients, ranging from large multinationals to family-owned firms both in Houston, TX and in Denver, CO. He worked on projects related to the Keystone XL pipeline, offshore and Arctic energy production in Alaska, and directed campaigns on hydraulic fracturing and public lands energy production in the Mountain West. Prior to his work in the energy industry, Shawn served as the Communications Director for the Colorado Farm Bureau from 2008 to 2012. He comes from a diversified agriculture background and graduated from both Northeastern Junior College and Metropolitan State University in Denver.



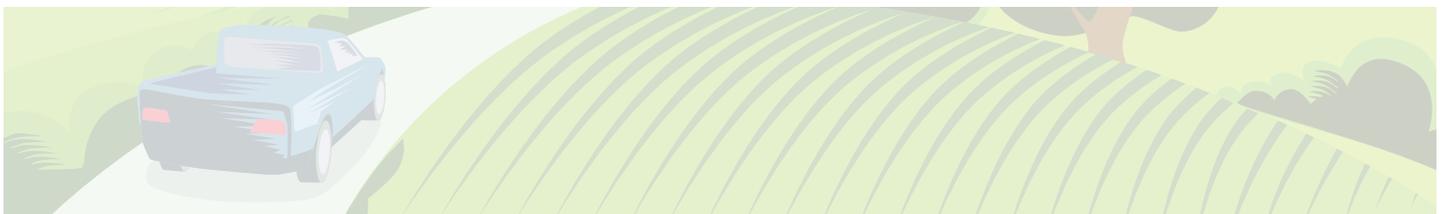
Gregg Moss

City of Westminster
Innovation Coordinator

Gregg Moss became the Innovation Coordinator for the City of Westminster in Summer 2019. Prior to that, Moss served as the President and CEO of the Metro North Chamber of Commerce for more than two years. Moss is a visionary. He focuses on strengthening the region’s business culture in ways that are intentional and collaborative. Committed to business and the entrepreneurial spirit, he has a rich history of working with for-profits and non-profits alike. Moss enjoys the Colorado experience and explores it regularly with his family.

Moss came to the chamber from Lakewood’s Mile Hi Church, where he oversaw the nonprofit as executive director. Moss was also an anchor and business reporter at 9News for more than two decades before announcing his retirement from the news station in July 2016. Prior to that, he worked at the Denver Business Journal as associate publisher/marketing director in the early 1990s. While at the DBJ, Moss would appear on Channel 9 discussing business topics, showing a natural talent for television. That evolved into a full-time job with KUSA.

Moss moved to Colorado in 1985 from New Orleans, where he graduated from Loyola University with a double major in communications and social work.





Commissioner Steve O'Dorisio
Board of County Commissioners
Adams County

Commissioner Steve O'Dorisio brings a wealth of information to his role in Adams County. He uses his experience in construction, his law degree from Denver Sturm College, and private sector global management experience to guide issues in social justice, equity, and neighborhood prosperity.

Commissioner O'Dorisio formally served the people of Adams County as a Deputy District Attorney for the 17th Judicial District of Colorado where he prosecuted a variety of crimes and sought justice by balancing the interests of the victim, the community, and the defendant. He continuously strives to make sure vulnerable residents have opportunities and everyone has a voice.

Commissioner O'Dorisio serves on various community boards, including the Denver Regional Council of Governments, Aerotropolis Regional Transportation Authority, and Highway 7 Coalition. When he is not bolstering regional connectivity, Commissioner O'Dorisio can be found innovating new strategies to retrofit historic neighborhoods with sidewalks and safe routes to school or guiding the successful adoption of policies to mitigate the impacts of growth and new development.

As a former agent of justice, Commissioner O'Dorisio is a compassionate servant of equity in social justice issues. He has a passion for proactive code compliance that partners with neighborhoods and he works to ensure the Criminal Justice Coordinating Council meets the needs of our residents.





Kevin Patterson

Connect for Health Colorado
CEO

Kevin Patterson has served as Chief Executive Officer of Connect for Health Colorado since April of 2015. He previously served as chief administrative officer and interim chief of staff to Governor John Hickenlooper and has an extensive history of public service. Kevin has served as the interim executive director of three state agencies during leadership transitions, the Governor’s Office of Information Technology, the Colorado Department of Local Affairs and the Governor’s Energy Office. He brings a strong understanding of state government and stakeholder engagement to this role.

Kevin has held leadership roles for the city and county of Denver in the Budget Office, the Planning Department, the Department of Human Services, the Department of General Services and the Department of Parks and Recreation. He was elected to the Denver Board of Education in 2001 and reelected in 2005. He serves on the Denver Zoological Foundation’s Leadership Council, the Health subcommittee of the Rose Foundation, and serves as a board member on the Tennyson Center for Children and the Keystone Policy Center.

Kevin graduated with a B.A. in Teaching from Sam Houston State University and holds both a Master of Public Administration and a Master of Urban Regional Planning from the University of Colorado at Denver.



Christine Scanlan

Keystone Policy Center
President and CEO

Christine Scanlan is President and CEO of the Keystone Policy Center, a nonprofit organization which over the past 40 years, has built a portfolio of substantive work in energy, environment, education, health, and agriculture. Keystone has accomplished this work with a series of complementary approaches that reflect the diverse strategies utilized in leadership and successful issue resolution.

Christine joined the Keystone Policy Center from her role as Director of Legislative Affairs and Strategic Initiatives and Senior Education Policy Advisor to Colorado Governor John Hickenlooper. Prior to her senior staff role in the Governor’s Office, Christine was a Colorado State Representative for House District 56 and served in leadership as Majority Whip.

In earlier years, Christine had previously been at Keystone as Senior Vice President and COO. Christine has extensive public policy experience as a seasoned facilitator, negotiator and policy expert and is a respected leader in finding policy solutions through collaborative dialogue to complicated issues of urgency and importance. Christine received both her MA Nonprofit Management and BA History from Regis University, Denver, Colorado.



Don Shawcroft

Rancher

President – Colorado Farm Bureau

Don Shawcroft is serving his fifth term as the President of the Colorado Farm Bureau. Shawcroft is a fourth-generation rancher who began his Colorado Farm Bureau career in the Young Farmers and Ranchers program. He has over 20 years of experience as a member of the Farm Bureau Board of Directors, and a clear vision of what he hopes to help Colorado Farm Bureau accomplish in the coming years.

Before his State Board tenure began, Shawcroft was the CFB Young Farmers and Ranchers Committee Chairman and winner of the 1983 State YF&R Discussion Meet. He has served as the Conejos County Farm Bureau President and Vice President and as the First Vice President of the Colorado Farm Bureau Mutual Insurance Company. Outside Farm Bureau Shawcroft has chaired the Colorado Agricultural Water Alliance and is a current board member of the Mountain States Legal Foundation. Don is a member of the Colorado FFA Hall of Fame.



George Sparks

Denver Museum of Nature and Science

President and CEO

George Sparks has been the President and CEO of the Denver Museum of Nature and Science since November 2004. He spent 24 years in the electronics measurement business at Hewlett-Packard and Agilent Technologies. His career included marketing, sales, and general management of global businesses in software, systems, and services.

Prior to joining Hewlett-Packard, George spent nine years in the Air Force as a pilot and as an Assistant Professor of Aeronautics at the USAF Academy (1976-1978). He is a Distinguished Graduate of the USAF Academy with a BS in Aeronautical Engineering and holds an MS in Aeronautics and Astronautics from MIT.

George's passion is public policy, particularly around science and education. He is a member of the Colorado Forum, and is on the Boards of Aspen Academy (an independent school), Colorado Education Initiative, Colorado Music Hall of Fame, Denver Metro Chamber of Commerce, Denver School of Science & Technology and National Western Stock Show Association.





Barbara Walz

Tri-State Generation and Transmission Association, Inc.
Senior Vice President of Policy and Compliance/Chief Compliance Officer

Barbara is the Senior Vice President of Policy and Compliance/Chief Compliance Officer for Tri-State Generation and Transmission Association, Inc. She has been with Tri-State for 22 years. She leads a professional staff responsible for government relations, energy and environmental policy, environmental and electric reliability compliance, safety, security and other external matters. She is responsible for developing and supporting corporate policies and initiatives that relate to energy and environmental issues while interfacing with state and federal elected officials, representatives from Tri-State’s member co-ops, and other key policymakers from organizations and businesses in the association’s service territory.

Tri-State is a wholly member-owned generation and transmission cooperative serving in Colorado, Nebraska, New Mexico and Wyoming. Tri-State also owns a generation station in Arizona. The association generates and transmits wholesale electricity to its 43 member cooperatives and public power districts, which supply retail electricity directly to consumers in a service area that covers approximately 200,000 square miles with a population of about 1.5 million.

In conjunction with her position at Tri-State, Barbara serves on the Washington DC based Carbon Utilization Research Council. She also sits on the Electric Power Research Institute’s Executive Committee (past chair) and Environmental Council. She serves on the University of North Dakota’s College of Engineering and Mines Executive Board and the UND Engineering Alumni Academy. She is a member of the Board of Directors for the Colorado Chamber of Commerce.

Barbara graduated from UND with a B.S. in chemical engineering and earned a master’s degree from the University of Denver in Environmental Policy and Management. She holds a certificate in Financial Success for Nonprofits from Cornell University. Barbara worked as the Assistant Director of Environmental Affairs for the National Paint and Coatings Association in Washington, DC and as the Western Region Compliance Manager for Foster Wheeler Environmental.

Barbara lives in Lakewood, Colorado with her husband Thomas Lipetzky and enjoys golf, swimming and competing in Triathlons.





