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Abstract

Recurrent droughts are a real and sometimes critical influence on life in Colorado. Although drought does not have the immediate impact of other extreme weather conditions such as flooding, it nonetheless influences businesses, personal security and freedom, and overall quality of life for everyone in the State. To capture and relate an understanding of the impact of drought on individuals and their perspectives, several people whose work and lives are influenced by water availability were interviewed for this report. The primary focus of the interviews was on how drought has impacted their businesses and their lives, and over what period of time they expect these impacts to persist.

Introduction

The impacts of drought can be partly described in terms of dollars and cents, business losses, and balance sheets. However, drought also has dramatic impacts on individuals, their families, and their quality of life beyond purely economic metrics. To gain an understanding of some of the social impacts of the most recent drought in Colorado, a small group of business persons representing different parts of the state and different economic sectors directly impacted was interviewed. The resulting discussions with these individuals on their perceptions of drought are used to illustrate some short-term and long-term impacts to businesses, families, and communities. Here, we hope to show that there is great variety in how drought directly impacts people, and also that the indirect impacts are widely experienced. Drought is one stress among many, and the resilience of any firm, farm, or family is affected by the whole of its social and financial environment. The policy question we face is how to learn from those experiences, and adapt our mitigation and planning responses to better minimize impacts and the damage done by drought.

Interview Process

To better characterize the impact of drought in Colorado at an individual level, five individuals were interviewed in June 2003. The interview was an open conversation between an interviewer and the selected individual, beginning with an opening statement that the purpose of the interview was to generate an understanding of how the individual's life and work were impacted by the recent drought and across what time horizon did he or she perceive the effects of drought persisting. To respect the privacy of those interviewed,

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names are not used in the case studies, though geographic location and business of each interviewee is provided.

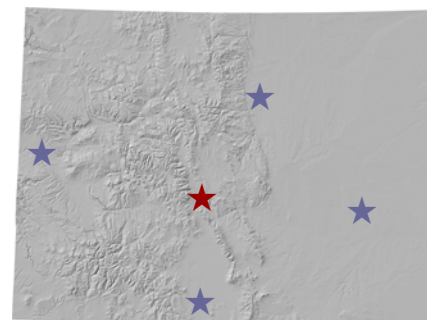
Case Studies

Profile 1: Owner and Operator, Rafting Company on the Arkansas River

The owner of a rafting operation on the Arkansas River detailed the ways the drought “definitely affected us on a number of levels.” Business did not completely stop on the Arkansas, although he mentioned that “friends on other rivers shut down.” His business was down about 20% in 2002 (compared to what he believes was an average of 40% for other rafting companies). Flows were “way below average, but we were still able to operate.” Additional costs were accrued in operating under such low flows, especially by running more boats with four rather than seven customers per boat and accounting for wear and tear on boats. Reduced revenue was also realized due to lower visitation numbers because peripheral sales such as wet suit rental and post-trip purchases of t-shirts and photos (customers tend to buy more after a trip if it was exhilarating) were lower. He also had to shut down after Labor Day rather than operate into October as in a non-drought year because of the low level of the river.

The drought affected his staff and hiring directly. River guides are paid by trip, so he did not need to cut staff from this end of the business in 2002, though guides experienced significant fatigue and stress to backs and shoulders as they navigated a river with more exposed rocks, worked harder to row and navigate without the current’s assistance and had to dislodge more boats run ashore or stuck on rocks. As for office staff, he usually hires about four to five full time staff between two offices. For the 2003 season he has only hired two and may bring on one more. He also had to delay his office manager’s start date by over three months. Although he was able to secure a line of credit for the off-season, it was 75% larger than in 2001, which will be a significant debt to repay and is part of the reason for his reduced office staff. In terms of capital, he has halted as much spending as possible on fiscal outlays such as marketing, paddles, rafts and a new van.

As for how long the impacts may persist, he said that “Interest in rafting has come back better than anticipated, but I still think we are on a three to five year recovery period before things are humming like they were in 2001.” It will be necessary to recover from the lower receipts in 2002 as well as the longer-term impacts of curtailed marketing—with revenue down, there was not money to spend on marketing for 2003. He may be facing an even longer-term adjustment prompted in some ways by the drought. He is considering moving



Rafting Company, Arkansas River

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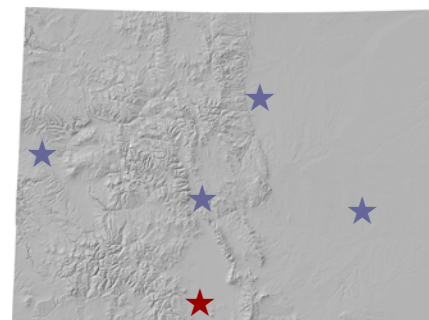
from the rafting business to concentrate fully on his fly fishing company. He had been casually considering such a change, but said that the “drought helped me focus. ... I have some questions about how viable the [rafting] industry is in the future and don’t think I would have been brought into that thinking without the drought.” He sees a long-term prognosis for low flows in the Arkansas, which would be difficult for rafting but not as harmful for the fisheries. Hence it appears that this drought has prompted him into reconsidering his business choices.

