

**Results of
Colorado Ag Producer Survey
on
Irrigation Infrastructure Needs**

September 2021



Flow measurement flume, Photo: Phil Brink



ADVANCING THE LEGACY

Ag Water NetWORK
Colorado Cattlemen's Association / Partners for Western Conservation
8833 Ralston Road, Arvada, Colorado, 80002..

EXECUTIVE SUMMARY

During the first and second quarter of 2021, CCA's Ag Water NetWORK surveyed agricultural producers to better understand their irrigation infrastructure challenges and needs. The online survey was conducted statewide with the help of conservation districts, water conservancy districts, and numerous individuals.

Irrigation infrastructure varies widely across Colorado. The type and complexity depends on the water source and the crop to be irrigated. Groundwater may be pumped using small submersible pumps or large turbines. Spring boxes may collect surfacing groundwater. Intermittent streams may be diverted with plastic sheeting weighed down by rocks and wood while substantial concrete, metal and boulder structures are used to divert water from rivers.

Irrigation technology has continued to advance over the decades, however, in many watersheds – particularly in the mountains – much of the irrigation infrastructure is not in fully functional condition. Some of the infrastructure is a century old or more and needs repair or replacement.

The Colorado Water Plan includes goals of supporting healthy watersheds, robust recreation and tourism, vibrant and sustainable cities, and viable and productive agriculture. Improving irrigation system components – especially surface water systems – can benefit other water interests.

Survey Results

Agricultural operations of all sizes were represented among the survey responses. The category with the most responses – about 47 percent - represented operators with less than 250 acres in production.

A slim majority of respondents (56 percent) utilized decreed surface water rights and 44 percent had mutual ditch company shares. Slightly less than one in five utilized either tributary or non-tributary groundwater via wells. Ten (10) percent derived irrigation water from a private irrigation company or water conservancy district. Only six percent of respondents indicated they obtained water from a government agency water source. This survey did not ask producers for further specification on the source of their water rights. In some cases, mutual and private irrigation companies and private irrigators have water rights connected to multiple sources, and they may also lease government-held stored water or direct flows occasionally or annually.

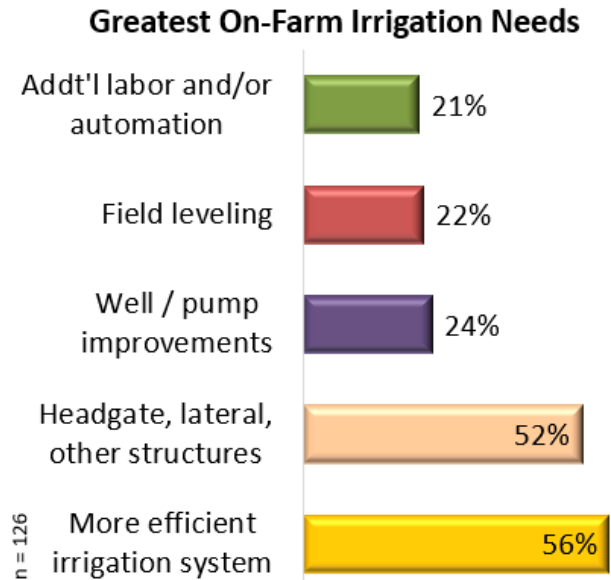
A majority of respondents indicated that on-farm efficiency improvements represented their greatest irrigation-related need. This was followed closely by improved control of infrastructural delivery components to the field edge or across the field, such as headgates or lateral ditches.

Other needs included well and / or pump improvements, field leveling to irrigate crops or pastures more evenly, and more labor or automation to reduce labor.



Diversion channel and headgate. Photo: Phil Brink

Regarding off-farm irrigation *delivery* needs, 48 percent of producers listed lining or piping ditches as the greatest priority. Slightly more than a third (36 percent) said their diversion structure needed improvement. Not surprisingly, almost the same number (34 percent) indicated their headgates needed improvement. Twenty-two (22) percent stated that additional water storage was needed. Almost the same number (21) percent cited “measuring device” as a need. The importance of measuring water use has been underlined by the frequent drought-driven water supply shortages over the past few years. Accurately measuring flow is one of the keys to protecting water rights.



Barriers

The survey asked producers two questions about barriers to advancing irrigation infrastructure projects. The first question was broad and simply asked what they perceived as barriers to making improvements. The second question was specific to *funding* barriers.

Producers cited a variety of barriers to making infrastructure improvements. Seventy-two (72) percent indicated that securing adequate funding and/or cost-share funds was a barrier. Thirty (30) percent cited legal challenges as a barrier. A few producers commented that legal uncertainty around their water rights was a barrier to making a decision to invest in infrastructure. Other legal issues include disputes over installing irrigation improvements in ditch easements.

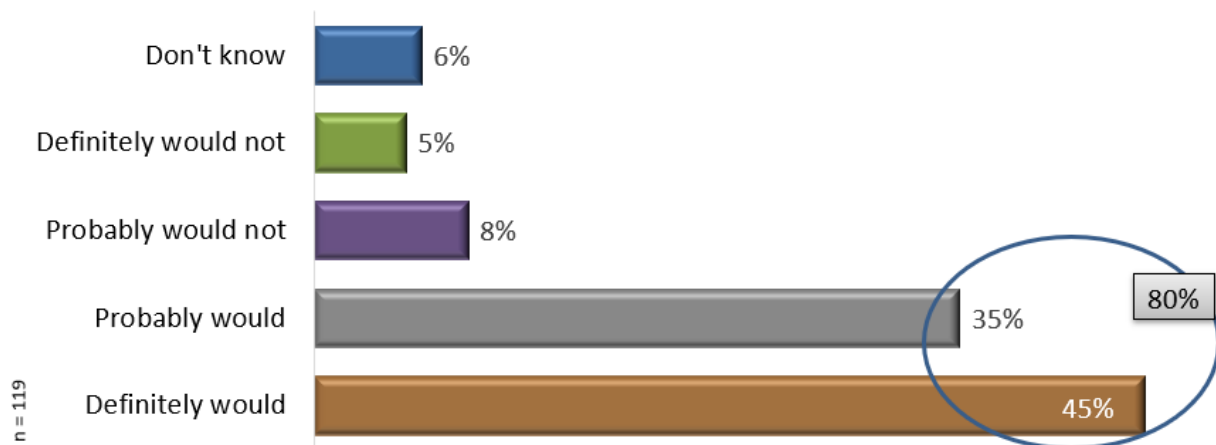
Twenty-three (23) percent indicated that not having an estimate of how much improvements would cost was a barrier, and 19 percent said that a lack of consensus among ditch shareholders was a barrier to making infrastructure improvements. Fifteen (15) percent felt that they did not know what needed to be done and eight (8) percent said the lack of a leader to oversee a project was a barrier. Only three (3) percent said that hiring a project manager was a barrier.

The top two barriers to funding were lack of knowledge about available grants and / or loans (48 percent) and lack of matching funds (43 percent). Twenty-nine (29) percent said that understanding the requirements of grants and loans was a barrier and 24 percent indicated their proposed projects did not score high enough to secure funding. Often these respondents were referring specifically to the NRCS Environmental Quality Incentives Program (EQIP), which provides funding for conservation improvements including irrigation infrastructure. Twenty-one percent stated that they needed a grant writer and 19 percent did not have a formal organization, such as an incorporated ditch company, to receive and manage funds for projects.

Regarding funding sources, producers were most familiar with the NRCS EQIP program and had limited knowledge about Colorado Water Conservation Board (CWCB) grants and loans, and minimal familiarity with US Bureau of Reclamation WaterSMART grants.

Would a low-cost or no-cost irrigation system assessment would be useful if it identified potential solutions? A total of 80 percent of respondents said it definitely would (45 percent) or probably would (35 percent). Thirteen (13) percent felt it would probably or definitely not be useful. A few producers commented that they had already had an assessment completed. Six (6) percent were unsure whether or not an assessment would be useful.

Would a low-cost or no-cost assessment of your irrigation water delivery system be useful if it identified where improvements are needed as well as potential solutions?



Colorado has experienced several devastating wildfires in the past few years. Wildfires can negatively impact irrigation water quality and availability, so producers were asked if it would be useful to have a wildfire impacts susceptibility analysis done for their watershed. A total of 51 percent thought it probably would or definitely would. Forty-one (41) percent thought it probably or definitely would not be useful. Nine percent were unsure.

The last question asked producers what they viewed as threats to continuing to irrigate their land. Two-thirds (66 percent) felt that less water in the future due to changing precipitation and temperature patterns posed a threat. Other threats to long-term viability included non-water related factors such as age and lack of labor or family interest, regulations, economics of farming and / or irrigating and urban encroachment.

Almost a third of producers (30 percent) expressed concern that lower basin or interstate compact calls could curtail irrigation water availability. Twenty-seven (27) percent felt that insufficient funds to repair non-functioning irrigation infrastructure posed a threat to their long term viability.

