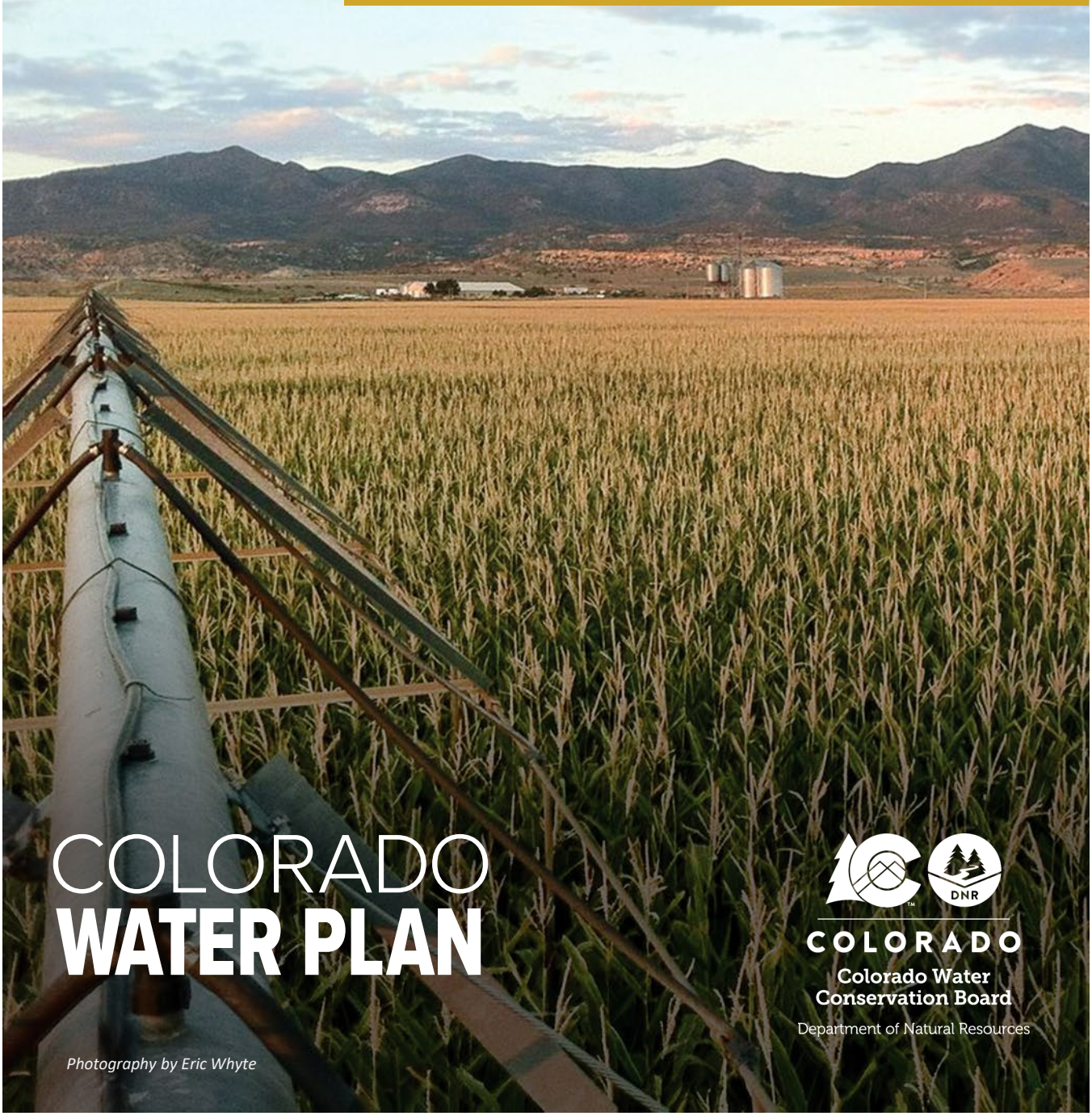
10 STRATEGIES TO PROTECT IRRIGATED AGRICULTURE

COLORADO WATER PLAN – ACTION 2.6

Assess the economic opportunities of avoided buy and dry to communities, ecosystems, and recreation.



COLORADO
WATER PLAN

Photography by Eric Whyte

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Colorado Water Conservation Board
Department of Natural Resources

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10 STRATEGIES TO PROTECT IRRIGATED AGRICULTURE

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Assess the economic opportunities of avoided buy and dry to communities, ecosystems, and recreation.

SOLUTIONS: TEN STRATEGIES TO PROTECT IRRIGATED AGRICULTURE

CONTEXT

Agriculture is a critical component of Colorado's economy and supports and enhances many state values like open space and wildlife habitat. Agriculture is foundational to quality of life in rural areas, but the intricacies of its relationships to other economic sectors is rarely understood or appreciated fully. Buy and dry acquisitions have irreversible impacts to not only the land, but the entire community in which they occur. Where buy and dry water acquisitions occur and irrigated agriculture is diminished, the local economy, ecosystems (e.g., wetland habitat or food sources for wildlife), and recreation opportunities may be negatively impacted.

The Colorado Water Plan's Agency Action 2.6 aims to help the Colorado Water Conservation Board (CWCB), local governments, and stakeholders assess the potential direct and indirect impacts of reducing irrigated acreage or converting agricultural land to urban or industrial use. This report assesses the value that agriculture provides to our state and identifies strategies to actively protect this value.

THE COLORADO WATER PLAN RECOGNIZES THE VALUE OF IRRIGATED AGRICULTURE

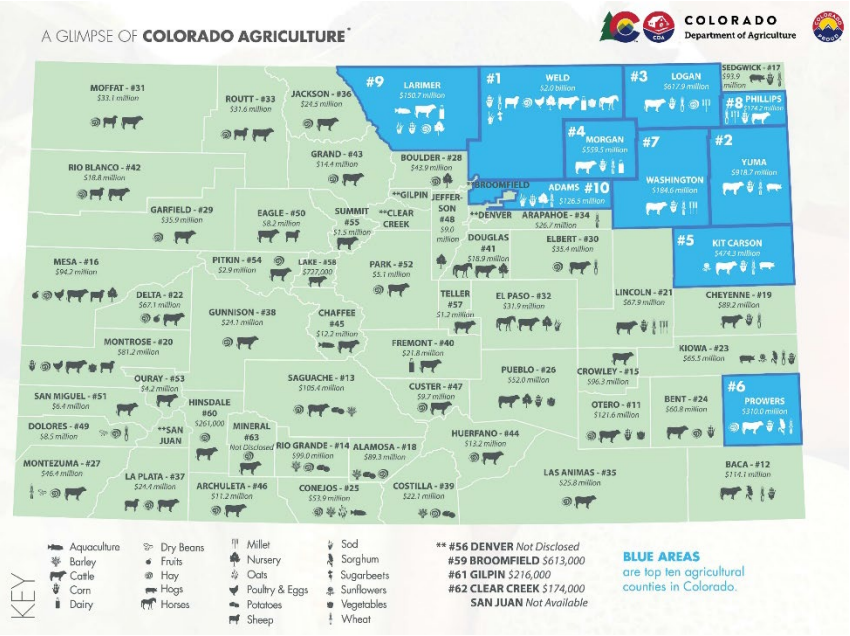
Colorado's agricultural sector contributes $47 billion to our state's economy each year[1] and supports businesses directly and indirectly, especially in our rural communities. For example, agricultural producers purchase supplies and equipment from local stores, employ local residents, and support the local tax base. Irrigated farms also provide wildlife habitat and support wetlands. Importantly, agriculture produces food and fiber for local and export uses. Maintaining acres of irrigated land and enhancing the productivity and profitability of those acres is critical to achieving a robust agricultural future in Colorado. Achieving these goals requires a renewed commitment by Coloradans to recognize the many benefits agriculture brings, and to partner with agricultural producers and work to find innovative, flexible, and collaborative strategies that maintain or even increase economic outputs.

Value to our Communities

Beyond being an economic generator, agriculture produces food and fiber we all depend on in daily life. Colorado's agricultural products are diverse, from local agritourism and farmers markets to international trade markets. Many of these products would not be enjoyed without irrigation. Local food production is highly valued by Coloradans, with 96% supporting the development of strong local food systems.[2] Farmers markets, community-supported farms, and Colorado Proud products in our grocery stores contribute to a strong sense of community, sense of place, and appreciation of where food comes from.

[1] Colorado Agriculture Brochure.pdf
[2] Public Attitudes Survey 2022 | Department of Agriculture

From cattle grazing on a western Colorado ranch to rows of corn grown on Tribal lands, agriculture is the socio-economic foundation of many rural communities where water has been used for farming since the 1850s. Today, most Coloradans live in urban or suburban areas, but approximately 13% of Colorado's population lives in a rural community. Supplemental irrigation is important to sustain agricultural production in these rural areas where there is simply not enough precipitation in the growing season to support crop production. If irrigation water is taken off these agricultural lands, land production value may begin to erode and result in a cascade of effects on the rural economy previously supported by that farming operation.



Value to our Ecosystems

When farmers and ranchers divert water from a river to irrigate their fields, the crops consume some of the water and the remaining water quickly returns back to the river as surface flow or, over longer periods via groundwater flow in shallow aquifers. Once the water makes it back to the river, this cycle is repeated by another downstream farmer or rancher. In some rivers, water can be re-diverted and used multiple times before it leaves the state.

Irrigation practices can retime river flows by removing water during the peak runoff season in late spring or early summer and returning water to the river later in the year. The retimed water sustains stream flow levels during the hottest and driest part of the year and helps maintain cool water temperatures for aquatic life. Irrigation reservoirs are beneficial and provide wildlife with riparian habitat and wetlands.

Value to our Recreation

Even though water used for irrigation is diverted from streams or pumped from groundwater aquifers, much of it is stored in reservoirs for future use. When stored in reservoirs, this agricultural water provides opportunities for flat-water and river recreation. In this way, the robust water recreation industry in Colorado greatly benefits from irrigated agriculture. Stream flow management programs for fishing and rafting are supported by agricultural partnerships.[3]

Fishing, hunting, and wildlife-watching drive Colorado's recreation economy. Although agricultural lands are privately owned, Colorado's farmers and ranchers often allow access to their lands for recreational purposes. Colorado Parks and Wildlife's (CPW) Walk-in Access program creates opportunities for hunters to access private agricultural land and provides additional revenue for farmers and ranchers.

[3] https://www.collegiatepeakstu.org/vfmp-voluntary-flow-management-program-2023

WHAT IS BUY AND DRY

"Buy and Dry" is a term used to describe the purchase of water rights used for agricultural irrigation, coupled with the permanent transfer of those water rights away from agricultural lands to serve another use. Buy and dry acquisitions of water supplies have become a common way to support the water demands of growing municipalities. Although new water supply projects that do not rely on buy and dry are continually being planned and developed, such as the Northern Integrated Supply Project and Wolf Creek Reservoir, new supplies are limited and many municipalities feel continued pressure to bolster their long-term water supply portfolios via the transfer of water from irrigated agriculture to municipalities. Irrigated farms and their relatively senior water rights continue to account for most Colorado water diversions and use, and represent an appealing, reliable long-term source of supply for cities.

The buy and dry of irrigated cropland is socially undesirable to Coloradans but remains an economically viable, predictable, and readily available source of water compared to developing increasingly scarce new supplies or radically changing the urban landscape. Reducing irrigated lands has become necessary in some basins to sustain irrigation of remaining crop lands.