Chad Vorthmann

Colorado Farm Bureau
Executive Vice President

Chad Vorthmann was born and raised on a fourth-generation row crop and cattle farm in southwest Iowa. He attended the University of Nebraska, competed on the livestock judging team and studied journalism and diversified agriculture. After college, he worked as a beef nutrition specialist. Two years later, he joined the staff of the Nebraska Cattlemen's Beef Association and was eventually hired to run the national Beef Quality Assurance program for NCBA. Wanting to work more closely with grassroots members, Vorthmann went back to the state level, joining Colorado Farm Bureau in 2002 as the Director of Communications. He was promoted to Vice President of Organization in 2007 and Executive Vice President in 2012. Chad's wife, Garin, works for Colorado Legislative Strategies, who provides contract advocacy services for Colorado Farm Bureau. The couple has two daughters. Chad enjoys cycling, and hunting elk, deer and black bear on the family's cattle ranch in Southwest Colorado.

Special Thanks to Additional Contributors

- Cristal DeHerrera – Denver International Airport
- Bob Frankmore – Tri-State Generation and Transmission Association, Inc.
- Laura Jackson – Denver International Airport
- Drew Kramer – Tri-State Generation and Transmission Association, Inc.
- Sara Leahy – Colorado Rural Health Center
- Patrick Pratt – Pac/West
- Mark Truax – Pac/West
- Ezra Watland – Connect for Health Colorado

Thanks to Staff Who Contributed to the Success of this Project

- Zach Riley – Colorado Farm Bureau
- Taylor Szilagyi – Colorado Farm Bureau

Thanks to Guest Speakers Who Helped Inform the Task Force

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- Elizabeth Garner – State Demographer, State of Colorado
- Rebecca Jablonski – Assistant Professor and Extension Economist in Food Systems, Colorado State University
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- Chantal Unfug – Director, Division of Local Government, Department of Local Affairs (DOLA), State of Colorado

Executive Summary

The Rural-Urban Nexus

Throughout the Task Force's deliberations on various aspects of agriculture and the rural economy, one idea consistently surfaced as a part of the discussion. This was the idea that Colorado's urban and rural communities and their economies are intrinsically linked. They rely on one another and succeed together. Whether discussing the problems facing rural health care or the emergence of new technologies on the farm and ranch, Task force members consistently noted the similarities with what they saw in urban areas and how the two types of communities shared many of the same root problems, even if those problems looked different at first glance.

We encourage the reader to keep in mind this idea of a rural-urban nexus when reading the findings in this report. Consider how policymakers, along with business and community leaders can consider this interconnectedness when creating new policies, developing businesses, and identifying opportunities to help improve the future of agriculture and rural Colorado. These same steps could improve urban Colorado at the same time.

Rural Health Care

Access to and affordability of rural health care services is critical to the continuing success of rural communities and agriculture producers at the individual farm and ranch level. The affordability of these services should not be overlooked. Agriculture is unique in its structure and location, making health care a critical need on the farm and ranch, at the community level, and across the state. From the availability of treatment options and distance to essential services to the affordability of health insurance, agriculture and rural communities face a significant challenge when it comes to health care. Pay, quality of life, quality of care, lack of quality affordable housing, and other factors all contribute to the difficulty of recruiting in rural hospitals and clinics. With changes to health care policy at a national level, the Task Force anticipates that uncertainty about the cost of health care will continue to be a problem for rural communities well into the future. Local and state policymakers can make some changes to help alleviate this uncertainty.

On the Farm and Ranch

State policymakers should improve profitability and expand care.

- Prioritize funding for rural health care services.
- Reduce costs for rural hospitals.
- Provide additional funding and support for Colorado Crisis Services and similar behavioral health programs.

Congress should fully fund the FRSSAN at the \$10 million level authorized in the 2018 Farm Bill.

- USDA should work quickly to create the grant program and allocate funding as quickly as possible.

In the Rural Community

Local policymakers and leaders should:

- Explore creative ways to keep rural hospitals operating and financially sound.
- Incentivize and retain rural health care workers in their communities.
- Explore ways to lower costs for hospitals and their workers by providing tax breaks, creating special health care districts, or subsidizing housing for health care workers.

At the State Level

State policymakers should:

- Explore solutions to reduce the cost of operating rural hospitals to keep them financially sound.
- Look for ways to encourage insurance companies to provide coverage in counties where only one provider exists. Policies that create barriers to entry in these rural markets should be assessed and changed to better incentivize providers to enter these markets.
- Incentivize and ease investment in telehealth solutions for rural communities, particularly as it pertains to the delivery of behavioral health services.
- Prioritize assisting rural health care providers in capturing more federal grant dollars allocated for the expansion of telehealth services.



Natural Resources

Agriculture is a primary steward of Colorado's natural resources. From the beneficial use of water and the production of various forms of energy to the efficient utilization and management of grass, forest, and wildlife resources on both public and private lands, Colorado farmers and ranchers are engaged in a daily mission to help manage natural resources. Efficiencies gained through new technology, in concert with the leasing of agriculture water to municipalities, could represent a new path forward for using less, and maintaining irrigated agriculture in rural Colorado. Work is also being done by Colorado's ranchers to improve the health and vitality of Colorado's creeks, streambeds, and other waterways.

Farmers and ranchers have many opportunities for advancement and growth when it comes to future energy development in Colorado. From renewable production to traditional oil and natural gas development, Colorado's agriculture will continue to benefit from energy creation well into the future. While producers are an essential voice in this discussion, other stakeholders must be willing to engage in that dialogue if agriculture is to be successful in the future.

On the Farm and Ranch

Water

- Agriculture producers should implement additional practices to:
 - Reduce water use.
 - Improve efficiency.
 - Be mindful of return flows and the maintenance of the water system as a whole.
- Agriculture producers should continue to embrace technologies, such as drought-tolerant crops that can improve yields with less reliance on scarce water resources.
- Investments should be expanded in individual agriculture operations through entities like Great Outdoors Colorado which should increasingly focus on outcomes-based results to ensure every dollar is put to its best use.

Energy

- Agriculture and energy producers should collaboratively explore innovative methods and alternative uses for energy that is under-utilized through current processes.
- Energy producing companies should work to maximize the economic benefits to farmers and ranchers through the siting and construction of new energy infrastructure and work to maximize revenues that flow to those producers.
- Farmers and ranchers should examine both the costs and benefits of hosting energy infrastructure on their land and look for ways to make needed changes to their operations that could improve their ability to site that infrastructure.

In the Rural Community

Water

- Both agriculture producers and municipalities must remain engaged and accept the shared goal that future Alternative Transfer Mechanisms (ATMs) are usable, sustainable, flexible and help to both keep water in agriculture and supply municipal needs.



Energy

- Rural leaders should work to attract future renewable energy development and cultivate an environment where both the community and project developers can maximize their returns.
- Rural leaders should work to advocate at the state and local levels for robust renewable energy development and help to alleviate potential areas of conflict among local stakeholders.

At the State Level

Water

- State policymakers must:
 - Prioritize storage projects and look for ways to streamline regulations that are hindering storage capacity.
 - Find a sustainable and long-term funding source for the Water Plan in order to ensure the greatest success in achieving its goals.
 - Ensure that demand management on a river system will be voluntary and include compensation for water rights holders.

Energy

- State policymakers and civic leaders should work together with rural and agricultural interests to better understand the dynamic between agriculture and energy production and explore ways to allow for continued robust energy production in rural communities and on agricultural land across the state.

Technology and Infrastructure

In the last several decades, dramatic changes in the way farms and ranches are run have changed the face of the industry. Now agriculture producers are working to implement new technologies in both crop and livestock production. Frequently called “smart agriculture” these new technologies not only help optimize overall agriculture production, but also have the potential to further reduce and better optimize labor costs, reduce agricultural input use, and increase environmental sustainability. Venture capital is streaming into agricultural and food technology and Colorado is well placed to attract a larger share of that capital in the coming years.

Equally important to the growth of on-farm technology and the proliferation of smart agriculture practices, is the technology that underlies those products and makes their use possible. Broadband infrastructure along with wired and wireless connectivity in rural Colorado is absolutely critical to the future growth of smart agriculture. Finally, new technologies stand ready to help improve efficiencies in transportation and logistics, but those must not overshadow the underlying highway, road, and bridge networks that enable this advancement to occur.

On the Farm and Ranch

Policymakers must understand the costs of implementing new technologies, as well as recognize their benefits. The adoption of these technologies should play into discussions on sustainability, climate change, and labor with an eye toward encouraging, not impeding their broader adoption.

Both state and local policymakers should work to incentivize and improve knowledge sharing on smart agriculture and develop models to ensure the industry is credited with improvements on key metrics using such technology.



Broadband

- Local officials should ensure an ordered and streamlined permitting process for the installation of new telecommunications infrastructure and work to mitigate the kind of opposition that can jeopardize new projects and existing equipment upgrades.
- As the need for new wireless infrastructure sites increases, wireless providers should think about ways to access and connect landowners with local policymakers to ensure concurrent buildouts. By creating an alliance with multiple landowners, organizations, and policymakers, operators will be able to better streamline the process of locating and constructing new infrastructure sites.

Transportation

- Agriculture producers should aggressively investigate how driverless technology could be implemented on their farm or ranch when the technology becomes feasible
- Local and state policymakers should work to incentivize businesses that seek to apply driverless technologies to agricultural use-cases.

In the Rural Community

Broadband

- Rural leaders should think outside the box on how to create new opportunities for broadband deployment in their community. The creation of new funding mechanisms and public-private partnerships should all be on the table.
- Rural leaders and policymakers should make sure their communities push for continuous updates to Colorado regional broadband plans.
- Any new facilities and equipment should be installed with an eye toward future increased data usage. While connectivity is important, expanded rural networks must be built to serve tomorrow, not today.
- Federal policymakers should work to ensure that broadband funding is being directed to agencies that have a good working knowledge of rural America. To that end, they should explore directing Universal Service Fund dollars through the USDA Rural Utility Service to ensure dollars are spent in the best way possible for the unique nature of rural network deployment.

Transportation

- Policymakers must prioritize improvements to transportation safety on rural roads and work to reduce the rural auto accident fatality rate.
- Future efforts to increase the number of hybrid and electric vehicles on Colorado's roadways should be coupled with programs that ensure equitable funding of the state's roads by the owners of those vehicles.