About one in five thought senior water right holders would fully exercise their water rights in the future and this would negatively impact their ability to irrigate. Almost the same number believed diminishing return flows would threaten their future irrigation water supplies. Six percent expressed concern over unsustainable aquifer withdrawal and declining water quality.

CCA's Ag Water NetWORK is working with the Colorado Association of Conservation Districts (CACD) and individual conservation districts to expand outreach to producers on their water-related priorities. The Ag Water NetWORK is also leveraging a CWCB grant to assist three conservation districts in accelerating implementation of local irrigation infrastructure demonstration projects.

Table of Contents

EXECUTIVE SUMMARY	2
Survey Results.....	2
Barriers	3
I. Background.....	6
A. Purpose of the Survey.....	6
B. Survey Details.....	7
Table 1. Survey Questions.....	8
C. How will the Survey Results be Used?	8
II. Survey Responses.....	9
A. Respondent Operation Characteristics.....	9
Table 2. Surveys Received by County*	9
Table 3. Surveys Received by River Basin*	9
Figure 1. Irrigated Acres (owned and leased).....	10
Figure 2. Type(s) of irrigation water rights owned or leased (Select all that apply)	10
Figure 3. What are your on-farm irrigation system needs?	11
Figure 4. What improvements are most needed in the delivery system(s) that convey(s) water to your farm? (Select all that apply).....	12
Figure 5. What do you see as barriers to making irrigation infrastructure improvements? (Select all that apply)	14
Figure 6. What are the barriers to funding irrigation infrastructure improvements? (Select all that apply)	15
Figure 7. Please rate your familiarity with the following funding programs.....	17
Figure 8. Would a low-cost or no-cost assessment of your irrigation water delivery system be useful if it identified where improvements are needed as well as potential solutions? ...	18
Figure 9. Would it be useful to have a wildfire impacts susceptibility analysis done for your watershed?	19
Figure 10. What do you see as the greatest threat(s) to being able to continue irrigating your land? (Select all that apply)?	20
III. Conclusions and Recommendations	24
A. Conclusions	24
B. Recommendations	25
C. Gift card winners.....	25
IV. References	26

I. Background

A. Purpose of the Survey

Whether water is derived from the ground or diverted from surface water, irrigated lands in Colorado rely on infrastructure to transport and apply water when and where it is needed. Agricultural irrigation and their corresponding water rights pre-dates Colorado's 1876 statehood recognition.

In our semi-arid climate, supplementing precipitation was identified early on as a necessity for water security. By 1852, water was flowing through a small irrigation ditch in the San Luis Valley called the "People's Ditch." In 1859, pioneer David Wall diverted water from Clear Creek to irrigate two acres of crops. Long before that, ancestral Puebloans used check dams to form small terraces, presumably for agricultural production, and built reservoirs to store domestic water. Today there are approximately 2.8 million acres under irrigation based on the 2017 Colorado Agricultural Statistics report.



Center pivot irrigation system. Photo: Phil Brink

The Colorado Water Plan includes goals of "supporting healthy watersheds, robust recreation and tourism, vibrant and sustainable cities, and viable and productive agriculture." Improving irrigation system components – especially surface water systems – can benefit other water interests.

For example, the Lower Gunnison River was recently deemed by the Water Quality Control Commission to be compliant with aquatic life standards for dissolved

selenium. Decades of work in the basin – including ditch piping and lining and on-farm efficiency improvements - resulted in the delisting of a 66 mile stretch of the river. The primary beneficiaries are birds and native and endangered fish, as well as downstream water users.

Irrigation infrastructure varies widely across Colorado. The type and complexity depends on the water source and the crop to be irrigated. Groundwater may be pumped using small submersible pumps or large turbines, or it may flow freely from the ground and be captured by a spring box. Intermittent streams may be diverted with plastic sheeting weighed down by rocks and wood while substantial concrete, metal and boulder structures are used to divert water from rivers.

Irrigation technology has continued to advance over the decades. There has been significant progress in the methods available to control, measure and apply water. Remote monitoring and adjustment of system components is also becoming more common. Nevertheless, in many watersheds – particularly in the mountains – much of the irrigation infrastructure is not in fully functional condition. Some of the infrastructure is a century old or more and needs repair or replacement. Declining spring and summer runoff in recent years underscores the need for lining

and piping of ditches in areas with high soil seepage rates. Reducing or eliminating transit losses leaves more water in the ditch system for use by irrigators. Additionally, piping ditches in mountainous areas creates a new opportunity for pressurized systems.

The Colorado Cattlemen's Association (CCA) and Partners for Western Conservation (PWC) created the Ag Water NetWORK in late 2015 with the objective of helping to 'keep ag water connected with ag land.' The Ag Water NetWORK advances this objective by providing producers with timely, contextual information about water to support informed decisions that help advance and sustain agricultural production in Colorado, especially irrigated agriculture.

CCA's Ag Water NetWORK has conducted three surveys since 2016. The first [survey](#) – conducted in 2016 - asked producers to share their views on leasing irrigation water for other uses. The second [survey](#) – conducted in 2019 – asked producers about their perceptions and priorities around watershed and stream management planning.

In our 2021 survey, we asked producers about their needs and concerns related to their irrigation infrastructure. Details and survey results are presented in the following pages. The current and previous reports are available at <https://www.agwaternetwork.org/Publications.aspx>.

B. Survey Details

The survey was released May 20th, 2021 and closed on July 26th, 2021 and received 149 responses. Not all of the returned surveys were usable. Some respondents only completed the first few questions, and two respondents indicated they did not irrigate any agricultural land. In all, twenty-three (23) surveys were removed from the dataset, leaving a total of 126 usable surveys.



Rock diversion dam. Photo: Phil Brink

A small number of respondents missed or ignored a question, but otherwise completed the survey. Thus, the number of responses to a given question ranged from 126 (highest) to 119 (lowest). The survey contained 12 questions as well as a section at the conclusion which allowed respondents to leave general comments or ask questions.

The results of the survey are explained and shown graphically in the following text and figures. A few of the survey questions included an “Other” category in which respondents could input their own answer or provide a comment. Producer comments associated with these survey questions are listed along with graphic and narrative analyses of the results. A footnote at the bottom of each chart indicates the number of respondents that answered the question (for example, n = 126). Table 1 (below) lists the survey questions.

Table 1. Survey Questions

1	Do you own or lease irrigated agricultural land in Colorado? If no, you do not need to complete this survey.
2	In which county / counties do you own or lease irrigated ag land?
3	How many acres do you utilize for irrigated agricultural production (owned and leased)?
4	Please indicate the type(s) of irrigation water rights that you own or lease (Select all that apply)
5	What are your on-farm irrigation system needs? (Select all that apply)
6	What are the improvements most needed in the delivery system(s) that conveys water to your farm? (Select all that apply)
7	What do you see as barriers to making irrigation infrastructure improvements? (Select all that apply)
8	What are the barriers to funding irrigation-related improvements? (Select all that apply)
9	Please rate your familiarity with the following funding programs:
10	Would a low-cost or no-cost assessment of your irrigation water delivery system be useful if it identified where improvements are needed as well as potential solutions?
11	Wildfires can negatively impact irrigation water quality and availability. Would it be useful to have a wildfire impacts susceptibility analysis done for your watershed?
12	What do you see as the greatest threat(s) to being able to continue irrigating your land? (Select all that apply)

As an incentive for completing the survey, random drawings for Bass Pro gift cards were held about every week and a half during the survey period. A total of \$200 in gift cards were distributed among six (6) winners. The winners and the value of the gift card that each won are listed at the end of this report.

C. How will the Survey Results be Used?

In addition to publishing this report online, CCA's Ag Water NetWORK will utilize the survey findings to better understand and address irrigator needs. The survey results will be used in outreach to agricultural producers and will help guide requests for funding and technical help for on-the-ground assistance to irrigators. Infrastructure improvement funding was the greatest need expressed by producers and the survey responses shed light on where funding is most needed.

The survey data – both the responses to questions and the producer comments - provide insights into irrigator priorities, concerns and needs. Improving irrigation water diversion, conveyance and on-farm efficiency advances agricultural sustainability and stability, and can provide multiple benefits to environmental, recreational and municipal water interests.

Agriculture represents the largest stakeholder in land and water resource management in the state. The results of this survey help to broaden water stakeholders' understanding of irrigation-related challenges and areas of need, and accelerate irrigation infrastructure improvements with co-benefits to other water interests.

II. Survey Responses

A. Respondent Operation Characteristics

Responses were received from 42 counties around the state, which represents about two-thirds of the counties in Colorado. Table 1 displays the number of surveys received from each county.