Profile 2: Farmer and Cow Calf Rancher, San Luis Valley (family ranch since 1883)

We have been “definitely affected in this drought” were the words that started this interview. The drought had and continues to have significant impacts on his business and those throughout the San Luis Valley. Both the extent of impacts and time horizon can be understood through some of the following observations. Since the drought began, he has sold one third of his herd and shipped another third to Missouri with a two year contract, which with the continuing dry conditions may need to be extended another two years. The cattle sold would take several years to replace once wetter conditions return. (Herds often include generations of breeding for a given rancher's preferences and experience, and as such can take many years to create.) The costs to freight cattle to Missouri are \$40 per calf each way, so his profit margins drop. “The operation costs on the ranch go on even without the calves.” He also commented that “Without a doubt this [drought] has been the hardest thing facing the valley rancher. He won’t come out without many years of hard work.” Discussing the permanence of impacts, he mentioned that “The next few years will be a critical time for the rancher because he sold the goose that lays golden egg,” meaning that ranchers, in selling their cattle, have risked future profits to stay in business today. He added that “People talk about drought as if it was just one year but the real blunt will last a long time. It will vary between five and ten years and some will sell the place out and that’s it. . . Lots of real estate and permits are for sale at a sacrifice price. This is going to be, and is, very serious.” To wit, financial losses this year reduce the ability of many agricultural businesses to withstand new stresses, and reduce the ability of farmers and ranchers to take advantage of new opportunities, or resist invitations to “cash out,” perhaps accelerating the changes in land use in rural areas.

This way of life, which is already at risk, is seriously threatened by drought conditions such as those experienced recently. This rancher added that you “can’t measure business entirely by the dollars.” He has one son who left the ranch and successfully pursued a different career. Another son and his family are on the ranch, and while his son

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Farmer and Rancher, San Luis Valley

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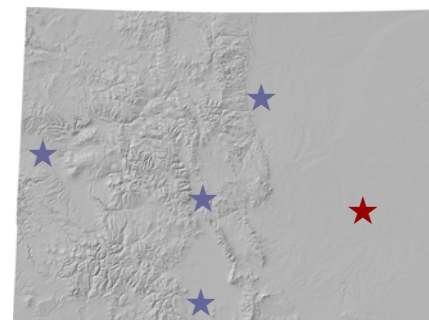
may think of leaving, the grandchildren love the ranch life. To him, one of the purposes of ranching is “to train kids to work and be responsible, contributing citizens.” The sense of stewardship and commitment to the land is important to many ranchers and farmers. Inasmuch as public support exists for preserving farms, ranches and open space, the public interest is affected by the detrimental impacts of drought on agricultural business as well.

Profile 3: Dry Land Farmer, southeastern Colorado (Kiowa County)

“Yes, it’s definitely affected our life and lifestyle and not just the farmers.” Our conversation started with an emphatic statement that the drought has significantly impacted this farmer’s life. Interestingly, though the effects felt on his farm were discussed later in the conversation, the issues he thought deserved primary attention were the ripple (indirect or secondary economic) effects felt by the entire rural community in an agricultural area when farming is affected. “It [drought] has been devastating on the whole community.” One very direct example was that while in a non-drought year he puts approximately 800 hours on the five or six tractors they normally run (they always change oil every 200 hours), in 2002 they changed oil only one time on only one tractor. This illustrates not only the reduced production on his farm, but the ripple effect of fewer gallons of fuel purchased and parts that did not need to be replaced by parts suppliers. His spending on fertilizer dropped from an average of \$200,000 annually to \$40,000 in 2002. That reduced spending directly impacted the local fertilizer cooperative. Another interesting ripple he observed relates to the school system. In Colorado, where schools receive funds in relation to the number of children attending classes, over 20 children from all grades have left in the past two years. With 80 students enrolled in the high school, this means that the school operating budget was significantly cut.

In discussing the scope and duration of impact, the Kiowa County farmer's first response was “Boy, it’s almost too early to say.” At his farm, which normally produces wheat, corn, milo (sorghum) and sunflowers, yields and income have been down drastically for the past three years. He has seen basically no returns on wheat crops in the past three years. Last winter, of approximately 12,000 acres of wheat planted, only 3,000 could be harvested. In the larger community, it is clear that the impact for some families has been life-changing and permanent. For example, one employee was laid off at the local fertilizer company and left Colorado with his family for a new job in Texas.