Rural Economic and Social Change

Rural Colorado's economies and populations are changing rapidly. Demographic shifts, economic changes, technology, and other forms of social and economic disruption are creating a flurry of change to the way farms and ranches across Colorado operate. This change will be ongoing well into the future and agriculture must continue to adapt and be flexible in response.

Many family farms and ranches are making significant changes to their business models, altering the way they operate and market their products. Others are changing ownership structures and reorganizing their businesses. Many farmers and ranchers will confront the challenge of transitioning their operations to the next generation soon. A focus on succession planning, the use of conservation easements, improving

rural quality of life, and improvements to rural education will all be necessary to ensure the success of agriculture and rural communities in the coming years.

On the Farm and Ranch

Agriculture Marketing

- Agriculture producers should carefully seek out information and support on diversifying their farms and ranches to seek new markets.
- Subject matter experts at public institutions like universities and state agencies such as the Colorado Office of Economic Development and International Trade (OEDIT) and the Colorado Department of Local Affairs (DOLA) should work to create a clearinghouse for access to education and information about how producers can use existing resources to leverage opportunities in new marketing channels.
- Food purchasers should look for ways to partner with farmers and ranchers to collaboratively develop agreements and processes that can alleviate the difficulties of things like supply chain management to better and more efficiently source locally produced food and commodities.

Succession Planning

- Farm and ranch families must resolve to prioritize estate and succession planning activities on their operations. Individual producers should become evangelists for engaging in the planning process and help friends and neighbors access the resources available to make the process productive.
- Producers should plan now for future reductions in estate tax exemption limits.

Conservation Easements

- Local and state policymakers should develop plans to ensure that anticipated growth in conservation easements is included in future land-use planning efforts. This could help alleviate complications associated with future necessary development or infrastructure construction.

In the Rural Community

Rural policymakers and leaders must adopt a growth mindset and think creatively about policies that can support those goals. Communities should focus on their strengths and aim to grow their base of agriculture-related businesses and diversify among the agriculture and food value chain.

Amid efforts to attract new business investment, rural communities should work to identify and make available existing infrastructure and assets (e.g. buildings and machinery) which may aide and speed new business investment.

State policymakers should identify ways to augment federal opportunity zone investment incentives with state-based matching incentives.

Rural Education

- Rural communities and agriculture producers must work to find creative ways to provide additional funding for rural schools. Innovative local programs must be created to help not only attract teachers but also to support them once they've taken a position.
- State policymakers must understand, accommodate, and encourage innovative and non-traditional educational pathways and partnerships.

Access to and affordability of rural health care services is critical to the continuing success of agriculture at the individual farm and ranch level. And the affordability of these services should not be overlooked.



Full Report

Rural Health Care

Agriculture is unique in its structure and location, making health care a critical need both on the farm and ranch, at the community level, and across the state. From the availability of treatment options, distance to essential services, to the affordability of health insurance, agriculture and rural communities have a significant challenge when it comes to health care.

Health Care on the Farm and Ranch

Multiple factors contribute to the necessity of having quality health care services proximate to rural communities and within reasonable driving distances from rural populations, farms, and ranches. One factor is the age of the average farmer and rancher. 31 percent of farm and ranch operators are 65 years or older. Nationwide, the average age of farm operators is 58.¹ As this population continues to age, access to health care services will become increasingly important.

Another factor is the dangers associated with farm and ranch work. Agriculture is ranked as one of the country's most dangerous industries.² Farmers and ranchers are at increased risk from illness associated with chemical and sun exposure, traumatic fatal and non-fatal injury from equipment and livestock, and lung disease. Additionally, due to social norms and farm business structures, agriculture is one of the few professions where children and family members are also at risk from these hazards. Particularly when addressing and treating acute or traumatic injuries in agriculture, geographic proximity to health care facilities is extremely important. Nationally, 60 percent of trauma deaths occur in rural areas, despite having only 20 percent of the total population.³ The average emergency medical services (EMS) response time in rural Colorado is 34 minutes, compared to 23 minutes in urban areas.⁴ The closure of rural health care facilities in some parts of Colorado has pushed drive times between some communities and the nearest health care facility into the hours, rather than minutes.

Increasingly, having nearby health care services that can address behavioral health needs is critical for agriculture operators. A variety of factors collectively referred to as "rural stress" has increased the incidence of farmer and rancher suicide, the incidence of behavioral health issues, and the increasing use of opioids. As a result, farmers and ranchers are nearly twice as likely to commit suicide as their urban counterparts.⁵ In addition to suicide, addiction continues to be a serious concern in rural communities. More than 74 percent say they have been personally impacted by opioid addiction.⁶ These two issues, suicide and addiction, are compounded due to the lack of behavioral health care services in rural Colorado. 22 of 24 rural Colorado counties have no licensed behavioral health professional, and more than half have no licensed addiction counselor.⁷ This is a problem that warrants exploration to address and destigmatize mental health.

Some progress is being made in improving rural health care access and outcomes. The percentage of rural residents with no health insurance dropped in the last five years from 23 percent, down to 12 percent. (However, rural insurance premiums are significantly higher than those in the Denver metro area, with some regions paying as much as double—see Health Care in Rural Community section). And many efforts are being undertaken to increase the availability and quality of mental health and addiction care. At the individual farm and ranch level, the Colorado Department of Agriculture, in partnership with Colorado Farm Bureau, Rocky Mountain Farmers Union, and other agriculture groups have launched an awareness campaign designed to increase rural public awareness of existing mental health services such as the Colorado Crisis Services mental health hotline.⁸

¹ USDA NASS (2017) Census of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf.

² National Institute for Occupational Safety and Health (2018) Farm Safety Survey.

³ Colorado Rural Health Center (2019) Snapshot of Rural Health in Colorado. <https://coruralhealth-wpengine.netdna-ssl.com/wp-content/uploads/2013/10/2019-Snapshot-FINAL.pdf>.

⁴ Ibid.

⁵ Centers for Disease Control and Prevention (2017) Suicide Trends Among and Within Urbanization Levels by Sex, Race/Ethnicity, Age Group, and Mechanism of Death. https://www.cdc.gov/mmwr/volumes/66/ss/ss6618a1.htm#F1_down.

⁶ Morning Consult Survey for American Farm Bureau Federation, (Oct. 2017) <https://1vix7b4f3jvk2x4eqy1byl1n-wpengine.netdna-ssl.com/wp-content/uploads/sites/13/2017/12/171015-AFB-Opioids-LE.pdf>.

⁷ Colorado Rural Health Center (2019) Snapshot of Rural Health in Colorado. <https://coruralhealth-wpengine.netdna-ssl.com/wp-content/uploads/2013/10/2019-Snapshot-FINAL.pdf>.

⁸ Depression in Colorado's Farm Country (Mar. 2018) <https://www.coloradofarmbureau.com/2018/03/19/depression-colorados-farm-country/>.

The hotline provides distance care for residents in mental distress and has improved outcomes for rural residents making use of the service. The hotline number is 1-844-493-8255.

At the national level, the American Farm Bureau Federation and the National Farmers Union have created a resource effort to drive awareness about the rural opioid epidemic.⁹ The 2018 Farm Bill has authorized funds for the creation of the Farm and Ranch Stress Assistance Network (FRSAN).¹⁰ FRSAN would deliver grants to local entities working to provide mental health assistance in rural areas across the country.

Recommendations:

- State policymakers should prioritize funding for rural health care services and should look for ways to reduce costs for rural hospitals to improve profitability and expand care. They should also work to provide additional funding and support for Colorado Crisis Services and similar programs.
- Congress should fully fund the FRSAN at the \$10 million level authorized in the 2018 Farm Bill and USDA should work quickly to create the grant program and allocate funding as quickly as possible.

Health Care in the Rural Community

The number of individuals in Colorado covered by health insurance has risen in the past few years. This increase can, in part, be attributed to the Affordable Care Act. While at the same time, however, costs have increased. Despite increased coverage, access to health care is still a challenge for some rural communities. 13 out of 64 counties in Colorado have no hospital, and two—Ouray and San Juan Counties—have no hospital and no clinic.¹¹ Dozens of counties have no access to critical mental health services.¹²

Combined, these factors lead to increased distance and travel time necessary to access health care, which leads to decreased utilization of health care generally and can be the difference between life and death in an emergency. According to the Pew Research Center, “Rural Americans live an average of 10.5 miles from the nearest hospital, compared with 5.6 miles for people in suburban areas and 4.4 for those in urban areas... Taking local traffic patterns into account, that works out to a travel time of 17 minutes for people who live in rural communities, 12 minutes for those in suburban areas and 10 minutes for those in urban areas.”¹³ The differences are even more glaring at the extreme ends of the spectrum. “Among the quarter of rural Americans whose travel time is the longest, it takes an average of 34 minutes to get to the nearest acute care facility, compared with just six minutes for the quarter of rural Americans whose travel time is the shortest.”¹⁴ This problem is further compounded by Colorado’s underfunded transportation infrastructure.

Additionally, access to health care services is expected to be more difficult in the future should more rural hospitals close. In 2015 alone, rural hospitals absorbed more than \$91 million in unreimbursed Medicare claims and bad debts.¹⁵ With costs high, and margins low, rural hospitals are in trouble. But the continued operation of hospitals and clinics is critical to the health of rural economies. Hospitals can be a significant driver of local employment and economic growth, so when they close or leave a community it can create economic havoc and leave thousands with no nearby care. Both access and affordability of care must be addressed to ensure the future health and vitality of our rural communities.

⁹ <https://farmtownstrong.org/>.

¹⁰ 7 USC 5936.

¹¹ Colorado Rural Health Center (2019) Snapshot of Rural Health in Colorado. <https://coruralhealth-wpengine.netdna-ssl.com/wp-content/uploads/2013/10/2019-Snapshot-FINAL.pdf>.

¹² Ibid.