Table 2. Surveys Received by County*

Routt	12	Montezuma	3	Jackson	2
Delta	11	Larimer	3	Phillips	2
Moffat	9	Morgan	3	Adams	1
Garfield	8	Rio Grande	3	Washington	1
Weld	7	Park	3	Logan	1
Montrose	7	Chaffee	3	Crowley	1
Mesa	7	Boulder	2	Fremont	1
La Plata	7	Eagle	2	Otero	1
Rio Blanco	7	El Paso	2	Prowers	1
Saguache	7	Yuma	2	San Miguel	1
Alamosa	5	Bent	2	Douglas	1
Gunnison	4	Archuleta	2	Sedgwick	1
Grand	4	Las Animas	2	Baca	1
Elbert	4	Custer	2	Teller	1

* The total number of counties exceeds the number of respondents because some respondents irrigate in more than one county.

Table 3. Surveys Received by River Basin*

Colorado (YWG, Mainstem, Gunnison / Uncompahgre, Southwest)	84
South Platte	31
Arkansas	17
Rio Grande	15
North Platte	2

* A county draining into two basins was attributed to whichever basin had the greatest drainage area within the county.

Irrigators in the Colorado River basin represented the majority of survey responses, followed by the South Platte, Arkansas and Rio Grande. Two responses were received from irrigators in the North Platte River Basin.

Figure 1. Irrigated Acres (owned and leased)

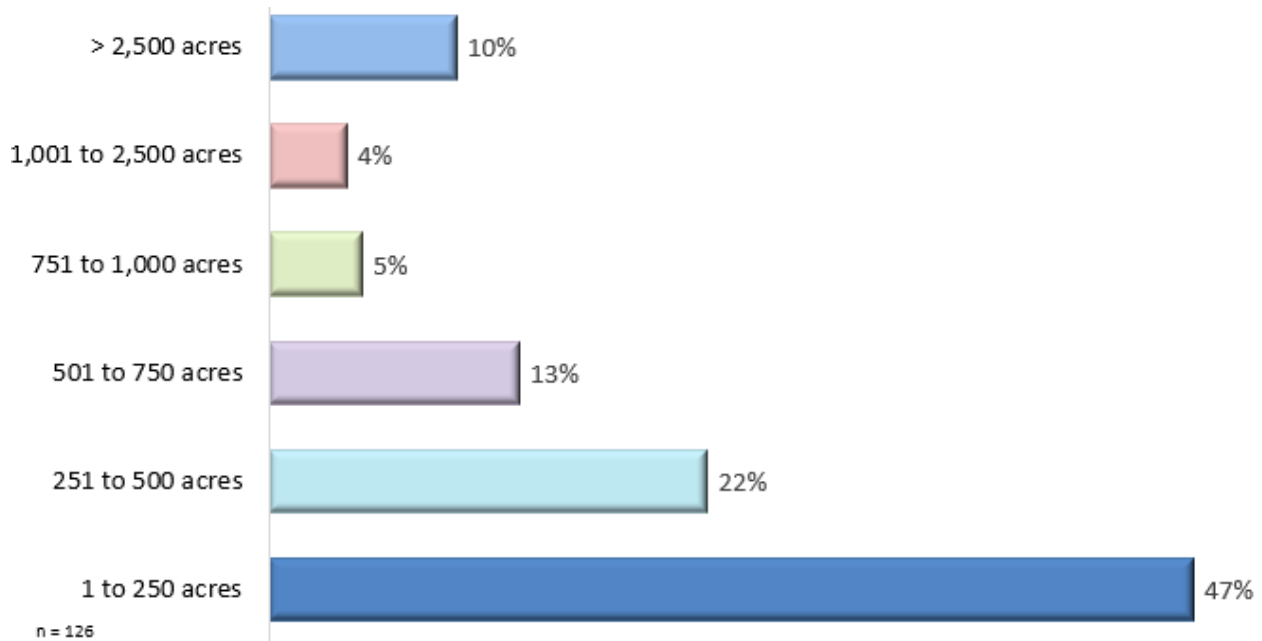
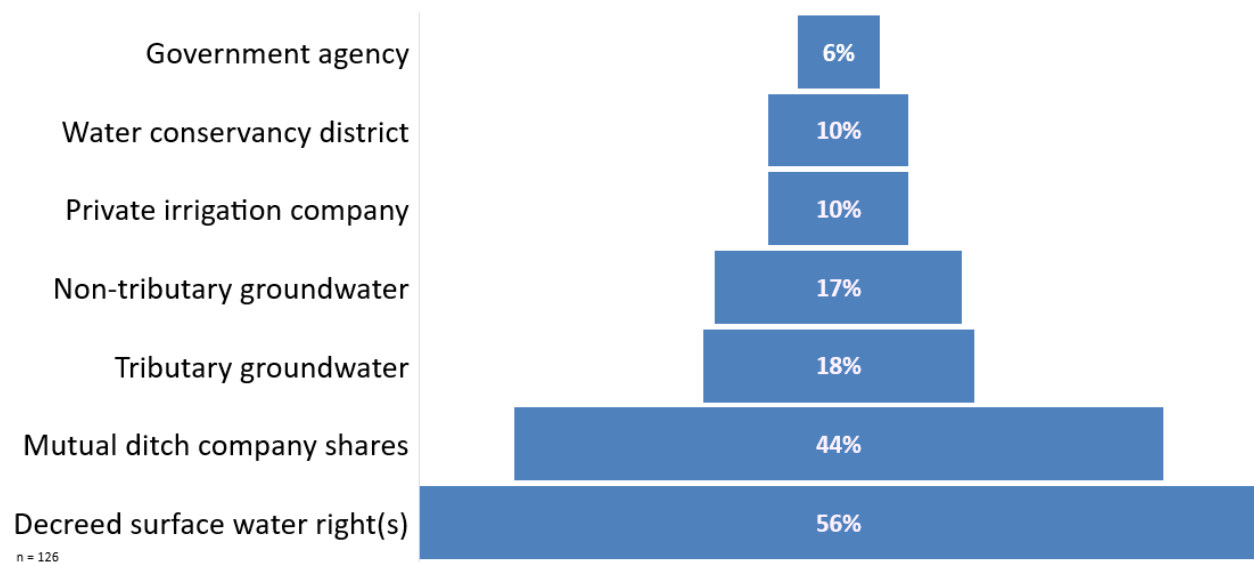


Figure 1 displays the survey responses by acreage under irrigation. Irrigated agricultural operations of all sizes were represented among the survey responses. The category with the most responses – 47 percent - represented operators with less than 250 acres in production. Producers irrigating between 251 and 500 acres represented 22 percent of the total respondents. Likewise, the combined total of the three size categories representing 500 to 2,500 acres also represented 22 percent. One out of 10 of the respondents (10 percent) said they were irrigating more than 2,500 acres.

Figure 2. Type(s) of irrigation water rights owned or leased (Select all that apply)

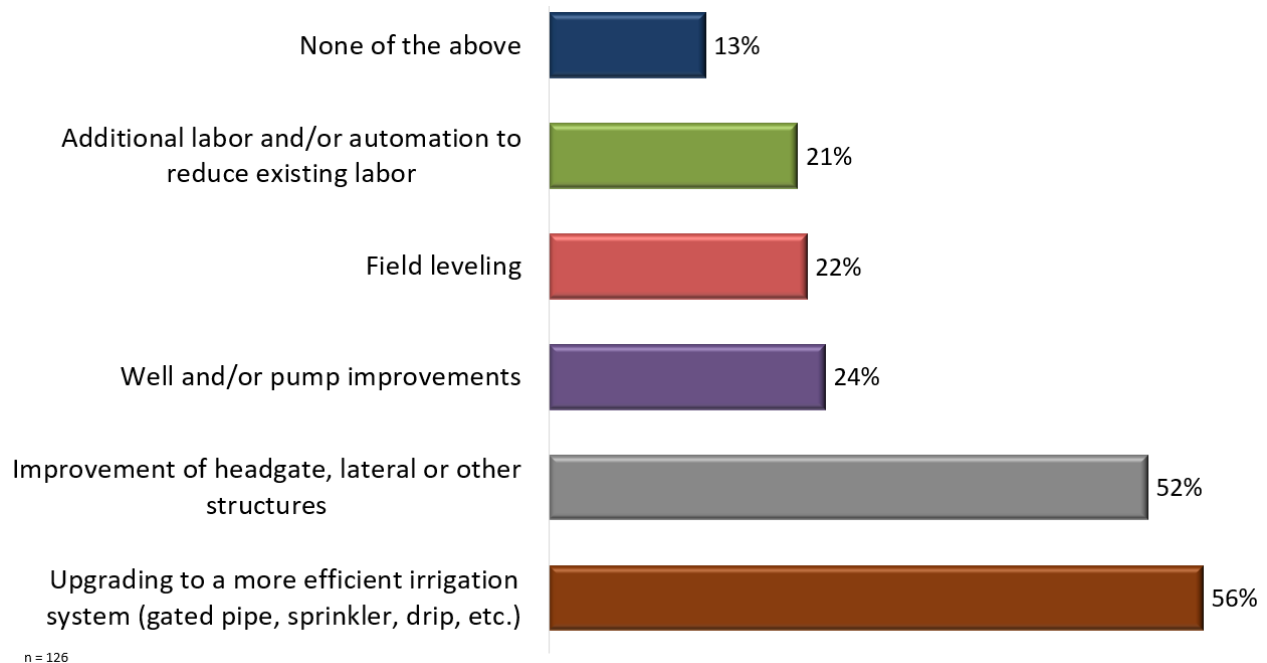


Agricultural producers access irrigation water from a variety of sources, as shown in Figure 2. Several respondents derive their irrigation water from more than one source. More than half of the survey respondents (56 percent) indicated they obtain water via decreed surface water rights and 44 percent said they owned or leased mutual ditch company shares.