The economic impacts of buy and dry vary by basin. The experience of the Lower Arkansas Basin is a well-known example of the potentially harmful impacts. Agricultural water supplies were purchased and transferred in large volumes hundreds of miles out of the region, and the extent of the impacts took some local communities and economies by surprise. The challenge with long-distance transfers is that while some individuals benefit financially from the sale, few of the proceeds from these sales make it back into the local economy. The economic activity and wealth accumulated by using these water rights for agriculture were irrevocably lost when the water rights were transferred to large cities distant from the farming communities along the Lower Arkansas corridor. Conversely, municipalities in Larimer and Weld counties, which are rapidly expanding into adjacent irrigated farmland, are witnessing increasing economic activity in historical agricultural communities like Severance and Eaton. The cost of this economic growth is the area's agricultural production, open space, and the buffer between communities that agriculture provides.

HIGH PLAINS AQUIFER – REPUBLICAN BASIN

The Republican River Basin has nearly 580,000 irrigated acres, which makes it one of the most agriculturally productive basins in the state. The basin has limited surface water supplies, so irrigators rely on groundwater supplies from the High Plains Aquifer. To remain in compliance with the Republican River Compact and to help reduce impacts of pumping on the High Plains Aquifer, the Republican River Water Conservation District provides incentives to farmers to permanently reduce irrigated lands by retiring water rights. Retiring these water rights will help preserve the High Plains Aquifer for future generations.

SAN LUIS VALLEY AQUIFERS – RIO GRANDE BASIN

Pumping groundwater for irrigation in the San Luis Valley has resulted in an estimated reduction of water stored in the Closed Basin Aquifer of approximately 1.2 million acre-feet since the late 1970s. Water users in the San Luis Valley recognize the need to monitor groundwater use and protect groundwater and surface water supplies. Through the formation of groundwater management subdistricts, local irrigators have implemented a system of self-regulation that uses economic-based incentives to reduce groundwater use, such as conservation programs, innovative water efficiency improvements, and land fallowing programs.

REDUCTIONS IN IRRIGATED LANDS TO SUPPORT GROUNDWATER SUSTAINABILITY

Declining aquifer levels in several of Colorado's groundwater basins requires proactive resource management.

One tool being used to keep these aquifers sustainable is reducing the amount of irrigated lands that depend on these diminishing resources.

TIPPING POINTS

Economists tend to use economic multipliers when estimating the impacts of reduced irrigated acreage in a specific geographic area, such as a county or group of counties. These multipliers help indicate the impact of lost agricultural production, but they only estimate the incremental, not the cumulative, impacts of these reductions in economic activity. These cumulative impacts are triggered by "tipping points" for rural businesses and services. As the economy declines, businesses reach their tipping points, which causes them to close or relocate. These closings further reduce economic activity.[4]

This concern is particularly applicable in communities with a high dependence on irrigated agriculture, such as those located in the lower ends of the South Platte and Lower Arkansas basins, as well as West Slope tributaries of the Colorado River. Insights on tipping points are valuable for targeting mitigation strategies needed to maintain quality-of-life services in affected communities. Five types of essential rural services could be become unintended casualties from focused buy and dry and include, in no specific order:

- Availability of medical services
- Access to quality food (avoiding becoming a "food desert")
- Affordable, quality daycare options
- Presence of local schools
- Presence of financial institutions

All five require a certain local population threshold to support their businesses. Key questions about knowing and understanding these thresholds to help identify possible strategies to mitigate impacts include:

- What local businesses or services are already near their tipping point?
- What incentives can be provided to keep these businesses or services in the community, assuming all affected parties agree they are essential?
- How can these incentives be financed or otherwise provided?

MOVEMENT TOWARD LESSENING IMPACTS

RESEARCH NEEDS

More information is required to fully understand the impact of buy and dry on local economies, including:

- The acquisition of data needed to estimate business tipping points in rural areas potentially targeted for buy and dry or other out-of-basin water transfers.
- The feasibility of providing financial mitigation to local economies through payments or by taxing major buy and dry transactions.
- The understanding of how funds would be distributed and spent to minimize adverse economic impacts if mitigation funds in a buy and dry transaction are provided or raised.

ROLE OF THE STATE

To date, the State has invested significant funds in helping irrigators in the Super Ditch concept. Super Ditch is a group of irrigators who want to lease a portion of their locally owned irrigation supplies to municipalities at a negotiated price. Helping irrigators includes assisting with investigations into how much water could be made available under various conditions, institutional roadblocks, economic feasibility and incentives, and a successful pilot program. The area in which the State could remain productively involved is focusing on actual and perceived risks associated with long-term leases to municipalities and potentially developing institutional infrastructure to manage it.

[4] https://irrigationtoday.org/features/lets-avoid-buy-dry/

MUNICIPAL EFFORTS

Some Colorado municipalities that purchase large amounts of irrigation water have taken steps to minimize the potential impacts of buy and dry. Two examples from the Lower Arkansas Valley include:

(1) Municipalities buying irrigation water rights to increase and diversify their water portfolios, and then leasing or reverting the water back to irrigators in 7 of 10 years (See Strategy 1 below). The intent is to minimize or moderate impacts to the area of origin, although it is uncertain how much of the wealth created by the water right purchase remains in the community. On the positive side, many of these transactions have funded irrigation system improvements and the remaining water supplies could be moved to irrigate lands that are most productive.

(2) Maintaining local water rights' ownership. This approach was developed in response to irrigators and communities dissatisfied after buy and dry incidents and with the negative impacts that followed. In response to buy and dry, irrigators from seven ditch companies in the Lower Arkansas basin organized to form the Super Ditch. Their efforts have been partially supported by a series of CWCB grants that look at the engineering, legal, and financial feasibility of this collective approach. The efforts showed that significant volumes of reliable surface water could be developed and leased to municipal users with little or no adverse economic impacts to the surrounding rural communities. The current and future wealth associated with the water rights would stay local. To date, a pilot study involving the Catlin Ditch Company and the City of Fountain has successfully implemented this approach on a small scale. Whether a large-scale lease agreement over a longer duration can be developed remains uncertain due to the familiar themes of money and risk.

STRATEGIC TRANSFERS

Implementing a more regional approach to water rights acquisitions can benefit both agriculture and municipalities. Through strategic planning, the harmful impacts of buy and dry can be minimized. One approach, shown by the Bessemer Farmland Conservation project (inset), allows trading dry-up lands, which keeps agricultural water on the most productive parcels and dries-up the least productive for transfer to municipal uses in Pueblo.

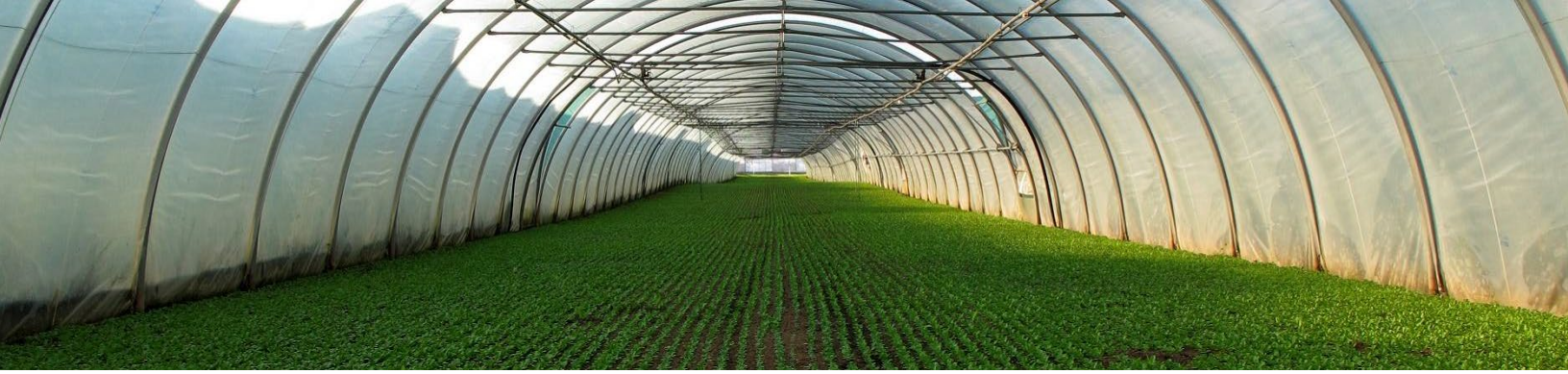
Another approach currently being implemented by Colorado Springs Utilities is helping farmers convert from flood irrigation to sprinkler irrigation by paying for a center pivot. Center pivot irrigation systems are pressurized mechanical systems that typically self-propel in a field. Then the corners of the fields (which are not irrigated by the center-pivot system) are dried-up and the water rights associated with these corner acres (typically 30 to 40 acres per 160-acre quarter-section) are sold to the municipality. The approach creates a win-win scenario: it sustains irrigated agricultural production on the farm with an efficiency upgrade that the producer would otherwise not have been able to afford and creates a new permanent water supply for a municipality.

Bessemer Farmland Conservation Project

This project looked at mitigating the negative consequences that would come with drying up nearly a third of the Bessemer Ditch, which is some of the most productive acreage in eastern Pueblo County. It involved the Palmer Land Conservancy working with the Pueblo Board of Water Works to develop an innovative alternative to traditional buy-and-dry. More flexible dry-up terms and conditions were included in the Bessemer Ditch transfer water court decree, which allows movement of water from marginal farmlands to the most productive lands, which lessens the impact of transferring water to municipal use.

THE 10 STRATEGIES AT A GLANCE

STRATEGY		OPPORTUNITIES FOR PROTECTING AGRICULTURE
1	**MINIMIZE BUY AND DRY** *Use tools and partnerships that keep agriculture in production, including CWSAs as alternatives to permanent transfers*	• Collaborative Water Sharing Agreements *(several legal mechanisms are available)*
2	**PROMOTE THE ECOSYSTEM BENEFITS OF AGRICULTURE** *Support multi-purpose projects, climate-resilient agriculture, and streamflow management programs*	• Building partnerships for multi-purpose projects • Stream flow management programs • Agritourism
3	**IMPLEMENT CONSERVATION EASEMENTS TO PROTECT AGRICULTURAL LAND** *Protect historical attributes and preserve open spaces and watersheds by using a strategic approach to conservation easements*	• Protecting the historical attributes and benefits of agricultural land • Preserving open spaces and watersheds • Deploying a strategic approach to conservation easements • Tying water rights to the land except in those instances where periodic leases of water to off-property uses are appropriate
4	**RECOGNIZE IRRIGATED AGRICULTURE AND ENERGY NEXUS** *Use renewable energy production on agricultural lands for lower input costs or diversified income*	• Renewable energy production on irrigated farms • Agrivoltaics • Microhydro
5	**EXPAND MARKET PATHWAYS FOR PRODUCERS** *Create more opportunities for economic success with investments in processing facilities, marketing campaigns, cooperatives and food hubs, and agritourism*	• Marketing campaigns • Planning assistance for local food systems • Using cooperatives and food hubs • Forming local coalitions
6	**ELEVATE AGRICULTURE IN URBAN PLANNING** *Use tools like intergovernmental agreements, collaborative zoning, and non-traditional models to guide development while preserving irrigated lands, local food production, and agricultural heritage*	• Intergovernmental agreements • Collaborative zoning • Purchase or transfer of development rights • Encourage water-smart development
7	**INVEST IN AGRICULTURE CAREER AND LEARNING OPPORTUNITIES** *Support efforts to connect agricultural and urban communities, ag-focused youth development and leadership programs, and invest in farmer-to-farmer training opportunities*	• Support agricultural-focused youth programs • Support efforts to connect agricultural and urban communities • Invest in agricultural education, training, and leadership
8	**PROMOTE DROUGHT RESILIENCY** *Remove barriers to implementing water conservation practices by providing increased funding in technology and partnerships*	• Climate resilient/water-smart agriculture *(numerous practices are available)*
9	**INVEST IN INNOVATIVE INFRASTRUCTURE AND TECHNOLOGY** *Support innovative practices that make production more sustainable and profitable through funding for research and on-farm trials*	• Replace aging infrastructure • Electronic grazing • Water conveyance and efficiency improvements
10	**EXPLORE FUNDING OPPORTUNITIES** *Provide education and support of local-, state-, and federal-level funding programs for agriculture*	• Government funded grants and loans • Local funding sources • Partnerships