¹³ How far Americans live from the closest hospital differs by community type (2018). Pew Research Center. <https://www.pewresearch.org/fact-tank/2018/12/12/how-far-americans-live-from-the-closest-hospital-differs-by-community-type/>.

¹⁴ Ibid.

¹⁵ Colorado Rural Health Center (2019) Snapshot of Rural Health in Colorado. <https://coruralhealth-wpengine.netdna-ssl.com/wp-content/uploads/2013/10/2019-Snapshot-FINAL.pdf>.

The operation of rural health care is expensive and difficult for a variety of reasons. It is difficult to recruit and retain quality health care professionals. In Colorado, it takes an average of one to three years to hire a health care professional, and less than half, only 40 percent, remain in the same community beyond five years.¹⁶ The issues surrounding this problem are diffused but it is thought that pay, quality of life, quality of care, lack of quality affordable housing, and other factors all contribute to the difficulty of recruiting in rural hospitals and clinics. This trend is similar to the difficulty rural schools have in recruiting and retaining talented teachers. Rural communities that can effectively support their local health care facilities and improve their quality of life will better succeed in attracting and maintaining talent.

Telehealth solutions—e.g. electronic medical records, electronic medical imaging, and the ability to email, call, or participate in a video call with a doctor or nurse—can help address the shortage of health care professionals in rural areas. The technology can be particularly useful in the care of patients with chronic conditions and in delivering patient counseling and mental health care.¹⁷ It can help reduce staffing costs and improve outcomes for rural patients.

Recommendations:

- Rural civic leaders should be creative in exploring ways to keep rural hospitals operating and financially sound. They should also look for ways to incentivize and retain rural health care workers in their communities. Ideas to provide tax breaks, create special health care districts, subsidized housing, or other ways to lower costs for hospitals and their workers should be explored. Explore visiting nurses contracts and incentivize to stay permanently.
- Work with health care providers and local stakeholders to expand telehealth opportunities in rural communities to provide basic health services.

Health Care at the State Level

Coloradans spend a large amount of money on health care but luckily at a rate at or below the national average. However, in some parts of rural Colorado, particularly on the Western Slope, health insurance premiums are double the cost of premiums in urban areas.¹⁸ High insurance premiums are reflective of high care costs. In many areas of rural Colorado those high costs are due to a high unit cost associated with health services. In other areas, it is thought that a lack of competition among insurers is also driving up costs. 44 Colorado counties have two or less insurance providers. 14 counties—all in rural Colorado—have only one insurance provider, and 30 have only two.¹⁹

With changes to health care policy at a national level, the Task Force anticipates that uncertainty about the cost of health care will continue to be a problem for rural communities well into the future. State policymakers can make some changes to help alleviate this uncertainty.



¹⁶ Ibid.

¹⁷ Colorado Commission on Affordable Healthcare (2017) Final Report <https://www.colorado.gov/pacific/sites/default/files/Cost%20Commission%20June%202017%20report%20FINAL%206.30.17.pdf>.

¹⁸ Ibid.

¹⁹ Ibid.

Recommendations:

- State policymakers should explore similar solutions to reduce the cost of operating rural hospitals to keep them financially sound.
- State policymakers should look for ways to encourage insurance providers to provide coverage in counties where only one provider exists. Policies that create barriers to entry in these rural markets should be assessed and changed to better incentivize providers to enter these markets.
- Efforts should be made to incentivize and ease investment in telehealth solutions for rural communities. Particularly as it pertains to the delivery of mental health services. State and local officials should prioritize assisting rural health care providers in capturing more federal grant dollars allocated for the expansion of telehealth services.
- Claims and provider utilization data should be more readily shared to help providers and insurers to better understand the ways in which costs can be reduced and resources more efficiently utilized.



Natural Resources

Agriculture is an important steward of Colorado's natural resources. From the beneficial use of water and the production of various forms of energy to the efficient utilization and management of grass, forest and wildlife resources on both public and private lands, Colorado farmers and ranchers are engaged in a daily mission to help manage natural resources. More must be done to inform and engage the public and policymakers about the necessity of agriculture as a management tool for these resources, and the economic and environmental benefits that accrue from that management. For instance, common grazing and tillage practices can help increase carbon sequestration, improve the carrying capacity of the land and increase soil nutrients. Additionally, a focus on outcomes-based programs can help ensure clarity on the achievements of specific policies as opposed to efforts to mandate techniques. While producers are an essential voice in this dialogue, other stakeholders must be willing to engage if agriculture is to be successful in the future.

Natural Resources on the Farm and Ranch

Water

Agriculture is the largest diverter of water resources in Colorado. Agriculture, however, is also the most efficient use of that water. Agricultural water resources are utilized for irrigation multiple times before returning to the state's water system. Where consumptive use occurs, it is important to remember that such uses go to the vital work of producing food for an ever-growing population. Many on-farm efforts are underway to implement new technologies and management practices that reduce consumptive use and improve irrigation efficiency in an effort to improve stewardship of Colorado's water resources.²⁰ For instance, new drought-tolerant corn varieties made up more than 20 percent of corn acreage nationwide in 2016.²¹ Efficiencies gained through these technologies, in concert with the leasing of agriculture water to municipalities, could represent a new path forward for using less and maintaining irrigated agriculture in rural Colorado.

Work is being done by Colorado's ranchers to improve the health and vitality of Colorado's creeks, streambeds and other waterways. The restoration of waterways not only aids in environmental conservation efforts, but also helps better manage water resources through the reduction of phreatophyte species and improving stream flows. Individual operators have many options to partner with both public and private entities to reduce the cost of such improvements and work to improve streambeds across the state is ongoing.

Recommendations:

- Agriculture producers should continue to make every effort to implement additional practices that reduce water use and improve efficiency, taking into consideration return flows and the maintenance of the water system as a whole.
- Agriculture producers should continue to embrace technologies, such as drought tolerant crops that can improve yields with less reliance on scarce water resources.
- State investments in individual agriculture operations through entities like Great Outdoors Colorado should be expanded, but should also be increasingly focused on outcomes-based results to ensure every dollar is put to its best use.

²⁰ Colorado Ag Water Alliance (2008) Meeting Colorado's Future Water Supply Needs. https://docs.wixstatic.com/ugd/302b62_c1c172d1059447bda7dfa1a08aa11f88.pdf.

²¹ USDA Economic Research Service, Drought-Tolerant Corn in the United States: Research, Commercialization, and Related Crop Production Practices (2019) <https://www.ers.usda.gov/amber-waves/2019/march/drought-tolerant-corn-in-the-united-states-research-commercialization-and-related-crop-production-practices/>.

Energy

Energy production of all kinds has been a boon for agriculture producers and rural communities in the last decade. The ability of agriculture producers to leverage and utilize natural resources on their land has provided additional revenue streams, helping many farms and ranches to stay afloat, improve their finances, invest in new equipment or land, and preserve their future. In some places along the Western Slope, and in northeast Colorado, this is predominantly through new oil and natural gas production. But all along Colorado's eastern plains, wind energy production has been the primary driver of energy production.

Energy is an essential part of modern food and agriculture production. Considerable energy is needed to operate equipment, manufacture fertilizers, transport grains and livestock, process food, and keep it fresh. This means that the agriculture industry in Colorado has not just benefited directly from the extraction of oil and natural gas or the production of renewable electrical power, but also from the reduced costs associated with that production. Despite lower overall costs on a state-by-state basis, Colorado agriculture producers face challenges on the affordability of electricity. Overall, agriculture producers in Colorado spend \$185 million on electricity expenses every year.²²

In 2015, the Colorado Energy Office, the Colorado Department of Agriculture and the USDA Natural Resource Conservation Service (NRCS) teamed up to create the Colorado Agricultural Energy Efficiency Program. The program performs free on-farm energy audits, a preliminary renewable energy assessment, technical assistance, and support for the financing and implementation of energy efficiency projects. The program focuses on improvements to energy efficiency for dairies and other high-consuming agricultural facilities, but more progress can be made in improving outcomes for agricultural irrigators. Despite only accounting for a quarter of Colorado's total cropland acres, irrigated acres account for 47 percent of total agricultural energy use due to the power needed to operate water pumps.²³ This represents an area in need of additional research and assistance in lowering costs and improving efficiencies.

Despite the challenges on the expense side of the equation, individual agriculture producers can benefit from the production of energy in several ways. The most common is the leasing of minerals held by agriculture landowners to energy companies. When wells are drilled and begin producing oil or natural gas, mineral owners receive a share of the revenue those wells generate. Similarly, many producers also receive revenues from the lease of surface rights and rights-of-way on their land to locate oil and natural gas wells, wind turbines, and solar arrays.

Farmers and ranchers have several opportunities for advancement and growth when it comes to future energy development in Colorado. First, new investments in renewable energy are being made by Colorado utilities that will open new areas for leasing wind and solar generation sources on agricultural land. Wind power generation represents 76 percent of Colorado's renewable electricity production and 22 percent of all electricity production.²⁴ Almost all such production takes place on agricultural land on Colorado's eastern plains. The construction and operation of wind power installations provides lease revenue to landowners and creates expanded economic activity in the communities where new facilities are constructed.

Tri-State Generation and Transmission Association, Inc., the wholesale power supplier to most of Colorado's rural electric cooperatives, is implementing its "Responsible Energy Plan" to guide the transition to a cleaner energy profile. Among many other components, the plan outlines the retirement of fossil fuel generation, adds significantly to Tri-State's current 475-MW renewable portfolio and takes steps to ensure the reliability and affordability of the cooperatives' power system. Xcel Energy has committed to revitalizing its energy generation portfolio in Colorado, committing to more than \$2.5 billion in development in eight predominantly rural counties. The Colorado Energy Plan will develop 1,100 megawatts of wind generation and 700 megawatts of solar generation by 2026.²⁵ This is enough to power nearly 700,000 homes.

²² USDA Economic Research Service data (2018) https://data.ers.usda.gov/reports.aspx?ID=17842#P6679e5f7c7684ecea8d2d6edcee52ba3_5_252iTOR0x17.