An almost equal number of respondents indicated using tributary and non-tributary groundwater irrigation (18 and 17 percent respectively). Ten (10) percent utilized water supplied through a water conservancy district and 10 percent also obtained water via shares in a private irrigation company.

Only six percent indicated they obtained water from a government agency. This survey did not ask whether the source of mutual ditch or private ditch-supplied irrigation water was from a government agency – such as storage water leased from the U.S. Bureau of Reclamation.

Figure 3. What are your on-farm irrigation system needs?



More than half of respondents (56 percent) said they need to upgrade their on-farm irrigation system to something more efficient. This could be transitioning from flood irrigation to gated pipe, or moving from gated pipe to sprinkler, installing a drip system, or something else. This result is similar to the findings of CCA’s 2019 survey in which fifty-five (55) percent of producers thought irrigation efficiency improvement should be a priority for watershed management planning.

Fifty-two (52) percent of respondents indicated they would like to upgrade their headgate, or lateral ditch or other structures involved in delivering water to their fields. Almost one-fourth of respondents indicated they would like to upgrade their well or pump. Old pumps, motors, deteriorated well casings, clogged well screens and declining aquifer levels are among the common reasons for improving well and pump systems.

Twenty-two percent of respondents indicated field leveling would be helpful. Efficient flood and furrow irrigation requires consistent, moderate field slopes to apply water evenly across fields.

Removing high and low spots increases field productivity and reduces un-even application of irrigation water.

Roughly a fifth (21 percent) of respondents cited a need for more labor and/or system automation to reduce the amount of labor needed to irrigate. Remote control and/or monitoring of headgates, waste gates, sprinkler and drip systems and flow meters are increasingly being used by producers to reduce labor, save time and streamline operational management.

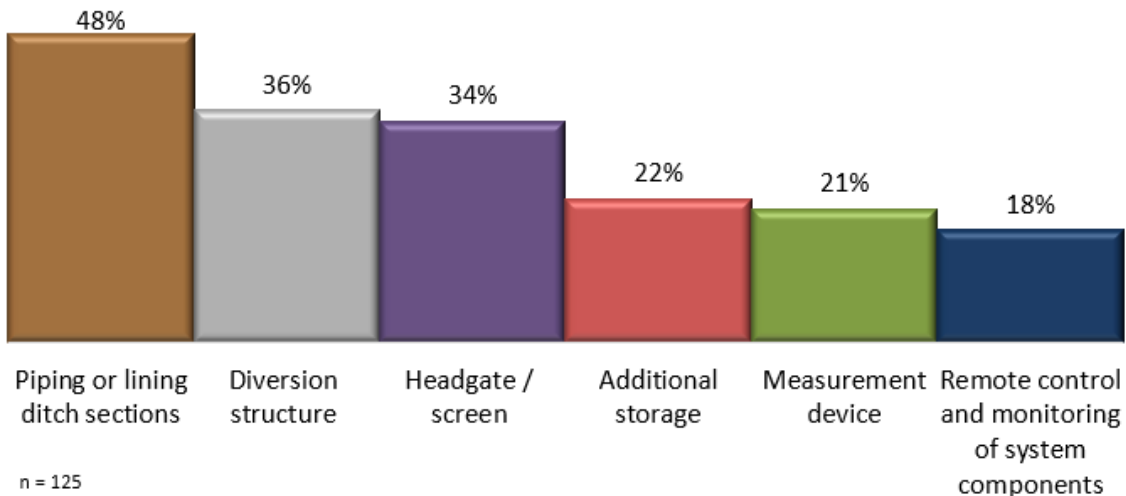
Beyond saving time and labor, producers are motivated to improve efficiency in order to utilize their irrigation water more effectively. The 2010 Statewide Water Supply Initiative (SWSI) report indicated that all basins in the state had existing agricultural water shortages. The shortages were highest in the South Platte, Arkansas and Rio Grande River Basins. The continuing drought in the Colorado River Basin and its tributaries is driving producers to maximize irrigation efficiency and water conservation.

Producer Comments to the question “What are your on-farm irrigation system needs?”

- I only have tail water and since they put in gated pipe, I basically have no water.
- Water quality improvement.
- Water measurement technology affordable and available online.
- Increase in water guns. Need three more rows.
- Smaller pivots or modern pivot sprinklers for drought contingent.
- Stream bank stability erosion control.
- Field stands established, weed and rodent control.

The producer comments shed light on the wide variety of individual priorities of irrigators. The first comment suggests that improved efficiency of gated pipe installed by upgradient irrigators has virtually eliminated field runoff, which the junior down-gradient user has relied upon. This underscores the tradeoffs and potential ramifications of irrigation efficiency upgrades. The last comment corresponds with a paradox some have experienced when upgrading pasture irrigation from flood to pivot systems. Gophers and prairie dogs can become a much greater nuisance under pivots because fields are no longer being saturated when irrigated.

Figure 4. What improvements are most needed in the delivery system(s) that convey(s) water to your farm? (Select all that apply)



On the survey, producers could check as many categories as they desired, and many checked multiple boxes. Piping or lining ditches or canals was cited as the greatest irrigation delivery need (48 percent) followed by diversion structures (36 percent) and headgate / screen repair or replacement (34 percent). For irrigation companies, these top categories often correspond to the highest cost and most complex projects. Additional storage – which was identified as a need by 22 percent of respondents – can involve costs that eclipse large diversion and piping projects. As a result, new, expanded and reclaimed storage projects now typically involve multiple water stakeholders due to the high costs and permitting involving multiple government agencies.

About one in five producers (21 percent) said that measurement devices, such as flumes or totalizing flow meters, were needed for their irrigation water delivery systems. The Colorado Division of Water Resources (DWR) recently announced it will initiate a rule-making process for surface water measurement, so the need to install or replace measurement devices will accelerate in the future. Eighteen (18) percent indicated that remote control and monitoring of system components was a priority.

Producer comments to the question “What improvements are most needed in the delivery system(s) that convey(s) water to your farm?”

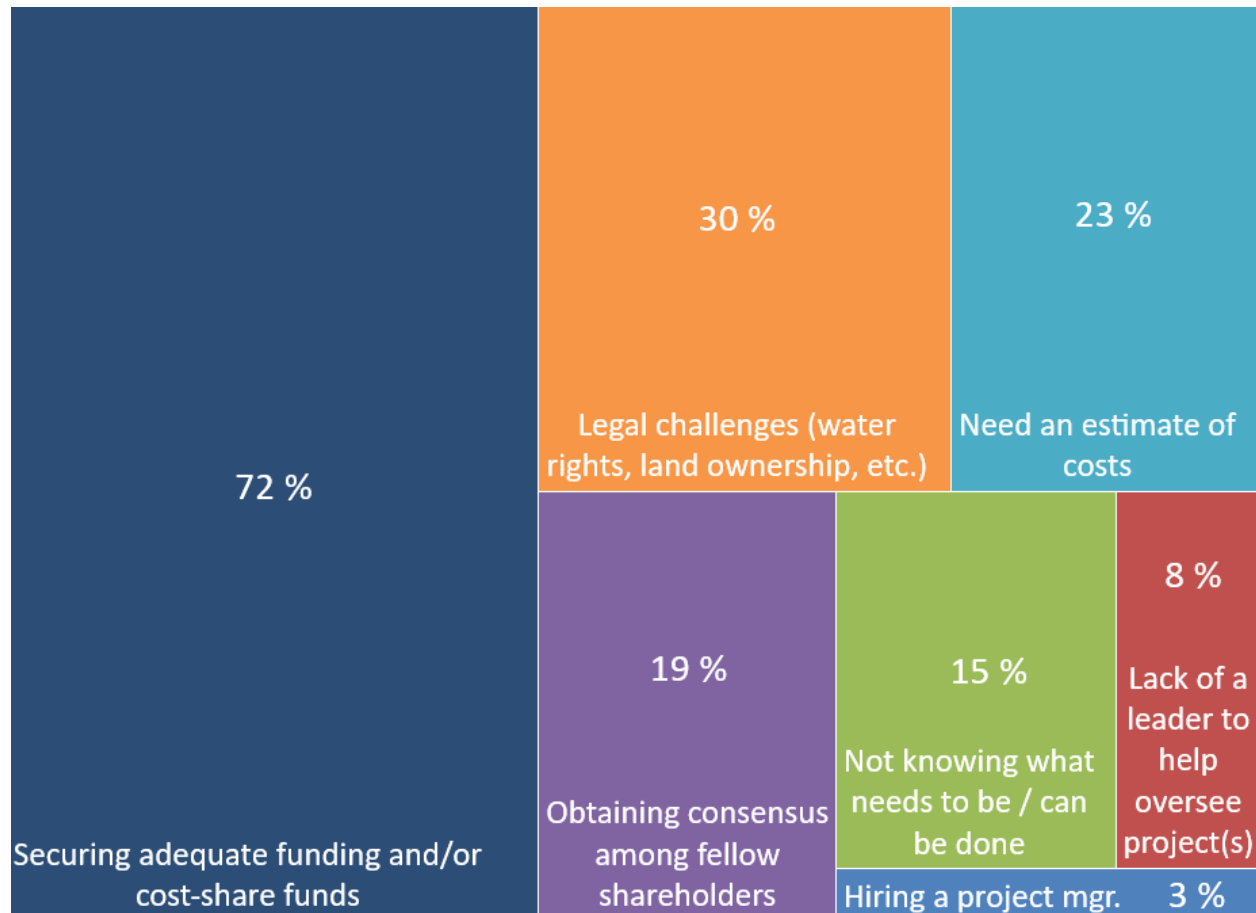
- Replacement of pipe and sprinklers.
- Cost share or grant funds to repair dam structure.
- Water quality improvement.
- With piping and valves replacing splitter boxes, valves have to be smarter or ditches need flux ponds.
- On farm water efficiency delivery system like center pivot, side roll or big gun.
- Larger pump and distribution system.
- Replacement of older electric pumps, investment in sprinkler systems, and pipeline.
- Pump replacement at some point in the future.
- Rehabilitation of the ditch.