STRATEGY 1:
MINIMIZE BUY AND DRY

The 2023 Colorado Water Plan stated that "Water supplies for Colorado's urban growth should not come at the expense of our rural communities through indiscriminate buy and dry methods." This built on commitments in the previous Water Plan that agricultural economic productivity will keep pace with growing state, national, and global needs, even if some acres go out of production. Across the state, water stakeholders want to minimize buy-and-dry in a way that respects property rights, recognizes the importance of agriculture in Colorado, and supports a sustainable agricultural industry—while identifying solutions to provide water for municipal needs. While traditional buy-and-dry may continue to be a way to transfer water rights from agriculture to municipal uses, several tools have been developed since the early 2000s to allow temporary, voluntary, and compensated transfer or sharing of water rights between agricultural and other water users as an alternative to buy-and-dry.

"Buy and dry" is a term used to describe the purchase of water rights used for agricultural irrigation, coupled with the permanent transfer of those water rights away from agricultural lands to serve another use.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

Administration of Colorado water law and adherence to traditional "buy-and-dry" terms and conditions intended to negatively affect senior water rights often restricts the use of flexible water sharing agreements. Municipalities may find it risky to rely on water supplies that they lease and do not own, as they may not be considered reliable supplies from a performance goal perspective. Planners may not consider a Collaborative Water Sharing Agreement (CWSA) because it is considered a more difficult and uncertain process to navigate. Recognizing these barriers has prompted the Colorado legislature to enact legislation to remove some of these barriers in order to promote CWSA use. The following table summarizes some of the tools used to temporarily change and share water use.

Tools for Sharing Water Enacted by the Colorado Legislature

Substitute Water Supply Plans (SWSP)	SWSPs may be used in conjunction with water-sharing agreements to allow temporary transfers of water from agriculture to municipal uses. This mechanism provides the State Engineer with the authority to approve a 1-year SWSP for out-of-priority diversions, as long as the SWSP replaces all out-of-priority depletions to prevent injury to other water rights. The SWSP may be renewed annually for up to 5 years.
Interruptible Water Supply Agreements (IWSA)	Allows the water to be loaned between two or more water rights holders as an option agreement. The State Engineer is authorized to approve and administer an IWSA without adjudication.
Agricultural Water Protection Water Right	The law allows the owner of an irrigation water right to obtain a water court decree quantifying the historical consumptive use (HCU) and return flow

	obligations without identifying the new use in the decree. The owner may then lease, loan, or trade up to 50% of the decreed HCU to a new place or type of use, under an approved SWSP. This allows the irrigator to more quickly and efficiently enter into water sharing agreements when the opportunity arises.

COLLABORATIVE WATER SHARING AGREEMENTS

CWSAs, formerly known as Alternative Transfer Methods (ATM), are innovative and flexible water use agreements between two or more users. To avoid the irreversible impacts of traditional buy and dry, the CWCB and stakeholders throughout Colorado have encouraged CWSA development. These agreements are considered an essential tool for meeting future water needs. Since 2004, CWCB grants have provided incentives for planning and implementing these types of projects. A variety of projects fall into this category, which typically provides a temporary, voluntary, and compensated alternative approach to buy and dry. CWSAs rely on legal mechanisms to complete the water transfer and prevent injury to other water rights.

In the 2023 Colorado Water Plan, the term Collaborative Water Sharing Agreements is used to encompass all types of water sharing and leasing activities, including the temporary dry-up of agriculture to meet municipal needs, commonly known as ATMs.

In 2020, the CWCB published a report that assessed the status of CWSAs across the state. The ATM Status Report (2020) compiled and assessed outcomes from CWSA projects to date, conducted outreach to gather viewpoints toward CWSAs, summarized barriers to CWSA implementation, and provided recommendations to promote and expand the use of this tool.[5]

Little Thompson Farm CWSA

As Colorado's first perpetual agricultural-to-municipal CWSA project, the Little Thompson Farm is an example of a water transfer that provides drought/emergency supply to a municipality while avoiding buy and dry. The farm was purchased by Larimer County and is leased for continued farming to conserve its agricultural, historic, scenic, and educational values. Larimer County then entered into an agreement with the City of Broomfield that sold a portion of the Colorado-Big Thompson Project water to Broomfield with the option to lease back to the farm when available, while another portion of the C-BT water stays on the farm but is available to Broomfield in 3 out of 10 years.

Recognizing the potential for CWSAs to be an important tool for future water supply planning, several entities in Colorado have developed documents to help guide the planning and development of these types of projects:

- **WaterNow Alliance** - ATMs: Flexible and Innovative Water Supply Alternatives (Alternative-Transfer-Methods-A-Guide-for-Local-Leaders-in-Colorado-WNA.pdf (waternow.org))
- **Colorado State University (CSU) Water Center** - ATMs: An Approach Toward Balancing Municipal and Agricultural Water Needs (JanFeb35_1.pdf (colostate.edu)

CWSAs may not work for all farms, as even temporary fallowing can have long-term results such as loss of customer contracts or labor. While barriers to large-scale adoption of CWSAs exist, many municipalities (Colorado Springs Utilities, City of Greeley, Pueblo) are including this tool in their water supply planning.

[5] https://dnrweblink.state.co.us/CWCB/0/edoc/212963/ATM%20Status%20Report.pdf

Innovative projects across the state are being implemented as momentum continues to build toward protection of agricultural lands.

The environment can also be a beneficiary of water sharing. Of the 16 CWSAs inventoried in the ATM Status Report, only three provided water for environmental uses. Because environmental uses are often non-consumptive, pairing municipal and environmental needs in a water sharing agreement can provide additional benefits beyond water supply. For example, additional water flowing into storage or into a stream system for municipal diversions can benefit those aquatic and riparian systems.

Colorado Water Trust – McKinley Ditch CWSA

For years, more than 3 miles of the Little Cimarron River near Gunnison have gone nearly dry in the late summer months. In 2014, Colorado Water Trust purchased a portion (5.8 cubic feet per second) of the McKinley Ditch to restore late summer flows to the river, which are often impacted by warm weather and upstream diversions. This project combines a Split-Season Water-Use Agreement with infrastructure changes to restore water to Little Cimarron. It is the first water-sharing agreement of its kind in Colorado. The agreement allows the water user to use their water right for irrigation in spring and early summer, and then for the CWCB to use it for instream flow in the late summer and early fall when the river and its ecosystem need water. In very dry years, all water in the stream is protected, and in high water years the full water right is diverted for agricultural irrigation.[6]

Point of Rocks CWSA

Since 2005, Xcel Energy has partnered with farmers in the North Sterling Irrigation District to provide up to 3,000 acre-feet of water (delivered during the winter) under an interruptible supply agreement. The agreement allows an annual base payment, plus additional payments if Xcel calls for the water to be delivered. The partnership provides water to Xcel Energy during significant drought.

[6] https://coloradowatertrust.org/projects/little-cimarron-river-mckinley-ditch/

STRATEGY 2:
PROMOTE THE ECOSYSTEM BENEFITS OF AGRICULTURE

In arid Colorado, the network of irrigation infrastructure used to convey water across the land has expanded areas of riparian habitat. Large farms and ranches located along irrigation ditches create connected open spaces, particularly when these lands are interspersed with public lands and wildlife refuges. The habitat and open spaces offered by agricultural lands provide food, water, protection, and migratory corridors for birds, insects, and larger wildlife across Colorado.

In many parts of Colorado, the aquifer recharge and return flows from irrigated agriculture create and maintain wetland and riparian habitat.[7] Fish and wildlife benefit from habitat supported by water stored and delivered for agricultural uses. Promoting the ecosystem benefits of agriculture can help keep water in agriculture.

Farmers are often the people living closest to the land. Living and working alongside nature inspires a sense of responsibility. That's why the agricultural sector is frequently invested in environmental stewardship programs.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

BUILDING PARTNERSHIPS FOR MULTI-PURPOSE PROJECTS

Implementing multi-purpose projects is an effective way to improve ecosystem benefits. Federal and state government agencies partner with producers to implement conservation practices that enhance wildlife habitat on the open space for wildlife on agricultural lands while keeping the land productive (see examples below). These practices include maintaining cover for birds and wildlife, rotational grazing for brush management and to improved soil health, and maintaining or enhancing return flows to restore wetlands.

Through the Farm Bill, the Natural Resources Conservation Service (NRCS) provides technical and financial assistance to participants who voluntarily make improvements to their working lands while the U.S. Fish and Wildlife Service (FWS) provides participants with regulatory predictability for the Endangered Species Act (ESA) when needed. This innovative approach empowers landowners to make on-the-ground improvements and provides peace of mind that no matter the legal status of a species, they can keep their working lands working.

[7] https://www.southplattebasin.com/documents/bip
[7] 5 Positive Effects of Agriculture on the Environment - Environment Co

This model has proven extremely popular with private landowners across the United States. More than 8,400 producers teamed up under Working Lands for Wildlife (WLFW) and have conserved nearly 12 million acres of wildlife habitat since 2010.[8]

***Habitat Partnership Program (HPP)* projects include:**

- *Habitat improvement*
- *Fence improvement or repair*
- *Game damage issues*
- *Information and education*
- *Research and monitoring*
- *Conservation easements*

HPP's purpose is to reduce wildlife conflicts, particularly those associated with forage and fences, to help CPW meet game management objectives, assist with private land conservation efforts, and enhance migratory corridors. HPP efforts are primarily with agricultural operators and focus on problems and objectives for deer, elk, pronghorn, and moose.

HPP has provided an opportunity for improved relationships through dialogue, education, and understanding among landowners, land managers, sportsmen, and CPW regarding resolution to issues and conflicts experienced with big-game management and agricultural problems.[9]

STREAM FLOW MANAGEMENT PROGRAMS

The water used for agriculture provides the space and flows necessary to maintain a robust on-water recreation industry in Colorado. The original purpose of much of the reservoir infrastructure where Colorado residents recreate was agricultural water supply. Stream flow management programs to support fishing and rafting opportunities are often supported by agricultural users and benefit the ecosystem.

Arkansas River Voluntary Flow Management Program (VFMP)

The VFMP provides non-consumptive benefits from senior water rights (often decreed for agricultural uses) as this water is moved from upper basin storage to lower basin storage reservoirs. The most visible VFMP benefits are the extended boating season in the upper basin and flow enhancements for the river fishery. Voluntarily managing and delivering water does not require an in-stream flow right and maximizes the beneficial uses of water by providing multiple benefits for multiple uses.