²³ Ibid.

²⁴ Energy Information Administration (2019) Colorado Profile <https://www.eia.gov/state/?sid=CO>.

²⁵ Xcel Energy (2018) Colorado Energy Plan Fall 2018 Update <https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/Resource%20Plans/CO-Energy-Plan-Fact-Sheet.pdf>.

New oil and natural gas projects in Oregon with the proposed Liquefied Natural Gas (LNG) export terminal and expanded development in western Colorado have the potential to revitalize the energy industry on the Western slope and drive new leasing activities for natural gas wells on land owned by agriculture producers in the Piceance Basin. The planned Jordan Cove LNG export terminal would provide access to new markets for western natural gas in Japan and other countries in the Pacific Rim. As a result, additional gas well drilling is expected to occur and provide additional lease revenue for agricultural landowners.

Recommendations:

- The Colorado Agricultural Energy Efficiency Program should expand its focus to aid producers in optimizing irrigation pump efficiency by providing assessments, technical assistance, and funding for the optimization of existing pumps and the installation of newer, more efficient electric irrigation pumps.
- Agriculture and energy producers should collaboratively explore innovative methods and alternative uses for energy that is under-utilized through current processes.
- Energy producing companies should work to maximize the economic benefits to farmers and ranchers through the siting and construction of new energy infrastructure and work to maximize revenues that flow to those producers.
- Farmers and ranchers should examine both the costs and benefits of hosting energy infrastructure on their land and look for ways to potentially change their operations to increase their flexibility in siting that infrastructure.

Natural Resources in the Rural Community

Water

Irrigated agriculture in Colorado is a significant driver of the total agriculture economy. This is due to the dramatically higher productive capacity of irrigated vs. non-irrigated farmland. By 2060 Colorado's population is expected to double; and by 2050, it is estimated that agriculture can expect to see a 15 to 20 percent decline in the number of irrigated acres as a result of urbanization and water transfers.²⁶ This could mean a loss of 800,000 acres of irrigated farmland and would create a significant economic loss for the rural economies supported by irrigated agriculture.²⁷ The secondary economic impacts from such a loss would be considerable. A study by a group of resource economics professors at Colorado State University found that during the 2012 drought, agriculture lost revenues of \$409 million, with an additional loss of \$307 million in secondary agriculture spending in local rural communities.²⁸

The State Water Plan sets goals to focus on Alternative Transfer Mechanisms (ATMs) as a preference to completely removing irrigation from farmland. These mechanisms allow water rights holders to transfer the use of their water to municipalities for temporary use. This allows municipalities to plan for water-short years and supplement lower supplies and provides water rights holders with an additional revenue stream. The future success of these arrangements will require cooperation among all water users to ensure that agriculture remains productive while supplying the water cities need.

Recommendations:

- Both agriculture producers and municipalities must remain engaged and accept the shared goal that future ATMs are usable, sustainable, flexible and help to both keep water in agriculture and supply municipal needs.

²⁶ Colorado Water Conservation Board Statewide Water Supply Initiative (2010).

²⁷ Colorado's Water Plan, (2015) Chapter 5.

²⁸ Bauman, Goemans, Pritchett, Thilmann; Estimating the Short and Long-term Economic & Social Impacts of the 2012 Drought in Colorado, (2013) <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1936-704X.2013.03152.x>.

Energy

Aside from agriculture, energy development has been one of the few drivers of some rural economies in Colorado. According to McKinsey, overall job growth in many rural American counties remained flat or shrank from 2007 to 2017.²⁹ One bright spot is “rural outlier” counties, which focused on energy, tourism and mining. For western Colorado, the closure of longstanding coal mines in communities is yet another headwind for future employment. However, new opportunities, such as the Jordan Cove Project, could help job growth. The project would help energy companies market a product already produced in Colorado by alleviating a supply bottleneck. This is expected to drive future growth in the local energy industry and could create an additional \$6 billion in revenue and add 38,000 jobs,³⁰ dramatically improving local economies on the Western Slope suffering from depressed energy and agricultural commodity prices.

Both Xcel’s Colorado Energy Plan and Tri-State’s Responsible Power Plan will provide a boost to the local economies where new generation assets will be located. The construction and maintenance of solar and wind farms generates both temporary and ongoing employment, as well as local procurement spending and increased tax receipts. All of which help to boost local economies during construction and into the future. The Colorado Energy Plan alone is expected to create 1,987 jobs and contribute an extra \$203.6 million to Colorado’s economy during the construction phase of the plan.³¹ With other similar projects announced or anticipated, many rural communities in Colorado may expect to see growth from renewable and traditional energy sources in the coming years.

Recommendations:

- Rural leaders should work to attract future renewable energy development and cultivate an environment where both the community and project developers can both maximize their returns.
- Rural leaders should work to advocate at the state and local levels for robust renewable energy development and help to alleviate potential areas of conflict among local stakeholders.



²⁹ McKinsey, The future of work in America: People and places, today and tomorrow, (2019) <https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-america-people-and-places-today-and-tomorrow>.

³⁰ Consumer Energy Alliance, Natural Gas Markets for the Western States and Tribal Nations (2019) <https://consumerenergyalliance.org/2019/04/western-states-tribal-nations-natural-gas-report/>.

³¹ Xcel Energy, Economic Impacts of the Preferred Colorado Energy Plan, (2018) <https://www.remi.com/wp-content/uploads/2019/05/558-Economic-Impacts-of-the-Preferred-Colorado-Energy-Plan.pdf>.

Natural Resources at the State Level

Water

Stewardship of our water resources is critical to all Coloradans. But development pressure and other competing interests for water typically put agriculture at a disadvantage. The persistent problem of buy-and-dry (the “drying” of farmland through the transfer of agriculture water to municipal use) has been a serious threat to the continued success of irrigated agriculture production in Colorado for decades. Additionally, the continued demand for municipal water and pressure to divert water to the fast-growing Front Range has strained the relationship between the rural areas and the urban center.

The Colorado Water Plan is currently the best policy the state has for managing our water into the future. While the plan is not perfect, executing on its recommendations will help to move the needle and ensure Colorado’s water use remains sustainable. But Colorado must go further in investing and executing on the Colorado Water Plan which calls for an initial investment of \$100 million annually from the state legislature. The price tag is anticipated to increase over time with estimates reaching as high as \$700 million annually being supplemented from the state. The Water Plan cites the supply gaps for municipal, industrial and agricultural water users. It sets a measurable objective of reducing the projected 2050 municipal and industrial gap from as much as 560,000 acre-feet to zero acre-feet by 2030, this will help stem the temptation to buy-and-dry agricultural land. It also emphasizes the need for water storage. As peak runoff of Colorado snowpack continually creeps earlier into the year, the state must recognize it will take not only storage, but potentially a new way to look at storing resources that are available at different times of the calendar year.

Colorado is unique in that it is a true headwater state originating nine major river basins that supply water to 18 states and Mexico. Colorado is part of nine interstate water compacts which outlines Colorado’s obligations to deliver water to downstream states. The water community has been engaged with ongoing discussions regarding the future potential for compact “calls” upon the Colorado river. These “calls” could require Colorado to curtail water diversions in order to fulfill compact obligations, leaving in-state water users with no ability to use water for agricultural, municipal or industrial uses. Water leaders are working with downstream states to develop plans that manage water demand to prevent future calls on the Colorado or other rivers. As peak runoff times shift, and populations grow in both Colorado and other western states, these discussions will grow increasingly important for all water users in the West, further highlighting the need to recognize the interdependence of rural and urban populations.

Recommendations:

- State policymakers must prioritize storage projects and look for ways to streamline regulations that are hindering storage capacity.
- State policymakers should prioritize finding a sustainable and long-term funding source for the Water Plan in order to ensure the greatest success in achieving its goals.
- Policy leaders should ensure that demand management on a river system will be voluntary and include compensation for water rights holders.



Energy

Colorado has made considerable gains in the production of energy across the energy spectrum. The development of energy resources, both traditional and renewable, has helped to grow our economy and put hundreds of thousands of Coloradans to work in well-paying and sustainable jobs. Rural areas and agriculture producers have greatly benefited from energy production and this must continue, or many of the state's rural economies will suffer greatly.

This energy production also helps to lower costs in rural communities and across the state. Colorado ranks 21st out of all states in the retail cost of electricity and 43rd overall in the cost of natural gas, which is used to heat many homes and generate electricity.³² This means lower energy costs for agriculture and food producers and rural residents.

It is important to recognize that the state needs an all-of-the-above energy portfolio. The opportunity for job growth and development in one sector does not mean Colorado can afford to restrict production in another sector. Some of Colorado's rural communities benefit from traditional energy production. Others benefit from renewable energy production. Efforts at the state level to erect roadblocks to energy production threaten the future economic health of many rural communities, as well as the farmers and ranchers who play host to that production.

Recommendations:

- State policy makers and civic leaders should work together with rural and agricultural interests to better understand the dynamic between agriculture and energy production and explore ways to allow for continued robust energy production in rural communities and on agricultural land across the state.



³² Energy Information Administration, Rankings: Average Retail Price of Electricity to Residential Sector, (2019) <https://www.eia.gov/state/rankings/?sid=CO#series/31>.

Technology and Infrastructure

In the last several decades, dramatic changes in the way farms and ranches are run have changed the face of the industry. New technologies like GPS and genetic modification have revolutionized the way crops are grown and harvested, and reduced labor, fertilizer, and pesticide inputs. Modern management techniques and the adoption of robotics technologies have helped improve dairy and egg production while improving environmental outcomes. Advancements in rangeland science have helped change the way ranchers manage their land, and genetic improvements continue to enhance the quality and value of livestock carcasses.

Still, other producers are working to implement new technologies in both crop and livestock production. Frequently called “smart agriculture,” these new technologies not only help optimize overall agricultural production, but also have the potential to further reduce and better optimize labor costs, reduce agricultural input use, and increase environmental sustainability.