Irrigation ditch in slide area. Piping damage-prone sections of open ditches improves the reliability of water delivery and reduces maintenance.

Photo: Phil Brink

Figure 5. What do you see as barriers to making irrigation infrastructure improvements? (Select all that apply)



Seventy-two (72) percent of respondents said that securing adequate funding was a barrier to advancement on irrigation infrastructure improvement. Thirty (30) percent said that legal challenges were a barrier. Twenty-three (23) percent said they needed an estimate of how much improvements would cost.

Nineteen (19) percent said getting consensus among their fellow shareholders was a barrier and 15 percent did not know what needed or could to be done. Encouragingly, only eight (8) percent said they lacked a leader to oversee projects and only three (3) percent said that hiring a project manager was a barrier.

This question also contained an “Other” category, which generated several comments highlighting the fact that there are many different perceived barriers to advancement on irrigation infrastructure improvement. Producer comments are displayed below:

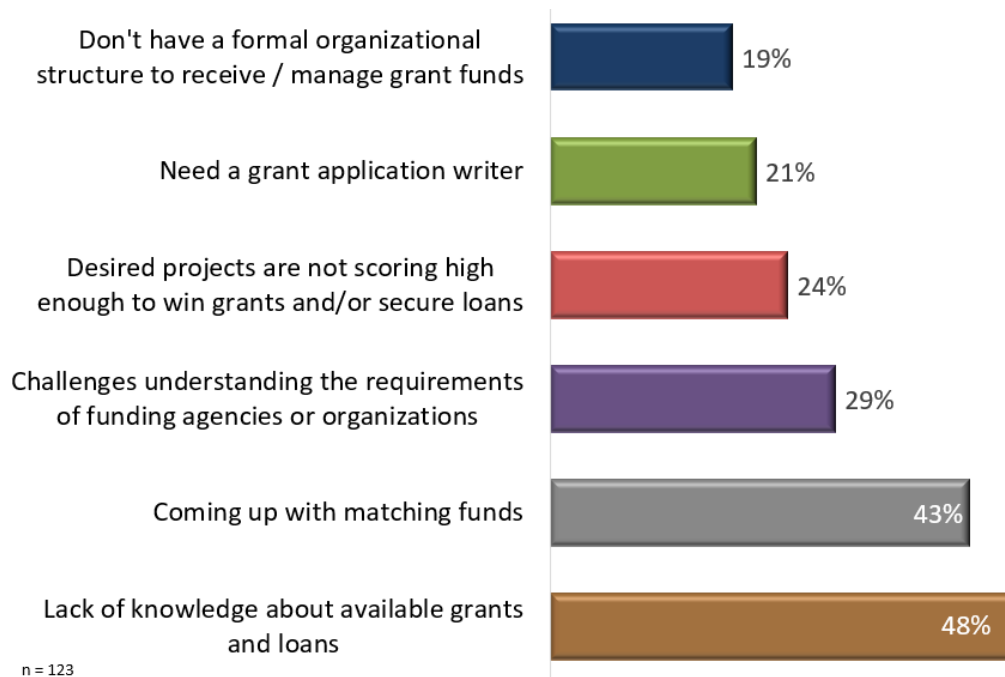
1. Water supply stability.
2. We have more issues on land after water is delivered. On-farm infrastructure [is needed].
3. Finding contractors in our area. Also, bids for projects are double the amount estimated and approved by NRCS.
4. Lack of someone to navigate the applications for WSR funding and the lack of funding for WSRF.

5. Agency management requirements.
6. Engineering firms ... make a lot of mistakes. BOR projects require habitat replacement. This concept is a proven failure.
7. Until we know if our water rights are going to change we don't know what is feasible to do.
8. Finding someone willing to do the work.
9. The use it or lose it attitude of the DWR Division engineer is counter-productive to the duty of water and water efficiency.

Comment #1 on water supply stability references the high variability in available surface water to junior and sometimes even senior water right holders from month to month and year to year. It is difficult to justify irrigation upgrades when the payback is uncertain. Comment #7 highlights a concern that potential changes to water rights are causing uncertainty and preventing progress. Many agricultural water right holders have found their water rights listed as partially abandoned on the Division of Water Resources' 2020 abandonment list, and are concerned that a portion of their water rights may be permanently abandoned.

Two producers indicated that finding local contractors to do the work was a barrier. One producer indicated project bids were much higher than the amount estimated and approved by the Natural Resources Conservation Service (NRCS). Other types of needs included getting assistance in completing grant applications and navigating funding agency requirements. Comment #9 references the "duty of water" which includes water lost through seepage and evaporation in transit to fields and water needed to push across furrow or flood irrigated fields. This "push" water, which typically results in some tailwater leaving the field, is interpreted by some as wasted water.

Figure 6. What are the barriers to funding irrigation infrastructure improvements? (Select all that apply)



To the previous question (displayed in Figure 5), almost three-fourths of the respondents indicated that securing adequate funding was a barrier to progress. Figure 6 (above) illustrates the responses to a question about barriers to funding for infrastructure improvements. Just under half of the respondents - 48 percent - stated that lack of knowledge about grants and loans is a barrier. It is clear that a lack of funding is perceived to be a greater challenge than a lack of *knowledge about* funding, though more outreach and training is needed about funding options. Some respondents may also have felt that having knowledge about one or two funding sources was sufficient.

Coming up with matching funds was seen as a barrier to infrastructure improvement by 43 percent of respondents. Securing matching funds represents a challenge, but securing grants or loans is seen as a larger problem. Understanding the requirements of funding entities was only seen as a barrier by 29 percent – a marked difference from the nearly half of respondents who said they lack knowledge about available grants and loans. Most producers have confidence in their ability to learn the requirements of funding entities, but they need more information on what funding is available for their projects.

About a fourth of the respondents (24 percent) said their projects did not score high enough to win grants or secure loans. About one in five (21 percent) stated that they needed a grant writer. Almost the same number (19 percent) said they lacked an organizational structure to receive or manage funds.

Conservation districts have the organizational structure to serve as fiscal agents for agricultural irrigation projects, but many conservation districts lack adequate staffing capacity to write and administer grants. CCA's Ag Water NetWORK is initiating a CWCB grant-assisted project that provides a conservation district with match funding to assess aging irrigation infrastructure and hire a coordinator to lead outreach and engage ag producers and other water stakeholders in the district. The coordinator will also prepare grant proposals to address identified irrigation infrastructure needs and potentially other natural resource issues, and work toward securing more long term funding to support district management needs.

Shown below are the producer comments in response to the question "What are the barriers to funding irrigation infrastructure improvements?"