AGRITOURISM

From fall festivals and corn mazes, to participating in grape harvesting and wine making, to wildlife-related recreation from the west slope to the east slope, agritourism provides opportunities for the public to have fun while experiencing rural agriculture and its benefits.[10] By emphasizing sustainable resource management on production and tourism sides of the industry, agritourism helps protect and preserve local ecosystems.

Monte Vista Crane Festival

In the San Luis Valley during fall and spring migrations, Sandhill Cranes gain strength for the final flight to traditional wintering grounds along the Rio Grande Valley in New Mexico, and use the same area in the spring before nesting in Colorado.[11] The Monte Vista Crane Festival, Colorado's oldest and most well-known birding event, provides an opportunity for the public to enjoy birdwatching and injects over $3.5 million into the local economy.

[8] https://www.nrcs.usda.gov/programs-initiatives/working-lands-for-wildlife
[9] https://cpw.state.co.us/habitat-partnership-program
[10] https://Coloradoagritourismassociation.org
[11] https://coloradocranes.org/colorado-greater-sandhill-cranes/

STRATEGY 3:
IMPLEMENT CONSERVATION EASEMENTS TO PROTECT AGRICULTURAL LAND

A conservation easement is a voluntary legal agreement between a landowner and another entity (usually a land trust or government entity) that places permanent restrictions on a piece of property. Ownership of the land itself is not transferred, and the landowner maintains many of their rights, including the right to use the land (consistent with historical uses), sell it, or pass it on to their heirs. Conservation easements can be obtained on a variety of land uses and can preserve the conservation values associated with farming and ranching, wildlife habitat, water supplies, recreation, and aesthetic qualities that help maintain Colorado's diverse landscapes.[12] Permanent restrictions that help protect conservation values on properties typically involve limits or bans on dividing property and building construction, bans on surface mining, and continued historical use of water rights on property (and may allow for the property owner to periodically lease water).[13]

Landowners who sell a conservation easement typically donate some or all of the value, which is considered a charitable contribution and can qualify the landowner for income tax deduction or a transferable tax credit in Colorado. The value is based on the difference between the value of the property before and after the easement donation. The value of a property before an easement typically contemplates development potential, while the value after an easement is based on existing land use without development.[9] There are also federal tax incentives for conservation easements that benefit the public. These types of incentives allow landowners to preserve working lands by reducing their tax burden (both income and property taxes), which gives them more flexibility to manage and plan for the future and withstand development pressure.[14]

House Bill (HB) 21-33 and Senate Bill (SB) 24-126 makes the following positive changes to Colorado's conservation easement tax credit program:

- Increases the tax credit incentive to up to 90% of the donated value of a landowner's conservation easement through 2026, and up to 80% thereafter.
- Increases the refundable portion of the tax credit to $200,000, which increases the attractiveness to many landowners.
- Expands the list of eligible landowners who can access the tax credit program to include certain types of water entities, such as water conservancies and irrigation and acequia organizations.
- Establishes efficiencies for landowners within the Colorado Division of Conservation.

[12] https://goco.org/news/blog/what-is-conservation-easement#:~:text=or%20local%20government.-,What%20is%20a%20conservation%20easement%3F,forever%2C%20permanently%20conserving%20the%20property
[13] https://coloradoopenlands.org/considering-conservation/
[14] https://s3.amazonaws.com/landtrustalliance.org/ConservationEasementTaxIncentiveBrochure2016.pdf

OPPORTUNITIES FOR PROTECTING AGRICULTURE

PROTECTING THE HISTORICAL ATTRIBUTES AND BENEFITS OF AGRICULTURAL LAND

The agricultural way of life in Colorado's rural areas is important to its rural citizens; water is the driving force behind this vitality. Agriculture supports not only businesses directly tied to it but also services like schools, medical facilities, and banks that rely on rural communities' economic health. Colorado's agricultural lands offer local and statewide value, and conservation easements help preserve that value for the future.

Conservation easements, especially those that involve irrigated lands, are a valuable tool for preserving the historical attributes and benefits of that agricultural land by permanently tying water to land. Flexible conservation easements that allow periodic leases of agricultural water to cities are critical for permanently protecting irrigated agriculture while providing water supplies to meet growing municipal demand.

A 2018 study by Colorado State University on Colorado's return on investments in conservation easements found that for every $1 invested in conservation easements through Great Outdoors Colorado (GOCO) and the Conservation Easement Tax Credit program, $4 to $12 of public benefits were provided.[11]

Agricultural Conservation Easement Program (ACEP) and the Inflation Reduction Act (IRA)	The IRA includes $1.4 billion in additional funding for the ACEP. The IRA also revised ACEP authority and is providing funding for easements that will most reduce, capture, avoid, or sequester GHG emissions. It also extended regular program funding through fiscal year 2031. NRCS is streamlining ACEP to ensure the program is easier and more convenient to use, and to strengthen IRA implementation. Specifically, NRCS is streamlining ACEP appraisals and land surveys, certifying eligible entities who help NRCS, and helping producers enroll land into agricultural land easements. In addition, NRCS is expanding the national priority areas eligible for IRA funding for ACEP easements.[15]

Funding for conservation easements needs to be maintained and enhanced. In addition to GOCO and the Conservation Easement Tax Credit program,[16] county and municipal governments, CPW, the U.S. Department of Agriculture's NRCS, and private sources provide funding for conservation easements. While these sources represent a variety of options for funding conservation easements, their continued support is needed.

PRESERVING OPEN SPACES AND WATERSHEDS

As described in Strategy 2, Colorado's farms and ranches are important for stewarding the land and water resources in the state, and their continued operation preserves habitat and provides open-space benefits. The 2018 CSU study on conservation easements[11] estimated the value of ecosystem services derived from conservation easements. The study described ecosystem services as the natural filtration and purification of water supplies, groundwater recharge, flood control, and habitat for fish and wildlife. It found that Colorado residents have derived an estimated $5.5 to $13.7 billion (in 2017 dollars) of economic benefit from land in conservation easements. While this value encompasses all land use types, prime farmland made up more than 10% of the protected land analyzed in the study. Placing irrigated lands in conservation easements provides benefits to agricultural producers and all Coloradans because of the ecosystem services and open spaces.

[15] https://www.nrcs.usda.gov/programs-initiatives/acep-agricultural-conservation-easement-program

[16] https://warnercnr.colostate.edu/wp-content/uploads/sites/2/2017/07/CSU-Conservation-Easement-Study_Exec-Summary.pdf

Peachwood Farms

Colorado Open Lands has been helping landowners in the San Luis Valley with conservation easements and bringing financial resources to the area for more than a decade. A first-of-its-kind groundwater conservation easement was recently established at Peachwood Farms to reduce groundwater irrigation at the 1,800-acre farm to help stabilize water levels in the aquifer, preserve water for the benefit of other farmers, enhance habitat for wildlife, and keep the land in production through drought-tolerant revegetation.[17]

DEPLOYING A STRATEGIC APPROACH TO CONSERVATION EASEMENTS

A strategic approach to establishing conservation easements can further enhance the economic, cultural, environmental, and open space value of irrigated lands. This approach could consider the following factors:

- Location of irrigated lands relative to areas of urban development where the continuity of open space would be beneficial for aesthetic value or wildlife corridors
- Proximity to water supply infrastructure that could be used to manage or convey water from CWSAs implemented on protected irrigated land
- The relative productivity of irrigated land and the benefits of protecting the most productive acres
- Location of irrigated land relative to areas with environmental and recreational attributes such as waterways with instream flow water rights, streams with frequent recreational usage, or Gold Medal Stream reaches

Strategic approaches to establishing conservation easements are being deployed and pursued by various groups in Colorado, and these efforts should be supported. Innovative projects across Colorado are being implemented as momentum continues to build for protection of agricultural lands.

Yahn Ranch

The Yahn Ranch, located in the South Platte River Basin, placed a conservation easement on its land to protect its agricultural benefits as well as its wildlife habitat and open space qualities. The conservation easement allows periodic leases of water to industrial or municipal users.[18]

Trampe Ranch

The Trampe Ranch, located in Gunnison County, is one of the most significant acts of land preservation in the state. Encompassing 6,000 acres, it includes some of the most familiar, productive, beautiful, and scientifically significant land in the Gunnison Valley. “This project brought together a deep and broad partnership of individuals, governments, and organizations, all allied around a shared commitment of helping local communities fulfill their visions for how they want to grow and what they want to preserve,” Jim Petterson, Southwest and Colorado director at Trust for Public Lands, said.[19]

[17] https://coloradoopenlands.org/water-conservation/peachwood-farms/
[18] https://youtu.be/nFwAwYjmOKY?si=YL3LNeAheAI6Y9ko
[19] https://www.tpl.org/our-work/trampe-ranch

STRATEGY 4:
RECOGNIZE IRRIGATED AGRICULTURE AND ENERGY NEXUS

In 2019, Colorado passed HB 19-1261 (Section 25-7-102, C.R.S.), the Climate Action Plan to Reduce Pollution, which included science-based targets for reducing statewide GHG pollution 26% by 2025, 50% by 2030, and 90% by 2050 from 2005 levels. The Governor directed state agencies to produce a "greenhouse gas pollution reduction roadmap," which they did in 2021 and updated in February 2024. While the agriculture sector was not among the four leading sectors producing GHG emissions, the Colorado 2021 Greenhouse Gas Inventory Update stated that emissions from the agriculture sector accounted for approximately 8% of Colorado's GHG emissions. The roadmap identified a role for "natural and working lands" (i.e., both irrigated and non-irrigated agricultural lands, grasslands, forest, urban parks, and riparian areas) in mitigating GHG in the atmosphere.[20]

Irrigated agriculture can also be a solution by reducing GHGs by:

- Incorporating renewable energy production into farm operations
- Enhancing carbon stabilization in the soil through a variety of practices that improve soil health
- Using crops such as corn and camelina for renewable fuels

CWCB, with the support of CDA, has promoted and can further promote these practices as described in the remainder of this section. Recent state funding has been made available through the Agriculture Drought and Climate Resilience Office to accelerate how quickly Colorado agri-businesses adopt or expand green energy generation and to support a suite of on-farm resilience practices and renewable energy projects.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

RENEWABLE ENERGY PRODUCTION ON IRRIGATED FARMS

Operating an irrigated farm requires energy for heating and lighting outbuildings, pumping water, and powering equipment. Renewable power generation incorporated into farm operations can improve the individual farmer's bottom line and favorably impact farm viability. From the State of Colorado's perspective, renewable power on farms furthers GHG reduction goals to the extent that it displaces power generated from oil, gas, coal or other GHG-emitting processes. Loss of irrigated farms that have developed renewable energy (or could) may represent a lost opportunity to reach the State's GHG reduction.