Equally important to the growth of on-farm and ranch technology and the proliferation of smart agriculture practices, is the technology that underlies those products and makes their use possible. Broadband infrastructure and both wired and wireless connectivity in rural Colorado is critical to the future growth of smart agriculture. As an everyday part of modern life, it is also an important quality-of-life indicator in rural communities, and can help with improvements in talent retention, education and health outcomes, and economic development.

Finally, transportation infrastructure is also key to the future success of agriculture and rural communities. The ability to grow food large distances from urban centers is predicated on fast and safe transportation networks. New technologies stand ready to help improve efficiencies in transportation and logistics, but those must not overshadow the underlying highway, road, and bridge networks that enable this advancement to occur.

Technology and Infrastructure on the Farm and Ranch

The individual farm and ranch will increasingly be ground zero in the testing and implementation of new technologies. The Internet of Things (IoT) is expanding rapidly as wireless internet connections are included in more and more everyday consumer goods—thermostats, lights, door locks, refrigerators, and more. As IoT devices increase in adoption, along with new data-gathering opportunities, it is projected that farms will create 4.1 million data points per day in 2050, up from 190,000 in 2014.³³ When combined with new data analytics technology, this has the potential to increase crop yields dramatically. Additionally, new genetic technologies for both crops and livestock have the potential to improve yields and further improve environmental sustainability.



³³ Andrew Meola, “Why IoT, Big Data & Smart Farming Are the Future of Agriculture,” Business Insider, (2016) <https://www.businessinsider.com/internet-of-things-smart-agriculture-2016-10>.

Technology will impact on-farm and ranch agriculture in several ways in the coming years:

- **Adoption of IoT**
Producers will have the ability to begin using IoT devices in many ways. From grain storage monitoring and soil moisture sensors, to estrus detection in livestock, connected devices will help producers manage their operations and gather data that can be used to identify broader trends. Unmanned Aerial Vehicles (UAVs), or drones, and the data they gather will further integrate with IoT applications as well as help with the day-to-day management of farm and ranch operations.
- **Machine Learning/Artificial Intelligence**
New software using advanced data analytics and machine learning will help producers capitalize on the dramatic increase in data generation from IoT, drones, satellite imaging, and equipment-based monitors.³⁴ The technology will also be increasingly used in farm equipment, such as Blue River Technology's see-and-spray machines which use computer vision to detect and spray individual weeds, dramatically reducing herbicide use. This technology will also be used in improving driverless technology for in-field tractors, harvesters and other farm machines, and in livestock production where robotics is helping to reduce labor costs.
- **Controlled Environment Agriculture**
The production of food crops indoors will not replace traditional agriculture according to a recent whitepaper by Newbean Capital. However, Task Force participants identified that the technology will continue to augment traditional food production in certain areas and help diversify the food supply chain. Newbean estimates a total addressable market for indoor production at \$9 billion.³⁵ In water constrained areas near large population centers like in Colorado, indoor production may provide additional revenue streams and help maintain the viability of family operations.

Other more long-standing technologies are also improving and becoming more relevant to the new smart agriculture paradigm. Satellite imaging companies are beginning to launch products that can help farmers and ranchers access hyperlocal weather forecasts. These services, coupled with predictive analytics, can help operators make better decisions on planting, harvesting, irrigating, etc. Their technology can also be used to better track and monitor soil moisture and pest or disease outbreaks.

UAVs can also be used by producers to simplify and improve the day-to-day management of farms and ranches. Drones are increasingly popular for use in practical applications such as locating lost cattle, checking livestock watering tanks, and inspecting irrigation facilities. Drones help producers to quickly and easily perform several operations, which all work to reduce the time it takes to complete routine tasks, lower vehicle mileage, and reduce fuel consumption. Drones are also being used in the aftermath of agriculture disasters to help assess damage, locate livestock, and check crop health.³⁶ Drone applications will continue to mature in the coming years and will continue to help automate day-to-day tasks on some farms and ranches, and will also be a bridge to further merging crop data analytics and remote imaging.

Investor capital for agriculture technology startups in Colorado is third only to Silicon Valley and New York. Interestingly, unlike the investing communities on the coasts, capital deployed in Colorado is spread more evenly across a larger number of startup companies.³⁷ This means that the networks and infrastructure necessary to expand this kind of investment is in place and should be promoted. As some Silicon Valley venture-backed startups in the food industry flag, Colorado is well placed to attract even more capital as the state's tech and agriculture industries further mature.

³⁴ Stanford School of Business, Technology in Agribusiness- Opportunities to Drive Value (2017) <https://www.gsb.stanford.edu/sites/gsb/files/publication-pdf/white-paper-vci-technology-agribusiness-opportunities-drive-value.pdf>.

³⁵ Vegetable Growers News, Indoor agriculture quickly gaining speed (2015) <https://vegetablegrowersnews.com/article/indoor-agriculture-quickly-gaining-speed/>.

³⁶ Colorado Farm Bureau Drone Program (2018) <http://www.coloradofarmbureau.com/wp-content/uploads/2017/10/Colorado-Farm-Bureau.pdf>.

³⁷ The Colorado Blueprint of Food and Agriculture (2018) <https://foodsystems.colostate.edu/regional-impacts/colorado-blueprint/>.

Recommendations:

- Policymakers must understand the costs of implementing these new kinds of technologies, as well as recognize their benefits. The adoption of these technologies and the benefits they provide should play into discussions on sustainability, climate change and labor with an eye toward encouraging, not impeding, their broader adoption.
- Both state and local policymakers should work to incentivize and improve knowledge sharing on smart agriculture and develop models to ensure the industry is credited with improvements on key metrics using such technology.
- Producers should do a thorough cost-benefit analysis before investing in smart agriculture technologies and ensure they fit into the financial and operations plan for their farm or ranch. Producers should be mindful that the use of technology alone does not create additional profit.
- State and local resources should be better utilized to help match startups with end-users and infrastructure assets in rural communities. They should also work to improve mechanisms that facilitate relationships between the venture capital community and rural agriculture startups.

Broadband

The buildout of broadband infrastructure and deployment of provider services to rural Colorado is of utmost importance. The need for rural broadband connectivity is now tantamount to rural electrification and telephone service. If rural America is to have any chance at closing the economic and social gap between them and urban areas, broadband coverage must expand to cover every rural household in the next several years.

Rural communities need access to health care, government services, and educational and business opportunities. For many rural communities, access can only be gained by using broadband services and sophisticated technologies that require high-speed connections and are essential for the use of many of the “smart agriculture” technologies described in the previous section. Rural broadband will also help deliver telehealth services where health care options are limited.

Farmers and ranchers need broadband internet access to effectively run their businesses and make use of new on-farm and ranch technologies that require a high-speed connection, in the same way small businesses in urban and suburban areas do. Yet 25 percent of farms and ranches in America have no internet access at all.³⁸ And according to the Federal Communications Commission, 26.4 percent of rural Americans lack access to 25 Mbps/3 Mbps service, compared to only 1.7 percent of urban Americans.³⁹ Current and future generations of rural Americans will be left behind their fellow citizens if they are without affordable high-speed broadband service that enables them to tap into modern web-based products and services.

Just as important to terrestrial broadband connections is wireless coverage. As in urban areas, many farms, ranches and rural businesses use web-based technologies through their mobile phones. While wireless coverage has improved dramatically, many areas of Colorado lack even the slowest mobile data connection. This is important because mobile broadband can be used as a stand-in for wired broadband lines, until such time as the infrastructure buildout allows for the delivery of service to rural homes and businesses.

³⁸ USDA, Farm Computer Usage and Ownership (2019) <https://usda.library.cornell.edu/concern/publications/h128nd689?locale=en>.

³⁹ Federal Communications Commission, Broadband Deployment Report (2019) <https://docs.fcc.gov/public/attachments/FCC-19-44A1.pdf>.

While it may never be economical to provide fiber-based broadband services to individual farmhouses, by deploying a blend of existing and new technologies, providers will be able to improve access to broadband and ensure that rural communities in Colorado and across the country can stay connected in the 21st century. Due to the strictures of new wireless technologies, this buildout will necessitate the siting of new wireless infrastructure on agricultural lands, potentially providing new revenue streams for a larger number of rural landowners.

Recommendations:

- Federal policymakers should continue to incentivize rural broadband deployment through Universal Service Fund dollars which provide affordable, nationwide telecommunications service.
- Federal policymakers at the FCC and USDA should work to convene the Task Force created in the 2018 Precision Agriculture Connectivity Act to provide solutions to connectivity challenges that inhibit the use of precision agriculture technologies.
- Local officials should ensure an ordered and streamlined permitting process for the installation of new telecommunications infrastructure and work to mitigate the kind of citizen opposition that can jeopardize new projects, buildouts and existing equipment upgrades.
- As the need for new wireless infrastructure sites increases, wireless providers should think about ways to access and connect landowners with local policymakers to ensure concurrent buildouts. By creating an alliance with multiple landowners, organizations and policymakers, operators will be able to better streamline the process of locating and constructing new infrastructure sites.

Transportation

Farmers, ranchers and the broader rural population travel great distances. Rural homes and businesses are often far from necessary services, and even small-town residents must often drive significantly more miles than an urban or suburban resident in order to visit businesses and services located in other towns or urban centers. Farmers and ranchers put in many miles off road as well, driving in fields and pastures, going about their daily tasks.

Agriculture producers spend a significant amount of time driving tractors and operating heavy equipment. The amount of time spent in a tractor or combine harvester depends on the season, but in the future, driverless and remote sensing technologies applied to agriculture machinery will help push those hours down. While driverless technology companies have focused predominantly on passenger cars, adoption of the technology may happen more readily in other areas and use-cases. In agriculture, where tractors and machines carry cargo and not passengers, safety considerations are less of a barrier to implementation. Coupled with the fact that most of the miles driverless agriculture machinery would cover are in-field, and not on roads and highways, driverless technology is poised to become market-ready faster in agriculture than in passenger cars.