- Small private individually owned decreed ditches. We are not large enough to fall into this category.
- The biggest issue in [our] county is that [some people] receive all the information and help. When you finally are awarded a grant it is appalling the manner in which it is handled. [Also there is a] lack of understanding that missing a growing season is a huge amount of lost income.
- Large shareholders not wanting to shoulder their proportion of the financial burden. Cash flow issues that are common with



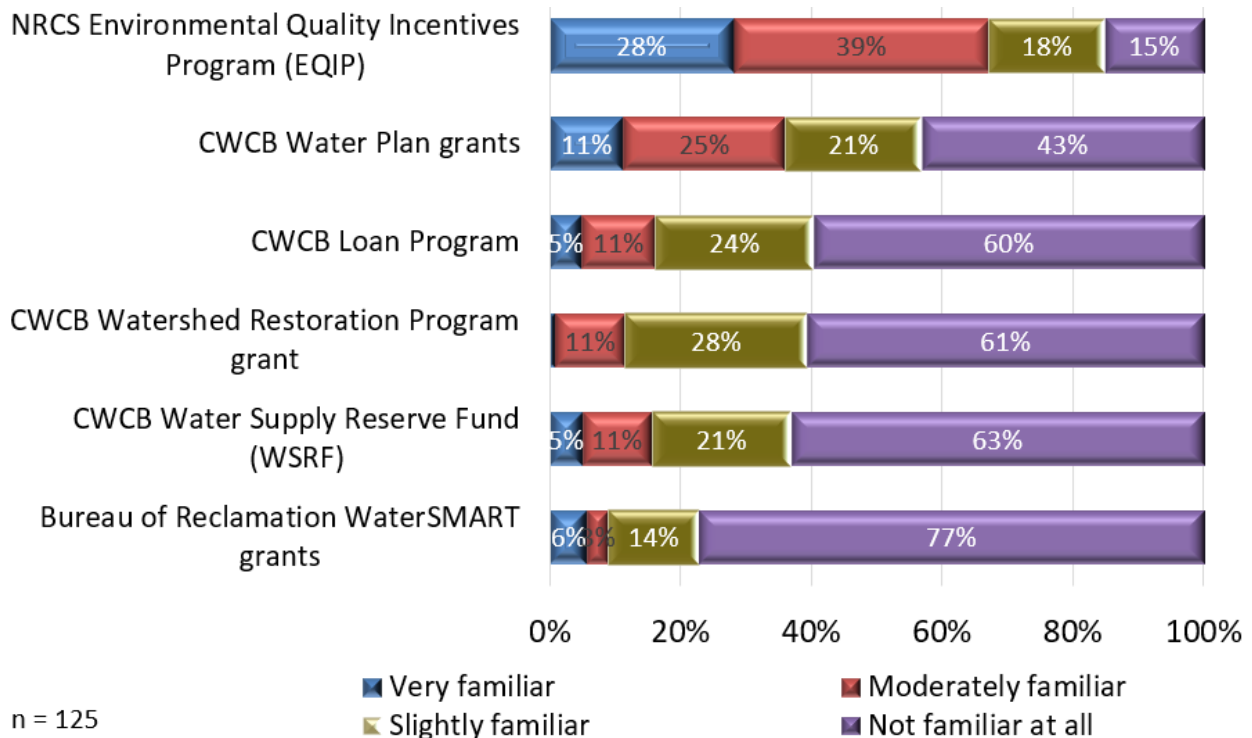
Valve and irrigation pipe.
Photo: Phil Brink

large ranching operations stressed by drought and fluctuating markets.

- Those that ignore the language of HB1177 that supports single use ag projects.
- Granting processes choose winners and losers. I would prefer that farmers could earn enough to make the improvements on our own. Each operation is unique and programs cannot be designed for each situation.

The producer who commented on HB-1177 – which created the nine basin roundtables in 2005 as well as the Interbasin Compact Committee (IBCC) – clarified in follow-up communication their concern was that HB-1177 set in motion a trend toward preventing grant funding for single-issue agriculture storage projects in favor of funding only multi-benefit projects. The producer indicated that HB-1177 actually supported and affirmed that any application of water for beneficial use was eligible for state funding and could not be prohibited from receiving funding.

Figure 7. Please rate your familiarity with the following funding programs



About two-thirds of producers (67 percent) indicated they were very familiar or moderately familiar with the USDA Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP), which is a program agricultural producers have utilized for decades to implement conservation practices. One-third of respondents indicated they were only slightly familiar or not familiar with EQIP.

Fifty-seven (57) percent had some level of familiarity with CWCB Water Plan grants. Forty-three (43) percent expressed having no familiarity with the program. Forty (40) percent expressed having some level of awareness of the CWCB loan program and a full sixty (60) percent were not aware of the program.

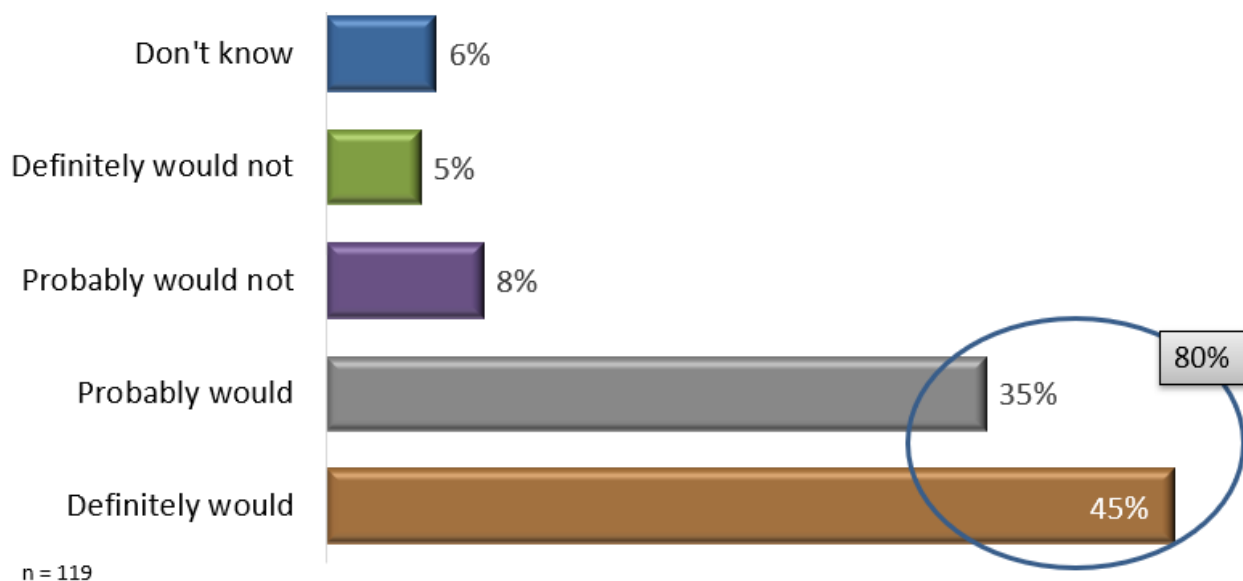
Familiarity with CWCB's Watershed Restoration program grant and the Water Supply Reserve Fund grant also had low familiarity ratings. More than 60 percent of respondents did not feel they knew anything about the programs. Even fewer respondents (a total of 23 percent) had some level of familiarity with US Bureau of Reclamation's WaterSMART grants. More than three out of four respondents (77 percent) were not aware of the program.

In the "other" category at the end of this question, comments included Colorado River Water Conservancy District's new mill levy funded grant program and the NRCS's Resource Conservation Partnership Program (RCPP).

CCA and the Colorado Ag Water Alliance (CAWA) will be working over the coming months to increase awareness and understanding about the various grant programs available for irrigation infrastructure improvement.

Additionally, CCA received a Water Plan grant to assist three conservation districts in cost-sharing on irrigation infrastructure improvement projects within their districts. The improvements will serve as demonstration projects that each district will use in outreach as part of their local integrated stream and watershed management planning activities.

Figure 8. Would a low-cost or no-cost assessment of your irrigation water delivery system be useful if it identified where improvements are needed as well as potential solutions?



Eighty (80) percent of respondents thought a low or no-cost irrigation water delivery assessment would be of some use if it identified where improvements are needed along with potential solutions. Forty-five (45) percent said it definitely would, and 35 percent thought it probably would help. Only 13 percent felt an assessment would not be useful, and six percent were unsure.

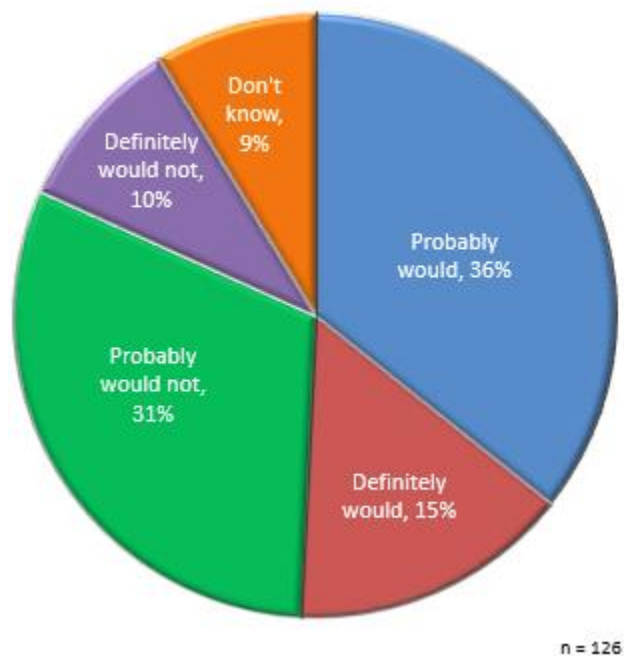
Producer comments related to this question are shown below:

1. We've already done an assessment / feasibility study.

2. I've been working on efficiency for 20 years and down to two projects to complete.
3. Mainly on-farm assessment is needed.
4. Already complete.
5. Have completed engineering for dam repairs.
6. We need financial assistance to meet the recommendations that are made. We also need knowledgeable experts so that the improvements are functional, not just look good on paper.
7. Just completed an EQIP grant to upgrade system.
8. Have just spent 3 years upgrading our on-farm systems through NRCS.
9. Engineering firms do not take into account worst case scenarios. Anyone can design a system for best case scenarios.