Drought in eastern Colorado has persisted for three years according to this farmer. The duration of impact of the drought may be determined in 2003. In order to recover from the previous years, he



Farmer, Kiowa County

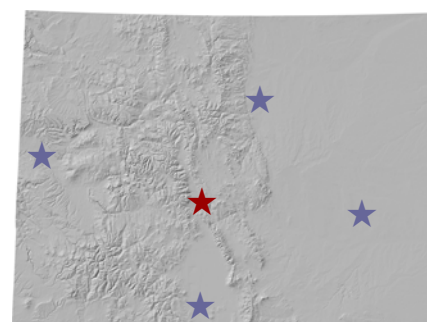
“Yes, it’s definitely affected our life and lifestyle and not just the farmers.”

needs to have successful crops, which means “farming like before the drought.” This includes planting crops and applying all of the accompanying fertilizers, pesticides, and other crop inputs. In order to raise good crops, he needs “to put money into the land. If something were to happen and we don’t [produce a crop], we would be devastated.” So the impact of this drought will be a more medium term phenomenon if this year is a wetter one than the last few years. If drought conditions persist, “we would be done and I assume that most everybody else would be too.” Therefore, the real impact will to some extent be determined by whether or not the drought continues into the next growing season(s).

Profile 4: Nursery Owner, Denver Metropolitan Area and Member Green Industries Association

Watering restrictions in urban areas were widely publicized throughout the summer of 2002, with some communities moving to complete outdoor lawn-watering bans. In an interview with the owner of a Denver metropolitan area nursery, the effects of the drought on his business were detailed. Direct impacts to his business were felt in a number of ways. First, operating costs increased significantly when their ditch water stopped flowing and they had to use city water for the nursery’s plants. Second, he hired fewer people in 2003 than in 2002 expecting to not do as much business as in years prior to the drought. Third, he changed some of his purchasing, buying less over all and changing his plant pallet, to some extent, to include more water-wise plants (those that the media and local water managers were recommending). Finally, as for changed sales or inventory, he mentioned that “We’re not selling rocks now instead of bushes, so it [drought] hasn’t changed us in that respect.” His clientele is looking for largely the same products as before, with a somewhat more water-wise pallet, though it is not clear how long that trend will last. For the first part of 2003, before the wetter weather started, all the above impacts on his business resulted in a 50% decline in sales compared to those realized in 2002 before the severe watering restrictions were enacted.

The owner of this nursery, which has been in operation since 1907, said that “Typically the effect of drought has lasted only as long as drought has.” While the drought started years prior to 2002, he did not see significant impacts until 2002 because reservoir storage provided water supply prior to that time. Another factor influencing the severity and horizon of drought impacts has been the economy. This business man gives roughly half the credit for lower business to the drought and half to the difficult economy, creating strong cumulative effects. When asked if the drought has made him reconsider his business in general, or maintaining his business in Colorado he said no. The drought “Caused me to worry earlier this



Nursery Owner, Denver Metro Area

The drought “Caused me to worry earlier this year if I would be able to be in business but not whether I wanted to or not. The weather is always a factor in this business. It is a given that the weather can be a friend or enemy or a little of both; it’s just part of the equation.”

year if I would be able to be in business but not whether I wanted to or not. The weather is always a factor in this business. It is a given that the weather can be a friend or enemy or a little of both; it's just part of the equation." At the end of the day, he does not see himself going out of business any time soon.

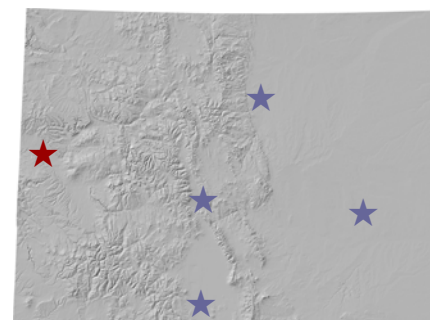
Profile 5: Truck Farmer in the Grand Valley

This farmer of fruits, vegetables, alfalfa and several other crops said that he was "not affected to too great of an extent because we had just about a normal amount of water over the year, though we were cut back a small percentage." He did lose several acres of his early crop of sweet corn because of the very hot conditions in June and the first part of July that stressed crops receiving even a normal supply of water. This loss was at least partially offset by higher alfalfa prices due to the scarcity of both harvested alfalfa and productive rangeland. The Grand Valley ditches have largely senior water rights on the river, so their irrigation systems received sufficient water.