The Advancing Colorado's Renewable Energy and Energy Efficiency (ACRE3) program promotes development and implementation of renewable energy and energy efficiency projects for Colorado's agricultural producers. It provides financial and technical assistance and education to help agricultural producers and processors cut energy costs, develop their own energy resources, and create markets for agriculturally derived energy and

[20] https://energyoffice.colorado.gov/ghg-pollution-reduction-roadmap

fuels. An important step to increasing renewable energy development on farms is to encourage energy companies to support this development through incentives, and not be a barrier.[21]

Past projects have involved energy-efficiency audits and have explored the feasibility of developing biofuel, wind, solar, and hydro projects. Currently, the State has teamed with the NRCS, the Colorado Energy Office, and other partners to facilitate development of low-impact small hydropower on pressurized irrigation systems, as well as at small drops in irrigation canals and reservoirs.[22]

AGRIVOLTAICS

Agrivoltaics refers to the co-location of solar energy installations and agriculture beneath or between rows of photovoltaic (PV) panels: it has the potential to ease land use conflict, does not require proximity to transmission lines as required for large PV projects, can improve yield and reduce water requirements for certain crops due to shading, and can diversify income for farmers. Agrivoltaics is in its infancy. Based on data collected so far by the National Renewable Energy Laboratory, there are more than 2.8 gigawatts of agrivoltaic sites in the U.S., the majority of which are confined to research test plots, though this is beginning to change.[23]

Jack's Solar Garden

Jack's Solar Garden is a 5-acre, 1.2-megawatt agrivoltaic research site on a small family farm in Boulder County. It is among the largest agrivoltaic facilities in the United States. Audubon Rockies has established a large pollinator habitat at the site, and Sprout City Farms is cultivating crops. Researchers are partnered with Jack's Solar Garden to study plant growth under and around the solar panels. Through partnerships with the National Renewable Energy Laboratory, CSU, and the University of Arizona, Jack's Solar Garden puts valuable research on co-locating solar panels with agriculture into the public sphere. Its educational non-profit, The Colorado Agrivoltaic Learning Center, works to educate local students and community members about agrivoltaics.[24]

Shading canals with solar panels

Constructing solar panels over irrigation canals is a concept being implemented at a large scale in Arizona and California[25,26], although it has not yet gained traction in Colorado. The benefits of these projects include reduced evaporative losses of water in the canals, more efficient PV panel performance attributable to local cooling, generation of significant amounts of renewable-sourced power, and reduced plant growth in the canals. However, significant challenges include access to the canal for operations and maintenance and earthen canal construction.

Whether this technology is economically feasible for relatively smaller mutual ditch systems is unknown, but Colorado Senate Bill 23-092 has directed the CWCB (in partnership with the CSU Water Center) to conduct a study on the use of floatovoltaics.

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[21] ACRE3 Program | Department of Agriculture (colorado.gov)
[22] Agricultural Hydro | Department of Agriculture (colorado.gov)
[23] The Potential of Agrivoltaics for the U.S. Solar Industry, Farmers, and Communities | Department of Energy
[24] Solar energy Colorado | Jack's Solar Garden, LLC | United States (jackssolargarden.com)
[25] Solar Panels Over Canals in Gila River Indian Community Will Help Save Water (voanews.com)
[26] Solar-paneled canals getting a test run in San Joaquin Valley | University of California

MICROHYDRO

Small-scale hydropower generation, also called micro-hydro, is a way of harnessing the energy of flowing water and putting that energy to mechanical or electrical use. Flour mills, for example, historically used water from a flowing stream to turn a waterwheel and mechanically drive flour grinders. Today's technologies allow energy to be captured from moving water and used to mechanically turn a center pivot sprinkler (mechanical hydropower) or create electricity.

Micro-hydro can also refer to small hydropower projects in irrigation canal drops and at small reservoirs. The benefit from power generation then accrues to the mutual ditch company or irrigation district that owns the infrastructure.[27]

Mechanical hydropower systems use the pressure of an irrigation system to spin turbines and drive a hydraulic pump that advances the center pivot around the field. In this instance, no electricity is generated, or needed, to move the center pivot. Mechanical hydropower systems are characterized by relatively low initial cost, independence from the larger power grid, and lower maintenance. Hydroelectric systems spin a turbine and create electricity, which is typically transferred into the electrical grid for off-farm uses. The farmer then receives a credit for this power production against the farm's monthly electricity use.[28]

The reasons for implementing small hydropower generation at the farm scale include economic incentives (including low-interest loans, grants from the State of Colorado, net metering, and utility rebates or incentives), the need to reduce pipe pressure, or to simply transition to a more sustainable energy source. Small on-farm hydropower generation offers an irrigator the opportunity to reduce electrical costs, but the benefits of small hydropower systems extend beyond the farm to environmental and community benefits.[23] To the extent that on-farm power would otherwise be supplied by burning fossil fuels, use of micro-hydropower contributes to reduction of GHG emissions.

> *"Capturing wasted energy streams is smart business and helps the bottom line. From a business model, it cuts costs, and hydropower is also part of tackling climate mitigation."*
> *- Kate Greenberg, Colorado Agriculture Commissioner*

Michael Vicenti takes advantage of the opportunity afforded by the Ute Mountain Farm and Ranch Enterprise, its 109 center pivot sprinklers, and its water supply. Photo: Gunnar Conrad

Ute Farm and Ranch Micro-hydro Improvements

In 2022, the Ute Mountain Ute tribe started up its first hydroelectric generator on an irrigation line on the 7,700-acre Ute Mountain Farm, which has 110 center pivots. By the end of 2024, the tribe will have 10 hydropower generators capturing the energy from pressurized pipes. The plant captures 18 kilowatts (kW) of energy from the flow, leaving enough water pressure to power the center pivot.

Once all turbines are online, the 10 hydropower generators will generate 612 kW of energy per year—enough to cover electricity costs for the farm and the adjacent Bow and Arrow Brand corn mill. Future energy savings are projected to be $30,000 to $40,000 per year.[29]

[27] Agricultural Hydro | Department of Agriculture (colorado.gov)
[28] 6.708 – Agricultural Hydropower Generation: On-Farm - Extension (colostate.edu)
[29] Ute Water - Water Education Colorado

STRATEGY 5:
EXPAND MARKET PATHWAYS FOR PRODUCERS

Agriculture is a core component of the local, state, and national economy. In the U.S., agriculture and its related industries contributed roughly 5.6% to the U.S. gross domestic product (GDP) in 2023, which equates to approximately $1.53 trillion dollars. Farms alone contributed $203.5 billion toward that total. Jobs in agriculture make up 10.4% of the total U.S. workforce, with 1.2%, or 2.6 million jobs, coming from direct, on-farm employment.[30]

In Colorado, the agricultural industry provides more than 195,000 jobs and as stated earlier in this report, contribute more than $47 billion dollars to Colorado's economy (approximately 10% of the state's GDP).[31]

To keep Colorado's agricultural industry viable, the state must continue finding ways to improve the profitability of our farms and ranches.

Focusing on local markets and direct sales allows local economies to more quickly see and more realize benefits from agriculture in the state.[32]

Farms that sell goods and commodities directly from their farm to consumers often see larger economic gains as compared to farms with non-direct sales. For every $1 million in farm-direct sales to consumers, studies estimate that 32 jobs are created.[33] These jobs come from the need to grow produce, create marketing, conduct accounting, and deliver and sell goods. Non-direct sales occur when farms sell to retailers who then process the goods for final sale. Non-direct sales, in comparison, only produce 10.5 jobs for every $1 million in sales.[26] This reflects a meaningful loss in agriculture-adjacent job generation and emphasizes the need for agriculture on a local level to stimulate the economy. It further reinforces why initiatives such as "Colorado Proud" are vital to the agricultural vitality of Colorado by encouraging consumers to purchase goods from local sources.

In addition to boosting local economies, locally produced goods are more environmentally sustainable than their imported counterparts. A life-cycle analysis study indicates that those goods created at a small to medium scale have much less global warming potential than those goods produced at a large scale. The study notes that transportation, storage, and packaging can lead to significant environmental impacts.[34]

[30] USDA ERS - Ag and Food Sectors and the Economy
[31] Colorado Agriculture Brochure.pdf
[32] Colorado Proud | Department of Agriculture
[33] Stimulate Local Economies - Farmers Market Coalition
[34] Sustainability | Free Full-Text | A Life Cycle Assessment Approach for Vegetables in Large-, Mid-, and Small-Scale Food Systems in the Midwest US (mdpi.com)

Knapp Family Farm Stand, Rocky Ford, Colorado

Topp Fruits and Knapp Family Farm: Community-supported Agriculture (CSA)

Both Knapp Family Farms and Topp Fruits are examples of CSAs. These operations focus on selling produce locally, in a farm-direct method, to enhance the positive impact on the local economy. Knapp's Farm Market provides access to quality produce that changes seasonally and is chosen to supplement locally grown produce, as well as support other Colorado Farmers. Topp Fruits LLC is family owned and operated and provides top-quality, nutrient-dense fruits to consumers across Colorado. Their orchards are certified organic and are holistically managed to produce a variety of products that complement the ecology of the land.

Zero Foodprint – Collective Regeneration

Collective regeneration is a program that pairs producers with food and beverage companies and restaurants to support regenerative farming practices by paying farmers to implement regenerative practices. Collective regeneration supports practices such as regenerative cropping and managed grazing to achieve outcomes such as improved soil health, nutrient density, resilience, and improved hydrology and biodiversity.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

Market pathway expansion for producers is occurring on the national, state, local, and producer level. As consumers and policymakers become more aware of the value of local agriculture to their health and communities, they will partner with producers to develop opportunities to promote and expand the industry.

MARKETING CAMPAIGNS

Colorado Department of Agriculture Markets Division provides wide-ranging marketing support services to the ag industry. This includes business development tools, market connection resources, export assistance, trade shows, agritourism resources, "Colorado Proud" program administration, and the Community Food Access Program.

"Colorado Proud" is a free marketing program designed to help consumers, restaurants, and retailers identify and purchase Colorado food and agricultural products. Its online search engine is the largest and most in-depth database of its kind and features a diverse selection of food-related businesses: buyers, farmers/ranchers, fisheries, farmers markets, processors/packers, wineries, restaurants, and more.

PLANNING ASSISTANCE FOR LOCAL FOOD SYSTEMS

On a national level, programs such as the U.S. Environmental Protection Agency's (EPA) "Local Foods, Local Places" planning assistance program helps cities and towns across the country engage with stakeholders to develop local food systems, preserve open space and farmland, revitalize "Main Streets" and downtowns, boost economic opportunities for farmers and businesses, and improve access to local and healthy foods, especially among disadvantaged populations.[35]

USING COOPERATIVES AND FOOD HUBS

A cooperative is a business owned and controlled by the people who use its services. While the number of agricultural cooperatives in Colorado has declined since the 1950s, the size of current cooperatives, in both membership and net business volume, has grown. New types of cooperatives are emerging as both producers and agricultural service providers look for alternative forms of business organization and ways to expand innovative farming practices.[36] Examples include Poudre Valley Community Farms and the High Plains Food Coop.

A food hub is a business or organization that manages the aggregation, distribution, and marketing of foods from local and regional producers to meet a wholesale demand. Food hubs provide a bridge between food producers and consumers, providing a mutually beneficial relationship across both ends of the food system.[37] More than 10 food hubs in Colorado have successfully aggregated, distributed, and marketed local food products. The cooperatives connects rural producers to more regional food markets, including urban and suburban markets. Specific benefits of food hubs include:

- Lower cost to access markets
- Automation of business practices (typically invoice customers)
- Regional extension of the market
- Access to refrigerated delivery to distant markets

These hubs can be brick and mortar or virtual on-line markets that serve a larger customer base than farmers markets or CSAs. Institutional and wholesale buyers prefer working with food hubs because deliveries tend to be more reliable, and it takes less time than dealing with individual producers.

A review of the food hubs and farmers markets in Colorado indicate a scarcity of networks in the eastern part of the state. Given this region is comprised of small farming communities, efforts to establish food hubs there would create jobs and retain residents in the area. Eastern Colorado has a variety of farms, including dairy, hog, beef, and crop producers. This product diversity is an asset to the region, and the variety of products would support new distribution systems.