Among the comments show above, comment #2 speaks to the time commitment that some producers must make in order to cash-flow capital improvements, such as irrigation efficiency projects. In general, the comments also highlight the variety of projects that are needed and the different stages of improvement that producers are involved in.

Figure 9. Would it be useful to have a wildfire impacts susceptibility analysis done for your watershed?



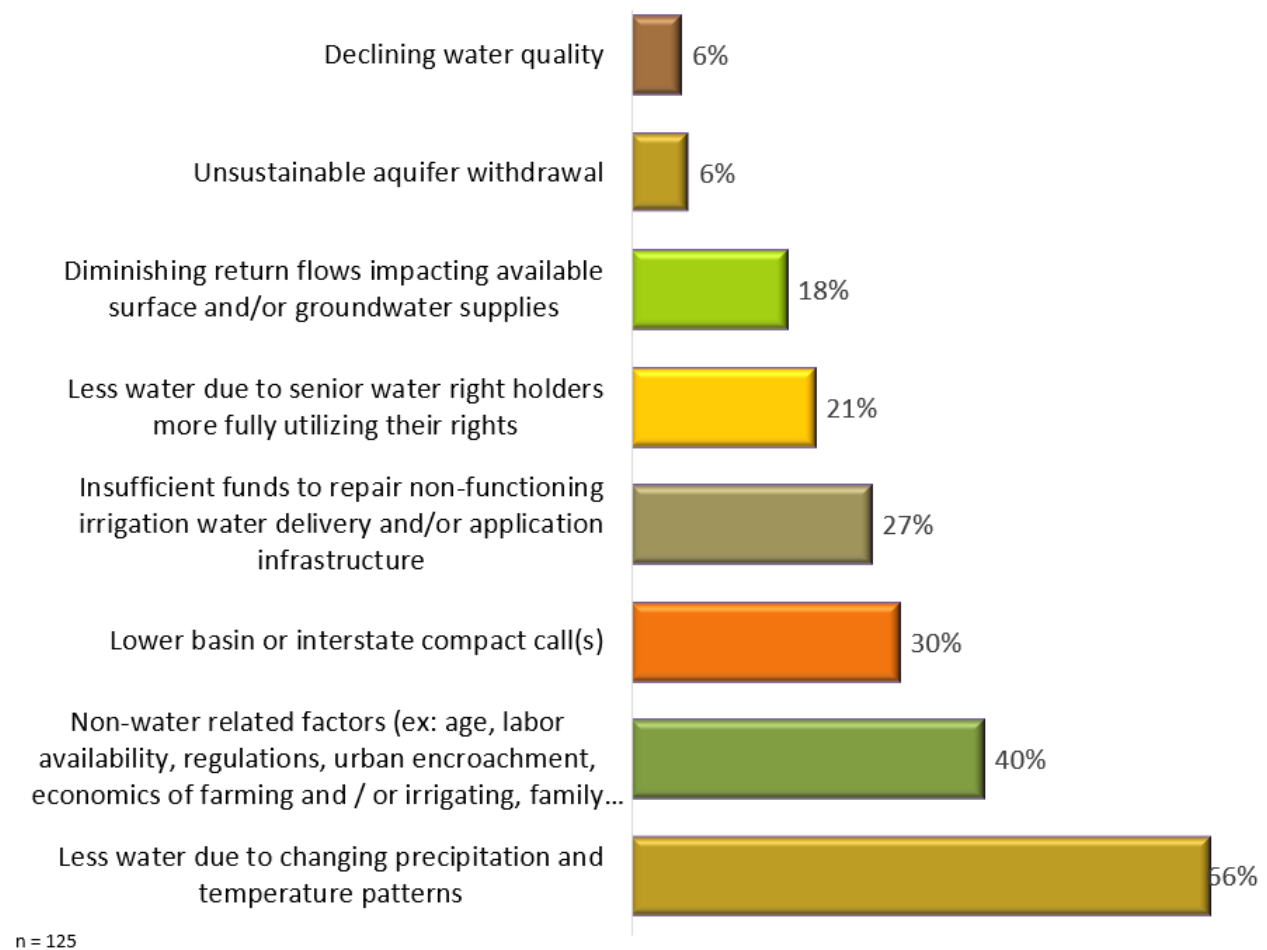
Wildfires can negatively impact irrigation water quality and availability. About half of the respondents thought a wildfire impacts susceptibility analysis would be useful for their watershed. The majority of these – 36 percent - felt that it probably would be helpful, with 15 percent saying it would definitely be helpful.

Thirty-one percent believed it would probably not be helpful and 10 percent said it would definitely not. Some of the producers who indicated that a susceptibility analysis would not be useful live in counties on the eastern plains, so they may not have considered wildfire to be a threat to their water supply. Others who indicated that an assessment would not be helpful live in forested watersheds where a wildfire risk assessment may have already been completed. Nine (9) percent did not know if an assessment would be helpful or not.

The variable intensity and burn patterns of wildfires results in differential impacts on water supplies. For irrigators, the primary concerns are related to the damage and clogging of diversion structures and inundation of ditches and fields with flood-carried mud and debris. Runoff from wildfire impacted areas can continue releasing sediment and nutrients for many years post-fire, and shouldering the cost of continued cleaning and repairs can be extremely challenging for producers.

CCA’s Ag Water NetWORK website (www.agwaternet.org) has a short video entitled “[Fire and Forest Management: A New Perspective for Watershed Planning](#).” The video highlights the impacts of the 416 fire near Durango and the Beaver Creek fire north of Walden, and includes observations from affected ranchers and United States Forest Service (USFS) staff about the impacts of the fires and how a more balanced approach could reduce catastrophic fires. Additionally, a webinar focusing on wildfire and watershed management is available on our website at <https://www.agwaternet.org/Webinars.aspx>.

Figure 10. What do you see as the greatest threat(s) to being able to continue irrigating your land? (Select all that apply)?



Having less water due to changing precipitation and temperature patterns was seen as a threat to future irrigation by two-thirds (66 percent) of respondents. Forty (40) percent indicated that non-

water related challenges were a threat to continued irrigation of their farm or ranch. Challenges could include age, lack of labor, regulations, urban encroachment, economics and lack of family interest in continuing operations. Thirty (30) percent thought curtailment of irrigation water due to interstate compact compliance could impair their ability to irrigate in the future. Almost the same number – 27 percent – felt that lack of funds to repair and/or upgrade irrigation system components was a threat.



Diversion structure damaged by high flows and debris.
Photo: Phil Brink

About one in five (21 percent) thought their water irrigation supply could be threatened by senior water right holders more fully utilizing their water rights and reducing the amount of water available to junior water right holders. Eighteen (18) percent thought diminishing return flows could threaten their irrigation supply. In some cases this could be related to senior right holders upgrading to more efficient on-farm irrigation methods and reducing or eliminating runoff and subsurface return flows. About six (6) percent felt that declining aquifer levels or water quality could impair future irrigation of their land.

Several respondents shared thoughts in the “Other” category as well, and their comments are shown below. Predominant themes among the comments included diminished spring runoff, government regulations, potential changes or new interpretations of water rights and laws that would result in the redistribution of water, compact compliance, aquifer depletion, failing or non-existent augmentation plans and urban sprawl.

- Development and water being used to water lawns.
- Need normal spring runoff!
- Groundwater users depleting aquifer; surface users are tied to the natural runoff while pumpers are not.
- Less water due to trans-basin diversions (Colorado River).
- Regulations and lack of understanding of water issues by the [individuals] that make the laws.
- State government is a problem.
- Our current district engineer.
- Rule on wasting water.
- Water supply.
- Lower Basin water needs.
- Additional snowpack for spring runoff is essential.
- Urban sprawl and governmental interference with WOTUS-type water grabs.
- A change in the priority laws that would take water for what other people think is good.
- Sub-district restricting pumping.
- Not knowing what our water rights will be.
- Changing social demands for environment and recreation (no storage but want water for rafting).
- Competition in terms of exempt wells and bogus water augmentation plans that will ultimately bankrupt watershed.