There was some concern that 20,000 acre feet would not be released from Green Mountain Reservoir but a suite of different agencies and water districts were able to find the water in other sources through cooperative agreements. He also noted that orchards in the Grand Valley were kept sufficiently watered. Even when the supply was cut 10 to 20% by the ditch companies in the hottest weather in the valley, they let the fruit growers and commercial entities have what they needed to stay in good condition.

While water was not scarce for Grand Valley farmers with access to irrigation supply, those around them out of the valley floor in Glade Park, Colburn, the south slope of the Grand Mesa and other locations were significantly impacted by the drought. Several of his acquaintances experienced moderate to severe impacts. For example, a family in Glade Park had virtually no feed for their cattle. Of 500 acres of hay that they typically harvest, they could only harvest five in 2002. Another rancher on the south slope of the Grand Mesa only received a very small percentage of his water, perhaps 10 to 20%. "He was out of water by early May last year." One ranching family in the lower valley, ranchers for four generations, had to sell their herd because the summer range they usually used on the Grand Mesa was unavailable and feed was too expensive for use as supplement.

Across western Colorado, this farmer has seen significantly different impacts from the drought. Although he was not greatly affected, others in the area had to acquire significant debt to stay in business, debt which will take many years to repay. Still others left the ranching business entirely. Interestingly, the stress he has felt on his orchards is a result of water quality problems (salinity) which he attributes to



Truck Farmer, Grand Valley

high quality water leaving the system at or near the Continental Divide. In other words, while the quantity of water reaching his farm is sufficient, the quality can be and is impacted by upstream impacts of drought (e.g., lack of high quality water from higher in system diluting lower quality sources lower in the system).

Discussion

These case studies illustrate a number of issues regarding the human impact of drought in Colorado. Everyone interviewed was affected by drought in one way or another, and the impacts of drought ripple through all affected communities through the loss of jobs and the related service businesses.

With a focus on commonality of experience, three major themes emerge. These are outlined below:

1. **Short-term impacts:** Reactions to the drought included reductions in spending and redefining of business practices through changes in planted crops, hiring practices, material and capital purchasing, and services provided. Most short-term impacts are reversible, but they may cumulate with other stresses to cross critical thresholds.
2. **Long-term impacts:** These impacts are the most alarming, because many of the long-term impacts such as selling businesses, live stock, or the family farm, are or may become irreversible. We heard about people losing jobs or not being hired in the first place, families having to move to find work, and business having to establish larger lines of credit and debt than they would normally. These impacts may last for five to ten years, or may be permanent. Examples of these impacts can be seen in the rafter's interest in selling one business and focusing on another, the green industry's greater involvement with decision-makers about water storage needs, and the ranch and farming communities' increased sales of property and grazing permits.
3. **Ripple effect:** In all of the cases presented, there were ripple effects from the drought impacts on businesses directly impacting the larger community. In farming communities, sales of gas, fertilizer and pesticides and other inputs that support farming needs were all significantly influenced. It is likely that peripheral service industries such as local slaughter houses, packing plants, and grain elevators were also detrimentally impacted.

As evidenced by the ranching and farming interviews, the impacts of the drought, as an additional stress on the farm economy, may also affect the demographics for farming, since young persons may find it even more difficult and unattractive to begin farming

and ranching. As quality of life changes in the small towns and retail is increasingly centralized in regional centers, social life is also changed. Drought that provides the last metaphorical straw on the camel's back hastens many changes, perhaps especially for small less-capitalized farms often already supported by in-town jobs which themselves may be threatened by decline in the number of farms and farm families. Consolidation of acreage into larger operations may maintain yields, but in a different social setting which may offer reduced opportunities of all kinds, from educational services and breadth to local social life. It is clear therefore that more than just the water users are impacted by the drought and its affects.

An additional impact seen in the "green sector" is the hard-to-estimate impact on seasonal and casual labor in the landscaping and gardening business when sales and plantings are impacted. In this way, the impacts of drought are spread even farther, such as to home-towns that might receive income from laborers who have traveled to work elsewhere. The impact on labor in metropolitan areas is also important here in Colorado; though economic measures are difficult, other impacts include changes in family opportunity and ability to afford education and other investments.

Conclusions

The stories shared by all of the interviewees confirmed that drought has serious and far-reaching impacts at an individual level and across the local community as a whole. Some people have decided on career changes or moves (some out of state) as a result of the drought. Others clearly articulated that they understand that "weather is a factor in this business" and as long as they are able to stay solvent, will continue in their current business. Effective solutions to help reduce or mitigate the negative impacts of drought will be those that address the short and long-term effects of drought and take into some account the ripple of influence drought has on local economies.