Already, Case IH has launched a fully autonomous “concept” tractor that does not have a traditional “cab” where the driver would sit. Other companies like SmartAg have developed modification kits and sensor arrays which can convert existing tractors to autonomous operation. Self-driving semi-trucks could also be extensively used in agricultural operations, hauling grain from the field to grain depots on lightly trafficked rural roads.

All of this has the potential to help reduce the man-hours dedicated to driving vehicles and operating equipment, lowering costs and enabling a more efficient allocation of time and labor.

Recommendations:

- Agriculture producers should aggressively investigate how driverless technology could be implemented on their farm or ranch when the technology becomes feasible.
- Local and state policymakers should work to incentivize businesses that seek to apply driverless technologies to agricultural use-cases. They should also work to reduce the regulatory hurdles associated with testing and bringing on-farm and ranch driverless technology to market.

Technology and Infrastructure in the Rural Community

Broadband

During the recent COVID-19 pandemic, at-home schooling has been a challenge for the rural community. Reliable broadband connections are equally as crucial for the rural communities that support the agriculture industry. In addition to quality of life issues, broadband connections are required for much of today's e-commerce, to run rural businesses and attract employees like teachers and doctors. Moreover, broadband is necessary to deploy critical services like emergency response, telehealth, and distance learning (see Health care and Education sections). It is estimated that broadband access and adoption of internet-based agriculture technologies could boost total U.S. agriculture market production by more than \$65 billion annually.⁴⁰

This makes the buildout of both coverage and capacity in the rural wireless networks increasingly important. Expanding coverage, capacity, and reliability can help to improve the environment for the adoption and use of smart agriculture devices and can also help provide an internet connection to the home through shared wireless devices like mobile hotspots.

While 5G wireless is quickly being deployed in urban areas, rural areas will have difficulty making efficient use of the technology. 5G spectrum is data-dense, but the signal propagates at a much shorter range (1,500 feet) than existing wireless technologies. This requires a larger number of radio towers to deliver signal, which is not feasible for use in sparsely populated rural landscapes. In small rural towns and in areas where rural homes are clustered, 5G fixed wireless may provide readymade solutions for increasing coverage and avoid the need to install buried wired infrastructure. But while 5G may make sense in limited places, more important to rural areas is an increase in coverage of the current 4G spectrum. As 5G increases in use in urban areas, this may help improve the capacity and reliability of existing 4G networks in rural areas.

Many opportunities exist to provide economic broadband connections to rural Colorado, outside of a tier-one provider building a carrier-grade network. But these solutions require creative thinking. Partnerships between rural telecom operators and electric co-ops, the creation of new special districts or public-private partnerships to invest in infrastructure are just a few of the creative ways broadband buildout has taken place in the past few years and will continue.

In the near term, AT&T's FirstNet buildout and partnerships with local providers will help provide connectivity for emergency services and other customers in rural areas. This may also help alleviate some of the pressure to develop fiber-based networks. Increasingly, more emphasis will be placed on fixed-wireless and cellular data connections to deliver services to rural areas, as opposed to more expensive installations of fiber-based broadband. Communities wishing to install broadband infrastructure will do so using public-private partnerships and other creative structures that help reduce the cost burden on private network operators.

⁴⁰ USDA, A Case for Rural Broadband, (2019) <https://www.usda.gov/sites/default/files/documents/case-for-rural-broadband.pdf>.

Recommendations:

- Rural leaders should think outside of the box on how to create new opportunities for broadband deployment in their community. The creation of new funding mechanisms, public-private partnerships etc. should all be on the table.
- Projects should be developed with a focus on the use of a blend of technologies to help ensure the broadest swath of residents can benefit from the installation of new infrastructure.
- Rural communities should explore the tradeoffs between building broadband infrastructure and facilitating the buildout of high capacity and reliable wireless networks.
- Rural leaders and policymakers should make sure their community pushes for continuous updates to Colorado regional broadband plans.
- Any new facilities and equipment should be installed with an eye toward future increased data usage. While connectivity is important, expanded rural networks must be built to serve tomorrow, not today.
- Federal policy makers should work to ensure that broadband funding is being directed to agencies that have a good working knowledge of rural America. To that end, they should explore directing Universal Service Fund dollars through the USDA Rural Utility Service to ensure dollars are spent in the best way possible for the unique nature of rural network deployment.

Transportation

For rural communities, safe and well-maintained transportation networks are an important part of everyday life. Residents need safe roads and highways to get from one place to the next over much longer distances than their urban neighbors. Businesses need access to roads and highways to ensure efficient transportation of goods and services. Agriculture in particular, needs well-maintained and safe highways and bridges to ensure that their commodities can make it from the farm gate to processing facilities quickly and efficiently. For producers growing perishable crops like lettuce and peaches, efficient transportation is even more important. Overall, almost 1.1 million jobs in Colorado are dependent on a reliable and safe transportation infrastructure.⁴¹

Safety is an important factor in rural transportation. An analysis of National Highway Traffic Safety Administration and Federal Highway Administration data show that fatality rates on rural roads are more than double the rate on all other roads in the state.⁴² But through improvements such as the addition of rumble strips, lane markings, guard rails, and (particularly for rural highways) adequate shoulders, safety outcomes and fatality rates can be significantly improved.⁴³ The increased application of driverless technology and the broader adoption of advanced driver-assistance systems in passenger vehicles and pickups will also help improve safety and efficiency. Key to several of these systems will be the presence of connectivity through next-generation wireless data networks in rural areas (see Broadband).

⁴¹ American Road & Transportation Builders Association (2015). The 2015 U.S. Transportation Construction Industry Profile. https://www.transportationcreatesjobs.org/pdf/Economic_Profile.pdf.

⁴² TRIP (2018). Colorado Transportation by the Numbers https://tripnet.org/wp-content/uploads/2018/08/CO_Transportation_by_the_Numbers_TRIP_Report_2018.pdf.

⁴³ Texas Transportation Institute (2012). Adding Highway Shoulders, Width, Reduce Crash Numbers and Save Lives, <https://tti.tamu.edu/news/tti-study-analyzes-roadway-improvements/>.

In the future, efficient and safe transportation infrastructure in Colorado will depend on increasing funding to the Colorado Department of Transportation for both maintenance and new projects. Colorado already funds its roads through a gas tax that is more than six cents per gallon lower than the national average of 46.7 cents.⁴⁴ Complicating the problem is the declining nature of gas tax revenue. As vehicle fuel efficiency increases, less gas is purchased by residents, resulting in declining revenues. The proliferation of electric vehicles compounds this trend, a dynamic that will only increase in the future.

Recommendations:

- Policymakers must prioritize improvements to transportation safety on rural roads and work to reduce the rural auto accident fatality rate.
- The proliferation of driverless technology and vehicle safety systems for rural vehicles should be cultivated through regulatory and incentive-based programs.
- Future efforts to increase the number of hybrid and electric vehicles on Colorado's roadways should be coupled with programs that ensure equitable funding of the state's roads by the owners of those vehicles.



⁴⁴ Colorado Department of Transportation (2017) Annual Report. <https://www.codot.gov/library/AnnualReports/cdot-official-annual-reports/2017-annual-report>.

Rural Economic and Social Change

Rural Colorado's economies and people are changing rapidly. Demographic shifts, economic changes, technology, and other forms of social and economic disruption are creating a flurry of change to the way farms and ranches across Colorado operate. That change will be ongoing well into the future and agriculture must continue to adapt and be flexible in response.

Many family farms and ranches are making significant changes to their business model, altering the way they operate and market their products. Others are changing ownership structures and reorganizing their businesses. Many will confront the challenge of transitioning the farm or ranch to the next generation soon. All of this is causing a great deal of uncertainty for agriculture operators and the communities in which they live.

Economic and Social Change on the Farm and Ranch

Agriculture Marketing

Changes in technology and the agriculture economy are also driving change in the social fabric of farm and ranch families. With increased efficiency and changing agriculture economics, the children of farmers and ranchers are faced with limited options to return to the family operation once they graduate from college. Many farms and ranches struggle to change the way they operate in a way that will support the livelihoods of future family members. Additionally, the percentage of farmers and ranchers who have at least one family member who works a full-time job off the farm to help supplement farm and ranch income is increasing.⁴⁵

These and other changes are driving shifts in the makeup and size of the nation's farms and ranches. Numbers of small and large farms and ranches are increasing, while the number of mid-sized operations is decreasing. In Colorado, mid-sized farms that operate between 50 and 1,999 acres make up the largest segment of the industry, nearly 45 percent of Colorado's 38,893 farms.⁴⁶

As economic patterns shift, many agriculture producers have sought to make changes to their business model to capture a larger share of the consumer food dollar, and in so doing increase profits. Organic production is one way some producers have chosen to change and provide an increase in the value of their products and improve incomes. Others have decided to change their marketing activities and adopt a direct-to-consumer model, selling their products at farmers markets, and online.

Direct-to-consumer marketing channels have grown significantly in the last several years. Colorado has as many as 177 roadside farm stands and Community Supported Agriculture programs, and 113 farmers markets.⁴⁷ USDA data shows an increasing number of producers are pursuing direct marketing opportunities. This number will continue to grow and both agriculture producers and policymakers should be cognizant of the growing trend. Also, the future opportunity for direct sales to restaurants and supermarkets is growing, as technology helps purchasers identify agricultural supplies and establish business relationships.

For example, agriculture producers will further leverage data analytics and supply management technologies to better service purchasers like fast-casual restaurants, breweries and brewpubs, and large food-service companies like those that operate cafeterias. This kind of integration will also develop opportunities for mid-level processing facilities and other links in the agricultural value chain which do not currently exist due to lack of aggregate demand, lack of capital, and a myriad other reasons.

⁴⁵ USDA (2019) Farm Income Forecast. <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/highlights-from-the-farm-income-forecast/>.

⁴⁶ USDA NASS (2017) Colorado Census of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/Colorado/st08_1_0001_0001.pdf.

⁴⁷ <https://www.localharvest.org>.