New storage and processing facilities are strongly needed in Colorado to support the expansion of local food markets. Without these facilities, the movement of traditional crops to drought-resistant crops (such as rye and camelina) will not be possible on a large scale. Funding is needed to expand supply chains, which will in turn support farming innovations. Additionally, leadership is needed to encourage larger grocery store chains to contract with local farmers, rather than import food from other states.

[35] Local Foods, Local Places | US EPA

[36] https://csuredi.org/redi_reports/the-ownership-of-enterprise-in-colorado-agricultural-and-community-based-cooperatives/

[37] https://healthyfoodaccess.org/business-models/food-hubs/

FORMING LOCAL COALITIONS

Local and regional stakeholder groups such as the San Luis Valley Local Foods Coalition and the Yampa Valley's Community Agriculture Alliance are just a few examples of how stakeholders can collaborate to help build resilient local food systems through funding and education, and by connecting local producers with consumers. These programs not only support the local agriculture industry but strengthen local communities that depend on that industry by preserving culture and improving quality of life.

Boulder Valley School District's – School Food Project

Recognizing that eating local is healthier, Boulder Valley School District gives purchasing preference (generally through direct relationships) to growers, producers, and processors in Boulder and Broomfield counties, surrounding counties, and Colorado. More than 40% of their total food spending is locally sourced. Their farm-to-school program also includes food and nutrition education programs, school gardens, and a junior "Iron Chef" competition.[38]

Rye Resurgence Project

A group of producers in the San Luis Valley created the Rye Resurgence Project, which was formed to build a market for high alpine rye. Realizing that this naturally resilient and hearty winter crop could help improve soil conditions, reduce erosion, reduce water usage, and improve farm sustainability, the project aims to build a community of buying partners and build an equitable market throughout the rye supply chain.[39]

[38] Home - Boulder Valley School District - School Food Project (bvsd.org)
[39] The Rye Resurgence Project

STRATEGY 6:
ELEVATE AGRICULTURE IN URBAN PLANNING

Strategic and collaborative management of urban growth maintains the many benefits of irrigated agricultural lands while providing housing and services to residents. Managing urban growth is important for irrigated agriculture, production of local foods, and maintaining ecosystem benefits from wetlands and wildlife habitat. Rural communities located near expanding urban areas face significant vulnerability. The encroachment of growing cities poses a threat, either by absorbing these areas or by depleting the vital resources they rely on. However, it is crucial to acknowledge the profound symbiotic relationship between the two. Rural communities provide invaluable economic contributions, ecosystem services, and cultural richness that help to counterbalance and complement urban life. Developing policies, land use regulations, and zoning that accommodates and preserves agricultural lands can keep local families and residents in agriculture while continuing to expand Colorado's urban landscape. Managing urban sprawl provides benefits to cities as well, and includes reducing the need to develop far-reaching infrastructure, and increasing the opportunity to invest in climate-smart management tools such as public transportation.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

Innovative and collaborative efforts across Colorado preserve irrigated lands, agricultural heritage and culture, and local food production by taking a thoughtful approach to urban development.

INTERGOVERNMENTAL AGREEMENTS

Municipal and county governments can develop Intergovernmental Agreements (IGA) that guide development of new urban areas by identifying development patterns that foster clustered development that preserves surrounding agricultural lands. Concentrated developments can be more affordable because the infrastructure and resources necessary for urbanization are more readily available. Creating an IGA can help encourage sharing of resources, infrastructure, community facilities, and other elements that help leverage development investments and promote revenue sharing and shared infrastructure costs.[40]

COLLABORATIVE ZONING

Cities and counties can create zoning districts that identify allowed land uses and development standards, and that offer incentives to ensure that a consistent vision of development and agricultural land preservation is met regardless of jurisdiction. The zoning district should collaboratively work with community stakeholders to create a development plan that identifies areas of residential, commercial and industrial development; farmland preservation; and local food production compatible with the district's vision. This could include deliberate low-water use zoning to conserve municipal water supplies. The highest and best land uses in the district should be identified and include representatives from various levels of government and agriculture.

[40] LUBP_CaseStudy_GrowthManagement.pdf

Boulder County Coordinated Comprehensive Development Plan	In 2003, Boulder County worked in partnership with many of their local municipalities to develop an IGA to plan for and regulate land uses to minimize negative impacts of new developments on rural areas near municipality boundaries and growth areas. An important focus for this IGA was on rural preservation areas, municipal influence areas, and unincorporated land in the county. This multi-agency IGA required careful coordination and collaboration among all groups involved. Boulder County Countywide Coordinated Comprehensive Development Plan Intergovernmental Agreement
Growing Water Smart	The Sonoran Institute and Babbitt Center for Land and Water Policy's Growing Water Smart program introduces communities to the full range of communications, public engagement, planning, and policy implementation tools to realize their watershed health and community resilience goals. Growing Water Smart workshops bring leaders from a city, town, county, or region together to devote entire days to learning collaboration and planning, which leads to custom action plans tailored to their unique needs and goals. https://sonoraninstitute.org/growingwatersmart/

PURCHASE OR TRANSFER OF DEVELOPMENT RIGHTS

Purchase of development rights (PDR) and transfer of development rights (TDR) programs can offer agricultural landowners compensation to offset the development value of their land if it is preserved.[41] In a PDR program, a local government would appraise the development right value for a property and then purchase a conservation easement that would preserve the property as agricultural (or perhaps allow some limited development), and the landowner would maintain the land's historical use. In a TDR program, a local government may identify and zone lands as agriculture, which would prevent future urban development. These areas would be considered "sending areas." To reduce the financial impact of landowners in "sending areas" they would be allowed to sell their development rights to a developer that builds in a designated "receiving area." Properly designed TDR programs create a market for development rights and can be a tool for protecting large areas of open space and agricultural land. PDR and TDR use conservation easements (Strategy 3), but the programs are most often developed at the municipal level in collaboration with landowners, rather than originating with the landowner.

Historic Splendid Valley

Historic Splendid Valley is an agricultural area created through a partnership between the City of Brighton and Adams County. The area is focused on preserving historical farmland while creating new opportunities for closer connections among residents, agriculture, and nature. The plan will help decision makers guide investments in residential, commercial, and industrial developments compatible with the plan while conserving farmland and local food production and promoting agritourism.[42]

[41] Essential Smart Growth Fixes for Rural Planning, Zoning, and Development Codes (EPA)
[42] Historic Splendid Valley | Brighton Colorado

ENCOURAGE WATER-SMART DEVELOPMENT

Municipalities are looking for development models other than traditional single-family homes to conserve water. These may include higher-density developments, water-wise and alternative landscape options, and non-potable/reuse programs for green space irrigation.

Higher density development can accommodate population growth while fostering efficiencies in water use, infrastructure development, and transportation. With higher-density development, urban sprawl into agricultural lands can be reduced and communities can grow in ways that protect natural and fiscal resources.

Water-wise landscaping principles and turf reduction requirements for non-functional turf will help municipalities conserve water as they continue to grow. Additionally, new sources of supply are being used for municipal green space irrigation. These include using non-potable supplies, which can help save costs of, and water lost through, expensive treatment, as well as reuse, which maximizes the benefit of already-existing supplies.

STRATEGY 7:
INVEST IN AGRICULTURE CAREER AND LEARNING OPPORTUNITIES

Agricultural jobs have been steadily declining in the United States. Since 1969, farm employment has decreased by 35%.[43] This decline can be attributed to a variety of factors:[44]

- Aging workforce
- Mechanization
- Steep initial investment cost in equipment and technology
- Unequal work-life balance
- Physical strain
- Rising real estate prices
- Diminishing amounts of arable land, especially near urban areas

While Colorado has seen a similar decrease in harvested acres, our state has recently seen an increase in its number of farms.[45] Declining job opportunities in agriculture is critical to address to keep agriculture a viable employment option for Colorado citizens.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

SUPPORT AGRICULTURAL-FOCUSED YOUTH PROGRAMS

Encouraging younger generations to become involved in the agricultural workforce is critical to addressing the decline in agriculture careers. According to the U.S. Department of Agriculture (USDA), the number of young producers increased from 208,000 in 2012 to more than 321,000 in 2017.[46] This coincides with the increasing number of young adults who are actively involved in Future Farmers of America (FFA), and 4-H programs. FFA reported an all-time membership high in 2023, with more than 945,000 members.[47] Programs like FFA and 4-H help develop confidence to participate in agriculture, promote awareness of agriculture's global importance, and support those individuals interested in making agriculture a career.

CDA has also invested in young producers through programs like NextGen Ag[48], the Agricultural Workforce Development Program[49], and the Colorado Agricultural Future Loan Program[50], seeking to lower barriers to entry for beginning farmers and ranchers.

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[43] https://farmdocdaily.illinois.edu/2023/07/changes-in-farm-employment-1969-to-2021.html
[44] https://agamerica.com/blog/the-impact-of-the-farm-labor-shortage/
[45] www.quickstats.nass.usda.gov/
[46] https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/st99_1_0068_0068.pdf
[47] https://www.agdaily.com/ffa/national-ffa-membership-hits-time-high/
[48] NextGen Ag Leadership Grant Program | Department of Agriculture
[49] Agricultural Workforce Development Program | Department of Agriculture
[50] Colorado Agricultural Future Loan Program | Department of Agriculture

St. Vrain Valley School's Farm to School Program

Saint Vrain Valley Schools has partnered with its high school Ag Science program and FFA to create a student mentoring program aimed at creating curiosity about agriculture and local farms. Student mentors work with pre-kindergarten through 8th grade students on topics such as soil health and the role of pollinators in agriculture. Teachers and student mentors grow foods along with student participants, and the produce is featured in the salad bar at school. In addition, the school supports farmers by serving local foods.[51]

SUPPORT EFFORTS TO CONNECT AGRICULTURAL AND URBAN COMMUNITIES

With the growth in urban population in Colorado there has been an increasing disconnect between producers and consumers of agricultural goods. This urban growth is partially connected with the dry-up of rural agricultural lands to make way for newer developments. Urban agriculture is a means to bridge the gap between urban youth and the barriers to entering agriculture. This is demonstrated with programs such as The Urban Farm in Denver.[52]

The Urban Farm

The Urban Farm is a community farm and educational center in Denver that promotes youth and community education about agriculture. It provides urban youth the opportunity to experience local food and agricultural production and systems and provides hands-on learning without needing to leave the city. The program inspires learning through practical work experience and fostering respect, responsibility, curiosity, caring, and grit.[43]

INVEST IN AGRICULTURAL EDUCATION, TRAINING, AND LEADERSHIP

Statistics show that from 2009-2021, the percentage of adults aged 25 to 64 with college degrees, certificates, or industry-recognized certifications increased from 37.9% to 53.7%.[53] Colorado is among the top five states with the highest number of people pursuing post-secondary education, ranking third with 60.5% of the 25 to 64 age group having completed a form of coursework. A proposed solution to protecting agriculture, especially with Colorado's high post-secondary completion rate, is to invest in programs that promote agricultural-focused courses, training, and leadership opportunities.