The last question was followed by an open-ended section where producers could comment on any water topic they chose. Their comments are shown below.

- Our irrigation association is being bought out and taken over by out of state speculators/investors/profiteers.
- Need help in erosion control.
- Smaller land-owners with water rights cannot afford the time/monies to improve headgates etc, funding always seems to be directed at larger ranchers with lots of employees, or are we are just not seeing available funds? Sometimes just some free delivered culverts would make a real difference, or reduced costs for renting equipment we cannot afford to own to put in new culverts etc! Thank you.
- It would be nice to have help maintaining developed springs.
- Need a grant to bring land back into irrigation that has not been irrigated for years due to cost of repairs.
- You didn't have adjudicated springs as an option under what type of water rights we all have. Many of us have springs that serve as a key source of water for livestock and/or irrigation, and we should address those projects, too.
- Protection of private property rights and grow our own food products and don't move towards importing food products.
- CCA should develop assessment resources in conjunction with affiliates.
- I would like to see a calculation that would give me the payback in years for proposed improvements.
- As ag producers we need funds and experts with working knowledge. When designs have flaws it becomes a costly issue for the producer. We also need ditch companies that are willing to work with all producers.
- Too many (gov/agency) inexperienced engineers with no practical experience delaying projects.
- BLM needs to address [the] width of ditch easements to allow minor pipe straightening on BLM land. Pipelines do not need to honor count our driven routes. That said they should follow the existing hydraulic gradients and not take shortest path possible. A 500-foot easement variance would cover most issues. It's foolish that the service road easement for a ditch cannot be part of a piping easement. Also no one needs an easement that honors the outside boundary of a ditch that is on a contour line placement.
- EQIP funding is the only source of on farm/ranch assistance available. The Colorado State Water Plan should identify more financial assistance (grants) for on-farm infrastructure needs. The CWCB should prioritize this assistance to individual farms/ranches. This is the model for Utah that Colorado should investigate.



Active riverbank erosion below stabilized area.
Photo: Phil Brink

The free-form comments in this section provide a glimpse of the myriad challenges individual agricultural irrigators are working to overcome. Two comments reference the fact that springs are

used for irrigation in some cases. This survey did not include an option to specifically select “spring” as a source of water. The hope was that spring owners would select groundwater in this case. Springs and seeps are important sources of water for stock-watering, wildlife and irrigation. Most springs are reliant upon seasonal infiltration of precipitation. Infiltration potential within a watershed can be improved by reducing tree densities to healthy levels and optimizing ground cover diversity to minimize erosion.

The last comment provides a suggestion that more CWCB Water Plan funding be used for on-farm infrastructure. CWCB Water Plan funds include a category for Agricultural projects. In FY 2021, funding for this category was \$1,500,000. Irrigators may also access funding from individual Basin Roundtables, which have Water Supply Reserve Fund (WSRF) grants that can provide money for agricultural irrigation projects. Basin WSRF grants can then be leveraged to obtain additional funds through CWCB’s statewide WSRF funding pool.

A list of state and federal grants that can help fund agricultural irrigation infrastructure projects is available on CCA’s Ag Water NetWORK website at <https://www.agwaternetwork.org/Grant-Funding-.aspx>.

III. Conclusions and Recommendations

A. Conclusions

On-farm irrigation efficiency upgrades and improved control of infrastructural delivery components to the field edge or across the field topped the list of producers' greatest needs. About half of the irrigators that rely on groundwater for irrigation water indicated they needed to upgrade their wells and/or pumps. Interestingly, several respondents who utilize *surface water* for irrigation checked the box of needing improvements to their wells or pumps. Many surface diverters use pumps to pull water from rivers and streams. Additionally, sprinkler irrigation systems are often powered by pumps mounted in wet wells installed within head stabilization ponds. Respondents that cited additional storage needs may have been referring to large storage structures off-farm or smaller on-farm irrigation ponds.

Delivery of surface water to fields is most challenged by sub-optimally functioning ditches, diversion structures, headgates and screens. Also, about one in five producers said they need to replace or install a flow measurement device. Land leveling and system automation to reduce labor were important to about the same number of producers.

All of the improvements listed above are potentially eligible for cost share funding from one or multiple government agencies. However, few irrigators consider themselves very familiar with any funding program other than the NRCS Environmental Quality Incentives Program, which is underfunded in many areas of the state when compared with demand.

Greater understanding of the wide variety of available funding sources can lead to more rapid and widespread implementation of needed upgrades when paired with experienced grant writers and knowledgeable project managers.



Water right utilization via small pumps.
Photo: Todd Inglee

The irrigation infrastructure improvement process starts with field assessment. Eighty (80) percent of producers thought a low-cost or no-cost assessment of their irrigation water delivery system would be useful.

One of the priorities of CCA's Ag Water NetWORK and Colorado Ag Water Alliance over the next several months is to raise awareness among producers about funding sources that are available for assessments. We will also be helping connect producers with funding that is best suited for their projects, as well as grant writers if needed.

Is a wildfire susceptibility assessment useful? About half of the respondents thought so, and about 40 percent thought not. According to the Colorado State Forest Service, "about 10 percent of Colorado's 24 million acres of forest need urgent attention to address forest health, wildfire risk and threats to water supplies." Agricultural water right holders are often not aware of the potential impacts of wildfire on their irrigation water supplies until catastrophic fire hits their watershed. Understanding what the effects of wildfire are likely to be and taking preemptive action to mitigate risks saves money in the long run.

Changing precipitation and temperature patterns were seen a threat to irrigation viability by two-thirds of respondents. Other concerns included water right and return flow uncertainties, water quality, declining aquifers, urbanization and government regulations, the challenging economics of agriculture and lacking sufficient funds to make repairs, and compact-call driven curtailment.

Less than 2.8 million acres are irrigated in Colorado based on the 2017 Colorado Agricultural Statistics report (the most recent report that included irrigated land area). Irrigated acreage currently comprises about 4 percent of the land area of the state. Yet, all of the melons, sweet corn, peaches and most of the other Colorado-grown fruit and vegetable crops that supply community supported agriculture (CSA) groups and grocery stores come from irrigated land. Much of the corn and alfalfa used by feedlots and dairies also comes from irrigated fields.

From economic, cultural and food security perspectives, retaining irrigated agricultural land for current and future generations is in the best interests of Coloradoans. On-farm efficiency upgrades and off-farm water delivery and storage improvements help to maximize water utilization for crop production and sustain producer viability.

B. Recommendations

- Expand the availability of no-cost or low-cost irrigation infrastructure assessments to help initiate and expedite progress on irrigation system improvement.
- Raise producer and conservation district staff awareness and familiarity about local, state and federal funding options for irrigation infrastructure and storage improvements. Provide concise information tailored to producers to help them better understand the grants and loans that are available, the basic requirements of each funding source, and how to apply.
- Connect groups and individuals interested in making irrigation improvements with grant writers.
- Highlight completed irrigation infrastructure upgrade projects to provide examples to producers of different methods being utilized.
- Educate and inform irrigators looking to accomplish system-wide delivery improvements with organizational structure options for obtaining and administering project grants.
- Provide irrigation districts, conservation districts and individual irrigators with resources about the state wildfire damage susceptibility assessments and the state forest action plan.
- Address agricultural viability and ag water rights and property rights protection. There is concern that agricultural water rights may not be fully protected as demand continues to grow.
- Examine options for improving easement flexibility for piping ditches and making minor adjustments to routes.

C. Gift card winners

A random drawing for a Cabela's gift card was held approximately every week and a half during the survey period. The gift card winners are shown below.

6/1/2021: J. Whaley, \$50 Bass Pro gift card; 1st drawing.
6/12/2021: T. Meyers, \$25 Bass Pro gift card; 2nd drawing.
6/18/2021: : E. Fogg, \$25 Bass Pro gift card; 3rd drawing.
7/2/2021: D. McCaw, \$25 Bass Pro gift card; 4th drawing.

7/17/2021: J. Holdren, \$25 Bass Pro gift card; 5th drawing
7/25/2021: D. Luke, \$50 Bass Pro gift; 6th drawing.

IV. References

<https://csfs.colostate.edu/forest-action-plan/>

<https://cwcb.colorado.gov/>

<https://cwcb.colorado.gov/colorado-water-plan>

<https://www.coloradoriverdistrict.org/2021/08/lower-gunnison-river-delisted-from-impaired-waters/>

<http://wrightpaleo.com/wordpress/wp-content/uploads/2011/11/Lakeline-MV.pdf>

<https://gamblershouse.wordpress.com/2010/10/24/mesa-verde-water-control/>

2017 Colorado Agricultural Statistics, Table 9. Land in Farms, Harvested Cropland, and Irrigated Land by Size of Farm: 2017 and 2012.

https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1_Chapter_1_State_Level/Colorado/

https://leg.colorado.gov/sites/default/files/images/olls/2005a_sl_314.pdf