Increasingly, agriculture producers will find ways to access data analytics from food retailers to better target sales of their products and reach through the value chain and access niche groups of consumers. Analysis of this data will also help to inform planting and production decisions which—in addition to the traditional commodities market, weather and management analysis—will help producers make more informed decisions about what to plant from one growing year to the next. This kind of data should drive increased profitability for producers who invest in the necessary operational changes that will allow them to fulfill new consumer demand.

These trends will further change the way many farms and ranches in Colorado market their product and improve their bottom lines. While not all operators will be positioned to change their business model and adopt new marketing techniques, technology will help a growing number of those producers to earn an increasingly significant percentage of their income from these kinds of activities.

Recommendations:

- Agriculture producers should carefully seek out information and support on diversifying their farms and ranches to seek opportunities in these new markets. Subject matter experts at public institutions like universities and state agencies such as OEDIT and DOLA should work to create a clearinghouse for access to education and information about how producers should make use of their resources to leverage opportunities in new marketing channels.
- Food purchasers should look for ways to partner with farmers and ranchers to collaboratively develop agreements and processes that can alleviate the difficulties of things like supply chain management to better and more efficiently source locally produced food and commodities.

Succession Planning

The future of agriculture in Colorado will partially hinge on how well current farmers and ranchers plan to hand over their legacy to the next generation. While family conversations about succession planning are not always easy to have, they are critical to the ongoing success of multigenerational farms and ranches. More than 95 percent of farms and ranches are family-owned and operated, but only 9.1 percent⁴⁸ encompass more than one generation. In the past, a significant roadblock to a successful generational transfer of a family farm or ranch was the estate tax. As a result of successful advocacy efforts at the federal level, the estate tax is currently less of a burden and challenge to agricultural succession planning, however, challenges remain.

Many within the agriculture community point to the need for producers to have early discussions about succession and estate planning. This allows for family members to understand future plans, resolve differences between the generations and siblings, and create buy-in for transitioning when it's time for current operators to retire. Discussions about who will hold future operational roles and decision-making authority should take place alongside those who specialize in estate planning and asset transfer.

The estate tax will always present a potential challenge to producers. But during times of reduced tax burdens, producers must act to preserve their legacy. At the individual level, farmers and ranchers must make use of resources that help enable these discussions and plan for the future. Many resources exist to help aid producers in addressing succession planning and the difficulties that come with it, but more can be done.

⁴⁸ 2012 Census of Agriculture.

Recommendations:

- Farm and ranch families must resolve to prioritize estate and succession planning activities on their operations. Individual producers should become evangelists for engaging in the planning process and help friends and neighbors access the resources available to make the process productive.
- Producers should plan now for future reductions in estate tax exemption limits.
- Rural communities which value agriculture production and family-based agriculture must help to continue conversations on succession planning, and work to find ways to match service providers with producers who want to initiate the succession planning process.

Conservation Easements

Conservation easements are a transaction whereby farmers and ranchers sell the development rights to their property, which are purchased by entities that wish to preserve them as working agricultural lands for environmental protection or both. The easement is put into place to help alleviate future development pressure and the landowner is compensated as if they were to sell the property outright.

Agriculture producers have adopted conservation easements to both improve agricultural finances by extracting value from the ecosystem services provided by their land, but also ensure their land will be able to change hands from one generation to the next.

Lands placed under easements are often kept in agriculture production and the funds from the sale of the easement help keep the agriculture operation in business. The existence of the easement can help improve succession planning outcomes and ensure that subsequent generations of the farming or ranching family can remain on the land.

Conservation easements and similar agreements that keep land in agricultural production will become increasingly important as the budgets of family operations tighten and owners look for ways to transfer their estate from one generation to the next. Additionally, both public and private entities will continue to have a strong focus on preserving open spaces and key habitats to alleviate pressure from both residents and federal regulations.

Recommendations:

- Local and state policymakers should plan for the future and ensure that anticipated growth in conservation easements is accounted for in future land-use planning efforts to alleviate complications associated with future necessary development or infrastructure construction.



Economic and Social Change in the Rural Community

Many parts of rural Colorado dependent on the agriculture industry face similar problems. The vast majority of those problems are associated with declining populations, the rural “brain-drain,” and a lack of investment. Additional pressures include the aging of Colorado’s residents. According to the Colorado State Demography Office, the number of people over the age of 65 in the year 2050 will be three times larger than in 2010, a growth rate twice as fast as the total population.⁴⁹

This aging population will put additional pressure on rural health care and employment and will also challenge the creation of new businesses and investment. However, with a population anticipated to grow to 8 million by 2050, some of those new people will locate to communities other than the Front Range. While 82 percent of that growth is anticipated to be along the I-25 corridor, as much as 18 percent will be located in other parts of the state.⁵⁰ On the margins, this will provide an opportunity for rural communities to attract new residents and business investment. Communities that are best positioned for growth by providing key services, public investment in quality of life markers (see Rural Health Care and Rural Education sections) and incentives to new business investment will absorb the largest percentage of that future growth.

As the population ages and new residents trend younger, the existence of these key services will further separate some rural communities from others. Some will thrive and some will fail. This has significant ramifications for the agriculture industry as the ability to attract future residents will determine the extent to which the business ecosystem that supports agriculture production will itself thrive or fail. If distances between the farm field and key service providers continue to grow, agriculture production will suffer. Especially within the mid-sized category of farms and ranches, which have a more limited ability to cope with the loss of the services described here. The failure of rural communities to thrive will hasten the consolidation of the agriculture industry and reduce the number of farmers and ranchers working the land.

Rural communities must move quickly to make the changes and improvements necessary to enhance key services and make the environment for business investment and inbound migrations as attractive as possible. This kind of activity will provide rural communities with the best chance of attracting and retaining qualified professionals, new residents seeking relief from the cost and pressures associated with life along the Front Range and recent college graduates who want to return to their hometown.



⁴⁹ Colorado State Demography Office data (2018) <https://demography.dola.colorado.gov/demography/infographics/#infographics>.

⁵⁰ Ibid.

Recommendations:

- Rural policymakers and leaders must adopt a growth mindset and think creatively about policies that can support those goals. Communities should target their strengths and aim to grow their base of agriculture-related businesses and diversify among the agriculture and food value chain.
- Amid efforts to attract new business investment, rural communities should work to identify and make available existing infrastructure and assets (e.g. buildings, machinery) which may aide and speed new business investment.
- Rural and state policymakers should work to better match investors with entrepreneurs and existing businesses within Colorado's 75 rural opportunity zones. State policymakers should identify ways to augment federal opportunity zones' investment incentives with state-based matching incentives.
- State leaders must recognize how public policy can affect rural communities in different ways than urban and suburban ones. Every effort should be made to recognize and mitigate the negative impacts on rural communities that state-level policy initiatives can create.
- Policymakers at all levels of government in Colorado should identify ways to lower compliance costs and incentivize rural business investment.

Rural Education

Public education in rural communities across Colorado is suffering. Inadequate funding coupled with shrinking populations and difficulty attracting qualified educators has local officials scrambling for solutions. While many acknowledge these problems exist, policymakers faced with stretched budgets and deferred maintenance of existing school buildings have trouble seeking expanded funding levels from community members.

Rural schools represent a diverse population that mirrors larger, more urban school districts but on a different scale. A class may include English language learners, advanced placement students, special needs students, and many others. Rural school districts often do not have the staff or tools to provide additional learning opportunities for these students outside of the average class, particularly when these numbers mean a separate class for less than five students. Often, schools look for digital or virtual support to provide class instruction or connect students to outside resources. However, like the agriculture sector, access to the high-speed broadband needed to utilize this technology can still be difficult to come by.

It is important to remember rural students face many challenges outside of the classroom. While poverty, childhood homelessness and access to health care exist throughout Colorado, in rural communities these circumstances become even more difficult to address. Severe weather, geographic barriers and limited social services mean children and their families must travel a significant distance in extreme conditions to access necessities like affordable groceries, health care services and even affordable clothing, such as winter coats. Many schools have worked to adapt to these circumstances and have created unique partnerships throughout their communities, but staff and resources are still needed to serve this role.



Rural schools become the economic driver and community centers for their communities. They may serve as counseling centers, as well as the public library. Creative staffing and funding solutions are necessary to provide these unique services. It is increasingly important to ensure that students have connections to local trade schools, community colleges and other educational pathways that can help them be successful in the future. Some areas in Colorado have begun to establish these non-traditional education partnerships and models. Future generations will be much more acquainted with an educational path that is much less linear than it is today. Rural educational models will have a more targeted focus on developing marketable skills and abilities through apprenticeships, on-the-job-training, and educator-employer partnerships.

Similar to health care and utility services, the existence of viable education services is critical to the future success of rural communities. But as the state population grows and public dollars become ever-tighter, rural students will be at a disadvantage compared to their urban counterparts. Those communities that can best support and maintain the success of their local schools will be much more likely to attract new residents and business investments. In the future, communities that make commitments that help ensure the success of their school system will outperform those communities that do not.

A key part of the future success of rural schools is the ability to attract and keep talented teachers and staff. This dynamic is similar to the difficulty rural hospitals have in attracting and keeping doctors and rural health care professionals. In addition to competitive salaries, quality-of-life issues must be front and center in the minds of administrators and policymakers. State and federal policies which incentivize teachers and doctors to seek employment in rural and/or disadvantaged areas will become less and less effective in the future. But new initiatives undertaken by rural communities to attract talent and address quality-of-life issues, coupled with current and future incentive programs may make more of an impact.

Important for the agriculture industry is the notion that the viability of rural schools will also play heavily into decisions made by the next generation about whether to return to the family farm or ranch or to remain in the city.

Recommendations:

- Rural communities and agriculture producers must work to find creative ways to provide additional funding for rural schools. Innovative local programs must be created to help not only attract teachers but also to support them once they've taken a position.
- State policymakers must understand, accommodate, and encourage innovative and non-traditional educational pathways and partnerships.