[51] Farm to School – St. Vrain Valley Schools (svvsd.org)
[52] https://www.theurbanfarm.org/
[53] https://www.forbes.com/sites/michaeltnietzel/2023/02/01/percentage-of-us-adults-with-a-college-degree-postsecondary-credential-reaches-new-high-according-to-lumina/?sh=51b20f414cc5

Agricultural Focused Education Programs

Colorado Agricultural Leadership Program	The Colorado Agricultural Leadership Program (CALP) is a 2-year course dedicated to developing and enhancing the leadership capabilities of those committed to the future of Colorado's agricultural and rural communities. CALP prides itself on the ability to provide practical, applied experiences similar to a graduate program.[54]
Testing Ag Performance Solutions	Testing Ag Performance Solutions (TAPS) is a growing season-length farming contest and research framework designed to boost understanding of how producer decision making and management leads to profitable outcomes. In TAPS, competitors (individuals or teams) are first tasked with selecting a corn hybrid, seeding rate, and crop insurance. Next, they make irrigation and nitrogen management and marketing decisions through the growing season that are implemented on a field under a precision irrigation system at CSU's research farm in Ft. Collins.[55]
Master Irrigator Program	The Colorado Master Irrigator Program equips producers with the knowledge needed to evaluate the potential pros, cons, costs, and methods to help pay for/recoup costs of implementing different tools and strategies to improve water and energy use, efficiency, and conservation; improve soil health; and profit on their operations. Colorado Master Irrigator offers farmers and farm managers in the Republican and Rio Grande basins advanced training on conservation- and efficiency-oriented irrigation management practices and tools. This program is the product of efforts led by several local producers, district management representatives, and others.[56]

There are also educational programs targeted specifically to water resources issues:

- Rio Grande Water Leaders Course: provides education and networking to prepare attendees to take a role in safeguarding, developing, and managing the water resources of the San Luis Valley.
- Water Education Colorado's Water Leaders Program: in-depth development program to help those engaged in water issues become more effective and capable in charting the path toward innovative and collaborative water solutions in an increasingly complex environment.
- Colorado Water Center: leads interdisciplinary research, education, and outreach to address complex and evolving water-related challenges in Colorado and beyond through collaboration between higher education and water stakeholders.

[54] COLORADO AGRICULTURAL LEADERSHIP PROGRAM - Welcome (coloagleaders.org)
[55] https://www.irrigationinnovation.org/csu-taps
[56] https://www.comasterirrigator.org/

STRATEGY 8:
PROMOTE DROUGHT RESILIENCY

Water supplies across Colorado are under stress from drought conditions, climate change, and population pressures. Agriculture is often the first to experience the hardships associated with diminishing water supply and has sought out water conservation practices to generate more security for an uncertain water future.

With the increasing frequency and duration of drought in Colorado, the ability of producers to stretch water supplies and adapt to changing climate conditions becomes even more critical. Drought resilience is the implementation of strategies that reduce the impact of drought shocks and allow systems to adapt when drought occurs. These strategies can include irrigation and delivery system improvements, improved soil health, soil moisture monitoring, and drought-resistant crop selection. A related need is the ability for farmers to be able to better forecast water availability throughout the growing season. The State's continued development of flow forecasting tools will allow farmers to better manage their irrigation supplies.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

Agriculture in Colorado is constantly developing ways to increase resiliency for water shortages and drier years. Changes in demand and water supply have led to increasing awareness and implementation of conservation practices.

Flood irrigation is one of the oldest and most common irrigation methods worldwide. Flood irrigation is relatively low-cost irrigation method because it does not require a lot of infrastructure and relies on gravity to move water, so energy costs are low. With improvements in infrastructure and conveyance, center-pivot irrigation (invented in the 1940s) has become a popular irrigation method. Center pivot irrigation systems are pressurized mechanical systems that typically self-propel in a field. They are a more efficient form of irrigation, offering 75% to 98% water use efficiency. In recent years, drip irrigation has grown in popularity. Like center pivot systems, drip irrigation can offer more than 90% water efficiency, while conserving water and fertilizer usage by reducing nutrient loss through runoff and facilitating more precise application.

More efficient systems may not fit all farms or landscapes. Limitations such as topography, cost, and type/quality of water supplies can prohibit use of more efficient application methods. In some basins, improvements in irrigation efficiencies can result in increased water use by the crops and reductions in return flows, requiring replacement of the historical return flow regime through an augmentation plan (such as the Arkansas River Basin). Additionally, the economics of farming may be a barrier to implementing conservation practices. Considerations such as reduced production, loss of customer contracts, and loss of labor may discourage changes to farming practices.

Irrigation water conservation can sometimes be discouraged under the misapplication of "use it or lose it." The Division of Water Resources (DWR) encourages conservation. As stated in its Synopsis of Colorado Water Law, Section 37-84-107, C.R.S., ditch owners are required to prevent waste, and section 37-84-108, C.R.S., to prevent the running of water in any ditch in excess of that absolutely necessary for the purposes needed.

Automating the Conejos River Headgates

This project builds on the Conejos Whole River Strategy and includes automating the Richfield, Salazar, and Seladonia Valdez diversions and improving gauge measurements at the bifurcation of the north and south branches of the Conejos River. During low flows, when accurate readings to meet Rio Grande Compact requirements are most needed, the gage does not function well, which limits DWR's ability to get a viable discharge measurement. This project upgrades the performance and accuracy of the flow sensors by building a low-flow conveyance structure and stabilizing and restoring stream health and connectivity.[57]

Low Energy Precise Application (LEPA)

The low-energy precision application (LEPA) irrigation concept was developed 40 years ago. The LEPA method applies water to the soil surface at low pressure using a tower-truss irrigation system that continually moves through the field. In irrigation treatments having ≤50% of the estimated full irrigation quantity, LEPA resulted in a 16% yield increase over sprinkler methods. As irrigation water becomes more limited, use and proper management of optimum irrigation methods will be critical.[58]

CLIMATE RESILIENT AGRICULTURE

Climate-resilient agriculture is an approach that helps guide actions to transform agri-food systems toward drought-resilient practices. It aims to tackle three main objectives: sustainably increase agricultural productivity and incomes; adapt and build resilience to climate change; and reduce and/or remove greenhouse gas (GHG) emissions.[59] Climate-smart agriculture increases resilience to climate change, helping agricultural communities and economies cope with and thrive under the more extreme drought and heat conditions predicted for Colorado's future. State support of climate-smart agriculture will help meet Colorado's climate goals and build a more resilient agricultural future. Climate-smart actions are well-aligned with the Colorado Department of Agriculture (CDA) mission, which is to strengthen and advance Colorado agriculture, promote a safe and high-quality food supply, protect consumers, and foster responsible stewardship of the environment and natural resources.

[57] https://dnrweblink.state.co.us/cwcbsearch/0/edoc/216713/RioGrande_BIP_Volume1_2022.pdf
[58] https://www.ksre.k-state.edu/irrigate/cptt/Bordovsky13117Final.pdf
[59] Climate-Smart Agriculture | Food and Agriculture Organization of the United Nations (fao.org)

Examples of climate-smart agriculture focused on implementation of soil health improvement practices are cover crops, low or no-tillage, manure management, soil amendments, intensive rotational grazing, and rangeland management. These soil health practices can increase soil organic matter, with potential subsequent benefits for soil water retention, nutrient cycling, and crop growth. Healthier soils provide ecosystem benefits and/or reduce ecosystem degradation by reducing erosion and dependence on synthetic nitrogen fertilizers, which lower the amount of dust, sediment, fertilizer, and nitrogen emissions lost to the environment.

The Colorado Soil Health Program (CSHP) and Saving Tomorrow's Agriculture Resources (STAR)

The Colorado Department of Agriculture launched the Colorado Soil Health Program in 2022 to provide financial and technical assistance to more than 360 producers as they implement new practices on one field over 3 years and consider adopting them across their entire operation. Participants gain familiarity and expertise with new practices and an increased understanding of the environmental and economic outcomes associated with them. The program also provides significant capacity support, equipment grants, training, and other support to conservation districts and entities so that they can provide trusted local support and knowledge to ensure producer success. The CSHP partners with National STAR for producer field evaluations and to provide producers with conservation planning resources.

STAR is a nationally used innovative and simple framework that allows farmers and ranchers to evaluate their current production system, identify areas for improved management and conservation to increase soil health, document their progress, and share their successes. The evaluation system assigns points for management activities on an annual basis, and scores are converted to a 1 to 5 STAR Rating, with 5 STARs indicating commitment to a suite of practices proven to improve soil health, water quality, and water availability.[60]

Additional key conservation practices that are being implemented across Colorado include:

- ***Ditch Lining*** **-** Lining conveyance structures to minimize seepage is an example of a commonly used irrigation efficiency that reduces groundwater recharge but supports maximum water delivery to the user. This lessens soil erosion and weed growth, but not without environmental impact.
- ***Deficit Irrigation*** - Aims to apply water during the most drought-sensitive growth stages of the crop and limit water application during other stages, with the goal of maximizing irrigation water productivity rather than maximizing yields.[61]
- ***Rotational Fallowing*** - Is a practice that allows farmers to maximize their water supplies in the face of shortages while also allowing the land to rest to improve soil health.
- ***Alternative crop selection*** - Alternatives to corn and alfalfa when irrigation water is limited or during drought include fall rye, spring rye, winter triticale, spring triticale, hard red spring wheat, barley, oats, pearl millet, sunflower, sorghum, or sudangrass.
- ***Improving Soil Health*** **-** Improving and maintaining soil health is an important strategy for efficiently using water supplies and improving yield. This is further discussed in Strategy 9.

[60] Colorado Soil Health Program | Department of Agriculture

[61] English, M., (1990). Deficit Irrigation. I: Analytical Framework. *J. Irrig. Drain. E.-ASCE* 116, 399-412

Drought Resiliency Resources

Colorado Agriculture Water Alliance (CAWA) – Drought Resiliency Projects	Beginning in 2023, through a grant funded by CWCB, CAWA is developing and testing early-stage projects that have the potential to reduce water use, improve water management, and demonstrate drought resilience and adaptation. These projects will collect information on water use and provide insight into the potential sustainability and scalability of the tested strategies.
NRCS – Environmental Quality Incentives Program (EQIP)	NRCS works one-on-one with producers to develop a conservation plan that outlines conservation practices and activities to help solve on-farm resource issues. Producers implement practices and activities in their conservation plan that can lead to cleaner water and air, healthier soil, and better wildlife habitat, all while improving their agricultural operations. EQIP helps producers make conservation success for them. Financial assistance for practices may be available through EQIP, and some producers may also qualify for advance payment. EQIP funding has helped many farmers in Colorado convert from flood to sprinkler irrigation.[62]
Colorado Drought Advisors	Colorado Agricultural Drought Advisors is a multi-organization partnership that offers webinars and training, as well as one-on-one consulting on creating drought plans with farms or ranches. Their mission is to build short- and long-term resilience to drought among Colorado producers by working with farmers and ranchers to connect resources, identify/assess risk, and implement practices that lessen the impact of drought.[63]

[62] https://www.nrcs.usda.gov/programs-initiatives/eqip-environmental-quality-incentives

[63] Colorado Drought Advisors - Colorado Drought Plan Program https://www.ksre.k-state.edu/irrigate/cptt/Bordovsky13117Final.pdf

STRATEGY 9:
INVEST IN INNOVATIVE INFRASTRUCTURE AND TECHNOLOGY

Farmers and ranchers today face many challenges: market volatility, urbanization, competition for resources, climate change impacts to weather, growing conditions, and water supply, environmental, and labor issues. Many of these challenges are not new to agricultural producers in Colorado, and they will hopefully continue adapting with innovative practices that make food and fiber production possible in our changing world.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

REPLACE AGING INFRASTRUCTURE

While replacing aging infrastructure may not seem innovative, it often provides the opportunity to install modern structures that have multiple benefits, including more efficient diversion of water (reducing losses), environmental benefits, and even hydroelectric generation capabilities.

Maybell Ditch Headgate Improvements

The Maybell Irrigation District and The Nature Conservancy (TNC) worked together to rehabilitate the Maybell Ditch diversion and modernize the headgate to provide users with water. TNC is also working to ensure safe passage of watercraft through the new diversion. The project will see increased ecological connectivity and resilience to climate change and improved control of the irrigation system.[64]

ELECTRONIC GRAZING

Electronic grazing (utilizing remote-sensing collars and a wireless network to manage where livestock graze) is an innovative practice that will potentially improve relationships among soils, livestock, and the environment.[65] Electronic grazing can be used to prevent overgrazing, improve plant species composition, and keep livestock out of highly erodible areas. Ranchers can control a larger herd with more detailed grazing plans and more efficient and intense rotation schedules.

[64] https://www.nature.org/en-us/about-us/where-we-work/united-states/colorado/stories-in-colorado/maybell-water-diversion-project/

[65] https://www.mdpi.com/2077-0472/13/1/91

Several other innovative practices such as water conveyance and application efficiency improvements, drought tolerant crop selection, and other conservation practices are discussed in previous strategies (#5, #8) and highlighted below.

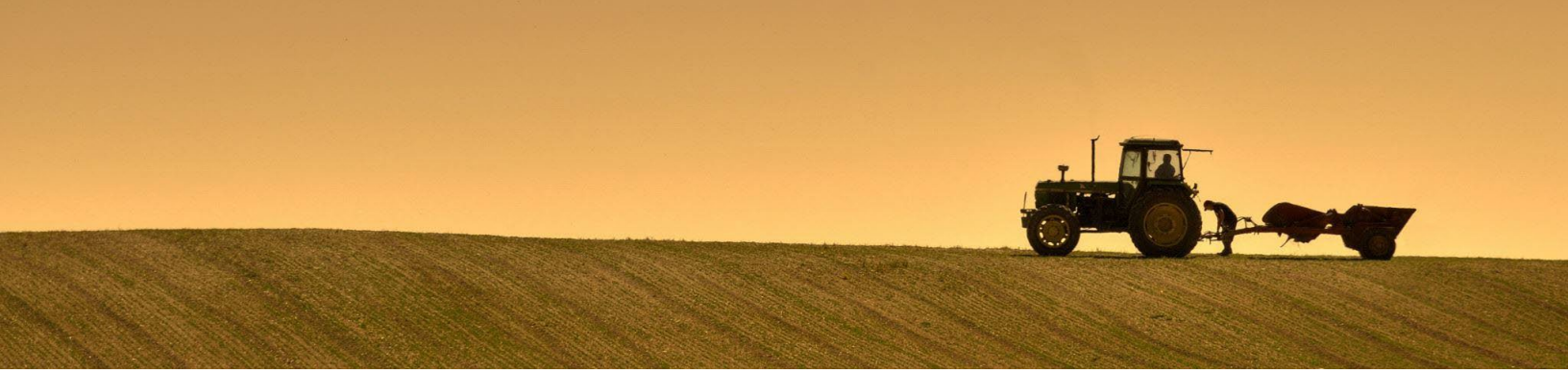
Intermountain West Alternative Forages Project

CSU Extension is conducting research and partnering with producers to plant new varieties of forage crops. A strain of intermediate wheatgrass, commonly known as Kernza, is drought tolerant, consuming about 30% less water, than alfalfa. Developed in Kansas, Colorado farmers from the Grand Valley to Fruita are evaluating the viability of growing Kernza at high altitudes, with a shorter growing season, and different soils. Its deep rooting system makes it more resilient to drought and could pair well with conservation programs in the Colorado River basin.[66]

Auto-Tarps

Although simple in design, an automatic, magnetically released flood gate called an "auto-tarp" could revolutionize flood irrigation. These systems, paired with Long-range low-power area network (LoRa) monitoring stations, can improve flood and furrow irrigation management, potentially resulting in less water being diverted and more water available for the stream, while maintaining the benefits of flood irrigation. An NRCS Conservation Innovation Grant is funding the implementation of these systems at locations within the Gunnison and Rio Grande basins.[67]

[66] Can a strain of wheatgrass help farmers use less water? (coloradosun.com)
[67] https://iwjv.org/flood-irrigation-conservation-innovation-grant/



STRATEGY 10:
EXPLORE FUNDING OPPORTUNITIES

The vulnerability of irrigated agriculture to buy and dry water transfers often boils down to economic circumstances. Sometimes selling the farm's water rights presents an economic opportunity greater than continued agricultural production. Production profit margins may not be adequate to cover continued O&M or improvement costs. However, funding from a variety of sources is available that recognizes the value of agriculture to our economy, our communities, and our ecosystems, and can offset operating costs or diversify farm revenue streams to make farming more profitable and incentivize farmers to keep the land in production.

OPPORTUNITIES FOR PROTECTING AGRICULTURE

Funding for agriculture is available at all levels (federal, state and local governments) in addition to partnership opportunities with individual entities, such as nonprofit organizations.

GOVERNMENT FUNDED GRANTS AND LOANS

The tables below lists just a few of the funding opportunities that support agriculture through grant and loan programs focused on keeping agricultural land in production.

FEDERAL FUNDING		Supports Strategies
NRCS –Easement Programs	Helps farmers protect, restore, and enhance wetlands, working farms, and grasslands through conservation easements	1, 2, 3
NRCS – Agricultural Management Assistance (AMA)	Helps producers manage financial risk through diversification, marketing, or other conservation practices.	1, 5, 8
NRCS –EQIP	Helps farmers, ranchers, and forest managers integrate conservation into working lands. Includes incentives to boost energy efficiency on the farm.	2, 3, 8, 9
NRCS – National Water Quality Initiative (NWQI)	Provides funding to accelerate voluntary, on-farm conservation investments and water quality monitoring to deliver the greatest benefits for clean water.	2, 3, 8, 9
NRCS - Regional Conservation Partnership Program (RCPP)	Uses a partner-driven approach to leverage collective resources to fund solutions to natural resource challenges on agricultural lands.	1, 3, 9
USDA – Working Lands for Wildlife	Targets conservation efforts to improve agricultural and forest productivity that enhance wildlife habitat on working landscapes.	2

FEDERAL FUNDING		Supports Strategies
U.S. Bureau of Reclamation (USBR) – WaterSMART Program	Supports planning and implementation actions to increase water supply through investments to modernize existing infrastructure and avoid potential water conflicts.	1, 3, 8, 9
USBR – Small-scale Water Efficiency Projects	Provides 50/50 cost share funding for small water efficiency improvements such as installing measuring devices or lining canals.	8, 9
USDA/USBR – Drought Programs	Provides assistance to implement projects that will build long-term resiliency to drought.	7, 8, 9

STATE FUNDING		Supports Strategies
Colorado Agricultural Future Loan Program	Offers financing to beginning farmers, ranchers, and agribusinesses through a lending program.	5
NextGEN Ag Leadership Grant Program	Provides grants to ag organizations and educational institutions that support development and training opportunities for the next generation of producers.	7
Resilient Food Systems Infrastructure Program	Provides funding for producers and processors to continue the development of processing infrastructure for fruit, vegetables, grains, legumes, dairy, and other non-meat products.	4, 5, 7, 9
Advancing Colorado's Renewable Energy and Efficiency (ACRE^3) Program	Provides financial and technical assistance and education to help agricultural producers and processors cut energy costs, develop their own energy resources, and create markets for agriculturally derived energy and fuels. Priorities focus on ag hydropower, energy efficiency, and renewable heating/cooling projects.	4, 5
CDA Agrovoltaic Grants	Helps fund the simultaneous use of land for solar energy production and agriculture.	4
CDA Soil Health Program (STAR and STAR plus)	Provides technical and financial assistance to producers as they implement new practices to improve soil health.	2, 7, 8, 9
CWCB Water Project Loan Program	Provides low-interest loans for the design and construction of ag, municipal, and hydro projects in Colorado.	1, 8, 9
CWCB Grant Programs	Provides funding to entities for a variety of water-related projects.	1, 2, 3, 4, 5, 6, 7, 8, 9
CWCB Ag Emergency Drought Response Program	Provides grant funds for the cost of emergency augmentation water during a drought.	1
Great Outdoors Colorado	Provides grant funds to support land conservation and stewardship projects	2, 3
Colorado Conservation Easement Tax Credit	Landowners can qualify for a state income tax credit by donating a conservation easement to a qualified land trust.	3

LOCAL FUNDING SOURCES

Local government support for sustaining irrigated agriculture with funded programs varies throughout the state. Mechanisms for funding local programs include the following.

LOCAL FUNDING		Supports Strategies
Sales Taxes	Voter-approved sales tax increases can provide funding for initiatives like the Chaffee Common Ground (see below)	1, 3, 6
Property Taxes	Voter-approved property tax increases help fund water projects and programs[68]	1, 3, 6
Grant Funding	Grants from local and county-based organizations can provide funding for community-specific projects.[69]	1, 3, 6
Colorado River District Community Funding Partnership	Created in 2021, this partnership funds multi-purpose water projects on the Western Slope in five project categories: productive agriculture, infrastructure, healthy rivers, watershed health and water quality, and conservation and efficiency. These funds provide a catalyst for projects that are priorities for residents in the District to receive matching funds from state, federal, and private sources.[70]	1, 2, 3, 8, 9

Chaffee Common Ground

Chaffee Common Ground was created through a 2018 voter-approved sales tax increase to be used to strengthen forest health; conserve and support working ranches, farms, and rural landscapes; and manage the impacts of growth through local, collaborative programs and projects.

A survey found that nine out of 10 local agricultural producers want to continue in agriculture, but they face economic challenges and conflicts with the growing population in Chaffee County. Grant funds help preserve agricultural working lands through conservation easements with landowners and programs that support agricultural sustainability.[71]

[68] https://www.watereducationcolorado.org/fresh-water-news/millions-in-new-taxes-approved-for-west-slope-front-range-water-districts/#/

[69] Open Space Grant Information | Adams County Government

[70] https://www.coloradoriverdistrict.org/community-funding-partnership/

[71] Protecting why we love to live, work and play in Chaffee County. - Chaffee Common Ground

PARTNERSHIPS

Previously noted as a strategy for preserving water for agriculture, CWSA's and other partnerships can provide a funding source for farmers to diversify their income and increase profitability. Compensating farmers for the cost of leaving lands fallow (like weed management and equipment payments) as well as the benefits of using their agricultural water for other beneficial uses is an important part of how these partnerships are structured. Other strategies, such as agritourism (Strategy 2), conservation easements (Strategy 3), agrivoltaics (Strategy 4), and others, can also provide additional funding sources and revenue streams.

FARMERS UNION CANAL PROJECT

The Farmers Union Canal Diversion and Headgate Improvement Project (Project) is a multi-benefit project to replace the aging diversion dam and headgates with new structures that divert more efficiently and provide watershed health benefits. This project brought together seven partners and additional funding from a USBR WaterSMART Grant to achieve these purposes. The Project is critical to improve ditch operations, reduce maintenance, and protect water rights, and will include fish and boat passage and adjacent streambank stabilization.[72]

Creating partnerships among multiple groups with overlapping interests is often key to unlocking funding at the state and federal levels. The most competitive projects often have multiple benefits for people, agriculture, and the environment.

[72] https://riograndeheadwaters.org/farmers-union-canal

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